THE PRACTICE OF OSTEOPATHY

CARL PHILIP McCONNELL

President American Osteopathic Association, 1904-05. Formerly of the Faculty American School of Osteopathy. Member of the Faculty Chicago College of Osteopathy

CHARLES CLAYTON TEALL

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FOURTH EDITION

Rewritten in collaboration with osteopathic specialists of note with much new and original matter

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Dedicated
To the Memory
of
Andrew Taylor Still

First Edition 1899
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PREFACE TO THE FOURTH EDITION

A science is said to be known by its literature and, if that be true, Osteopathy is backward for there are few available books on the subject for the student and investigator although there is a vast amount of unclassified journalistic matter. A pretentious start was made and, for a time, it appeared that we should have texts on all subjects for the teaching of Osteopathy but, for reasons not necessary to give here, these books did not live although their value and need was never questioned.

The third edition of the Practice of Osteopathy was exhausted very soon after publication and there have been insistent calls for a fourth which is now presented with the hope that it will find as friendly a reception as was accorded the previous editions. Close attention to current literature has been given and reports from experienced practitioners in the field has been sought and this material made use of wherever possible. Besides this, certain sections have been written by specialists in their several lines whose signed articles we confidently present. The subject of osteopathic practice has been handled to avoid undue optimism in the light of experience but, also, not to lose sight of the fact that osteopathy won its way by performing the so-called impossible in a multitude of cases. Therefore, it has been thought best not to draw a hard and fast line on our limitations.

The border line between osteopathy and surgery has been demonstrated as well as can be done on paper without the actual patient in hand. Medical literature has been called upon to give its store of knowledge wherever our needs have appeared and all osteopathic prints have, also, given from their accumulated wisdom and experience.

The authors acknowledge, with thanks, this information from the many writers for osteopathic journals who have created a great fund of knowledge on osteopathic subjects and particularly those who have contributed special sections.

Carl Philip McConnell.
Charles Clayton Teall.

1920.

"OSTEOPATHY is not so much a question of books as it is of intelligence. A successful osteopath is in all cases, or should be, a person of individuality with a mechanical eye behind all motions or efforts to readjust any part of the body to its original normality, because unguided force is dangerous, often doing harm and failing to give relief that should be the reward of well directed skill."—A. T. STILL.

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PART FIRST

INTRODUCTION

What Hippocrates was to the Allopath, what Hahnemann was to the Homeopath, Andrew Taylor Still is to the Osteopath, and it is safe to say that when another century shall have rolled away, his fame will be equal to that of either. That he is a maker of history, even the most skeptical will admit. His teachings are revolutionary but are borne out in fact, and on that as a foundation, is built the superstructure of the young therapeutic giant—Osteopathy.

It would be of great interest to trace the history of the first inception of the thought that drugs were not only unnecessary but harmful, then view the struggle to grasp something tangible to take their place, then see the development of the idea that the human body has within it all that is needed for its upbuilding and repair until he came to this fundamental: "The power of the artery must be absolute, universal and unobstructed or disease will result. The moment of its disturbance means the period when disease begins to sow the seeds of destruction in the human body; and in no case can it be done without a broken or suspended current of arterial blood," capped by the epoch-making discovery of the cause for this interrupted flow of the blood stream—the theory of obstruction by anatomical displacement. It is the only theory of the etiology of disease that will stand the test of science and its acceptance and practice means a revolution in the field of therapeutics.

As it is, he sets the exact date, June 22, 1874, when the light dawned and he saw the outline of his great philosophy—Osteopathy. Then came the years of adversity and struggle. With the eye of a prophet he saw the future of that philosophy, and with the firmness of a Spartan has defended it since birth. It must be a separate, distinct system. Outside the fact that it was to heal the sick and was founded on a knowledge of anatomy and physiology it had nothing in common with existing schools, and if it were ever to grow it must be alone, for his brother practitioners would have none of it and if left to their tender mercies it would have "died a-borning." Even had it been taken up the result would have been the same for they would never have

fully developed it. And so through the lean, terrible years he struggled, buoyed by the faith of a discoverer, urged on by love of this child of his brain, fanatical in his determination to win. And win he did for it was vouchsafed to him in his vigorous old age to sit on his hearthstone and see the results of his work, his struggle and his faith. It is something to know that his fame has circled the earth, to be honored and sung by millions; a boon not accorded many a sage or philosopher. Not only has the public accepted it but the medical profession is making tardy but forced recognition of certain cardinal principles of osteopathy by using them, but, of course, without credit.

Osteopathy has been defined as "that science or system of healing which emphasizes, (a) the diagnosis of disease by physical methods with the view of discovering, not the symptoms but the cause of disease in connection with misplacements of tissue, obstruction of the fluids and interference with the forces of the organism; (b) the treatment of disease by scientific manipulations in connection with which the operating physician mechanically uses and applies the inherent resources of the organism to overcome disease and establish health, either by removing or correcting mechanical disorders and thus permitting nature to recuperate the diseased parts, or by producing and establishing antitoxic and antiseptic conditions to counteract toxic and septic conditions of the organism or its parts; (c) the application of mechanical and operative surgery in setting fractures or dislocated bones, repairing lacerations and removing abnormal tissue growths or tissue elements when these become dangerous to organic life."[1] In a word, osteopathy is adjustment and the osteopath is an anatomical engineer who knows what is wrong and has the ability to correct it. Dr. Still changed diagnosis from guess work to fact and on it his fame may well stand, for when the cause of the disease was found, treatment was easy. He has ever emphasized the necessity of thorough examination and correct diagnosis. All treatment must be based on the definite, specific object to accomplish certain definite, specific things.

"Osteopathy would expound and apply the true philosophy of manipulation. While the hands are used, it is not this alone and chiefly that distinguishes its method of operation, but the idea and purpose that lie behind manipulation."[2]

All manipulators are not osteopaths any more than all butchers are surgeons. The need for deep study of the subject is apparent from this characteristic statement of Dr. Still's: "Osteopathy is a science; not what we know of it, but the subject we are working is deep as eternity. We know but little of it. I have worked and worried here in Kirksville for twenty-two long years, and I intend to study for twenty-three thousand years yet."[3] This brings us to the point of the relations of osteopathy with other manipulative forms of treatment. They are not many, for Gerdine,[4] in closing a long article on the "Physiological Effects of Mechanical Therapeutics" says: "I have striven to show that in no way is Osteopathy similar to massage either in theory or practice if Osteopathy is conceived of, according to its founder, Dr. A. T. Still, as a system of healing in which a definite lesion in form of a bony displacement is the causative factor and a removal of the same, the curative factor in disease."

The fact that use is made of the hands to the extent it is by both osteopaths and masseurs or Swedish movement operators gives rise to the mistaken idea of similarity in treatment.

"The essential distinction," says G. D. Hulett, "between Osteopathy and all other systems of healing based on manipulation, clusters around the etiology of disease. While these other systems, as indicated at least by their practice, look at disease from a peripheral standpoint, osteopathy views it from a central standpoint."[5]

Massage is a small branch of manipulative therapeutics, but conceding that it is perfect and scientific it can only resemble osteopathic treatment in one ramification of osteopathic practice, viz: relaxation of muscles.

The fact that massage is often employed by osteopaths in connection with their work shows the limitations of that form of treatment. Says McConnell[6]: "In the human body, as in any delicate, complicated mechanism, there is mechanism within mechanism; and, in order to obtain certain mechanical effects, many times there is required a series of complicated movements, all of which bear a ratio one to the other according to the energy utilized and the mechanical principle involved." No other form of manual treatment takes this principle of mechanics into consideration. It is possible, as Gerdine points out, for an undeveloped osteopath to practice massage under another name. That the two should be

confounded before the public is due to his ignorance and not from any fault of the system. Massage is a valuable aid in the treatment of disease but it is not Osteopathy.

"In the bright lexicon of osteopathy there is no such word as rub[7]."

Osteopathy in its relation with medicine has little in common. From the beginning, its founder realized their paths should run divergently, so the first step, its teaching, must be considered from a different viewpoint. To quote from an address by Teall[8]: "But to adequately teach osteopathy a vast amount of original work must be done. Anatomy is anatomy but there is a vast difference in its application. Physiology must be taught to mean something more than an interesting phenomenon. Pathology has an unfilled gap between cause and effect which must be bridged. The post-mortem has a great story to tell but an osteopath must tell it. A slide of degenerated tissue under the microscope is of interest, but why the degeneration? It is described at length by the authorities, but the reason for the causes and morbific changes are not carried out. Obstetrics along strictly natural and physiological lines insuring both mother and babe against injury; gynecology, minus the knife and plus common sense; all these, and more must be put into shape to teach the osteopathic student. The archives of osteopathy were empty ten years ago. There was no precedent to follow and the ideas in teaching which had prevailed for centuries dominated. All this is changed. The colleges teach the science along strictly osteopathic lines, making the application of the truths which have escaped the notice of centuries of investigation."

All schools recognize the wonderful recuperative power of nature, as this from the introduction of a standard allopathic text book will show[9]: "There is no scientific dogma better established than this: that the living organism is in itself adequate to the cure of all its curable disorders. This natural law sustains the medical skeptic in his infidelity, enables the homeopath to report his sugar cures, and helps all physicians out of more close places than they are generally willing to acknowledge." But at times, as all will agree, nature is not able to overcome its maladies and assistance is needed. Here, again, is a divergence as to the method and character of that assistance. There is no system so trivial or absurd which cannot point to its cures, but a school of medicine should have a settled system with

established methods of procedure. This is not true of any school employing drugs as its principal therapy. In the President's annual address at Cleveland he says[10]: "The observant reader of the progressive medical press is struck at once by the unsettled condition in the field of modern therapeutics. The trend is emphatically away from drugs. But, in the effort to get away from medicine, the medical investigator has wandered far afield, cutting loose from nature and resorting to the artificial." It is the last paragraph of the extract quoted which particularly emphasizes the point of divergence, natural *versus* unnatural methods. It must be understood at once that the osteopath admits the reality of drug action for "there is no doubt that the pharmacopeia records many drugs whose action is rapid and effective so far as securing activity or decrease of secretion is concerned, but the element of danger, i. e., their destructive power is great. Oftentimes their power does not stop at the point desired or limit its effect to the therapeutic action sought[11]." This point of unreliability of the drug is emphasized by the following from recognized medical authority[12]: "We give drugs for two purposes: (1) To restore health directly by removing the sum of the conditions which constitute disease. Here we act empirically with no definite knowledge—often indeed with little idea of the action of our drugs, but on the ground that in our hands or in the hands of others they have restored health in like cases. (2) To influence one or more of the several tissues and organs which are in an abnormal state so as to restore them to or toward the normal; with the hope that if we succeed in our purpose recovery will take place. The purpose we effect by means of the influence which the chemical properties or drugs exert on the structure and function of the several tissues and organs. Minute information, therefore, of the nature of drugs and their action is essential for their proper employment." Osteopathy brings into action the latent or stagnant forces of nature by specific methods which are usually reliable. Naturally there being such a wide difference in theory of the cause of disease it would be also shown in diagnosis as well as treatment. The most striking points to the layman in medical procedure are: first, wide difference in the system of diagnosis and in its findings by physicians of the same school; second, the great variance in remedies employed by different physicians of the same school for the same disease.

Osteopathic diagnosis is so physical in its character, depending upon actual conditions found and not upon the subjective symptoms alone, that

the same patient examined by a number of experienced osteopaths will be given the same diagnosis, and he will also be able to detect in each the same effort to correct in all their technique. All the methods of physical diagnosis are used plus the distinctive osteopathic procedure. Results wherever used bear out the effectiveness of the system.

The osteopath must and does consider the necessity of surgery, but his effort is always to prevent the operation if possible. There can be no doubt that surgery is carried to extremes and there is a strong sentiment growing that much of it is unnecessary. Says Homer Wakefield, M. D.[13]: "It is to the everlasting disgrace and mortification of the medical man that the wealthy classes who are continually under the observation and direction of eminent men, in dietary, and all life habits, in health as well as in sickness, are not only the very ones who develop appendicitis and most largely go to operation, but are almost exclusively those who attain to this distinction." The operations of today are wonderful and the surgeon shows great skill and genius in their performance, but great as he is in these matters how infinitely greater is the man who can prevent them. The need of the osteopath today is to be trained to recognize surgical conditions and neither allow surgery unnecessarily nor make the more terrible error of not acting soon enough. Where surgery is a necessity there is always an etiological factor to be considered. The cause of the manifestation not always being removed what is to prevent a recurrence or serious sequela in spite of the operation? "The specialist ... if he has wit enough to read the lesson presented to him, that it is not sufficient to remove an ovarian tumor, e. g., and that if nothing is said at the same time or subsequently as to the causes which induced it, a positive damage may be done to the woman, who may, therefore, while considering herself cured, proceed to manufacture one on the other side, or may find herself in a few years suffering from cancer in the stump of the previous one[14]." And so the combination of osteopathy with surgery may be necessary that the cause shall be removed. Osteopathic treatment before operations in reducing congestions and inflammations, also in toning the nervous system, is particularly efficacious while the after treatment gives gratifying results. In fact, the two go hand in hand when conservatism rules both.

That diet should receive particular attention from the osteopath is not strange, for his veneration of nature peculiarly fits him to realize the

necessity of correct feeding. Probably no subject is more discussed or presents a wider range of opinion than diet. There is overfeeding and underfeeding; long intervals and short between feedings. There is the no breakfast and no supper plan, mixed diet and the vegetarian, uncooked foods, and one exclusively of milk, anything you want so long as you are hungry but chew it well, etc., ad. lib. All are represented by osteopaths in their following as they are from other professions, but probably this would more nearly represent the views of them as a school. In health, first, most people eat too much and do not thoroughly masticate and insalivate. This applies to all stations of society. Second, meat forms too large an item in the daily dietary. Third, there is not enough variety and the ration is not well balanced as to elements. Fourth, not enough care is used in preparation of foods. In illness, first, the stopping, complete or partial, of food until the system can take care of it; second, the giving of easily digested foods. The man who avoids violent extremes in diet as well as in other habits of life will usually last longest. It is to be hoped that some rational system can be evolved on which all factions may agree, for the present confusion of authorities is bewildering. The osteopath gives attention to hygiene, sanitation, exercise, environment, mental attitude, etc., as they may affect the welfare of his patient.

Osteopathy can cure all curable diseases, for the same forces which will overcome one malady will overcome another when set in motion. Forces that produce a diseased condition will it normalized restore the established type.

FOOTNOTES:

[1] Littlejohn, (J. M.)—Journal of the Science of Osteopathy.

[2] Encyclopedia Americana.

[3] Booth—History of Osteopathy.

[4] Journal of Osteopathy, May, 1905.

[5] Principles of Osteopathy, p. 190.

[6] Journal of the Science of Osteopathy, Dec. 15, 1900.

[7] Osteopathic Calendar, 1900.

[8] Reported, Portland, (Me.), Advertiser, Feb. 27, 1905.

[9] Potter’s Materia Medica.

[10] Teall—Journal of the American Osteopathic Association, Aug., 1903.

[11] Tasker—Principles of Osteopathy, p. 110.

[12] Allbutt’s System of Medicine.

[13] Cyclopædia of Practical Medicine, June, 1906.

[14] Rabagliati—Air, Food and Exercise, p. 129.

OSTEOPATHIC ETIOLOGY AND PATHOLOGY

Osteopathic Etiology

Osteopathic etiology and pathology constitutes the most interesting chapter of osteopathic science. The primal divergence of the osteopathic schools from previous systems is to be found in the osteopathic interpretation of disease causes and processes, and not in osteopathic therapy as some may think. Osteopathy makes claim to an independent school because it possesses a distinct etiology, pathology, diagnosis and treatment. Thus osteopathic practice is not a mere method, but instead a system, a school, a science.

At no period of medical history have physicians of the older schools felt more keenly the futility of medical methods and the lack of an all-embracing principle of medicine than at the present. A recent writer[15] who claims to have discovered a principle that encompasses the entire field of medicine, says: “We found, we may say, that the backbone of medicine was the absent factor, and that if the patient labors of so many great minds had not proven as useful in the development of practical medicine as they should, it was because they lacked such a fundamental framework to afford a fixed *nidus* for each discovery, wherein its true relation to other discoveries would at once become evident.”

Since the conception of osteopathy its fundamental framework has not changed one iota as to principle, although the application of the principle has been greatly elaborated. When Dr. Still proclaimed that “the rule of the artery is supreme” he gave utterance to a basic physiological truth. But when he demonstrated that osseous and other anatamo-mechanical lesions disturbed the artery and caused disease, and that readjustment of the anatomical cured the disorder, thus allowing the physiological to potentiate and revealing that the living body contains all the attributes of a vital and physical mechanism, did his teaching contain the germ of a comprehensive philosophy; this gave osteopathic science a “backbone” with a consequent

fixed *nidus* for all existing facts and future discoveries. And thus, it should always be emphasized that mechanical readjustment of the component parts of the vital body is the eternal keynote of the osteopathic school of healing.

The Osteopathic Lesion.—Broadly speaking a lesion is "any morbid alteration in a tissue whether attended by a recognizable structural change or not; but especially a change in which the continuity of some of the tissue elements is broken in upon.[16]" There are several kinds of lesions expressing the tissue involved, character of degeneration, locality of same, etc. But upon analyzing the medley of arbitrarily defined lesions the fact will be evident that much of medical etiology and pathology has not been logically and consistently sifted and arranged; and moreover, it will be found the **cause of causes** of many diseases is unknown.

Herein, arises the great significance of the osteopathic lesion, for the lesion alters the very governing and controlling tissues of the body, viz., the nervous tissue and the vascular channels. Hulett[17] defined the osteopathic lesion as "any structural perversion which by pressure produces or maintains functional disorder." The constant maintenance of the structural perversion will, also, cause organic disease, although it is granted that functional disorder must necessarily result prior to any organic change.

The osteopathic conception of a lesion, functional and organic disorder caused by pressure from disturbed structures, does not bring us into an absolute new field. Medical literature of all ages contains references to diseases caused by pressure of tissues on nerves, blood vessels, or other channels. But the osteopathic idea is an absolutely new one in the application of this principle universally. It simplifies and makes uniform the arbitrariness of present semeiology.

Thus the osteopathic idea that many diseases originate, primarily, from anatomically malaligned, malpositioned, or malrelated tissues causing a blockage of vital processes, immediate or remote, is a theory inclusive of disturbances to all tissues. This principle is fundamental and is supported by the physiological truth that uninterrupted vital channels preserve health; moreover clinical and experimental data, as will be shown later, substantiate this fundamental. It at once places interpretation of a lesion in an entirely new light from preconceived concepts, and is analogous to and co-extensive with etiology and pathology.

Etiological Factors.—The osteopath believes in the potency of inherited and environmental influences. There can be no question that a few diseases and certain disease tendencies may be inherited, the principle feature, however, from the standpoint of heredity is, various organs and tissues have less vital resistance. These should not be confounded with congenital weaknesses and diathetic tendencies.

Environmental influences are very important factors. One's surroundings and daily habits in the home, shop, or office count for much in the aggregate. Food, drink, air, rest, sleep, clothing, exercise, mental attitude, etc., are all factors in the sum total of health, and consequently ill health may be traceable to their abuse. In fact, all hygienic and sanitary measures are duly considered by the osteopath. Various abuses, over use, and disuse of the functions will certainly be followed by physiological discord.

The germ theory contains much truth, but in the very large percentage of cases where the micro-organism is a factor its significance is only of secondary consideration. Immunity and resistance comprise an important part of the health problem, of which the intact anatomical is of first consideration. Usually the micro-organism plays the role of an exciting and determining factor; before it can multiply and grow there must be a field that is first nutritionally disturbed. Nutrition of the tissue is the one great point always to be considered. The constitution of an individual is the pivot about which predisposing, environmental, and exciting factors of disease center. Health represents the integrity of the artery as well as a maintenance of that master tissue, the nervous system, and anything that produces or influences, directly or indirectly, a disturbance of physiological functioning borders on the pathological.

Hence the osteopath recognizes many of the common medical causes of disease, but reserves the privilege of rearranging their relative positions, for the osteopathic cause of disease greatly modifies their value.

Osteopathic Etiology distinctively emphasizes structural derangements and perversions. Of **first** importance, owing to static requirements, is the **osseous lesion**. This lesion is represented by any abnormal change of position or relation of the many bony constituents of the body. The framework of the body is subject to not only any and every physical violence of any mechanism, but moreover being the corporeal foundation of

a vital mechanism is subject to both direct and indirect biochemic changes and influences.

Thus the osseous lesion is caused (a) by traumatism, e. g., strains, falls, blows, etc.; (b) indirectly by atmospheric changes, over and violent exercise, the slumped posture, debilitating habits, etc., through the media of muscle changes and imbalance; (c) by nutritional effects disturbing the elements of bony tissue; (d) by ligamentous change such as thickening of a capsular ligament; (e) by infections; (f) compensatorily and reflexly through the media of body distortions and muscular irritability or debility, e. g., an innominate lesion may be compensatory to a lumbar curvature, dietetic errors may cause dorsal muscular irritation and contraction produce a constant osseous lesion which in turn may result in chronic indigestion.

The pathological changes in the osseous lesion are commonly one of structural derangement, deviation or complete displacement. The vertebral segments are of primary consideration owing to their important relations to the spinal nerves, spinal cord centers and sympathetics; the ribs owing to the close sympathetic and spinal nervous relations; and then other osseous tissues, as the innominata, clavicles, etc., depending upon their importance to contiguous vessels, nerves and organs. It should always be remembered and emphasized that mechanical changes of the anatomical structures is the primary essential in osteopathic etiology; this is the one great inception of pathological variations from the distinctively osteopathic conception, which the osseous lesion typifies. Consequently the osseous lesion factor is actually a luxation (complete, or partial, even to a very slight degree), or malalignment of the bony constituents, which by virtue of their physical malposition impinge or irritate contiguous tissues. The essential test is the functional one, movement. The degree of involvement may be one of many gradations ranging from a slight malposition or impaction to a marked deviation or firm anchorage.

Second in importance from the static requirement of support is the **muscular lesion** though from the standpoints of movement and dynamics it is often of the first consideration etiologically. Many interosseous lesions are the result of spastic involvement of deep seated spinal muscles, of fibrotic changes and of tensions and weaknesses that either establish a rigidness of the segments, compromising nervous stimulus or vascular channel, or produce an imbalance of muscular tone and tension. In the latter

instance some type of sidebending-rotation osseous lesion occurs, commonly anchored within the physiologic movements of the spine. The muscular lesion may be an actual dislocation of either muscle or tendon, but rarely. Commonly it is a contracted, or tensed, or contractured muscle. The muscle, also, may be diseased either from primary or secondary causes through nutritional and infectious sources and thus be an etiological feature.

The muscular lesion is caused, (a) by direct or indirect violence the same as the osseous lesion; (b) by atmospheric influences; (c) by slumped posture, debilitating habits and various errors of living; (d) infections; (e) by reflex irritations; (f) by compensatory changes; (g) by disease causing hypertrophy or atrophy; and, (h) secondary to osseous lesions, being the result of impingement to the muscles' nervous control. The tensed or stretched muscle may result from a separation of the points of origin and insertion.

Herein the fundamental osteopathic concept is the resulting affection due to the physical encroachment, directly or indirectly, of the muscle tissue upon vascular channel or nerve fibre, or the effect upon the movement or alignment of the osseous tissue.

Muscular contractions, displacements, and tensions play a most important part in acute disorders, although muscular lesions that are secondary to other lesions are usually taken into account when treatment is given. Muscular lesions affect, (a) blood and lymph vessels; (b) nerve fibres. Muscular contractions, especially, impede mechanically the return of the venous blood to the heart. The lesions to the nerves may be manifested in innumerable ways, depending upon the location of the muscle and the function and distribution of the nerve affected.

Then there is the relaxed, overstretched, and atonied muscle. This condition results as a secondary effect to mechanical strains, these being so severe and constant as to cause direct stretching and possibly tearing of the muscle fibres. This should be distinguished from the exhausted or debilitated muscle, e. g., as found in neurasthenia and anemia.

Diagnostically there are, (a) contractions of more or less area, due to atmospherical changes; (b) the deeply seated contractions involving a very small area, caused by vertebral and rib lesions; (c) contractions due to reflex disturbances; (d) contractions caused by postural effects and deformities;

(e) contractions from spasms of the blood vessels as a result of nervous irritations; (f) contractions due to toxicity of the blood. All of these characteristic muscular lesions give a direct hint as to both etiology and prognosis.

Third, the **ligamentous lesion**, as a lesion *per se*, is usually of secondary importance to the osseous lesion. In chronic cases affections of the capsular ligament and muscular fibrosis commonly maintain malalignment or rigidness. There are two features that should be noted in particular when considering this lesion; first, thickenings and adhesions; and, second, relaxations.

The tone and integrity of the ligaments cannot but be of vital concern to the stability, suppleness, and adaptability of the bony framework in all physical movements. No matter how slight the osseous lesion may be the ligament must of necessity be involved. The osseous derangements are either a source of irritation to the ligamentous tissue, resulting in congestion and inflammation and hence thickening and adhesions, or else the ligaments are so strained and tensed that in time atony may occur. Probably, in a fair percentage of atonied cases the first disturbance to the ligament is one of irritation and congestion, and from long continued involvement irritation is supplanted by debility.

Consequently the primary consideration of the ligamentous lesion from the etiological standpoint is the character of the tissue (ligament) changes. This, also, gives us a direct hint that is of the utmost value in prognosis. The independent displacement of a ligament is rare, thus ligamentous lesions from the viewpoint of purely physical displacements are secondary to if not an actual part of the osseous lesion. Ligaments, when displaced or tensed, readily impinge or irritate contiguous tissues, but the original cause of the structural perversion is commonly either the osseous or muscular lesion. Hence, whatever factors enter into the production of these lesions will at least indirectly produce the ligamentous lesion.

Fourth, the **visceral lesion** is frequently overlooked as being of much moment as an osteopathic lesion. Visceral displacements acting as a source of functional and organic annoyance on the physical plane (structural perversion which produces and maintains pressure) alone are not in the least uncommon.

Any or all of the abdominal viscera, or even the organs of the thorax, may be displaced (physically) pathologically. Actual displacement of the viscus is a prolific source of distinct disorders and many obscure symptoms. True it is the organs are most frequently displaced from indirect causes, but nevertheless the actual physical malposition is in turn a primary cause of still another train of symptoms and diseases.

Visceral lesions are caused by, (a) vertebral lesions; (b) postural defects; (c) direct violence; (d) nutritional disorders; (e) childbirth; (f) unhygienic measures (tight lacing, heavy skirts, etc.); (g) congenital weakness.

From the displaced heart due to valvular and debilitating influences to the displaced liver, the stomach, the kidneys, the intestines, the ovaries, and the uterus, may arise a source of direct or indirect irritations, a train of apparent or masked symptoms, or a group of nutritional disturbances that include an extremely important chapter in etiology. Moreover not only may one organ alone be involved but several may be displaced or prolapsed as a whole as in splanchnoptosis; and even these in turn may be the direct cause of further organic displacements as the abdominal viscera prolapsing upon the pelvic organs. Here is a very fruitful field for the diagnostician, for to separate cause from effect requires keen perception, an acute sense of touch, and above all, most careful weighing of all the factors that enter into the maze.

Fifth, the **composite lesion** is not always recognized as an extremely important osteopathic factor. By composite lesion is meant a structural lesion that primarily includes the osseous, muscular, and ligamentous tissues as a whole. This may be termed a lesion *en bloc* or *en masse*.

Composite lesions are of exceedingly frequent occurrence. Indeed, many composite lesions are overlooked and instead of treating the *en bloc* disturbance as a consistent whole the component factors are treated separately with no concern or attention to the whole.

Postural defects are excellent types of the composite lesion. The various curvatures, the tilted pelvis, etc., are representative of the composite lesion. Etiologically, pathologically, diagnostically, and therapeutically the contour of the spine and ribs, the relation of the innominata to the sacrum and spine, and the symmetry of the body generally should be recognized and appreciated. The relation of the part to the whole and of the whole to the part are of vital etiological concern. An incipient curvature may be easily

overlooked, a pendulous abdomen neglected, and a slipped innominatum passed unnoticed wherein as a result the entire vertebral column is malaligned in relation to the physiological curves or to the perpendicular line of gravity.

Frequently attempts are made to correct individual lesions when attention should be directed to the composite lesion and *vice versa*, e. g., a displaced rib is usually dependent upon a corresponding vertebral lesion, and thus the transverse plane or section of the body should be considered as a whole. A single lesion may be dependent upon a composite lesion or a composite lesion dependent upon one or more single lesions. A slipped innominatum or a disordered hip joint may bring about a strain to a greater or less section of the spinal column, or a twisted vertebra may cause a curvature, whereas on the other hand postural defects may cause a strain at its maximum focal point resulting in over-stretching and relaxing of ligaments so that an osseous lesion results, or a spinal curvature cause an innominatum displacement. Thus there is a constant establishing of equilibrium, physically and physiologically, through the medium of compensation, but at some phase of the change there are apt to be pathological phenomena resulting, and very frequently physiological harmony is not reestablished but instead irritation, debility and other disease symptoms are constant effects until relieved.

Consequently osteopathic etiology is many sided and complicated. To know whether an osseous, ligamentous, muscular, visceral, or composite lesion is primary or secondary, compensatory, reflex, predisposing, or exciting, requires a command of theoretical knowledge backed by much actual clinical experience.

In noting the above distinctive osteopathic etiologic features the student should not lose sight of the constitutional status of the patient which may be modified by inherited, congenital, diathetic, and environmental influences, all of which go to make up the predisposition of the individual and have an important relation to osteopathic factors. Then it should be recalled that disease processes may be of insidious progress, and the products and effects of pathologic changes accumulative.

Osteopathic Pathology

In the etiologic study the osteopathic characteristics have been designated structural maladjustment, although at the same time not losing sight of the angle that the body is not only a physical mechanism but also a vital organism. Structural perversions characterize the osteopathic distinction when dealing with the physical body, and remembering the vital or biochemic mechanism, mental attitude, diet, hygiene, etc., are not forgotten. To retain or attain health, thorough appreciation of both the physical and vital mechanisms should be kept in view, for there is both an independent and dependent interaction on the part of each. The living body being an entity premises a system of therapeutics both physical and vital, that acts in direct accord and harmony with physical laws and physiological functioning.

Osteopathic pathology deals with the distinctive osteopathic lesion as a factor in production and maintenance of disease. Then the province of pathology is, first, to determine whether the lesion is in reality an etiologic factor; second, the immediate character of the lesion disturbance; and, third, how organic life becomes involved.

Inspection, palpation, clinical results, dissection and laboratory experimentation include the methods employed to prove that the lesion is of practical consequence. That the lesion is an etiological factor can be known only through clinical and experimental proof; the immediate character of the lesion disturbance can be determined by dissection; and how organic life becomes involved requires the summation of histological, physiological and pathological data.

The following outline assumes that the reader is familiar with anatomy, physiology and pathology. Osteopathic pathology does not add to medical pathology an absolutely new pathology in all of the present known numerous details, but instead interprets much of clinical pathology anew, and furthermore it presents absolutely new data that is exclusive, but germane to the present general medical and surgical fields.

Nervous tissue and arterial blood are the master tissues, the controlling and governing factors in health, and disturbances of these tissues are necessarily the cause of ill health. The rule of the artery and the control of the nerve must continue uninterruptedly in order that physiological functioning remains intact. The body should be looked upon as a being

complete, no more or less, each tissue and organ essential to the whole and the organism as a whole essential to every part. This is fundamental and germane to a living structure, and hence disturbance to the governing and controlling tissues, the nerves and vascular channels, must necessarily cause a break in the concatenation and disease must logically follow.

Thus in the osteopathic pathology we look to those influences that primarily disturb the nerve or artery, study the disease process or extension from inception to effect and from primary lesion to morbid results, and note action and interaction of tissue upon organ and organ upon organ.

That all parts of the body are in intimate and dependent relations each with the other through the media of the nervous and endocrine systems is a well known fact based upon histological and physiological grounds. The neurone being the physiological unit implies that any disturbance to the cell quickly disturbs any or all of its processes. It may be said that "nervous tissue is dependent for its integrity upon two things, blood supply and trophic influences. The nerve cell is solely dependent on a proper supply of blood, and dies when this is withdrawn. But the nerve fiber is more dependent on the trophic influence of the cell of which it is a prolongation. It dies when cut off from the cell but it can get along for a time with but little direct blood supply. On the other hand, if the nerve fiber is injured it reacts on the cell, leading to a partial but curable degeneration of the cell body."[18] Here is the immediate pathologic key to many diseases. Whatever cuts off or obstructs the artery leading to the cell is a primary etiologic factor; this then leads to degeneration of protoplasmic processes and axone. It should be carefully noted that if the obstructed blood vessel is one to the nerve fiber only the resultant partial injury to the cell is curable.

"When an axone degenerates the retrogressive process involves not only the main axone, but also its terminals, together with the collaterals belonging to it with their terminals."[19] This is an exceedingly important link in the explanation of osteopathic pathology, that distant organs may be affected by the osteopathic lesion. Moreover, "degenerations of a secondary character may occur in those systems of neurones which are more or less dependent upon the peripheral sensory neurone system for their impulses."[20] This is equally true with the central motor neurone, or any neurone. It shows how far-reaching a degenerative process and its effects

may be. It further makes clear that nerve intactness is directly and absolutely dependent upon a normal circulation, and that it is self-evident any blockage either to blood vessels or to neurones will vitally affect those tissues that govern and control the life processes of the body. The integrative action of the nervous system is one of the outstanding facts of physiology.

The above is presented so the student may see how osteopathic spinal lesions, if deeply seated and effective enough, can involve remote tissues and organs. No one will doubt that fractures and complete dislocations of the spinal column will seriously affect visceral life, or a prolapsed kidney will be a cause of nutritive disturbance, or a displaced uterus the cause of ovarian congestion, or a dislocated hip the cause of atrophy of the leg muscles, but it has remained for the osteopath to offer proof that slight misplacements of the vertebræ or ribs, incipient curvatures, postural defects, slight deformities, and unsymmetrical bodies are of sufficient etiological importance on the physical plane to affect neurone integrity and obstruct artery courses, and thus organic life.

The question at once arises, what is the immediate or direct effect upon blood vessel or nerve of the osseous, ligamentous, muscular, visceral or composite lesion? The osseous lesion will be taken as a type. The direct effect is usually one of hyperemia or ischemia, generally the former, for as physiologists and clinicians observe irritation commonly precedes debility. In the vertebral and rib lesions there may be direct pressure upon the spinal nerve at its spinal foramen exit or on the sympathetic chain directly contiguous to the heads of the ribs. This causes congestion, inflammation, ecchymosis, and degeneration of the nerve fiber, followed by macroscopic and microscopic changes as connective tissue proliferations, arterial scleroses, etc. Or, as seems probable in experimental work, the inception of the pathology may be frequently the result of blockage to nervous stimuli, which when maintained affects the efferent vasomotor, secretory, trophic and other fibers so that circulation and nutrition are definitely involved.

Thus the cells so sensitive to altered vascular changes are directly and remotely affected, and disease characteristics dependent upon structure and function of tissue, and degree of irritant are evident. This can vary, in degree only, with the muscular lesion that involves collateral spinal cord

circulation, the visceral lesion that irritates sympathetic life, or the composite lesion that deforms or perverts structure en masse.

But is the physical noxa as potent an etiologic factor as the chemical or bacteriologic? Adami[21] informs us whether an irritant is physical, bacterial or chemical, no satisfactory distinction can be founded on the duration of the irritation; that a local irritation of the nervous system may lead apart from "direct reflex action, to changes of nervous origin, in the region of the injury and in the reflexes affecting associated regions, the higher centers; and through them the system at large, may become affected by paths that it is not always easy to trace." Again he says that "centrifugal impulses alone, apart from any local injury, may originate a succession of phenomena of inflammation in a part." And "in all probability a nervous and central origin must be ascribed to some, at least, of the sympathetic inflammations seen to occur in areas supplied by the other branches of a nerve supplying a part primarily inflamed; and again in areas supplied from the same region of the brain or cord as the inflamed organ." Other inflammatory changes, of course, may occur independently of centrifugal nervous influences, and the vessels react independently of central influences.

This, then, presents a situation postulated thus:

1. The body follows definite structural relations and is influenced by mechanical arrangements in its morphology.

2. The integrity of tissue depends upon structural freedom of nutritive courses.

3. The above predicates a structural etiology as exact and precise as structural relations are important to nutrition.

What proof, then, of the foregoing have we to offer?

First, the **clinical proof**. Clinical results have been obtained in tens of thousands of cases that include disease of various types and lesions, and of all sections and organs of the body. The art of osteopathy has been perfected in many of its details, based upon actual experience and splendid results. The cure of the patient is paramount to all other consideration, and whereas the osteopathic school has been shown a superior system it logically follows on *a priori* grounds that relief and cure of suffering is of the first and final importance.[22]

Were it not for clinical results no new system of therapeutics could withstand criticism and calumny and finally triumph and be publicly, legislatively, and scientifically recognized.

Second, the **autopsy proof**. Many dissections have been made and autopsies held with the view of discovering the character and the potency of the osteopathic lesion. This very important work has borne out the osteopathic theory of disease. Vertebral and rib displacements have been noted, corresponding ligamentous tissues thickened, associated nerve tracts and vascular channels disturbed, and finally the related organ found diseased.[23]

Third, the **experimental proof**. Experimental proof appeals, logically, to the scientific mind. This proof[24] is being gradually developed.

Experimental investigation has been successfully carried out upon numerous animals. The experiments conclusively prove that not only spinal inhibitory and stimulatory manipulations (mechanical) are productive of immediate physiological changes in the viscera, but that the structural anatomical lesion or noxa is an important factor in the etiologic field. Pathological changes in several organs directly follow the artificially produced vertebral and rib lesions, showing beyond doubt the reality and effectiveness of the osteopathic lesion. This emphasizes the point that centrifugal impulses originate an inflammation in a previously healthy and uninjured tissue or viscus. And as “inflammatory phenomena may be sympathetically developed in regions innervated from the same area in the brain or spinal cord” it remains to prove the actuality of vertebral and rib lesions, i. e., structural perversions really affect contiguous nerve courses and vascular channels; and this has been demonstrated in laboratory experiments and at the autopsy. Consequently the vertebral, rib, or other lesion may be an important etiologic factor either to the nerve strand from cord or brain to viscus or from viscus to cord or brain.

Dr. Still says in his Autobiography that “all nerves depend wholly on the arterial system for their qualities, such as sensation, nutrition and motion, even though by the law of reciprocity they furnish force, nutrition and sensation to the artery itself.” It matters little in this outline whether obstruction to nervous integrity is by way of an impinged artery or by direct pressure, or both, or otherwise, for the primary consideration is the noting

that the osteopathic lesion is a real and potent factor of disease. Sajous[25] informs us that "a neurone is directly connected with the circulation (via neuroglia-fibril) by one or more of its dendrites, which serve as channels for blood plasma," that a neurone receives its nutrition directly from the general circulation, and that from the axone the blood passes into a lymph space connected with a vein. Thus in reality a part of the circulatory system is that of the entire cerebrospinal system.

The student is referred to the various publications of the Research Institute and Deason's Physiology for experimental data confirming the validity of the osteopathic theory, although it should be emphasized that clinical evidence is quite conclusive. Malalignment injuries of the vertebral articulations, for example, ranging from imbalance of muscular tension to infections, is certain to result in some type of rotation and sidebending of the segments to an extent that apposition is compromised and abnormal anchorage supervenes. There are many factors of the pathology: muscular tension and fibrosis; damaged ligaments, particularly the capsular; interference of nervous stimuli, blockage of impulse directly and reflexly as shown by pathologic involvement in cord centers and sympathetic ganglia, and in certain cases direct obstruction of nerve fibers as revealed by Wallerian degeneration; involvement of circulation as shown by damage to blood-vessels, local edema and local acidosis, and effect upon local tissue respiration and drainage. Through a combination of these various factors circulation, nervous equilibrium and chemism of related parts are involved, both anatomical and physiologic balance is upset, and resistance of corresponding viscera affected. Reciprocal innervation and the axone reflex are also disturbed, all of which are important predisposing causes that disturb resistance of tissues and organs, upset their correlated mechanisms and render active various possible infections and toxins that otherwise a normal circulation, nervous and endocrine systems, and oxygen supply would rapidly and successfully combat and restore the organism to normal. Thus from the practitioner's standpoint there are three points to always keep in mind: readjustment of the lesion; correction of the forces, habits, environment, etc. that produce the lesion; and hygienic attention of the body after lesion adjustment in order that normal condition may be maintained. A thorough study of the physiologic movements of the spine is a prerequisite to an understanding of the various possible abnormal appositions, though it should be appreciated that these movements are not consonant or applicable

to many abnormal conditions. Pathology reveals many gradations and combinations not found in normal conditions. Frequently the key of a successful technique rests upon an understanding of the individual make up of the interosseous lesion.

It has not been the purpose of this section to go into details but rather to follow logically an outline of osteopathic etiology and pathology. The various details will be found in the osteopathic works on Principles as well as in the experimental articles referred to. It should be understood that the osteopath believes thoroughly in *vis medicatrix naturae* whether the indications are for stimulation or inhibition or for the basic readjustment. Generally speaking, however, therapeutic philosophy resolves itself (ultimately) into the principle that a cure depends upon giving an impetus to impaired, habitual and latent forces, which in the osteopathic field implies fundamentally adjustive manipulation whereby the resultant impetus or physiological stimulus is initiated.

In a word, osteopathy premises that the body is a vital and physical mechanism subject to derangements, structural alterations, and functional changes, as results of violence on the mechanical plane, as well as disturbances on the psychic and biochemic planes. Hence, osteopathic philosophy is inclusive of preventive, palliative and curative measure.

FOOTNOTES:

[15] Sajous—The Internal Secretions and the Principles of Medicine.

[16] Foster—Medical Dictionary.

[17] Hulett—Principles of Osteopathy.

[18] Dana—Text Book of Nervous Diseases.

[19] Barker—Reference Hand Book of the Medical Sciences.

[20] Delafield & Prudden—Hand Book of Pathological Anatomy and Histology.

[21] Adami—Inflammation, Allbutt's System of Medicine.

[22] See Case Reports, American Osteopathic Association.

[23] Clark—Applied Anatomy.

[24] McConnell—Numerous articles Journal A. O. A. 1905-19, Bulletins Research Institute; Deason, Bulletins Research Institute, Deason's Physiology;

Burns' Osteop. World, Aug. 1905; Basic Sciences, Bulletins Research Institute; Pearce, Osteopathic Physician, Nov. 1905.

[25] Sajous—Internal Secretions and the Principles of Medicine.

OSTEOPATHIC DIAGNOSIS AND PROGNOSIS

Osteopathic Diagnosis

In osteopathic diagnosis the spine is the first and greatest object of interest, for on the result of its examination will depend the treatment to be given which is in turn hoped to bring about recovery.

As it is the structure on which rests the weight of the body the practiced eye is able to detect at a glance, by the poise and gait of the patient, if there is an abnormal condition affecting any considerable area of the spinal column. It is well to observe these points, especially in the female, before having them prepare for examination, as it will often give a clue to sources of trouble through faulty carriage, improper dress, particularly corset and shoes. Slight changes of gait, unnoticed by the patient may be of great aid in determining the beginning of disease in the spinal cord.

No osteopath is justified in accepting a patient who will not permit every examination deemed necessary, as remote and obscure lesions are frequently the cause of disease, so preparation of the patient for the first scrutiny is of importance. This cannot be made with the patient fully clothed, as visual observation is second only to the touch in making one's deductions. Neither can palpation be made through more than one thickness of clothing with accuracy, and examination next to the skin is always preferable. This need in no way ever cause complaint, for with the use of a loose fitting short kimono, with all outer clothing removed except the knit undergarment, and with skirt bands loosed, a complete survey of the whole dorsum from occiput to coccyx can be had without the slightest unnecessary exposure. It is well to remember that the patient has come for help and the osteopath is not justified in sacrificing thoroughness for any exaggerated feelings of modesty. With tact and care in the use of the garments the most sensitive ones need feel no hesitation in coming for treatment.

A complete history of the case should be taken before the examination begins, former methods of treatment, symptoms, environment, etc., as it

will aid in the final conclusions. It is well to have blanks for keeping records of all cases.

Probably the most comfortable manner to begin physical examination is to seat the patient on a table squarely with hands placed upon the knees, then raise the garment and expose the whole back. Begin by noting the texture of the skin, if it is clear, pigmented, blotched, or has eruptions. Try the capillary reflex by pinching or stroking quickly with the finger tips or the blunt end of a pencil. Find if it is moist or dry and also outline the areas of changed temperature, if any. Then observe the general contour of the spine with the patient sitting upright, to find how near it is to the normal body curve.

Occasionally having the patient alternately sit and stand will, by comparison, throw light upon the condition. With the patient bending forward place the hands on the crest of the ilia and see if they are of equal height.

Occupation may result in over development of one side or there may be congenital asymmetry[26]. Note position of the scapulæ and habit of posture in sitting and standing.

Before taking up the subject of a critical examination of each vertebra there are certain points it will be well to consider. It is easy to know instantly, without counting, the number of the vertebra causing the lesion if these landmarks are remembered: First, the spine of the third dorsal is on a level with the spine of the scapula. Second, the spine of the seventh dorsal is on a level with the inferior angle of the scapula. Third, the spine of the last dorsal is on a level with the head of the last rib. It will save much time for the busy osteopath to have these well in mind.

The **pathognomonic symptoms** of the osteopathic lesion are: (a) maladjustment; (b) contracted muscles; (c) tenderness; (d) limited movement. To these might be added changes in local temperature and disturbance of function, but the former is not constant and the latter may be remote. Here the primary lesion is considered, for an osteopathic lesion may be, also, secondary or compensatory. Forbes speaks of compensatory changes as being an important diagnostic sign.

Diagnosis of the position of a vertebra is sometimes difficult to the beginner from its having longer or shorter spines than normal. Horsley speaks of the occasional congenital absence of a spinous process. They may be bent laterally, upward or downward and thus have all the appearances of a marked displacement, while occasionally the body itself seems much at fault. These present what might be termed normal abnormalities and make it necessary for the osteopath to be very sure of his diagnosis before attempting to correct what is not abnormal, for disappointment, at least, and injury, perhaps, may follow.

To avoid mistake, carefully palpate the transverse processes and determine if they are at right angles with the adjoining normal spine. In the cervical and lumbar vertebræ it is possible to reach the tips of the transverse processes, and on moderate pressure, if a lesion exists, pain will be elicited. Further, where tenderness is associated with other diagnostic points it can be safely assumed that a lesion exists, and by outlining the suspected vertebra with the finger and localizing the sensitive spot one can be sure of the point of greatest irritation and the character of the displacement. Associated also with these signs will probably be evidence of congestion, such as thickened tissues, contracted muscles, etc.

After having examined the condition of the spinal column thoroughly by inspection, begin at the first dorsal and examine the spinal column down to the sacrum. Place the middle and ring fingers over the spinous processes and stand directly back of the patient and draw the flat surfaces of these two fingers over the spinous processes from the upper dorsal to the sacrum in such a manner that the spines of the vertebræ pass tightly between the two fingers, thus leaving a red streak where the cutaneous vessels press upon the spines of the vertebræ. In this manner slight deviations of the vertebræ laterally can be noted with the greatest accuracy by observing the red line. When a vertebra or a section of vertebræ are too posterior a heavy red streak is noticed and when a vertebra or vertebræ are anterior the streak is not so noticeable. Thus when suspicious points are noticed a special examination of the localized point can be given. This examination simply takes into consideration the contour and superficial condition of disordered portions of the spinal column. In a few cases such an examination will not be necessary, for the symptoms and signs of the disease will be so clearly manifested that one’s attention will be called directly to the cause. Still,

great care should be taken in the majority of cases, as the osteopath finds causes of disease remote from the seat of complaint. We must always bear in mind the significance of reflex stimuli and sympathetic radiation.

In making a critical and exhaustive diagnosis of the spinal condition after the foregoing general examination has been made, it will be best to have the patient lie on the side upon the operating table. When the patient is in this position a more thorough examination can be made, as then the spinal muscles are not contracted unless abnormally so, for when a person is in the upright position muscles are continually contracting first on one side and then on the other, as one of their functions is to act as a support in keeping the spinal column erect. The patient lying on his side, the physician should then stand in front of him and reach over upon the back and make a thorough examination of the affected portions of the spinal column, chiefly through the dorsal and lumbar regions.

Consideration should be given the contraction of the muscles along the back, chiefly the deeper layers of muscles. It may even be necessary to relax some of the muscles before a thorough examination of the vertebræ can be made. From a pathological point of view too much stress should not be put upon the contracted state of the muscles; although in a number of instances the contracted muscles may be the primary cause of the patient's trouble; especially so when the affection is due to atmospheric and other changes. Contraction of the muscles may be secondary to the lesions presented in the bony frame work. For instance, a dislocated vertebra may be the cause of an irritation to the innervation of certain muscles along the spinal column and thus cause them to contract. Still, we must not lose sight of the importance of the contracted muscles from a diagnostic point of view. They are oftentimes prominent signs that a lesion exists in the immediate region and are thus faithful guides in locating the cause of diseases.

In closing the general consideration of the spinal column it is well to emphasize the importance of training the faculties to grasp at a glance the story told by the back as a region, instinctively placing the proper value on each physical sign and weaving them into a composite whole so that the patient's condition stands out a vivid picture on the osteopath's mind. When this is accomplished the more detailed observations are but incidental. Relative to the examination of the spinal column Clark[27] says: "To the osteopathic physician, the most important part of the human body is the

spinal column. By its changes in contour and condition the various visceral diseases can be diagnosed, in most cases. I believe that every disease is characterized by extreme changes or signs, and I further believe that every chronic visceral disorder is manifest by changes in the spinal column that can be, by the practical eye and touch, readily interpreted. In short, there are various signs along the spinal column that point out the weakened or diseased parts of the body. This method of diagnosing disease, that is by noting these spinal changes, is distinctly osteopathic, and I believe the time will come when it will become such an exact science that the character of the spinal change or lesion is diagnostic not only of the viscus affected, but the way it is affected."

Regional examinations and diagnosis will now be taken up.

Neck, Head and Face.—To make a thorough diagnosis of the condition of the cervical vertebræ probably requires more skill and a more acute sense of touch than of any other region of the body. The irregularities and variations of the cervical vertebræ, the numerous muscles and the passage of many vessels through the neck are very liable to mislead one.

One may examine the cervical vertebræ by having the patient either lying down or in a sitting posture. The former position is preferable, as then the muscles of the neck are passive, and besides it is much easier to relax the muscles if such should be necessary. Also one has better control of the field of examination.

It is undoubtedly best for the student when learning to examine the cervical vertebræ to first examine along the base of the skull the condition of the occipital muscles (after the patient has assumed the dorsal position upon the treating table) for any contractions; for if disorder exists in the upper five cervical vertebræ the condition will be manifested by contraction of muscular fibres along the base of the occipital bone. The muscles of the occiput are supplied by fibres from the posterior branches of the upper five pairs of spinal nerves, and if lesions exist to these upper nerves a contracted state of more or less extent of the occipital muscles will occur, no matter how slight the lesion. Thus the examiner after locating contracted fibres under the occiput has a direct clue to lesions existing somewhere in the upper five cervical vertebræ. After locating these contracted fibres of the occipital region and then still keeping the finger upon the contracted

muscular fibres and following them downward until the contractions are lost and seem to enter the spinal cord, one has then located the exact point of disorder that is causing the irritation to the muscular fibres involved, and most probably the cause of the affection from which the patient is suffering, i. e., provided one has reason to suspect the trouble is in the cervical vertebræ. Simply follow the contracted muscular fibre downward until it seems to enter the spinal cord and there one will find a lesion. After the osteopath has become expert in diagnosis this will not be necessary unless he has to make a very fine diagnosis or unless he is examining a stout neck where it is hard to examine through the heavy muscles. With this method one has a firm, flat, broad surface to work on (the occipital bone) making it very easy first to locate contracted muscles and second to trace the course of contracted muscles and thus find the disorder. Otherwise the beginner is apt to get confused by trying to examine the condition of the cervical vertebræ. Later, when a student becomes more expert such a procedure will rarely be necessary only in cases that require special work in the examination.

When the point of disorder has been located the diagnosis as to the exact character of the maladjustment has to be determined. The abnormal position of the vertebra, tenderness at the point involved, local contracted muscles, and limited motion are the four diagnostic points, although the temperature of the affected part as compared with the general cutaneous temperature and the state of the local vascular channels (blood and lymphatics) will occasionally be of aid.

Owing to the irregularity of the spinous processes of the cervical vertebræ in regard to their length, great care has to be taken in the examination. Probably there is no other region of the body that will tax the patience of the osteopathic student so much in his practical work as making a diagnosis of disorders in the cervical spine. It requires patient and persistent work to become a fair diagnostician of the cervical region, and it will take much experience to become expert in both the examination and treatment.

One can depend that lateral deviations of the spinous processes are abnormal in most instances. Placing the finger upon the spinous processes of two consecutive vertebras the student can readily tell whether or not there is any lateral displacement; but telling as to other features is

impossible as the spinous processes vary greatly in length. When a vertebra is lateral, a slightly twisted condition will be felt by the finger when placed upon and between the two spinous processes.

To elicit the various degrees and combinations of rotation and sidebending one should depend upon the symmetry of the transverse processes. Reaching anterior to the sternocleidomastoid muscle, or better still, pushing the cleido muscles forward and reaching posterior to them upon the transverse processes, a very fair examination can then be given the vertebras. When the vertebras are deranged, especially anteriorly or posteriorly, that is the apposition of the articular facets, a slight elevation will be felt, possibly not any larger than a very small pea, either the anterior or posterior aspects of the transverse processes, depending upon which way the vertebræ are deranged. Remember that accompanying this slight elevation will be degrees of sensitiveness of the vertebra at the point deranged. In cases where the vertebra is lateral a slight eminence will be noted along the outside of the process. Commonly disordered vertebræ are not entirely deranged in one direction but are oftentimes slightly rotated, so we may find them dislocated antero-laterally or in various combinations of sidebending-rotation. Several consecutive vertebras may be deranged in like manner of direction; this condition is chiefly found in pathological curves of the spinal column. Probably the most common general lesion is a strained condition of several consecutive vertebræ, each one being nearly intact but all of them as a whole somewhat strained or twisted. Thus there are many pathological states to take into consideration, although it is not surprising to the osteopath when he realizes that many of our pains and aches are due to anatomical derangement. Frequently bending the head strongly forward and downward, or downward pressure with slight rotation will produce pain at the point of lesion.

Subdislocations of the **atlas** are probably among the most common lesions presented to the osteopath. Owing to the articulation of the atlas and occipital bone being an anatomically weak point and the neck muscles being exposed constantly to atmospheric changes, besides the articulation between the head and neck receiving the brunt of many jars, falls and strains, the atlas is especially susceptible to derangements. On account of the intimate relation of the atlas to the superior cervical ganglion of the sympathetic and to the vertebral blood vessels it is certainly very necessary

that the atlas should be well taken care of. No other tissue maintains such a significant position in relation to the blood and nerve supply to and from the brain. To diagnose correctly the position of an atlas and to be able to correct it is undoubtedly one of the most essential achievements of the practitioner of osteopathy.

The most common disorders of the atlas are anterior and lateral displacements. Next in order come “rotary” lesions of the atlas, i. e., where the atlas has been deranged diagonally or simply twisted. It may also be luxated anteriorly and laterally, or posteriorly and laterally, etc. A posterior derangement of the atlas is comparatively a rare disorder, although owing to the many lesions that are found in atlases one has, during the course of a year’s practice, several to correct. The atlas may occasionally be slightly tipped laterally, anteriorly, or posteriorly, and in a few cases it may be somewhat impacted against the occipital bone. Many times when the atlas is displaced the axis is also deranged on account of the close relation between the atlas and axis by the odontoid process of the axis.

To examine the atlas the patient may be either in the sitting or dorsal posture; it matters but little which position is taken. Possibly the dorsal position is better, as then the neck muscles are more relaxed and if necessary an examination of the cervical spine, below the atlas, can easily be made.

By placing the middle finger of either hand on the transverse processes of the atlas when the patient is in the sitting posture, or the thumbs on the transverse processes when the patient is in the dorsal posture and comparing the two sides, undue prominence of one side or the other can easily be noted. Remember the transverse processes of the atlas are slightly above and posterior to the angle of the inferior maxilla. Always, in examining one side of the patient, compare it with the other; it may save considerable embarrassment. One side may seem abnormal when by comparing it with the other side, both sides may be found the same and still be normal. With the fingers still on the transverse processes note the distance between the process and angle of the jaw, besides take into consideration the tenderness of the locality, and, also, what is of essential importance in all interosseous lesions, its articular range of movements. There should be room enough (approximately) to just comfortably wedge the end of a medium sized middle finger between the transverse process of the atlas and the angle of

the inferior maxilla when both are normal. Thus with the fingers on the transverse processes an expert will be able to readily determine whether or not an atlas is lateral or anterior. If an atlas is posterior the distance between the angles of the jaw and the transverse process will be increased, besides the atlas will be quite prominent posteriorly. In conjunction with the abnormality of the tissues (prominence or depression of the bone and state of the muscles) the sensitiveness of the locality is extremely significant.

Outside of displacements of the atlas, a lesion between the **axis** and **third cervical** is most common; following next in frequency are lesions of the **skull** and **atlas**. By that is meant where all the cervical vertebræ are intact as far as their individual relation is concerned, but the skull is forward, backward or lateral upon the spinal column. This condition occurs quite frequently. To determine its condition the same methods are employed as in diagnosing a deranged atlas; for if the dislocations exist between the atlas and skull the same diagnostic points are presented as far as the skull is concerned as when the atlas, or atlas and axis, are dislocated from the occipital bone or from the axis or third cervical. Following the preceding examinations, additional examination will have to be made to see whether or not the atlas is intact with the vertebræ below. If the atlas is found to be intact with the vertebræ below and lesions are presented between the atlas and the skull, then the disorder must be between the atlas and the skull and nowhere else. Occasionally there are cases where the skull is so far posterior upon the spinal column that the angles of the jaw strike against the transverse processes of the atlas when the jaw is opened widely.

Derangement of the **muscles** of the anterior and lateral regions of the **neck** are common. Especially are contractions of the muscles on either side of the larynx liable to occur. In examining the cervical region do not pay too much attention to the superficial muscles, but examine carefully the deeper muscles. It is from these that impingements of nerves and constrictions of vessels are likely to take place in the contracted fibres. Also, imbalance of muscular tension may be the source of the resulting malalignment. In examining for contracted muscles do not gouge into the muscle nor grasp the muscle roughly, but bear down lightly (inhibitory) upon the muscles and then gradually exert firmer pressure. By carefully and firmly exerting pressure over muscular areas the deep muscles can then be felt beneath the superficial ones. Otherwise when the muscles are manipulated severely the

superficial ones will contract to such an extent that the deeper ones cannot be felt. The muscles contracting on either side of the larynx tend to draw the larynx downward and thus there may arise a source of irritation. The various muscles contracting in the antero-lateral region of the neck are very often the source of chronic irritations of the pharynx or throat. The omo-hyoid muscle may become contracted and cause slight traction on the hyoid bone and thus produce an irritating cough. To examine the muscles of the neck thoroughly it is best to have the patient flat upon the back, for then all the normal muscles are relaxed.

Lesions quite frequently occur in the **temporo-inferior maxillary** articulation. The lesion may be either unilateral or bilateral, more commonly the former. The disorder usually consists of a relaxation of the muscles and ligaments about the articulation which allows a slight but perceptible dropping of the inferior maxilla on the side involved. In other cases there may be presented a spasticity of tissue, while in still others some degree of joint infection may be found. Lesions of this articulation particularly impinge upon fibres of the fifth cranial nerve. The points of diagnosis are clicking and tenderness at the articulation. These two points are the symptoms of which the patient complains; those noticed by the osteopath are a slight deviation of the jaw to one side or the other when the jaw is opened and a flinching of the patient due to tenderness when pressure is exerted over the articulation of the jaw. When the physician places his fingers around the jaw, anterior to the angles, and the thumbs over the bridge of the nose, having patient open the mouth, at the same time exerting pressure with the fingers and thumb, a sharp click may be elicited by the return of the jaw into its articulation.

In disease of the **scalp** the condition of the muscles of the scalp should be taken into consideration. The muscles are usually found contracted. The contraction of the muscles is generally due, as well as the disease of the scalp, to derangement existing in the posterior branches of the upper five pairs of the cervical spinal nerves.

In the **neck**, anteriorly the **hyoid** is the only bone to consider. It is easily palpated by standing at the head of the table and with the second finger of each hand outline both ends to ascertain its relation with the thyroid cartilage. Note carefully any contracted tissue or glandular enlargements which might cause undue tension. The tilting of either end of the hyoid

from these contractions is productive of much throat irritation. At the same time the **larynx** may be examined. It may be prolapsed, causing irritation of the laryngeal group of nerves. The **thyroid** and **cervical** glands should be palpated for enlargements, and all the muscles and ligaments for contractions. Externally the **tonsil** may be felt by deep pressure in front of the angle of the inferior maxilla.

The Ribs.—Under the osteopathic diagnosis of the ribs will be included the examination of the clavicle and sternum. To be able to diagnose intelligently, the position of the ribs in detail is very necessary to the osteopath. Many of the diseases of the heart and lungs, besides a large number of the diseases of the digestive tract, may be traced to a deranged rib; also, occasionally diseases of different regions of the head and neck may be due to dislocated ribs. In making a thorough examination of the ribs each rib should be carefully noted as to its position. The ribs may be examined when the patient is sitting up; but it is better to have the patient flat upon the back and especially so if the floating ribs are to be carefully examined, because the muscular tissues of the side if contracted will interfere with the diagnosis. In many instances the rib lesion is secondary to a vertebral subluxation.

An expert osteopathic diagnostician will be able to detect at once by a single passage of the hands down over the ribs if there are any disorders of them. In passing the flat of the hand, especially the flat part of the fingers over the ribs, carefully observe if the intercostal spaces are too narrow or too wide, and if any of the ribs are unduly prominent or depressed. If an intercostal space is too narrow it shows that the ribs on either side of the intercostal space are too close together. Then the question arises, which one of the ribs is crowding upon the intercostal space, or whether both of the ribs are crowded together. Usually when the sternal end of the rib is displaced upward, the involved rib is prominent and when displaced downward the rib is depressed. Thus it is commonly easy to diagnose which is the involved rib. Besides finding an abnormal position of the rib there will be more or less tenderness over the rib. Finding a rib prominent or depressed and tender is generally quite conclusive that the rib is displaced. Then the range of movement as expressed through the sense of resistance is a helpful guide in diagnosis.

If a **typical rib** is placed upon a flat surface and one end of it is depressed the other end will be elevated and *vice versa*. This peculiarity holds true as well when the ribs (typical) are dislocated in the living body. If the anterior end is elevated the posterior end is commonly depressed and *vice versa*. Care should be taken in examining the first rib and the false ribs, for in these ribs this peculiarity is not found.

As a whole a very complete diagnosis can be made of the condition of the ribs by examining the anterior part of the thorax, although it is always best to examine along the angles of the ribs if for nothing more than to confirm the diagnosis made at the sternal ends. Still it must be remembered that the preceding only holds good when the entire rib is dislocated. Many times simply one end of the rib is deranged and the other end is practically intact.

Besides careful examination of the sternal end of the rib, attention should be paid to the condition of the costal cartilages. The costal cartilages may become deranged at either the articulation with the rib or with the sternum. The same rule holds good when the costal cartilages are dislocated as when the ribs are dislocated, i. e., when the cartilages are prominent, they are usually displaced upward and when depressed the cartilage is displaced downward toward its neighbor.

One is apt to think that a rib is only dislocated at its vertebral end. Although lesions of the vertebral end are generally of greater significance as far as the etiological factors are concerned, still the sternal end of the rib must not be overlooked. In examining the vertebral end of a rib attention should be paid the angles of the ribs, for at the angles a better opportunity for examination is given on account of the prominence. It will be necessary in many cases to find out whether or not the vertebral end of the rib is lying between the transverse processes instead of in front of them. In many severe lesions of the ribs the vertebral end of the rib is dislocated upward or downward from the transverse process of the vertebra and lies between the transverse processes of the vertebræ above and below its attachment. This certainly requires considerable skill in the diagnosis, for oftentimes the point to be found is barely an eighth of an inch in diameter. It is usually best before making such a close examination to relax the tissues well over the field of examination.

The **ribs** as a whole may be too transverse or too oblique upon one side. This is chiefly found in pathological curves of the spine, but still such conditions may exist where there are severely contracted muscles, especially in some cases of paralysis. Thus the contour of the ribs must be taken into consideration by comparing one side with the other.

In examining the **first rib** an examination somewhat different from the other ribs should be given. It is best to have the patient assume a sitting posture; then place the middle fingers of each hand upon the first ribs near their centers and compare one with the other. Also note the difference of the spaces between the ribs and clavicles. Generally the first rib is dislocated upward, rarely downward. Besides finding an abnormal prominence or depression of the rib at its center considerable tenderness will be noticed. Examinations of this region are every day experiences with the osteopath.

When diagnosing the position of the **floating ribs** it is best to have the patient lie flat upon the back with the thighs flexed upon the abdomen, so that the tissues about the lower ribs may be entirely relaxed. Then by placing the flat of the fingers carefully over the ribs the outline and position of them can be easily discerned. The floating ribs are oftentimes found deranged and are the source of a great deal of suffering through the iliac regions. These ribs may become dislocated from the vertebral ends and drop down obliquely toward the iliac crest, or else the free end may become locked beneath the rib above. Occasionally both ends of the rib drop down quite perceptibly and consequently is the cause of considerable distress. In such instances the rib is depressed inward so that the normal contour of the lower thorax is lost.

An examination of the **clavicle** should be carefully made. Always compare the clavicle with its fellow and examine thoroughly its articulation with the sternum as well as at the acromial prominence. Often the sternal end of the clavicle is slightly dislocated posteriorly to the sternum; although it may become completely luxated. The acromial end may be dislocated upward or downward.

In examining the **sternum** special attention should be given the articulation of the manubrium and gladiolus. This is due to the crowding anteriorly of the articulation of the sternal parts. Normally until well along in adult life there should be some movement here due to its membranous

attachment. Occasionally the ensiform cartilage is turned inward, producing a tender point, but this rarely occurs. Also the articulation of the cartilages in the region of the eighth, ninth, and tenth ribs may be found considerably deranged, causing local tenderness and even stomach trouble.

Dorsal and **Lumbar Spinal Region**.—With the patient sitting on the table abnormal deviations can be readily noted. There may be lateral swerves, from muscular weakness, or unilateral tension, involving the whole spine or less, or a reversal of natural curves, i. e., the spine depressed anteriorly between the shoulders and posteriorly in the lumbar making the straight spine. There may be, also, an exaggerated normal curve in the dorsal region producing a kyphosis with a compensatory lordosis in the lumbar region sufficiently great to change its relations with the pelvis. By the method previously given, now outline the spinal column for lateral and bilateral scoliosis. These, frequently, are at their incipiency, and to the casual observer would pass unnoticed. It is well to make an outline of the spine before beginning treatment, and at times following, that progress may be observed. A simple method is lead tape which can be had from any plumber shop and can be molded to the deformity and traced on paper together with date of examination. H. F. Goetz has perfected an appliance for outlining and recording these deviations. Observe well the ligaments, as well as extent of joint movement, under deep palpation; from irritation they may become thickened and more or less fill the spaces about the spines and transverse processes, causing a rigid, smooth spine.

To make a detailed examination the patient should be stretched out on one side upon a treating table, although the general examination may be sufficient. Then, standing in front of the patient and reaching over him, a most careful diagnosis can be made. Do not stand back of the patient as the flat of the fingers can not be used to advantage in outlining the different vertebræ. The various contracted muscles that may be found along the spinal column will be of valuable aid in locating derangements of the vertebræ and vertebral ends of the ribs. By using contracted muscles along the spinal column as a guide for locating lesions, reference to the large superficial muscles is not made, but to the small areas of contracted fibres of the deep muscles. It is the deep muscles that become more or less contracted, and even fibrotic, when lesions of the vertebræ and ribs exist. The superficial muscles are generally contracted by atmospheric changes,

slumped postures, wrong habits, etc., and are not generally the result of disorders in the osseous system. The preceding points in regard to contracted muscles cannot be too carefully observed for there is a tendency among many osteopaths to treat the contracted deep muscles as primary lesions in nearly every case. Remember that if they are not due to the motor nerve fibres of the muscles being irritated by the spinal lesion, or to a reflex stimulus, or to a compensatory change, that although the muscular tension may be the inception of the almost certain interosseous lesion, still the leverages secured through bony adjusting are very essential not only in correcting the osseous malposition but in loosening and releasing fibrous muscles and thickened ligaments.

Thorax.—Examination of the thorax as a region has been largely gone over in speaking of the ribs and their sternal attachment, cartilages, sternum and the clavicles, but its appearance as a whole should be carefully noted for it will be a valuable aid in diagnosis. Deviations from the normal, such as the emphysematous or barrel-shaped chest in asthmatic affections, or chronic cough, or accompanying kyphosis, the flat chest and its association with phthisis, the rachitic, etc., should be considered. Spinal deformities are reflected in the thorax by marked changes in contour, such as elevations and depressions corresponding to the spinal changes. These result in marked interference with the thoracic organs and in young subjects are of particular interest. Rib changes are frequently the result of vertebral deviations.

Abdomen.—The position for examination of the abdominal viscera is usually with the patient supine, head slightly elevated, knees drawn up partially and supported to relieve any muscular strain, and with the hands at the sides. In this position complete relaxation is obtained. Observe any enlargements from gas, fluid, or tumor, muscular changes, color, etc. The patient may, also, be placed upon the side, and in the knee-chest position for further verification of the diagnosis. Where the abdominal wall is much relaxed, or there is a pendulous abdomen with enteroptosis, there will be found a change of relations of the viscera by these different positions, allowing them to be palpated in another position. When there is marked tenderness it is often possible to go deeper with less discomfort with the patient in the knee-chest position. The Trendelenburg position may also be utilized. Where ascites is suspected palpation should be made with the patient in various positions in order to note changes of location of the fluid.

Frequently much can be learned by inspection with the patient standing. Clues to visceral disturbance can often be had by tracing the nerve connection from the spinal lesions to the suspected part.

In examining the **liver** care must be taken that any gouging or severe bruising of the organ does not take place. The liver can be outlined by percussion and also by palpation of its lower and inner borders Congestions, atrophy, enlargement or hardening should be noted, also any change in position.

A rather complete examination can be given the **biliary tract** from the **gall-bladder** to the **duodenal orifice** of the **biliary duct**. By a careful inhibitory pressure over the duct the outline of the tract can be discerned providing the patient is not too stout. When the tract is swollen considerable tenderness will be present. The patient will complain of a stabbing or piercing pain upon pressure and manipulation if the duct is inflamed.

Usually the tenderness is greatest nearer the **duodenal orifice**. The duodenal orifice is about one and one-half inches diagonally downward to the right from the umbilicus. In cases of impacted **gall-stones** the osteopath as a rule has very little trouble in locating the stone.

The **spleen** may be percussed and when in a markedly enlarged condition its lower border can be palpated. Great care must be used in the latter condition as there is danger of rupture.

In examining the **stomach** the usual methods of inspection, palpation, percussion, analysis of the contents, etc., are employed.

Palpation and manipulation over the **intestines** are practiced a great deal by the osteopath in various intestinal diseases. By his educated sense of touch he is usually able to locate at once any **impactions** of **fecal matter**. Such impactions are generally found in the ilio-cecal and sigmoid regions. In the various acute **obstructions** from invagination, tumors, twists, adhesions, spasticity, knots, etc., many times one is able to readily locate the seat of the disturbance. There is one point to specially emphasize; that is, do not overlook prolapsed regions of the intestines; such occur frequently and are a source of considerable distress, especially constipation. Simple manipulation will never do much good, neither will spinal treatment or injections, as a rule. A specific treatment must be given and, that is, after

locating the exact point of prolapse, to reach carefully beneath the fold and replace it.

In emaciated subjects the **kidneys** can be readily located, and in a few instances when they are diseased one can feel the contracted tissues about them. Be very careful not to injure the **capsule** about the kidney. Do not punch or gouge them in the least; but locate the kidneys by a careful inhibitory palpation.

Lumbar and Pelvis.—The intimate relation between the lumbar spine and pelvis make a consideration of them as a region necessary. Outside of ordinary curvatures involving both the dorsal and lumbar regions there are certain conditions which involve but one structure and require careful differential diagnosis to determine whether the lumbar or pelvis is at fault. In the former the fifth vertebra is a weak point and is most frequently at fault. The deviations are usually a sidebending and frequently accompanied with some rotation. Occasionally a malstructure of the lower lumbar or pathologically relaxed ligaments will approximate the spines and be misleading as to the real condition. A rotation or lateral tilting of the fifth lumbar may have the effect of elevating the crest of the ilium so that the innominatum would appear involved. There will be a difference in the length of the legs, angles of feet when patient is lying on the back, anterior spines out of line and tenderness of the muscles attached near them. However, other diagnostic points of innominate lesions, i. e., tenderness of symphysis and sacro-iliac articulation, and prominence of the posterior spine, will be lacking. Marked deviation of other lumbar vertebræ may produce practically the same effect, but the lesion will be so apparent that there will be no doubt as to the cause.

To be able to diagnose accurately and intelligently the pelvic region requires nearly as much skill as in examining the cervical region. The pelvic bones are liable to many subdislocations, especially in the female. However, it should be remembered that many apparent innominate lesions are secondary or compensatory changes due to lumbar lesions. The pelvis as a whole may be tipped anteriorly or posteriorly upon the spinal column. It also may be twisted or rotated laterally upon the spinal column. The most common lesions are subluxations of an innominatum forward, backward, upward, or downward, or various combinations of these displacements, such as a tipping forward and downward of an innominatum, or a tipping

backward and upward, but these combinations do not always exist in the manner given. As a rule when the ilium is anterior, the ischium posterior, then the innominatum as a whole is downward; when the ilium is posterior, the ischium anterior, then the innominatum as a whole is upward. This is only a rule, there are exceptions to it; for in some few cases when the ilium is anterior, the ischium posterior, the innominatum may be higher, and when the ilium is posterior and the ischium anterior the innominatum may be lower.

To be able to diagnose such derangements will require skill and practice; still there are symptoms and signs that are characteristic of such disorders. In examining the pelvic bones have the patient flat upon the back at first. Be sure he is flat upon the back for a very slight variation may make considerable difference in the relation of the pelvic bones, one to the other, so far as the diagnostic points are concerned. Then go to the feet of the patient and grasp the ankles firmly, rotate laterally both legs, first to one side and then to the other, as well as pull and push both limbs slightly, and then bring the heels together directly in the median fine of the body and compare the length of the limbs at the heels. If there is any disorder whatever in one innominatum, and the thigh muscles have been relaxed thoroughly by the preceding movements and the heels are brought together in the median line of the body, a difference in the length of the limbs will readily be observed at the inner malleoli or the heels. For if the ilium is forward the ischium must be backward and as a rule the innominatum is thrown downward, thus causing an apparent lengthening of the limb which will be noticed by comparing the heels; if the ilium is backward the ischium must be forward and as a rule the innominatum is then upward, causing an apparent shortening of the limb on the affected side. A very slight variation in the pelvis will make considerable difference in an apparent lengthening or shortening of the limbs. Such conditions are generally met with several times a day by osteopaths. The object of the lateral rotary movement and the pushing and pulling of the limbs is to make sure that all the thigh muscles are thoroughly relaxed, for it is a very easy matter for contracted muscles in one thigh to produce an apparent shortening of the limb. Also be very careful in comparing the length of the two limbs at the heels where they come together that they are exactly in the median line of the body, for if they should be to one side or the other, however slightly, there would be an apparent lengthening of the outer limb as compared with the limb near

the median line. While the patient remains flat upon the back it is a good plan to compare the anterior spines of the ilia. It may be readily noticed that one is higher or more depressed than the other, which will help to confirm the diagnosis. It is a good plan also to have the patient sit up squarely upon the table and compare the crests and posterior spines of the ilia; thus one may be seen to be higher than the other. Then, also, note the angles of the feet when patient is supine; an everted foot usually means that the limb is shorter due to the tilted pelvis; the opposite is commonly true when the foot is inverted. However, this is not an absolute rule. Care should be taken in differential diagnosis of possible old fracture of leg, of infantile paralysis, of asymmetry, etc.

There are **three diagnostic points** exclusive of all other signs that are quite conclusive when coupled with the preceding examination. If an innominatum is dislocated or subdislocated there will be tenderness over the symphysis pubis on the side affected, tenderness over the ilio-sacral articulation on the side affected, and tenderness along the crest of ilium where the abdominal muscles are attached. When tenderness is found at these three points it is quite conclusive that the innominatum is deranged, for at the symphysis pubis and ilio-sacral articulation tenderness must exist if the innominatum is disturbed, and by a change in the crest of the ilium the abdominal parietes will be affected, provided they are not too much debilitated. Marked tenderness of the external cutaneous nerve as it passes over the crest of the ilium below the anterior spine will be noticed on the unaffected side (Dr. Still). There will be, on rectal examination, marked tension of the tissues on the affected side. Possibly the patient may complain of pain exclusively in one side along the pelvis and limb which will be a leading symptom telling which side is affected.

Additional diagnostic signs will be rigidity of muscles along the ilio-sacral articulation and abnormal prominence or depression of the ilium at its articulation with the sacrum, depending upon which way the innominatum has slipped. Considerable deviation of the pubic bones may be noticed. The pubic bone on the side affected may be either thrown upward or downward.

Radiographs have repeatedly revealed subluxations of the innominate bones in many instances. This is certainly quite conclusive in confirmation of the osteopathic ideas in regard to the pelvic bones becoming dislocated.

Sacrum.—Examination of the sacrum is best made with the patient lying on the side, with the osteopath standing in front and with the hand palpate its posterior surface. In the sitting posture its relation with both innominates can be determined. It is displaced posteriorly but seldom, the most frequent being anterior, downward, and a combination of the two. In the anterior conditions tenderness at the sacro-iliac articulations is a good point, but it must not be confounded with an innominate lesion. The downward displacement is shown by comparison with the lower lumbar vertebræ. Observe the relation between the two, as a change in contour of the spine will also change the angle of the sacrum and *vice versa*.

Coccyx.—With the patient and operator in same position as for the sacral examination outline the coccyx, as to first, **contour**; second, **rigidity**; third, **sensitiveness**. If abnormalities are detected go to the other side of the table and with a well lubricated index finger palpate its anterior surface. Changed contour, displacements, and old fractures can be readily determined. The most common deviation is anterior at its union with the sacrum. The lateral form generally resulting from muscular contraction is next, with posterior but seldom. "If the lower part of the sacrum is rotated backward, the sacro-coccygeal articulation or angle is affected or becomes more acute, since the tip of the coccyx is not displaced, but held in position by structures attached to it. If the sacrum is displaced downward the effect is about the same. Often this sort of sacral lesion is mistaken for an anterior luxation of the coccyx."[28] Remember that normally there should be some movement of the coccyx. It has a fibro-membranous articulation.

Uterine, **ovarian** and **rectal** examinations are largely of the same nature as those given by other practitioners, although osteopaths find that oftentimes other practitioners are mistaken in regard to the etiology of many diseases to which these organs are subject.

Arms and **Legs**.—There is comparatively little that is exclusively osteopathic in regard to the diagnosis of disorders of the arms and legs. One important feature that the osteopath finds in examining the arms and legs is that many of the disorders supposed to originate in the affected member are found to be caused from vertebral or rib dislocations. Innominate and lumbar lesions are particularly fruitful sources of trouble in the legs and feet. Always carefully examine the spine in the region of innervation to the arms and legs when they are affected. The shoulder and hip joints, as well

as all joints, are subject to partial dislocations. Many times when pain or other symptoms are presented in the arms or legs the trouble is at the shoulder or hip joint or in the spinal column. There are two regions that are very apt to be overlooked in the examinations of the arms and legs and they are the elbow joint and the fibula. The small bones of the **ankle** and **wrist** as well as of the foot and hand are subject to many dislocations which are easily discerned upon examination and often overlooked. Special emphasis should be given in regard to many supposed diseases of the knee joints which are really caused by lesions in the spine or at the hip joint.

Osteopathic Prognosis

Everyone is of the opinion that to forecast the probable result of a disease is one of the most difficult problems the physician has to meet. To state the duration, course, and termination of an attack of disease as presented by its nature and symptoms implies an accurate knowledge of both disease processes and changes, and an insight into the individual's idiosyncrasies backed by ripe clinical experience. And after each of these factors has been carefully considered to balance one against the other, nothing short of superhuman knowledge may present a sufficient insight in order to render an accurate prognosis. A prognosis represents the culmination of one's learning, an understanding of disease characteristics, and an insight into temperament.

C. M. T. Hulett[29] says: "Only when we can know all the conditions, causative and sequential, with their possible complications and terminations, together with a full history of therapeutic results in a large number of similar cases, and carefully analyzing and weighing these various elements, are we prepared to really make a prognosis." Nettie H. Bolles[30] writes as follows: "The prognosis depends upon the cause of the disease, the possibility of removing the cause, or the likelihood of recurrence of causes, and the chances of avoiding such recurrence. The circumstances to modify the outlook are various and deserve careful consideration." It is not the purpose here to go into the many essential details, for that would mean an outline and forecast of all disease processes, and the effect of numerous extenuating circumstances. The medical profession have been gathering data for these three thousand years and

prognosis with them is still inaccurate and incomplete. Osteopathic science will add just so much to the accuracy of prognosis as the sum total of the knowledge displayed in the fields of osteopathic etiology, diagnosis, pathology and therapeutics. Suffice it to give here a few salient practical hints as noted in the osteopathic treating room and at the bedside.

Osteopathically it may be said that prognosis depends, first, upon the true conception of osteopathy; second, upon the relative value of all factors pertaining to health and disease; and, third, upon the skill (technique and native ability) of the osteopath. The first and second being granted, the third includes a remarkably practical and pregnant field, for in no school does the physician get into as close touch and understanding of the actual condition of the patient's disorder as in the osteopathic. Although the fundamentals and principles of the osteopathic conception of diseases are really broad, liberal, and all-inclusive, still owing to the fact that each individual (and thus each disease) is more or less a law unto himself should there not be absolute tables and prescriptions to be governed by; remember, however, this does not imply our fundamentals are not basic or our principles are not truths, but rather the application and execution of the same are as varied as the individual's constitution, temperament, and disease. Herein rests the really difficult practical consideration of etiology, pathology, diagnosis, treatment, and prognosis. In other words, if the diagnosis and treatment are accurate the result rests entirely with the patient.

First, too much emphasis cannot be placed upon the fact that prognosis is dependent upon the osteopath—his education, training, ability, experience, and technique. One's fitness is most important. And fitness and personality complement each other. An osteopath may know theory and still not be practical; still one cannot be practical unless he knows theory.

Second, osteopathic treatment frequently changes the usual course of acute disease. It is well known that many diseases have a certain regular course in their history. Many times the osteopath will be able to abort, lessen the severity, or cut short the ailment, thus changing the recognized symptoms and termination.

Third, the knack of treatment, or knowing how to treat, not only one region of the body but all regions, not only one temperament but all temperaments.

Fourth, the preparatory treatment before correcting the lesion. Prevention, palliation, or cure, and thus prognosis, may be dependent upon a necessary preparatory treatment. Here is where a study of the patient's temperament is very essential.

Fifth, a prolonged treatment may defeat one's purpose. As a rule a comparatively short, thoroughly indicated, specific treatment is best.

Sixth, much, relative to prognosis, can be told by the tone of the vertebral ligaments. When a lesion corrects too easily or does not remain well in place it shows a lack of tonicity on the part of the ligaments and muscles. Improvement is in direct ration to the increase of tonicity.

Seventh, special care should be taken with the irritable spine. This spine commonly precedes the debilitated spine. Unless precaution is taken to apply inhibition before treating specifically a cure may be prevented or at least the disorder prolonged.

Eighth, relaxation of muscles is not always essential, although the lack of it may prevent the correction of primary lesions. The relaxation should be carried out with care in order that all shock and irritation may be kept at a minimum.

Ninth, needless stretching, traction, extending, rotation, and snapping of the neck is not only useless but may be positively dangerous. Rarely is it necessary to go through the above "movements" as many are accustomed to do.

Tenth, it may be necessary, but not always, to give as additional treatment, after the anatomical defect has been specifically treated, a certain amount of stretching and moulding of the parts.

Eleventh, owing to the close personal relations of physician and patient, personality has a powerful influence on prognosis.

Twelfth, too much emphasis cannot be placed upon the uselessness and injurious effects of over and misapplied treatment.

All of the above have a positive bearing on prognosis. The osteopath should study his technique well. He will find that it gradually changes and improves from year to year. In a word, as he gains in experience he will become more skillful by giving careful attention to the development of the

sense of touch, by noting the resistance of the tissues, and a score of details that are very hard to describe but the sum total of which determines and indicates the successful osteopath.

Another practical point that bears upon prognosis as well as upon the health of the osteopath is the manner of giving treatment. First, the height of the treating table should correspond to the height of the practitioner. The table should be made for the practitioner and not the practitioner fitted and warped according to a certain table. Second, give part of the treatments on a treating stool. Here there is greater freedom of movement on the part of the patient, hence greater and more effective leverage can be obtained. Suit your treatment to the patient, not your patient to the treatment. Third, make your weight count for energy expended in the treatment. As soon as one set of muscles become tired substitute another set, e. g., the back muscles and the arms, the arms and the hands. Fourth, whenever possible substitute the weight of the patient for expended energy. Fifth, when lifting keep the spinal column straight; do the bending of the body at the knees. Hence a better treatment and a more favorable prognosis, and besides that new occupation neurosis, the "**osteopathic back**," will be materially lessened in both severity and frequency.

FOOTNOTES:

[26] See Tubby, Deformities.

[27] Clark's Applied Anatomy, p. 334.

[28] Clark's Applied Anatomy, p. 331.

[29] Prognosis—Journal of the American Osteopathic Association, Jan., 1906.

[30] Prognosis—Journal of the American Osteopathic Association, Nov., 1902.

OSTEOPATHIC TECHNIQUE

The technique of treatment is, in a sense, a personal factor, for it is a well known fact no two osteopaths treat just alike. Nevertheless, the principles of technique are constant and universally applicable, and he who applies them with specificity manifestly secures the best results, and exhibits a technique that is finished and characteristically osteopathic. General manipulations are not essentially osteopathic, although by employing them a few definite results may be obtained; still such technique should not be classed as distinctive osteopathic therapy. Every case is a law unto itself and must be studied individually in order to be able to understand it perfectly. So much depends upon the ability of the osteopath in the treating of a case, that in order to meet the indications intelligently he must have command of the various anatomical details of the body, not only in his mind but upon his finger tips.[31]

The **sense of touch** should be very acutely developed and this requires months of persistent, practical experience. A carefully educated sense of touch is the keynote to both osteopathic diagnosis and operative technique. From the very nature of the osteopathic conception—the physical body viewed as a mechanism whose disordered or diseased conditions demand anatomical readjustment—it is imperative that a delicate and educated sense of touch be acquired in order to logically and successfully apply its tenets. Proficiency means not only being able to note certain small physical irregularities, and various degrees and areas of muscular contractions, and variations in body temperature, but the extent and state of vital resistance, that is, tissue condition, and the feeling of organic resistance, e. g., the heart, lungs, liver. These are the special features wherein osteopathic fingers detect disease causes and traces. To know the difference between normal and abnormal structural deviations and distortions, as well as organic changes, requires an accurate, detailed knowledge of anatomy and pathology with a systematic daily education of the sense of touch; but to realize, appreciate and know by tissue resistance feeling that nutritional condition is improving requires much more practical experience.

Thus two very practical points should be taught to and thoroughly impressed upon every osteopathic student: First, **the sense of resistance of the tissues**. This gives us an absolute clue to the vitality of the patient. As has been stated, there is a vast difference between the feel, the sense of resistance, of normal and abnormal tissues; for instance, a normal muscle and a contractured muscle, a normal liver and a congested liver, a normal intestine and a prolapsed intestine and these differences comprise innumerable gradations.

Second, **the receptivity of the patient to treatment**. This is dependent upon the vitality of the tissues. The sense of resistance to touch gives us an important diagnostic clue; the receptivity of the patient to treatment tells us much as to prognosis. After a few treatments the receptiveness will be positive or negative; that is, the patient is, or is not, responding to treatment. Consequently the receptivity of the patient usually tells much as to the state of nutrition.

Definite principles should be followed when applying the technique, for the osteopathic lesion is a "structural perversion," thus indicating mechanical readjustment for its correction. The time is coming when the technique will be taught graphically and mathematically. This would not be a difficult thing to do, and it could not but prove invaluable aid to the student. He can then the more readily and comprehensively grasp the principles involved. To resolve and illustrate manipulative readjustment to and by the principles of mechanics would add considerable to osteopathic development. For example, how nicely the correction of certain innominata maladjustments illustrates the principle of the wheel and axle. Vertebral and rib displacements when readjusted make application of the principles of the simple machines. We are gradually approaching a more comprehensive understanding of the physiologic movements of the spine and of the etiologic role of muscle tension. This is part of the foundation work. Great care must be exercised in correlating this data with the individual case, for in therapy we are dealing with abnormalities—not alone normal physiologic changes. If our distinctive dynamics and therapeutics were taught in this manner the average osteopath would be more specific and comprehensive in his work and as a consequence more scientific. And consequently the principles involved in each and every case would stand out clearly. Hence

diagnosis would be more exact, routine pommeling discarded, and better all around technique executed.

Two general rules are applicable to all dislocations, whether partial or complete: 1. Exaggerate or increase the dislocation. This is to relax the tissues about the dislocated articulation and to disengage the articular points that have become locked. 2. Reduce the dislocation by retracing the path along which the parts were dislocated. Hence to **correct** a **lesion**, for example, a vertebral lesion: (1) Exaggerate the lesion. (2) Place the fingers of the hand that are not employed in exaggerating the lesion over the extended portion of the lesion. (3) Extend the region that is flexed when the lesion was exaggerated. (4) When the lesion is being extended produce traction and slight rotation of the region. (5) At the same time extension, traction and rotation is being produced push in upon the extended portion of the lesion. To this might be added for sake of clearness and greater assurance of success: (a) Be positive the focal point absolutely corresponds to the lesion, or else most if not all of your effort will be useless. (b) Just before reaching the maximum of exaggeration have your fingers correctly placed for the readjustment, and at the very moment of maximum exaggeration or just a fraction of a second prior begin to correct or readjust, or else you will lose the vantage gained and the operation will probably be a failure. (c) The general traction and rotation are to aid in unlocking the lesion, not to readjust as some may think. Inhibiting and releasing the soft tissues, such as spasms, contractions and contractures of muscles, and stretching thickened and adherent ligaments is very important preliminary work. Then, next to securing exact leverages an essential point is to maintain the release or exaggeration until the readjusting step is incepted. In other words, coordination of all factors is the desideratum. The lack of this is the cause of many failures. Hot fomentations frequently assist in relaxing irritable and spastic soft tissues. This, however, is but a preliminary measure. All rough handling, needless snapping of parts, and excessive rotation and stretching are not only apt to tighten the lesion more, shock the system and irritate the parts, but it may be absolutely dangerous.

It should not be forgotten that the osteopath includes many measures in his treatment of various diseases, as nursing, dieting, hygiene, sanitation, hydrotherapy, antidotes, antiseptics, etc., and does not depend upon

readjustive manipulation alone, although correcting disordered anatomical structures and perversions are paramount in the treatment.

The General Treatment.—A general treatment but accentuates the ignorance, in a majority of cases, of many so-termed osteopaths. It is a deplorable fact that there is a tendency among some osteopaths to give general treatments in every case presented. The only explanation of such a procedure that one can think of is a lack of conception as to what osteopathy really is. To give a general treatment in every case is not only actually detrimental to the patient but it is the height of folly on the osteopath's part, for it gets him into a slovenly habit of procedure from both scientific and curative points of view, besides giving the outside world an impression that osteopathy is but little different from massage and Swedish movements instead of skillful, mechanical engineering of the human body. But a "general treatment" is not to be confused with definite attention to be a series of more or less interrelated lesions. The essential point is to normalize the body when and where distinctly indicated and after a skillful manner.

A general treatment, broadly speaking, should be given only under three conditions: (1) Constitutional diseases that are to be treated symptomatically. (2) Certain anemic cases. (3) When one is ignorant of the real cause of the disease. Each of these conditions is self-evident why a general treatment should be given. A fourth might be added, for those individuals who think they are not getting value received unless they are treated from head to foot. Such patients are usually ignorant of the philosophy of osteopathy and it is the osteopath's duty to teach them differently.

The general treatment consists in stretching the spinal column from the atlas to the coccyx and relaxing all contracted muscles along both sides of the spinal column, besides giving special treatment to the cervical region, between the scapulæ, the splanchnics and internal and external rotation of the legs. It is no wonder that fake osteopaths do cure a case occasionally. They are quite certain to correct some disorder by pulling and hauling a patient around in such a manner. Still on the other hand they are very likely to do injury to the patient. Those who claim that no injury can come from osteopathic treatment are mistaken. One can injure a person by treatment if he is not careful. It does not stand to reason that the most delicately

constructed mechanism should stand any amount of manipulation and misdirected force that may be given it.

Positions of the Patient and Physician in Treating.—The position of the patient when a treatment is given depends altogether upon the affection to be treated. Probably about one-half of the cases can be treated to advantage upon a table, the remainder sitting on a stool. Many osteopaths treat nearly all their patients upon a table. It is much better to change back and forth, because to correct a certain disorder may be hard upon the table, but will be comparatively easy when the patient is on a stool, and *vice versa*. Besides, constantly changing back and forth rests a physician greatly.

Learn to treat in various positions, because it will be impossible to have all cases assume a certain position when being treated; and especially in treating acute cases one is obliged to suit his treatment to the patient and not the patient to the treatment. There is also a tendency for one to get into slovenly habits of treating when patients are all placed practically in one position, and certainly one cannot treat all cases in one position to equal advantage. Also learn to treat as well with one hand as the other. Many times one will be in such positions that equal use of either hand will be required. Carefully educate the sense of touch in both hands.

Another point should receive consideration: learn to shift the strength exerted in treating from one set of muscles to others. For example, when one is standing for a long time he will continually shift his weight from one limb to the other. In the same manner in treating use the strength of the hands awhile, then the arms, then the muscles of the back, then the weight of the body, etc.; all in such a manner that there is a constant change by utilizing certain groups of muscles for the same work, as well as utilizing the weight of the body of both physician and patient to advantage. It rests a physician greatly and thus allows him to perform a maximum amount of work with a minimum amount of strength and labor.

It is frequently an advantage to the physician to treat upon the nude skin, thus preventing the fingers from becoming tender. Gowns can be easily made that open down the back so that the patient does not have to disrobe.

The Neck and Head.—In the treatment of the neck the patient may assume the sitting posture or lie flat upon the back. The latter is preferable, as then one has complete control of the neck and head. Absolute control of a

part is always necessary and when this is secured the dangers are reduced to a minimum, provided always that reasonable discretion as to the amount of strength, is used. Before correcting the various deviations of the cervical vertebræ it is usually best to thoroughly relax all the muscles, superficial and deep, about the field of operation. In relaxing muscles three methods may be employed. The muscle may be firmly grasped and manipulated until relaxed, or a firm pressure may be exerted upon the muscle and thus inhibit its nerve force until the muscle relaxes, or the muscle may be longitudinally stretched. The second method is comparatively slow and is usually given in acute cases where the patients are so weak and exhausted that they cannot stand any severe manipulation. This method, however, has certain advantages when employed as a preparatory step in interosseous adjustments, though steady traction accompanied with slight rotation, if precisely localized, has many advocates.

In relaxing muscles by manipulation, grasp firmly the belly of the muscle and draw outward on the muscle several times until it relaxes. If the patient is sitting, place one hand upon the head of the patient or about the chin in such a manner that complete control of the head is maintained throughout the procedure; then with the fingers of the other hand upon the contracted muscular fibres a manipulating or kneading of the muscle can be given. It is best to flex the neck and head to the side where the contracted muscles are, so that a better hold of the muscle may be maintained; then by a series of flexions and extensions with manipulation of the contracted muscles outward, results can be readily obtained. When the patient is lying on the back the physician may stand to one side of the patient's head and with one hand on the forehead of the patient and the other hand around the opposite side of the neck, a rotary motion of the head and neck, which is equal to flexion and extension in the sitting posture, may be given by the hand on the frontal region while the other hand relaxes the muscles; or the osteopath may stand at the head of the patient and with either hand on the side of the head and neck of the patient a series of rotary movements of the head and neck may be given with manipulation of first one side of the neck and then the other; the hands and fingers being placed in such a manner that when the fingers of one hand are relaxing the muscles on its side the other hand is executing the movements of the head and neck, each hand continually alternating in the work. This latter method requires some practice in order

to do the work readily and successfully, for quite a variety of movements are required.

In the former method after one has worked on one side he is obliged to change to the other side and go through the same process. Movements may also be given to stretch the contracted muscles, thus overcoming the contraction and producing relaxation of the muscles.

After having relaxed the muscles over the field of operation, correcting the vertebræ will generally be easier to accomplish. In readjusting an atlas it matters but little whether the patient is sitting up or lying down. A firm hold of the atlas can be gotten in either instance. In correcting the middle and lower cervical vertebræ it is best to place the patient upon the back.

In correcting dislocations, as heretofore suggested, two general rules should be followed: (1) Exaggerate or increase the dislocation. This is to relax the tissues about the dislocated articulation and to disengage the articular points that have become locked. (2) Reduce the lesion by retracing the path along which the parts were dislocated. One can readily see that a dislocated ball and socket joint could be reduced only by the dislocated bone retracing the path by which it left its socket, for the capsular ligament would at once prevent its returning to the socket by any path other than that taken when dislocated. This applies to all dislocations to a greater or less extent.

After locating the exact position of the abnormal vertebra the first rule is applied, i. e., exaggerating the lesion by flexing the head in the opposite direction to which the vertebra is dislocated. Then with one or two fingers placed firmly upon the side of the vertebra in the direction dislocated, so that when the proper time comes the vertebra may be pushed or slightly rotated back into its normal position, with the other hand produce flexion of the neck, so that the angle of flexion is exactly over the involved vertebra; next produce slight traction, so as to be sure that the articular points will be disengaged; and then with rotation and extension of the head to a normal or upright posture, at the same time pushing in on the disordered vertebra, are the movements to be executed in reducing a dislocated vertebra. It takes considerable practice to be able to correct a vertebra and to know when it is corrected. The amount of force applied varies greatly in different cases. Cases of recent subdislocation require but little force unless there is marked

spasticity of tissue, while in long standing cases many times the amount of force required is about all that one wishes to exert. As a rule in many chronic cases it is better to give a series of preparatory treatments in order to reduce muscle fibrosis and thickening of capsular ligament. Remember that often it is a slight rotary movement or twist given that aids the most in executing rule second. No matter to what position a vertebra is rotated or side-bent the principles applied are the same in each case.

Be very careful when flexing, extending or rotating the neck that too much strain is not brought to bear upon the ligaments. Some osteopaths seem to take delight in rotating and flexing the neck to a great degree. It is a dangerous procedure and moreover does not accomplish anything in particular. It should be kept in mind that osteopathic treatment is scientific and not a number of general movements of various regions of the body. Locate the lesions exactly and then a specific treatment can be given in every instance. To illustrate the treatment according to the preceding rules we will assume that a certain cervical vertebra is anterior, say the fourth cervical. This means that there is an interosseous lesion between the fourth and fifth. The inferior articular processes and facets of the fourth have slipped upward and forward on the opposing facets of the fifth. First, hyperextend the head in such a manner that the fulcrum comes exactly over the displaced articulating planes, thus throwing the fourth vertebra still more anterior, or in other words, exaggerating the lesion or increasing the space anteriorly between the fourth and fifth cervicals, so that when the head is flexed forward and pressure is exerted upon the anterior part of the vertebra (body or transverse process) the vertebra will have room and release enough to occupy its normal position. Second, when the head is hyperextended place a finger anterior to the transverse process of the dislocated vertebra and with the other hand around the head, that is producing the hyperextension, throw the head forward with slight traction and rotation and at the same time push posteriorly quite strongly upon the dislocated vertebra. Follow out the same principles in all cases, no matter in which way the vertebræ are deranged.

There are several methods of applying the underlying principles of adjustment. Relaxation and leverages may be secured in various ways. Preciseness, expeditiousness and skillfulness can be attained only by considerable personal experience.

In cases where the lesion is between the skull and atlas have the patient sit on a stool with the back part of his head against your chest, and reach around the head with one hand under the chin; then with the other hand around the transverse processes of three or four upper cervical vertebræ pull the spinal column toward the median line, while at the same time lifting up on the skull with the other hand and throwing the skull toward the median line. The object of lifting up on the skull is to relax and disengage the articulations, by inhibition, traction and rotation, between the occipital bone and atlas. This is one method applicable to the various lesions of the occiput, which are of frequent occurrence.

In treating the **pharynx**, **tonsils** and **larynx**, outside of correcting spinal lesions, an anterior treatment to these organs is very effective. Examine the deep muscles beneath the angle of the jaw when the pharynx and tonsils are involved; and when the larynx is affected note the condition of the muscles on either side of the larynx. After locating deeply seated contracted muscles in the region of the angle of the inferior maxilla place the fingers over the contracted tissues, and then by a downward, inward sweeping motion toward the median line the muscles may be readily relaxed. When treating the larynx relax the tissues on both sides by an upward, inward movement. These treatments are very effectual when applied directly to the disordered tissues.

Attention should also be given to the lymphatics. In simple infections treat the glands very lightly but attempt to break down the surrounding edematous barrier. Release all the tissues down to and including clavicles, first ribs and pectoral and axillary regions.

To treat slight lesions of the **inferior maxillary** articulation, stand at the head of the patient when he is lying down and hook the fingers about the jaw just in front of the angles, and with the thumbs over the bridge of the nose have the patient open the mouth while considerable force is exerted against his effort. This reduces any slight dislocation of the inferior maxilla. When the jaw is completely dislocated place a piece of wood or hard substance between the molars and exert pressure upward and backward on the chin. If the dislocation is bilateral work on one side at a time.

The object of treatment to the **face** is to stimulate or inhibit points of the fifth nerve that come near the surface (see neuralgia of fifth nerve). While

the patient is lying flat upon the back carefully stimulate these various points, especially the supraorbital and nasal, with a downward and outward movement, or inhibit as indicated.

In treating the **scalp** relax the muscles over the scalp thoroughly. This is secondary treatment to correcting the innervation to the scalp at the upper four or five cervical vertebræ.

In cases of pharyngitis, tonsillitis, croup, hay fever, etc., an effective local treatment may be given through the **mouth** upon the soft and hard palate. Introducing a finger into the mouth clear back upon the roof of the soft palate, and with a downward and backward sweeping movement from the median line on either side toward the tonsils, considerable relief can be given the patient. This treatment relaxes the tissues, relieves the congestion, and gives a stimulating treatment to the local nerves. A treatment of the same nature may be given over the hard palate to affect the palatine nerves, especially in hay fever, when the itching of the palate and sneezing are extreme. In cases of young children it is best to protect the finger by wrapping a piece of cloth around it.

An osteopath should never give a manipulation or movement unless he understands why. Just as soon as one gives general imitating movements, from that moment his work is not that of a scientific osteopath, but of a Swedish movement curist and masseur and a poor one at that. The osteopath's work is to locate the anatomical derangement and correct it, as a mechanic would adjust any disordered mechanism. General treatment amounts largely to naught, although in some few instances it is of benefit.

To give a detailed description of the treatment of all lesions that may be found in the cervical vertebræ would be impossible in this sketch; only a general survey of the work can be given. Each case calls for special treatment, but the same general principles are applicable in each case. If there is any one thing that should be eliminated from osteopathic treatment it is those mechanical routine movements of rotating, flexing, extending, and various Swedish-movement-massage-like manipulations that certain osteopaths give in each and every case. It shows that they are imitators and do not have a correct conception of osteopathic therapeutics. True it is, that routine movements will have stimulating and other effects upon the system. But does the body require such treatment? Is it lack of exercise on the part

of the patient? If it is, then let the patient exercise himself. You do not want to lower yourself to be a mere "engine wiper," or an exerciser. If it is not the lack of exercise and the system is in need of certain treatment, then seek the cause and apply a specific treatment. Do not hide behind generalities.

The Ribs.—In correcting dislocated ribs many methods may be employed, but all are subject to the same principles as given under the treatment of the neck and head.

One of the best methods to correct typical ribs is to have the patient upon the side with the side of the affected ribs upward. Find out exactly the nature of the dislocation, i. e., what is the relation of the dislocated rib to the other tissues. Note whether the rib is upward, downward, inward or forward, locate exactly the dislocated rib. Then, while standing back of the patient, place your fingers upon both ends of the rib. Place your fingers in such a manner that when the proper time in the procedure arrives, all that will be necessary will be to push the ends of the rib into their articulations. For instance, if the rib is raised anteriorly and lowered posteriorly, you will place the fingers on the sternal end, above the affected rib and the fingers on the vertebral end, below the rib, so that when the rib has been released from its abnormal position it may be slipped into normal position. After having placed the fingers in the exact position necessary, have an assistant take the arm and draw it obliquely across the face, while at the same time the patient takes a forced inhalation. The object of drawing the arm across the face and the deep inhalation is to exaggerate the lesion—to draw the ribs out of their locked position—so that the fingers upon either end of the rib may push the rib into normal position. Drawing upon the arm raises all the upper ribs as well as the dislocated typical rib, principally by the use of the serratus magnus; also inhalation has an effect to throw the rib outward and upward and thus away from its articulation. Thus after the lesion has been increased sufficiently to loosen the rib from its abnormal position, the arm is relaxed, the patient exhales, and the fingers upon the ends of the rib correct the dislocation. This treatment is used to the greatest advantage when there is a dislocation of a typical rib; it can be given while the patient is lying down or sitting up, although the former position is preferable.

An excellent method, when the **sternal end** of the rib is dislocated is to have the patient sit upon a stool with his back toward the physician; then by placing the knee in the back (while standing up, or easier still for the

physician to sit upon an operating table back of the patient) over the vertebral end of the rib so that the rib may be held rigid posteriorly, reach around with one hand over the dislocated end of the rib and place the fingers upon the rib in the direction dislocated; so that when the rib is sufficiently released from its abnormal position it can be readily pushed into place; then with the other hand under the axilla of the arm on the affected side, pull up and back on the shoulder, so that the rib may be pulled away from its sternal articulation; and at the same time have the patient take a deep inhalation so as to aid in throwing the rib outward, upward and away from its sternal attachment; then when the end of the rib has been released sufficiently, relax the hold underneath the axilla, have the patient exhale, and slip the rib into its normal position by the fingers over the end of the rib. This is an excellent method. It is easy to give and does the work admirably.

Practically the same procedure may be gone through when the **vertebral end** is dislocated, by changing your position to the front of the patient, but there is danger of the knee slipping off from the sternum during the operation and injuring the ribs. Several other treatments may be given to correct dislocations of the vertebral ends of the ribs. For example, while the patient remains sitting the osteopath stands in front of the patient and reaches around both sides upon the angle of the ribs; then with an outward and upward movement of the fingers upon the angle of the ribs, they are pulled away from their locked position and allowed to slip into normal articulation. This treatment is applicable only when the ribs are dislocated downward, but it is one of the best treatments for such cases.

Another method oftentimes employed in correcting dislocations of the vertebral end of the ribs is to have the patient lie flat upon the side with the affected side upward; then by flexing the arm on the forearm and placing the elbow against the chest or abdomen reach over the patient upon the angle of the dislocated rib and pull it away from the vertebra; when it is pulled away from the spinal column sufficiently, push upward or downward on the angle of the ribs, as the case may demand. The elbow placed against you gives complete control of the patient and aids, by your weight, in throwing the rib upward or downward.

A treatment somewhat like the preceding one which is commonly employed, is to reach underneath the patient’s upper arm, when he is lying

upon his side, with the arm extended upward across the face; then by placing the fingers of the hand underneath the patient's arm over the angles of the affected rib or ribs and reinforcing the hand by the fingers of the other hand an upward, outward and rotary movement can be given the ribs, which pulls them out of their abnormal position and allows them to return to their normal articulations.

An effectual treatment to spread and raise the upper ribs is to have the patient flat upon the back, and with the fingers of one hand underneath the angles of the ribs and the other hand upon the elbow of the patient's arm of the same side throw the patient's arm across the chest transversely and bear down upon the elbow, at the same time spring upward and outward on the angles of the ribs with the other hand. By throwing the arm across the chest and bearing down upon the elbow a strong leverage can be obtained upon the upper ribs, especially those between the scapulæ. This treatment is very efficacious in certain lung and heart diseases.

Still another method of adjusting ribs is to have the patient flat on his face upon an operating table with the arms hanging down on both sides of the table and a small pillow or folded blanket beneath the upper part of the chest; then standing beside the table, or better still, with one foot upon a low stool and the knee of the other limb upon the table in such a manner that one is directly over the patient's dorsal region one is then in a position to have full control of the vertebral end of the ribs. If the ends of the ribs are displaced downward, placing the thumbs over the angles of the ribs and pushing upward and outward on the angles, the ribs can be very readily crowded into position. If the ribs, especially between the scapulæ, are dislocated in any direction, they may be quite readily corrected by placing the hand over the shoulder posteriorly and throwing it outward and upward and away from the spinal column in such a manner that the ribs are pulled away from the abnormal position; then upon relaxing the hold upon the shoulder with the one hand, the fingers of the unemployed hand may push upward or downward, as the occasion requires, on the angles of the affected side so that the ribs may be slipped into place.

Many times one is obliged to treat the ribs of one side as a whole. In such instances the ribs are almost invariably thrown downward except on one side of scoliosis of the dorsal region. Several methods may be employed to raise the ribs. Probably the best method is to have the patient upon the side

and with one hand upon the angles of the ribs and the other hand holding the wrist of the upper arm of the patient, an upward lifting movement is given both upon the angles of the ribs and upon the arm of the patient while the patient inhales. The work upon the angles of the ribs is to raise the ribs directly; the work upon the arm is to raise the ribs indirectly, principally by the use of the serratus magnus. Another effective treatment is to have the patient upon the back and with one hand over the anterior ends of the ribs and the other hand over the angles of the ribs an upward movement is given them by springing the ends of the ribs toward each other and by strong inhalation on the part of the patient. This treatment is most effective where the false ribs are at fault and especially in case of hemiplegia. While the patient is upon the back an assistant may take hold of the arm and draw it upward over the head of the patient, producing considerable additional upward tendency of the ribs, and the physician giving the same treatment of the ends of the ribs as before; or the physician may take an arm in one hand and raise it above the head of the patient and with his other hand around the angles of the ribs, and the patient inhaling deeply, the ribs may be raised.

A treatment used a great deal in raising the ribs as a whole is to have the patient sit upon a stool, and reaching around the patient from the front, place the fingers upon the angles of the ribs and raise them upward on both sides at the same time. This treatment can also be given by standing behind the patient and reaching around upon the anterior ends of the ribs and lifting upward while the patient aids you by deep inhalation. Remember that many times the ribs are drawn downward by contraction of the muscles, due to atmospherical changes and slumped postures. One should begin at the upper ribs in all treatments where the ribs are to be raised, as a whole, and work downward.

To correct the **first** and the **floating ribs** a different treatment has to be given than the foregoing.

An **upward displacement** is the most common lesion of the **first rib**. To correct such a dislocation, have the patient sit upon a stool and with one hand pull the head to the opposite side in order that the lesion may be exaggerated by traction of the lateral muscles of the neck (principally the scaleni) upon the rib; this disengages the rib from its abnormal position; then with the fingers of the other hand upon a point midway of the ends of the rib, exert a downward pressure at the moment the extended head is

relaxed describing a short arc. But don't relax head until readjusting pressure is exerted upon rib. If the patient is unable to sit up, and it is not best to give the foregoing treatment, have the patient flat upon the back, with one hand take hold of the arm on the affected side and pull down and out upon the shoulder so that the rib may be somewhat drawn away from its articulation and released from its position; then with the fingers of the other hand upon the center of the rib, or its highest point, press downward when the hold upon the arm is being relaxed. Correction of an upper displacement of the first rib is an every day occurrence. **Downward dislocation of the first rib**, is rare. To reduce this dislocation, place the thumb beneath the vertebral end of the rib, and with the other hand lift up strongly on the shoulder from beneath the axilla, at the same time exerting pressure upward with the thumb on the end of the rib.

The **floating ribs** may be dislocated obliquely downward, or the free end of the rib may be caught underneath the end of the rib above. In either case, in order to correct the displacement, place the patient upon the back with the thigh on the affected side flexed upon the abdomen so that the tissues about the field of operation are relaxed; then bear down carefully but firmly over the free end of the rib with the fingers until one finger can be hooked underneath the end of the rib; then with the other hand over the vertebral end of the rib, have the patient take a deep breath, at the same time springing the ends of the rib toward each other, thus relaxing the rib from its locked position; then have the patient exhale quickly and at the same time spring the rib into its normal position. It oftentimes requires repeated trials, especially in stout persons, and quite often the operation is painful to the patient. It is necessary that one should understand this operation thoroughly, as it is one of the most common treatments in osteopathic practice. The floating ribs are very liable to dislocations and may be the cause of many pains in the side, disturbances of the vessels as they pass through the diaphragm and inflammation in the iliac region. A palliative treatment may be given the floating ribs by having the patient lie flat either on the back or on the side; then place the hand near the vertebral end of the ribs and raise them upward while the patient takes a deep breath.

Treatment of lesions between the **manubrium** and **gladiolus** are best given by placing the patient with the face downward upon the operating table, and having the articulation of the manubrium and gladiolus just over

the edge of the table. An assistant should hold the patient firmly upon the table while hyperextension or flexion, as the case may require, with traction, is exerted upon the head, neck and shoulders, and manipulation of the articular points is given to reduce the dislocation. The same principles are employed here as in correcting lesions elsewhere.

Correction of the **cartilages along the sternum** is very easily accomplished by having the patient sit upon a stool and the osteopath standing behind the patient places a knee in the back; then reaching around with one hand over the cartilages and the other hand underneath the axilla, execute the same movement as given in correcting dislocations of the sternal ends of the ribs.

A treatment sometimes used to release a depressed condition of the **cartilages** of the **false ribs** is to stand behind the patient while he sits upon a stool and reach around him with fingers underneath the cartilages and raise them upward as he inhales. By having the patient take a deep breath and then exhale quickly while the fingers are over the cartilages a much better grasp of them can be obtained. This treatment should be carefully given, as there is danger of tearing the cartilages loose from the ribs.

The Dorsal and Lumbar Spinal Regions.—Here, as in other regions of the body, before an attempt is made to correct the vertebræ the muscles should be thoroughly relaxed. One of the easiest methods to relax the muscles is to have the patient lie upon the side, and then by standing in front of the patient and reaching over him with the fingers upon the contracted muscles an upward and outward rotary manipulation is given; or the patient may sit upon a stool while the physician stands in front with the arms around the patient and the fingers over the contracted muscles manipulating them upward and outward. Another very easy method is to stand behind the patient while he sits upon a stool and place a thumb over the contracted fibres, with the other hand underneath the axilla lifting the shoulder upward and backward so as to favor a relaxation of the muscles, while the thumb manipulates them.

In relaxing the **muscles** of the **lumbar region** have the patient on the side upon the table; then flex the thighs upon the abdomen with your weight against the knees so as to control all movements of the patient; reach over the patient with the fingers upon the contracted tissues and manipulate them

outward and upward on either side until they are relaxed. A method sometimes employed to relax the muscles of the dorsal, lumbar and sacral regions is to place the patient flat on his face upon the table; then by pushing up on the muscles from above downward with the flat of the hand they are easily relaxed. This treatment should be especially given when the patient's muscles are contracted by atmospherical changes and from standing in one position for a long time. When the muscles of the back are contracting they draw downward and many times draw the ribs with them, as well as tensing the tissues over the sacral foramina and obstructing or irritating the sacral nerves. By using the modern table longitudinally relaxing, or stretching, the lumbar and dorsal musculature saves considerable strength and effort of the physician.

To correct **vertebral lesions** of the **dorsal region** the same rules should be followed as in treating lesions of the cervical vertebræ. Treatments may be given with almost equal ease whether the patient is lying on the side or sitting up.

To illustrate the treatment of the dorsal region when the patient is lying down, assume that there exists a lateral lesion, combined rotation and sidebending, between two vertebræ; if the lesion is below the seventh dorsal use the legs as a lever, and if the lesion is above the seventh dorsal use the head and neck as the lever. Have the patient lie upon the side toward which the lesion is pronounced, either reach under the neck or around the limbs with one hand, and with the other hand upon the lesion bend the head and neck or the thighs in such a manner that the angle of the flexion is directly over the break in the spinal column; this is to exaggerate the lesion; then by lightly lifting up on the neck or limbs and with a slight rotation of this lever the flexed parts should be extended, at the same time exerting pressure with the hand over the lesion in such a manner that the vertebra is pushed forward toward its normal position.

Practically, the same treatment is given when a patient is sitting up, with the exception, of course, that the limbs cannot be used as levers. Lesions of the dorsal region or even the lumbar region can be corrected while the patient is sitting up. By this method considerable lifting is done away with. In fact, the weight of the patient can be used to great advantage by substituting it for one's strength. No matter in what direction the lesion is, the physician reaches around the patient's shoulders so that he just holds the

weight of the patient from falling to one side or the other; thus with one hand manipulating the lesion the other arm is around the patient guiding the weight of the body in flexion, rotation and extension. It is not always necessary to lift up on the patient but just let the weight of the patient act as strength applied to the power arm. Always make it a point when working upon dislocated vertebræ in any region that just as soon as one has obtained a slight movement in the lesion **do not attempt** to correct it any more for the time being. A slight movement toward the right direction may be all that is necessary to relieve the ill effects of the lesion. In fact it might be impossible to get the lesion anatomically correct as the shape of the vertebra may have conformed in a greater or less extent to its abnormal position.

An excellent method to correct the various combinations of rotation and sidebending of the third to ninth dorsals is to have the patient sit up with the physician either sitting or standing, depending upon height of seat, back of the patient. Have the patient lean back until head is supported upon shoulder of physician, and the anterior and posterior musculature of torso, abdomen and pelvis are thoroughly relaxed. Reach around the patient's chest with one arm, the hand of which is placed beneath the axilla. The thenar eminence of the other hand is placed upon the posteriorly prominent transverse process of the lesioned segment. Then with careful hyperextension, traction, and rotation and, sidebending of the torso, the anchorage is released, care being taken that localization is exact; this moment of coordination is accompanied with a thrust of the thenar eminence upon the transverse process. Relaxation, leverages and thrust must be precise and thoroughly coordinated.

To reduce vertebræ that are **deviated anteriorly** in the dorsal region, especially between the scapulæ, is often a hard matter. A satisfactory method is to stand behind the patient, while he is sitting upon a stool, and reach around both sides of him upon the sternal ends of the ribs corresponding to the anterior vertebræ; then have the patient relax with the head upon the chest, and at the same time take a full inhalation while pressure is exerted posteriorly upon the sternal ends of the ribs. The object of this method is to pull back the rigid ribs (the lungs being filled with air) which are attached to the anterior surfaces of the transverse processes of the vertebræ, and thus upon the anterior vertebræ pushing them posteriorly; all

of the muscles of the body being quite passive and the head relaxed on the body, a separation of the vertebræ is accomplished, thus favoring a crowding posteriorly of the subdislocated vertebræ.

To correct **vertebræ** of the **lumbar region** is on the whole much easier than in the dorsal region. Here the legs can be used as levers to great advantage. By the same method of flexion, rotation, and extension, as employed in the dorsal region when the patient is lying on the side, the result can generally be obtained.

Sidebending is the most common single lesion of the lumbar vertebræ, though there may be some rotation at the lumbo-sacral juncture. Occasionally malformation is found at the fifth. To correct the lumbar lesions the following method is often used: place the patient upon the side of the rotation or sidebending with knees flexed, buttocks well back and entire spinal column straight. Next bring torso and head, with spine straight, well forward to edge of table. Then with hand upon ilium tilt it slightly forward, and with other hand upon shoulder rotate entire spine, including head, so that spine is locked and the point of localization exactly corresponds to the lesions. This brings the spine back to nearly a straight position. Next, after a moment or two of tension-relaxation, either thrust back upon the shoulder or forward upon the ilium. Again exactly coordinating localization, relaxation and leverages is the key of the method.

The Abdomen.—Direct treatment of the abdomen is given in many diseases of its organs. The patient should lie flat upon the back, the legs flexed upon the thighs and the thighs flexed upon the abdomen, so that the abdominal muscles will be thoroughly relaxed; and then the various organs of the abdomen can usually be manipulated with ease. Remember that in many diseases of the abdominal viscera the treatment of the splanchnics and vagi will be the primary treatment rather than direct abdominal treatments.

In treating the **liver** directly, the ribs over the liver should be raised and separated, and the lower border of the liver manipulated directly, as considerable therapeutic results can be obtained, particularly when the liver is congested and enlarged. Manipulation of the **bile ducts** is very essential in many liver diseases. The treatment relieves congestion of the ducts and removes any collections of mucus in the ducts due to the congestion, as well as freeing obstructed flow of bile. The manipulation should be a deep,

downward one, directly over the path of the ducts (from about the cartilage of the ninth rib to the duodenal orifice of the biliary tract, the latter being about one and one-half inches diagonally downward and to the right of the umbilicus). Be very careful when first manipulating, and bear down lightly over the duct so that the structures superficial to it may be relaxed as the duct is deep below the surface of the abdomen. Usually the gall-gladder can be emptied by light pressure over the skin above the cartilages of the eighth, ninth and tenth ribs. The light manipulation acts, probably, by way of the spinal segment, as a stimulus to the dilators of the sphincters of the gall-bladder. Very likely through reciprocal innervation relaxing the sphincter of the bile duct will contract fibres of the gall bladder.

Manipulation of the **stomach** has considerable effect in strengthening its circular fibres and toning up the coats in general. In cases of gas formation, the gas in some instances may by manipulating over the stomach, be forced through the cardiac or pyloric orifices.

Direct treatment over the **spleen** by raising the eighth, ninth, tenth and eleventh ribs of the left side is effectual in congestion and enlargement of the organ.

In thin subjects the **kidneys** can be treated directly by pressing down carefully but deeply over the kidneys, and lightly crowding them upward and outward. This treatment also has some effect in relieving contracted tissues about the renal vessels and kidneys.

Treatment to the **intestines** through the abdomen is an effective treatment. In the various obstructions to the intestines, constipation, etc., the direct work is essential. Treatment of the intestines is to correct any abnormal position that they may have assumed, to relieve constrictions of the gut caused by contracted tissues, to relieve impactions and adhesions, to increase peristalsis and to tone up the intestinal coats in general. The treatment consists in a manipulation of the intestines, especially in the right and left iliac fossæ, and the pelvic colon, ascending colon and duodenum, as impactions and prolapses of the gut are more liable to occur at these points than in any other locality. In manipulating the intestines, work for a definite purpose and not give a general kneading treatment unless the walls of the abdomen and the coats of the intestines are weakened; in the latter case the spinal treatment is the primary one. In treating over the iliac region,

draw upward and inward on the folds of the gut. It is claimed by some authorities that nerves pass from the cutaneous surface of the abdomen directly to the intestine by way of the peritoneum; if such is the case, manipulation of the abdominal walls would have direct effect upon these nerve fibres. The abdomen may be treated when the patient is sitting up, but the treatment is not satisfactory. (See Prolapsed Organs).

The Pelvis.—The treatment of the pelvis is easy, but the difficult work is in making a diagnosis of the position of the pelvic bones. The pelvis is especially apt to become deranged by jars and falls. Some of the most successful osteopathic results have been obtained in correcting the pelvic region.

To relax the muscles over the pelvis, the patient should be on the side or upon the face; then relax the muscles by manipulating them upward, chiefly those over the sacral foramina. It is a good rule to adjust the lumbar first owing to release secured to the nerves supplying pelvic muscles and also to the fact that many pelvic distortions are secondary or compensatory to lumbar lesions. The easiest method to correct the innominata is to have the patient lie upon his side; then by standing in front of the patient slip one hand between the thighs and grasp around the tuberosity of the ischium, and with the other hand upon the crest of the ilium, the innominatum can be moved upward or downward and forward or backward (wheel and axle principle). Simply pulling or pushing upon these two points in whatever direction necessary is all that is required providing the soft tissues are thoroughly relaxed. By having the patient flat upon the back practically the same treatment can be given, but not to so great an advantage. In cases where the ilium is posterior and the ischium anterior, the physician may stand back of the patient, while he is lying upon his side, and place one knee against the sacrum and with one hand upon the ilium, with the other take hold of the ankle of the affected side (the involved side being uppermost in all cases where the patient is lying upon his side); pressure can be exerted upon the ilium and the limb pulled backward, thus correcting the derangement. This treatment should be avoided as much as possible, as there is considerable danger of pulling back too severely and injuring the patient; the lever is long and the amount of force exerted upon it cannot be judged precisely.

Another method is, with the patient on the back, flex and evert the knee to the side so the side of the foot lies flat on the table. Grasp the ankle with one hand and with the other on the crest of the ilium of the opposite side then, by pushing down firmly on the knee the articulation is gaped and at the same time the operator pushes with his body against the knee with a sharp thrust. This may have to be repeated a few times before the articulation is released and if one is keen he will easily detect the slight concussion carried down the femur as the adjustment takes place. This will correct a forward and downward innominate. For an upward and backward one, place the patient in exactly the same position and go through the same motions except that the knee is pulled toward the operator. If the desired "chug" is not felt and adjustment is not definite, the leg may be pulled down rather smartly by the ankle to a parallel with the other. This is a technique that is easy, both for the patient and operator, and will correct any but the most stubborn.

In the case of a greatly relaxed and atonic condition of the ligaments of the pelvis much trouble is experienced, often, in making the adjustment permanent. Many suggestions have been made and most of them useless but, probably the use of a belt of non-elastic webbing about two inches in width buckled tightly around the pelvis just below the anterior spines will do as much as anything and is a procedure well to follow in all such cases. Where there is a pendulous abdomen a support in the shape of a simple belt which should be so fitted as to act as a sling will transfer the weight of the abdominal viscera from the muscles, already stretched and atonic, to the belt and put the burden over the sacrum. This prevents the pulling of the innominatum in lesion again. Overcorrection is suggested as a means on the ground that it sets up irritation and induces fibrous ankylosis and for the same reason W. W. Howard places his patient prone and with thumb works the ligaments associated with the joint until they are thoroughly inflamed. The patient is then put in bed a few days and after the inflammation has cleared up the ligaments will be found to have shortened.

To correct a rotary lesion between the pelvis and fifth lumbar the patient should be placed upon the side, and with the body held firmly, the pelvis can be forced backward or forward as the occasion demands. (See Coccyx).

The Legs.—The origin of many symptoms manifested in the legs, as in the arms, are due to spinal lesions corresponding to the region of

innervation to the affected tissues. The derangements of the pelvic bones are a frequent source of symptoms that are referred to the legs and feet. The osteopath finds that a slight dislocation of the hip may occur which is especially likely to affect the knee. This partial dislocation is apt to be an upward-posterior one; the head of the femur resting in the upper and posterior part of the acetabulum. Many diseases of the legs and feet are due to local displacement of the bones. The method of treatment is the same as given in surgical works. (See Sprains).

A general treatment of the legs and thighs is oftentimes necessary; it consists of flexing the thighs quite firmly upon the abdomen, and executing thorough external and internal rotary movements of the thighs and legs. In a few cases both limbs are flexed strongly at the same time upon the abdomen. After giving these movements manipulation over the saphenous opening and beneath the popliteal space is performed. This general treatment tends to increase the circulation of the entire limb and to relax thoroughly all contracted fibres.

The Arms.—In treating the arms, care has to be taken that the affection is not due to spinal derangements; otherwise the arms are manipulated according to the disorder. Complete dislocations of the shoulder comes under the province of surgery. Many times the osteopath locates slight or incomplete dislocations of the shoulder. Partial dislocations of the shoulder are generally anterior. (See Sprains).

In cases where pain exists in the shoulder or arm, outside of locating the cause in the shoulder joint, the affection may be due to fibres contracting over the coracoid process, or a dislocation of the second or third rib, and in some instances the clavicle is deranged. Special care should be given to a possible bursitis and tendo-synovitis. Occasionally muscular fibres may slip out of the bicipital groove. Dislocations of the bones of the arm are treated according to surgical methods. The pains and various troublesome symptoms that may be manifested in the fingers or the hands are oftentimes caused by slight dislocations of the elbow, shoulder, ribs, or vertebræ, as low as the sixth to eighth dorsals.

The coccyx.—The coccyx, owing to its exposed position and rather unstable attachment, is subject to many injuries; more indeed than come to notice. Its injury results in many local and general disturbances owing to its

close relation to the sympathetics. Successful treatment of deviations often bring startling results. They may be divided into **fractures** and **displacements**.

In **complete** or **partial** fracture of the coccyx, as well as in dislocation, if the patient can be seen with reasonable promptness after the accident much can be done for relief of the pain and the prognosis is good for complete recovery.

Examination should be made externally and internally and after the condition is diagnosed about the same procedure is indicated for any of the conditions. With the patient on the left side introduce the right index finger, well lubricated, into the rectum and carefully relax all tissue within reach of the tip. If there are spasms of the coccygeal muscles, inhibition of the anterior nerves will quiet them. When this has been done place the left index finger externally along the body of the coccyx and holding it firmly both within and without release it longitudinally and then adjust. After this has been done it is well to hold it there until all danger of returning spasm, which might displace it again, is over, when the finger can be withdrawn.

The pain following will depend on the severity of the injury, but will keep up more or less constantly for several days. When severe, relief is often given by introducing the finger and relaxing contracted tissue which is pulling it from its position. Hot water bags placed next to the part will be of benefit. The bowels should be kept confined for forty-eight hours if possible in cases of fracture. Watch carefully the progress of union that the bones are *in situ* so there will not be deformity.

In diagnosing the first injury be sure that there is no splitting of the first segment or splinters which may require surgical interference. In old cases of fracture where there is complete bony ankylosis it is not justifiable to attempt any change, but where there is motion and a fibrous union, after preparatory treatments about one week apart, it can usually be replaced. Look well to any muscular contractions which might interfere with it. Force must never be used nor any attempt to replace until it has been first released from its articular attachment. In the various forms of **displacement** the same technique applies as in fractures, or the finger and thumb of one hand may be used, the tip of the finger internally at the sacro-coccygeal articulation and the thumb externally at the same point. Complete control of

the part is secured in this manner. Great care must always be used in treatment of any displacement of the coccyx. Contractions of its muscular attachments will often cause deviations in contour. Removal of the irritation and relaxation will allow it to assume its normal position.

The sacrum.—Adjustments of the sacrum as distinguished from the ilium in strictly innominate lesions are not many. When posterior with the patient on a stool the knee of the osteopath coveted by a pillow and placed against the sacrum and both hands grasping the anterior borders of the ilia, strong traction will move it into position. In a downward displacement with the aid of an assistant from behind holding the crests of the ilia firmly as the patient sits on the table, the osteopath in front clasping both arms about the patient and with a rocking motion from side disengages the sacrum and at the same time lifts it into position.

For anterior displacements use the technique described in replacing upward and backward innominate dislocation first right side and then left, which will result in correcting the lesion.

The preceding osteopathic technique includes a few of the treatments given by the osteopath. Although many osteopaths use methods not given here, those outlined are sufficient for illustrative purposes. A point which cannot be too thoroughly impressed upon the student is that osteopathic treatment is in reality **constructive** work, that is, readjustive, not only in detail, but in viewing the body structure as a whole. Detailed readjustment is an essential, still do not lose sight of the relation of the part to the whole. In our distinctive work anatomical construction is the basis of physiological function, although physiological stimulus is essential to anatomical development.

How often to treat.—How often to treat a case depends entirely upon the nature of the disease from which the patient is suffering. Just as in giving drugs the frequency of treatment is entirely dependent upon the seat of the disease and its severity. Acute cases require a thorough treatment at least once daily, and many times in severe cases the treatment has to be repeated several times daily. In subacute and chronic cases, as a rule, treatment should not be given as often as in acute cases; possibly once a day, but usually alternate days is better. In office practice cases are

commonly treated two or three times weekly. Still it is better not to treat some cases oftener than once a week.

There is more danger in treating too often and too long than in not treating often enough. The distinctive work of an osteopath is to correct disordered anatomical structures; and when a certain derangement has been corrected the tissues should have rest and plenty of time for repair. When treatments are given often, it simply keeps the tissues in an irritated state and nature does not have time to heal the diseased tissues. Always make it a point at each treatment to correct some definite lesion, and when the work is accomplished let the parts alone until the tissues have recovered as much as possible from the effects of the previous treatment before another treatment is attempted. The reason why some cases do not get cured under osteopathic treatment is simply because the osteopath keeps the diseased tissues in an aggravated state by the constant treatment so that they do not have the least chance to heal; the physician is thus adding irritation to the disease.

It is only by experience that one can tell how often to treat. Each case is a special study; what would be quite sufficient for a certain individual with a given disease would not be at all suitable for a second individual with the same disease. As in drugs what is suitable for one person would not be adapted to another, because the make up of each individual is entirely different; but here the parallelism diverges, for in drugs there is a foreign agent introduced into the system, while in osteopathic treatment the curative agent is entirely harmonious with the idiosyncrasies of the individual. It is for this reason that experience in practice is so essential.

Most cases should not be treated, as a rule, after a meal unless the patient is suffering from some digestive disturbance; for treating other regions of the body outside of the digestive tract causes more or less stimulation of the parts treated and thereby draws blood away from the organs of digestion. Cases of disordered brain circulation, where the patient is unable to rest or sleep at night, should be treated at about their retiring time so that the circulation of the body may be equalized, thus giving the patient undisturbed rest.

To show in a practical way the methods of experienced osteopaths in this matter G. J. Helmer[32] is quoted: “I submit the following table to illustrate

the frequency of treatment in one hundred cases taken from my practice: one case three times per week, sixty-three cases two times per week, twenty-two cases one time per week, nine cases once every two weeks, five cases once every four weeks. Comparing the present with the past, I find I am lengthening the time between treatments with much better results."

Another very practical side of the question and one which will be greatly appreciated by the patient, is the lessened cost for the same result in the less frequent treatments, as well as the saving in time. With the loss in going to the office, rest after treatment, not to mention possible wait while there, three times weekly represents more time than the average person can well spare and not infrequently will deter him from continuing. More especially is this true of those coming from a distance.

Length of Treatment and Overtreatment.—Naturally the length of treatment depends upon the case at issue and nothing more. There is no reason why any two cases should be treated for the same length of time unless they present identical lesions and then the personal equation of the two might present such a wide difference of aspect as to forbid such a proceeding.

The question of time has no place in the matter, save that it must not exceed physiological limits and be sufficient for the needs of the case. The patient should understand at once that it is to accomplish a specific purpose that the treatment is given, just as definite as a surgical or dental operation, and when the work is done it is time to stop. He would hardly be attracted to the dentist who guaranteed to use forty-five minutes in extracting a tooth. Good judgment is required in this as in all matters pertaining to osteopathy. There is a generally expressed opinion among the older osteopaths, based on experience, that: first, a short specific treatment is productive of best results and, second, treatments given under high tension when quick work is necessary are most satisfactory. Long treatments are debilitating and over stimulation amounts to inhibition. Further, in a long treatment it is necessary to go over the whole body, thus dispersing the vital forces (which have been stimulated for healing and upbuilding the pathological area) to parts not involved, thus defeating the very purposes intended. Dr. Still always advocated and gave the short, specific treatment.

The point always to be considered is the individual characteristics of the patient, and effects of the first treatment should be carefully observed. After a patient has been under treatment for any considerable time it is well to give him a vacation from treatment, and it is remarkable what improvement will be shown at times by such a measure and how seldom he will lose ground. Dr. Still presented this subject vividly as follows: “To treat the spine more than once or twice a week and thereby irritate the spinal cord, will cause the vital assimilation to be perverted and become death producing by effecting an absorption of the living molecules of life before they are fully matured and while they are in the cellular system, lying immediately under the lymphatics. If you will allow yourself to think for a moment of the possible irritation of the spinal cord and what effect it will have on the uterus, for example, you will realize that I have told you a truth. Many of your patients are well six months before they are discharged. They continue treatment because they are weak, and they are weak because you keep them so by irritating the spinal cord.” It is not a rare experience for a patient to leave apparently with little or no improvement only to report a complete recovery a little later.

Misapplied Treatment.—Probably in spinal treatment more risks are taken than in any other region of the body. To us as a school it is by far the most important and interesting area we have to treat, consequently it is not surprising that various general treatments and methods have been devised with the idea of getting quicker and easier results. Herein lies the danger outside of mistaken diagnosis, for short cut treatments can never take the place of time and skill. Technically speaking, if one thoroughly understands the philosophy of osteopathy and is conversant with the underlying principles of its therapeutics, there is absolutely no danger of even the slightest injury. It is the one who takes chances by not properly diagnosing and by not being cautious enough with delicate persons when applying his treatments that is apt to overstrain some tissue or organ and otherwise do bodily harm. Of the treatments considered dangerous not one of them is without merit if judiciously applied, but unfortunately in many cases they are in general and indiscriminate use. It is well to remember that we are moving structures which have never been moved before and that time enough has not elapsed to observe what the ultimate result may be. Again, in adjusting a subluxation of the spine do not forget that the force necessary for that adjustment, if misapplied, is sufficient to produce a lesion, and there

is no doubt that this has happened. Your patient's interests are above everything and must never be sacrificed for any reason whatever, so if at any time there is uncertainty always give the patient the benefit of the doubt. On the other hand the osteopath must have the courage of his convictions and fortunately when these are coupled with good judgment the results are all that could be desired. The following should be used with great caution if used at all:

First, **Indiscriminate stretching** of the spinal column with the aid of an assistant. It is not good osteopathy although there are some cases where it may be beneficial. While not specially dangerous, generally, in delicate patients, elderly people, arteriosclerotic conditions, and in some stages of Pott's disease it is absolutely contraindicated. Moreover in most spinal cases except impacted vertebræ and symmetrical curvatures the stretching of the vertebral ligaments locks the lesion firmer.

Second, **Extreme rotating** of the cervical region. This cannot be considered good treatment in any case with the exception of the muscle stretching. On the contrary it is dangerous; first, it is not osteopathy for it is not specific; second, the nervous shock is severe, an important consideration in delicate people; third, the cervical ligaments become stretched and the vertebræ are easily displaced, while damage to a diseased vertebra, an aneurism or in arteriosclerosis would be irreparable. No other region of the body should have greater care in treatment than the neck.

Third, **Hyperextension** of the spine with the patient on his face. This treatment is rarely indicated. In fact, it is barbarous and a relic of an early day. Possibly more cases have been injured by this treatment than all others combined.

Fourth, **Rough separating** of the vertebræ and ribs while the patient is on his face. This is a most excellent treatment in many cases, but great judgment is necessary. Delicate patients, heart disease, and necrosed vertebræ and ribs should be carefully excluded.

Fifth, **Innominate adjustments** such as placing the patient on the side and putting the knee against the sacrum while grasping the leg at the knee. Or, the placing of the patient face down with one hand on the sacrum and the other holding the knee. In both these there is a tremendous leverage and in the latter the strain is at the lumbar rather than where needed. There are

other unnecessarily risky methods for this operation, while it is easy to perform in most cases and without danger.

Sixth, **Abdominal treatment** gives wonderful results when intelligently applied, but it may be productive of great harm in conditions of tumors, malignancy, and pus formations.

Misapplied treatment is always dangerous, no matter to what part of the body given, and it is proof of wrong diagnosis when given. As a rule treatment is given without proper diagnosis in such cases, so a misapplied treatment has two interpretations—first, ignorance; second, laziness. In the former lies the greater danger for ignorance coupled with force and lack of skill is an appalling combination.

Cases are frequently reported where tumors have passed from the vagina, rectum, nose, etc., the osteopath thinking it was the result of good treatment, without considering that it was simply the breaking of a long pedicle with great danger from hemorrhage. The greatest care should be exercised in treating cases where aneurism, osteomalacia, and arteriosclerosis are present, also in the leg treatment of tabes dorsalis and in the weak, thin ribs of elderly people and those with a gouty or rheumatic diathesis. Imagine treating an abscess directly, yet it has been done, as have varicose veins with the terrible danger of rupture and embolism. Aneurisms have been ruptured in the same way.

One could go on indefinitely with this subject, but to sum up: if the osteopath is not familiar with the feel of the living anatomy in its giving and resisting under treatment both in health and disease and does not know his osteopathy, nothing can prevent him doing harm. A successful practitioner means an understanding of pathology, then experience plus common sense.

FOOTNOTES:

[31] See Ashmore's Osteopathic Mechanics.

[32] Journal of the American Osteopathic Association, Dec., 1903.

OSTEOPATHIC CENTERS

"Osteopathic spinal centers" was a term commonly used in the early period of osteopathic development. From the facts, first, that a few centers have been actually determined in the cord, viz., genito-urinary, vasomotor, etc.; second, that the innervation from the spinal segment to various thoracic, abdominal and pelvic viscera correspond with a considerable degree of accuracy to certain vertebral sections, and third, displacements of tissues of the spinal column affect viscus integrity, depending upon the locality of the structural perversion as to the organ involved and is a clinical observation of great import, arose the misnomer "osteopathic centers." For one to ask what "centers" should be "treated" in this or that disease shows a lack of the conception of osteopathy as if he asked what "movements" to give when "treating" a certain disorder. It is as unosteopathic, as it is unscientific, broadly speaking, to suppose osteopathic technique implies the application of movements to certain nerve centers.

Osteopathic Stimulation

"Osteopathic stimulation" is another term loosely used without extensive clinical experience to support it. Mechanical stimulation is frequently utilized in the physiological laboratory. But to employ it extensively and comprehensively in the treating room or at the bedside the therapeutic potency of it will be found wanting; that is, to employ it to the exclusion of that most important basic treatment, readjustment, is a great mistake.

Clinically, the pathologically slowed heart may be stimulated by a stimulus to the cervical sympathies, the gall-bladder emptied by a stimulus near the costal cartilages of the ninth and tenth ribs (this is probably via the spinal segments), etc. Normally, these organs and others may be temporarily stimulated. Experimentally, Burns[33] of Los Angeles and Pearce[34] of San Francisco have shown the potency of osteopathic mechanical stimulation. For example, stimulation (mechanical) in the middle and lower dorsal regions irritates and increases peristaltic action and vaso-constriction in the stomach and intestines.

Osteopathic Inhibition

Likewise the term "osteopathic inhibition" has not always been scientifically employed. Mechanical inhibition is probably used less frequently than stimulation but still it is of more importance. Probably the true interpretation of considerable of so-termed stimulatory and inhibitory efforts, is simply one of normalization of tissues, physiologic equilibrium resulting from such changes.

Clinically, to relax contracted muscles by inhibition, to relieve neuralgia by impinging nerve courses, to relax the cardiac orifice of the stomach by pressure at the ninth or tenth dorsal vertebra on the left side, etc., are excellent examples of the therapeutic value of inhibition. Experimentally Pearce and Burns produced the opposite results to that of stimulation. Inhibition in the middle and lower dorsal region caused relaxation of the muscles of both the stomach and intestines, decreased peristalsis, and caused dilatation of the blood vessels.

The employment of stimulation and inhibition rounds out to a certain extent our therapeutics, that is, makes it more practical and specific. We should not, however, over-rate the relative value of stimulatory and inhibitory treatment as compared with the readjustive treatment. Not but what the former is of considerable practical importance, but the point to be emphasized is that it gives a scientific demonstration of how pathological effects result, if long continued, from the various osteopathic lesions. In a word, it shows the physiological process from cause to effect, or rather a step in the beginning pathological (perverted physiological) in many disturbances.

Therapeutically, all will agree with Cherry[35] that "stimulation and inhibition should be employed in all forms of acute disease as palliative measures until such time as the primary lesion may be removed."

As a preparation for adjustment of any bony lesion there is no question but that simple inhibition for a brief time in the area will bring about relaxation of soft tissues in a much more satisfactory manner than the usual massage like method. McPherson, Montreal, has developed a technique of sacral pressure which he uses exclusively in his practice. Without going into the merits of his theory there is no doubt that inhibition at the second and

third sacral will bring about relaxation of the muscles of the lower trunk in a most gratifying manner. Another thing, if there is difficulty in introducing the finger in making either a vaginal or rectal examination, a minute's pressure at these points will, in most cases, cause the sphincter to relax so as to cause no discomfort to the patient. This pressure will, also, have a great effect on the hypogastric plexus and the pelvic organs.

Osteopathic Readjustment

Readjustment or adjustment is many times particularly emphasized in this work as the key to osteopathic therapeutics.

If the theory of readjustment can not stand the most searching tests of science osteopathy will have to be relegated to a most subservient place, on a par with massage, Swedish movements, and various medical gymnastics. Consequently the readjustment theory is again referred to, and especially so when the subjects of osteopathic centers, stimulation and inhibition are outlined.

No doubt many stimulatory (so-called) and general treatments exert their greatest influence by inadvertently readjusting tissues. Then how much more effective would the readjustment treatment be if applied intelligently. In certain acute disorders, e. g., "colds," immediate relief is often obtained by relaxing muscles through either stimulation or inhibition; in reality the final result, as far as the muscle is concerned, is one of readjustment. Likewise in stretching and rotation of tissues and sections of the body the effect may either be stimulatory or inhibitory, and still it may be, also, readjustive.

After all has been said the ultimate physiological effect of any of these treatments, if of any therapeutic value, must be one of stimulation to a part or to the body generally. But there is a vast difference between physiological stimulation and the one method of obtaining the same termed mechanical stimulation. It is not the purpose here to enter into anything like an exhaustive survey of stimulation and inhibition but simply to outline a few practical hints on the relative values. Everyone is aware that overstimulation is equal to inhibition, and even applying it to very delicate subjects the therapeutic end we may wish to obtain may be lost and as a

consequence the patient exhausted; whereas at the same time readjustment possibly could have been employed and real permanent effects secured.

So we should whenever possible utilize the basic principle of our therapeutics, readjustment, for this represents in the majority of cases, first, permanent results; second, a saving of much time, and third, less exhaustion on the part of both patient and physician.

McConnell[36] has shown in his series of laboratory experiments on animals the reality and potency of the readjustment fundamental. The effect of malaligned vertebræ and ribs upon contiguous vascular channels and nervous tissues, not only affects immediate skeletal muscles by simple contractions but even produces interstitial myositis. Through narrowing of the intervertebral foramina and tension upon the fibrous tissue anchoring the spinal nerve in its exit, and through pressure and strain on the sympathetics in contact with the heads of the ribs, which are secured there by the parietal layer of the pleura, organs in corresponding cavities become diseased. Some of the diseases produced in the series of experiments were catarrhal and parenchymatous changes in the stomach and intestines, congestion of the liver and spleen, acute nephritis, goitre, inflammation of the lymphatics, edema of the cornea, and degenerations of nervous tissues. Still too much emphasis should not be placed upon the narrowing of the foramen for certain pathologic changes are shown to be due to other conditions than Wallerian.

The osteopath, as stated, may inadvertently correct osteopathic lesions. *Vis medicatrix naturae* undoubtedly corrects many osteopathic lesions; this is evident from the fact that many bodily strains, sprains, and injuries are overcome naturally or involuntarily, that is, without any voluntary assistance from an osteopath. On the other hand all osteopathic lesions are not due to outside influences or forces, e. g., in pneumonia the severely contracted dorsal muscles often partially dislocate the vertebral ends of the ribs and thus increase the seriousness of the disease; and this is true in many acute conditions wherein visceral changes will reflexly contract spinal muscles and also through these contractions produce osseous lesions. Here is where osteopathic treatment in acute diseases will not only correct the primary lesion but also these secondary ones and thus abort, or shorten, or lessen severity, or prevent complications of the disease. But it should always be borne in mind that when certain disease processes occur it will

take a definite time at best for curative changes to predominate. In other words pathological changes are just as real and potent as physiological facts or anatomical data and the character of the same should always be considered.

Consequently in readjustment work a distinctive etiology and pathology has to be taken into account. The color, contour (whether the lesion is simply a local one or there is a composite or group lesion), condition (irritation, debility, contractions, and tenderness), and movement of the several regions, and the spine as a whole should be noted. And the student should always keep in mind that the osseous vertebral lesion may be, (a) a twist between two vertebræ (this generally means a rotation of one section of the spine on another section), (b) malalignment of several vertebræ (the composite or group lesion), or (c) the impacted or strained lesion, (this is a lesion that Clark attaches considerable significance to, wherein there is injury to the articular surfaces and ligaments without osseous derangement, followed by exudation and other inflammatory products, limited motion, etc.).

VasoMotor Nerves

It is extremely important that the osteopath should be thoroughly conversant with the regions where he may affect the vasomotor nerves to various tissues and organs. Many anatomical derangements undoubtedly involve the vasomotor nerves, and it is therefore necessary to know where they may be affected. The following table is taken mostly from the physiology of Landois and Stirling, but many of the statements have been noted at various times; it is, therefore, impossible to give full credit.[37]

The vasomotor center is in the medulla, consequently the osteopath gives cervical treatment to influence this center. Treatment of the upper cervical region has undoubtedly a marked effect in tending to equalize the vascular system of the body, when it is disturbed.

Head.—The cervical sympathetic for the same side of the face, eye, ear, salivary glands, tongue, etc., and possibly the brain. Lesions are found in all the tissues about the cervical region, but usually in the vertebræ, which influence these nerves. Deep contracted muscles oftentimes involve them.

The spinal vaso-constrictors for the vessels of the head are from the first five or six thoracics. Many lesions are located in the upper five or six dorsal vertebræ, or corresponding ribs, that have apparently a direct influence upon the vessels of the head. Not only congestive headache and congestion of the brain tissues are influenced by lesions in this region, but disease of the eye, ear and face occasionally arise from such derangements. It is always best when the head, neck or even the arms are involved, to examine carefully this region. Vaso-dilator fibres for the face and mouth are found from the second to the fifth dorsals; these fibres unite almost entirely with the trigeminus, and pass from the superior cervical ganglion of the sympathetic, to the ganglion of Gasser. This fact is of great importance to the osteopath, for oftentimes when inflammation of the face and mouth occurs, lesions may be located along the upper dorsal vertebræ or ribs, or in the deeply contracted muscles of this region. Observation revealed in several cases of erysipelas that the causative lesion was located in the upper dorsal region; and the cases were cured by correcting these lesions, thus showing that probably the vasomotor nerves were the seat of the trouble. Other dilator fibres arise apparently in the trigeminus, for stimulation of this nerve between the brain and Gasser's ganglion causes dilatation of the vessels of the face. The lingual and glosso-pharyngeal nerves are the dilators of the lingual vessels. The sympathetic and hypo glossal are the constrictors; these arise in the sympathetic and reach the nerves by way of the superior cervical ganglion. Stimulation of the cervical sympathetic causes constriction of the retinal vessels. This point is extremely interesting to the osteopath, because diseases of the retina and optic nerve are oftentimes due to subluxated cervical vertebræ, usually the atlas or third cervical. The retinal fibres leave the sympathetic at the superior cervical ganglion and pass along the communicating ramus to the ganglion of Gasser, from whence they reach the eye through the ophthalmic branch of the fifth nerve, the gray root of the ophthalmic, the ganglion and the ciliary nerves. Almost all the fibres to the anterior part of the eye are found in the fifth nerve; this, also, is another important point for the osteopath's consideration. Cases of conjunctivitis, keratitis, corneal astigmatism and diseases about the eyelids and tear ducts are usually caused by lesions to the fifth nerve, due to a deranged atlas or third cervical. The vaso-dilators for the anterior part of the eye, and also dilating fibres to the iris may be affected at the first and second dorsals. This point is also taken advantage of

by the osteopath, for lesions of these fibres occur oftentimes at the upper dorsal. It is claimed that important fibres that aid in the control of the metabolism of the retina, may be affected at the fourth and fifth dorsals.

Lungs.—Reflex constriction by stimulation of the intercostals, central end of the sciatic, abdominal pneumogastric and abdominal sympathetic. There is not a rich vasomotor supply.[38] The essential feature to the osteopath is that the vaso-constrictors to the lungs and bronchial tubes are very likely to be interfered with by rib and vertebral dislocations, from the second to the seventh dorsals, inclusive, but chiefly at the third, fourth and fifth. The heaviest innervation being from the third, fourth and fifth spaces, probably explains why asthma is often due to a dislocation of the third, fourth or fifth rib.

Heart.—First to fifth thoracic via ganglion stellatum and inferior cervical ganglion. Vasomotor fibres to the coronary arteries are found in the vagi.

Intestines.—Sympathetic, chiefly through the splanchnic nerves. Vaso-constrictors of the jejunum from the fifth dorsal down, for the ileum slightly lower and for the colon still lower. There are none below the second lumbar. Dilators are present in the same sheath, but more abundant in the last three dorsals and the upper two lumbars; all probably end in the solar and renal plexuses.

Receptaculum Chyli.—Stimulation of the splanclinics causes dilatation.

Liver.—The splanchnics chiefly on the right side. The vagus contains vaso-dilators. There are also fibres from the inferior cervical ganglia of the sympathetic.

Kidneys.—Vasomotor nerves from the sixth dorsal to the second lumbar, but principally from the ninth to twelfth dorsals, inclusive. In the large majority of kidney diseases, lesions are found from the tenth to the twelfth dorsals. Stimulation of the sciatic centers causes contraction. There are also fibres from the superior cervical ganglion.

Spleen.—Vasomotor fibres are in the splanchnics, third dorsal to third lumbar, principally, on the left side. There are some fibres direct from the brain. Stimulation of the vagi contracts the spleen.

Portal System.—Fifth to ninth dorsal.

Generative Organs.—For Fallopian tubes, uterus, vagina, vas deferens and seminal vesicles, vasomotor fibres are found in the lower dorsal, and the second, third, fourth and fifth lumbar nerves, principally.

Coccyx and Immediate Region.—Third lumbar down.

Back Muscles.—Dorsal Posterior branches of the lumbar nerves and intercostal nerves. These nerves arise from the gray ramus of the corresponding sympathetic ganglia.

Arm.—From the brachial plexus, the sympathetic, inferior cervical ganglion and first thoracic ganglion, and sometimes lower.

Leg.—Second dorsal down, the sciatic and crural nerves, and the abdominal sympathetics.

Sensory Nerves

Inhibition of various regions along the spinal column is frequently given by the osteopath to lessen pain. It is only a temporary or palliative treatment, but many times gives great relief. One should inhibit usually over tender points and contracted muscles. These (tender points and contracted muscles) are signs to the osteopath that disturbances exist at these points. The following table is taken from Quain, which is Head's classification:

Heart.—First, second and third dorsals.

Lungs.—First, second, third, fourth and fifth dorsals.

Stomach.—Sixth, seventh, eighth and ninth dorsals. Cardiac end from sixth and seventh. Pyloric end from ninth.

Intestines.—(a) Down to upper part of rectum, ninth, tenth, eleventh and twelfth dorsals. (b) Rectum, second, third and fourth sacrals.

Liver and Gall-bladder.—Sixth, seventh, eighth, ninth and tenth dorsals.

Kidney and Ureter.—Tenth, eleventh and twelfth dorsals. Upper part of ureter, tenth dorsal. At lower end of ureter, first lumbar tends to appear.

Bladder.—(a) Mucous membrane and neck of bladder; (first) second, third and fourth sacrals; (b) over distension and ineffectual contraction, eleventh and twelfth dorsals, and first lumbar.

Prostate.—Tenth, eleventh (twelfth) dorsals. First, second and third sacrals, and fifth lumbar.

Epididymis.—Eleventh and twelfth dorsals and first lumbar.

Testis.—Tenth dorsal.

Ovary.—Tenth dorsal.

Appendages, etc.—Eleventh and twelfth dorsals, first lumbar.

Uterus.—(a) In contraction, tenth, eleventh and twelfth dorsals, and first lumbar. (b) Os uteri; (first) second, third and fourth sacrals (fifth lumbar very rarely).

Other points are used by the osteopath to relieve pain of certain regions, for such the reader is referred to the article on neuralgia; besides many tender points are found along the spine by the osteopath, where inhibition gives relief to the patient, provided such points have a connection with the case in question.

Hot fomentations if property applied, through reciprocal relationship of the nervous system, are of value in relieving pain, releasing spastic musculature and normalizing visceral function. Frequently, in both acute and chronic cases, this is an excellent preparatory measure, to be followed by careful adjustment. It will be recalled that the functional test, movement of a vertebral lesion is of primary consideration.[39]

FOOTNOTES:

[33] Burns—Partial Report of Experiments upon Visceral Reflexes. The Osteopathic World, Aug., 1905.

[34] Pearce—Some Laboratory Demonstrations of Osteopathic Principles. The Osteopathic Physician, Nov., 1905.

[35] Stimulation—Leslie E. Cherry, Journal of the American Osteopathic Association, Feb., 1905.

[36] McConnell—The Osteopathic Lesion,—Journal of the American Osteopathic Association.

[37] See also Gaskell, The Involuntary Nervous System; Pattenger, Symptoms of Visceral Disease; Mackenzie, Symptoms and Their Interpretation.

[38] MacLeod, Physiology and Biochemistry in Modern Medicine.

[39] See Luciani, Human Physiology, Vol. III; MacLeod, Physiology and Biochemistry in Modern Medicine.

PATHOLOGICAL SPINAL CURVATURES

Spinal Curvatures

Any deviation of two or more consecutive vertebræ from the normal curves of the spinal column is usually termed by the osteopath a pathological curvature. Of the common pathological curvatures of the spinal column there are found: (1) scoliosis or lateral curvature, (2) kyphosis, or excurvation, an antero-posterior curve with the convexity backward, and, (3) lordosis, or incurvation, an antero-posterior curve with the convexity forward.

Osteopathic Etiology.—Of primary importance in the causation of pathological curvatures of the spinal column, are injuries to the spine, such as strains, falls, blows, and various physical forces, acting directly or indirectly, as injuries to the chest, pelvis and limbs. The osteopath in his daily work finds more curvatures, as well as acute and chronic diseases, resulting from some simple injury to the spine, as a slip, strain or twist, than from any other cause. The dire effects of any violence to the spinal column cannot be overestimated.

Among **predisposing causes** may be mentioned, continued ill health, general weakness, rapid growth, rachitis, tuberculosis, etc. Any habitual one-sided position may result in a curvature. An injury to the chest, adhesions from pleuritis, chronic liver disease, obliquity of the pelvis producing unequal length of the legs, carrying heavy weights on one side, and various morbid growths of the chest and abdomen, may all produce curvatures. Many cases are found in school children who are growing rapidly, and whose muscular strength and development do not keep pace with their growth. Unilateral atrophy of the muscles, due to central changes or overuse, may be the cause of deviations of the spinal column. Sacro-iliac disease in some instances is a potent factor. Thus there may be a great variety of causes productive of the incipiency, and the spine being strained or irritated at a single point and in a certain way gradually develops a

curvature. Every spinal and innominate lesion should be considered as a potential cause for a curvature.

Scoliosis.—This is the most common spinal deformity and is characterized by lateral deviation from the median line. In most cases the curve is to the right in the upper dorsal region, with a compensatory curve in the opposite direction in the lumbar region. The curve being to the right in the majority of cases, is probably due to the fact that most people are right-handed.

Morbid Anatomy.—The vertebræ in the region involved are rotated so that their spinous processes point toward the concavity of the lateral curve. The bodies of the vertebræ on the side next to the concavity are thinner, due to absorption; the intervertebral discs are made thin on the same side by pressure and absorption. The ribs are considerably distorted, depressed on the concave side and prominent on the convex side. The ligaments on the concave side are contracted, and stretched on the convex side. The muscles on the concave side are more or less contracted, and on the convex side they are stretched, causing atrophy and fatty infiltration of their tissues.

Kyphosis.—This may be a slight posterior curve really amounting to nothing, or it may be a very grave pathological condition as in Pott's disease. Therefore it is very necessary that one should make a most careful diagnosis (see Pott's disease).

The most common **causes** of kyphosis are Pott's disease, rachitis, occupation, general weakness, rheumatism and old age.

In Pott's disease, the posterior curve is characterized by a sharp angle, and by the spine being very rigid. This, taken in conjunction with the history and other symptoms should be sufficient to enable one to make a diagnosis. Radiographic examination should be made.

The condition of round shoulders, which in time produces marked kyphosis, is rarely a habit as it is usually termed. In nearly every case it indicates either a weakness of the back muscles or, what is more apt to be the cause, a strained posterior condition of the dorsal vertebræ, commonly of the lower dorsal region.

Morbid Anatomy.—In mild cases there is simply a relaxation of the ligaments of the vertebræ and a separation of the laminæ and spinous

processes. In severe forms there may be absorption of the anterior portion of the intervertebral discs and the bodies of the vertebræ (Pott's disease).

Lordosis.—This may be a congenital condition, especially when occurring in the lumbar region. Anterior curves of the spine are generally found in the lumbar or cervical regions, but occasionally occur in the dorsal region, causing the spinal column to be more or less straight, and thus weakening the individual. This curve is commonly compensatory to kyphosis, hip-joint disease and congenital dislocations of the hip.

Treatment of **Spinal Curvatures**.—The treatment of pathological curves of the spinal column, by osteopathic methods, has been highly satisfactory to both osteopath and patient. The success of the osteopath in these cases has been due to his comprehensive and exact knowledge of each vertebra, and of the spinal column in general. He recognizes curvatures that the ordinary practitioner, and it is safe to say the orthopaedic specialist, would not even notice or recognize. On account of the highly developed sense of touch of the osteopath, he is capable of detecting the slightest deviation of one vertebra from another, and of the spine in general from the normal. Thus by the uniqueness and peculiarity of his work he is capable, not only of discovering a curvature, but also of reducing a curve when found.

The work consists of, first, relaxing any muscles that may have become rigid over the seat of the curve. Then follows a treatment to each vertebra involved, by attempting to replace it, and treatment to the curve in general by springing it toward its normal position. At each treatment effort should be made to accomplish something toward correcting the spine; too many treatments are given in a "general" way, and being unspecialized amount to nothing. One must become familiar with the exact location of each vertebra involved, to attempt a correction of a curvature intelligently. Upon this one point it is impossible to speak too strongly, for a great many treatments have been wasted and improvement of cases retarded by not paying enough attention to the details of the diagnosis, either from pure slothfulness or from an imperfect conception of osteopathy. Corrective exercises are always of value in addition to treatment.

These remarks refer to incipient and certain moderate curvatures. In other cases radical measures (Abbott) should be employed if age and conditions

permit. Remember, however, that the practitioner in his daily work of adjusting the many combinations of rotation and sidebending lesions corrects innumerable actual and impending curves.

Lateral curvature in the dorsal region is undoubtedly the hardest to correct on account of the ribs, which complicate the condition. A marked curve in the dorsal region is sure to be accompanied by a dislocation of the vertebral end of one or more ribs. Treat each distinct lesion separately, follow by general stretching, replacing and molding of the tissues. A good method to stretch tissues and adjust a moderate lateral curve is to utilize the swing, or in lieu of this have the patient stand just at arm's length from the wall with concave side toward the wall with straight arm at right angles and palm resting against the wall. Stand in front of patient whose feet are firmly on the floor and reach around with both hands upon the spine. As the patient sidebends toward the wall it tends to correct the deformity, so if the operator coordinates his adjustment with that lateral movement of the patient, precise fulcra can be obtained and a certain, definite correction secured. The significance rests with the stretching of tissues and the definite fulcra obtained, thereby securing a maximum sidebending and rotation toward correction.

The **dislocation** of an **innominate** sometimes complicates matters, but is a simple point to remedy, and should not be overlooked.

The correction of a curvature presents a special study to the osteopath, whether it be scoliosis, kyphosis or lordosis, and special rules cannot be laid down for treatment. Cases of rare occurrence are what might be termed "symmetrical" curves; i. e., no vertebra presents separately a marked lesion, the column on the whole being simply bowed. Such cases can be treated by springing back the spinal column, and by the use of methodical exercises. Unfortunately most curvatures are characterized by various lesions between the vertebræ, and thus each lesion requires special work.

In simple curves the use of braces, jackets, and the various mechanical appliances are of very little use to the osteopath, in fact, more harmful on the whole, than beneficial. Naturally they would apply to a "symmetrical" curve, or where the patient is too weak to sit or walk, but they can be of very little use to the average patient, in place of correct osteopathic treatment. Mechanical appliances confine the movements of the patient,

interfere with the development of the muscles, and impinge to a greater or less extent the spinal nerves. Due attention to hygienic surroundings and diet are certainly of aid. Proper exercises and occupation for the sufferer should be advised. Special care should be taken in examining (radiographic) for infectious lesions (arthritis).

Straight Spine is a term used particularly by osteopaths for a condition seldom recognized by orthopedic surgeons. The following is from H. W. Forbes[40]: Straight spine is "a departure from the normal in the conformation of the chest; characterized anatomically by bilateral diminution in size, decrease in the antero-posterior diameter, relative increase in the transverse diameter and flattening of the anterior and posterior walls; characterized clinically by diminution of respiratory capacity, lowered lung and heart resistance, impaired general nutrition and predisposition to neurosis.

"Of the many possible manipulations that may be used to lift and overcome the morbid bend of the ribs I will attempt the description of but one.

"Relax the musculature of the back and chest. Rotate, flex and extend the dorsal spine. Examine all the ribs on each side and loosen any that do not move freely. Having done this, the patient is prepared for the specific treatment. Have the patient sit on a stool and lean forward on a table. Have him separate the elbows, flex the forearms, place one hand over the other and his forehead on the hands. Tell him to relax all the muscles of the shoulders and arms and to breathe deeply without using the muscles. After a few trials he is able to fully expand his chest without contracting the muscles connecting the upper extremity with the trunk. The physician then takes a position at side (either side) of the patient and places the weight of his trunk on the ribs of the side he is on, a little external to their angles. He passes his arms around the patient's body; the arms passing across the front of the chest are carried around far enough to allow the hand to be placed on the ribs just external to their angles. The other hand is placed on the top of this one. In this position the physician's body on one side, and his hands on the opposite, occupy similar positions. The patient is now told to inspire deeply and at the same time to relax the shoulder muscles, as before instructed. As the chest expands drop the weight of the trunk on one side and make pressure forward (forward meaning toward the anterior surface of

patient's body) with the hands on the other side. This lifts the ribs to a greater extent than the patient unassisted could lift them. At the end of inspiration and during the first third of expiration the chest is compressed laterally. The compressing force, if applied correctly, will fix the ribs in a position of less obliquity and will also correct the increased lateral bending of them. The dorsal spine becomes more convex posteriorly at the moment of lateral compression of the thorax, if correctly made. Great force should not be used at the beginning. Repeat the manipulation five to twenty times each treatment. Give treatment three times a week. A similar movement may be given on the table.

"The greater number of flat chests in patients under thirty years of age may be corrected. If the patient is above thirty, although complete correction may not always be accomplished, the results are satisfactory. Two to six months treatment is required."

A "typhoid spine" comes as a sequel to typhoid fever. There is constant pain, tenderness along the lumbar region and rise of temperature. The pain is generally increased when the spine is moved forward or sidewise. Such a condition is clearly understood by the osteopath. There are always found distinct vertebral lesions along the region that is tender on pressure. In fact these very lesions may have been the predisposing cause of the attack of typhoid fever. The treatment is rest and the indicated manipulation to correct the derangements. It is of great interest to note that where the typhoid patient is treated osteopathically the condition just described seldom results. Observations by C. M. T. Hulett confirm this statement.

The **Neurotic Spine** may be the result of injury but the subject is usually of a nervous, neurasthenic type. It occurs from the age of puberty to adult, much more often in females than males.

The patient has dull pain in the back of the neck or in the lumbar or sacral region, complains of a constant tired feeling and often of a sharp neuralgic pain in certain parts of the spine. Generally there is a drooping posture in the upper dorsal with shoulders thrown forward, which is a sign of weakness. There is extreme tenderness along the spine and usually the pain is confined to the sensitive places.

Treatment consists of a constitutional toning up, and increasing muscular strength through judicious exercise. The posterior curve may be pushed

toward the median line by laying the patient on the face; also with the knee in the back and the flat of both hands on the sternal ends raise the ribs; or by the arms making use of the pectoral muscles accomplish the same result. Deep breathing is also effective. Relief can usually be given and a cure will depend upon the patient's general condition.

The **Hysterical Spine** is usually considered the same as the neurotic spine, but there are many cases which have the sensitive spine without being hysterical. There is more deformity usually present, particularly in the lumbar region. Probably there will be a history of some injury.

The treatment is to correct the curvature and build up the general health. These conditions are stubborn and progress is slow. In both the neurotic and hysterical spines the ligaments of certain areas will be found atonied and relaxed. This is especially noticed upon attempting to spring a group of vertebræ when all of a sudden the section relaxes. In either of these spines the lesions will irritate or obstruct nervous courses, produce venous stagnation or arterial starvation, and disturb lymph channels. H. F. Goetz has observed that in functional nervous diseases the dorsal spine is flat, while in visceral displacement the dorso-lumbar spine is posterior.

The **Spine of the Aged** wherein is found stooped shoulders and a rigid spinal structure, can be distinctly improved by slow, cautious traction. This tones weakened muscles, releases contractures, separates the compressed intervertebral discs, and definitely tones the viscera. Careful work is imperative.

FOOTNOTES:

[40] Journal of the American Osteopathic Association.

POTT'S DISEASE

An article on Pott's disease does not really come within the province of a practice of medicine. Still it will be acceptable to the practitioners and students of osteopathy, as one of the objects of osteopathic work is to improve, not only medical and obstetrical practice, but also surgical practice, and besides the osteopath will have many cases of spondylitis to treat. "Pott's disease, or caries of vertebral bodies, was first described by Percival Pott in 1779. It consists of a destructive ostitis affecting the spongy tissue of one or more of the bodies of the vertebræ. The ostitis is tuberculous, and is similar in character to tubercular ostitis seen in the epiphysis of the long bones. Owing to the superincumbent weight of the head and shoulders pressing upon the carious vertebral bodies, the spine and trunk become peculiarly and characteristically distorted. The morbid process is limited, as a rule, to the bodies; the transverse, articular, and spinous processes are rarely primarily affected." (Park).

The first consideration in the **treatment** of Pott's disease is rest. If the disease is a progressive one, rest in bed in the recumbent position is necessary. Naturally, the object of the treatment is to secure resolution of the tubercular ostitis as soon as possible. To do this, careful manipulative treatment should be applied to the diseased vertebræ. The treatment must not be harsh, for there would be danger of greater irritation to the parts, and possibly infected particles from the destroyed tissue might gain entrance to the vascular system. The osteopath must be extremely careful how he manipulates the spinal column in Pott's disease. The object of the manipulation is not primarily to overcome the deformity, as some may think such an act possible, but to separate the vertebræ enough to allow a freedom of the circulation, and to remove impingements of the nerve tissue. It is impossible to overcome the deformity to any extent when part of the body of the vertebra is destroyed; but if one could treat the case at the incipiency, most probably deformity would be prevented. There is another danger in treating cases too severely, and that is causing exhaustion of the patient. Treat the spinal column not only to separate each articulation slightly, but to carefully crowd the diseased vertebræ toward their normal position. When

the disease is in the dorsal region, considerable attention has to be paid to the ribs, as they are invariably involved when the spinal curvature is great. Hence it is necessary to treat each rib separately, and try to correct them at least, and remove any obstruction to nerve fibres or vessels that may be found. One of the strongest arguments against the indiscriminate use of braces, jackets and various mechanical appliances in spinal deformities, is that they tend to straighten the spine, by simply crowding the vertebræ and ribs as a whole into place, besides interfering with the cutaneous circulation. The osteopath should realize that each vertebra and rib has to receive special treatment, in order to correct the spinal column, and that mechanically exerting pressure upon all the vertebræ at one time tends to lock the vertebræ and ribs all the more securely. It is like trying to correct a certain subdislocation of the cervical vertebræ by pulling and twisting the neck instead of applying specific treatment—the lesion is all the more firmly fastened. Young, in his Surgery, makes this observation: “Like chronic abscess or chronic bone disease, this affection has its origin in the fact that the tissues of the anterior parts of the bodies of the vertebræ have been partly deprived of their nutrition because of luxated ribs or subluxated or twisted vertebræ.”

After the tissue destruction has been limited, and the deformity corrected as much as can be, an ankylosis should be secured if possible. Promotion of ankylosis depends altogether upon the preceding treatment—rest and an improved nutrition of the parts. A truss or brace, if correctly applied, is often beneficial in such cases. The treatment of spinal abscesses is entirely in accordance with surgical treatment.

In all cases the general health of the patient has to be well taken care of. The osteopath must not be over zealous for quick results. It takes many months to perform a cure; however, there is always a tendency toward a cure. Treatment of the spinal muscles and of the limbs, and pure air, sunlight, massage and good food are very necessary.

SPRAINS AND FRACTURES

SPRAINS

The osteopath is often called upon to treat sprains of various sections of the body as well as to relieve after effects of fractures and restore function to the part. The osteopathic treatment is very effectual; therefore, an outline of the purpose and method is given.

Sprain is defined by Dorland as "the wrenching of a joint with partial rupture or other injury of its attachments, and without luxation of bones." From an osteopathic viewpoint the above definition is not fully explanatory, for there is in most cases a partial luxation of the bones. The most common cause of a sprain becoming chronic is the presence of partial bony displacements. Rupture of tissues may be the cause of a chronic state but is not nearly so frequent as the bony dislocation. In most sprains, the wrenching causes a displacement of the bony tissues, which may or may not return to normal position and relation. The function of the muscles is not primarily to hold the bones in place; this is left to the ligaments, so when a wrench of a joint is so severe as to cause rupture of muscles or tearing of ligaments, partial luxation of the bones is almost certain to follow; and even where such damage does not occur a change in the relation of the bones is a frequent occurrence.

Unless a sprain can be seen very early it may be difficult to detect just what has happened; whether it rests with a rupture of the areolar and connective tissues, a displaced cartilage, tendon, or bone, a torn ligament, or ruptured muscle. Hemorrhage and swelling take place so rapidly that no time should be lost in critically examining the joint. When in doubt as to the structural disturbances, particularly in acute cases if there is a possibility of a fracture, and in chronic cases any supposition that tubercular involvement is present, have a radiographic examination.

There is comparatively little to be found in medical literature relative to the **pathology** of sprains. Probably Moullin in his excellent monograph on Sprains has given as good an outline as can be found[41]. He says that

“generally speaking, the tissues on one side of a joint are overstretched and torn; those on the other compressed and crushed together; but there is always so much twisting, and such a difference in the strength and power of resistance of various structures, that unless the part is examined with the greatest care it is almost impossible to say what actually has given way.” Hemorrhage due to torn vessels is the cause of most of the swelling within the first few hours. Later on, there is considerable lymph mixed with the blood. There is not only extravasation of blood into the surrounding tissues but also into the synovial wall and cavity. This causes considerable irritation and pain owing to the roughening of the membrane, and the joint becomes inflexible. And if the joint or any strained tissue is kept too long at rest the mass becomes organized and is the cause of much discomfort and annoyance.

Similar changes may occur in the bursæ due to the extravasated blood. Strong ligaments may be torn across, but not frequently. The tear is usually a separation from the bone. Occasionally interosseous ligaments, as for instance in the knee, may be injured.

The muscles may be severely torn, but more often they are “hurt by their own sudden and spasmodic effort at recovery than by anything else.” In a few cases the tendons and muscles will be found bruised, lacerated, and dislocated.

The veins occasionally rupture and thus results more or less effusion, so that rigidity and edema may persist for a long time. The bones are very frequently damaged. This may be a simple bruising of the tissue but more often, as osteopathic diagnosis shows, there is partial displacement of the bony structure.

A point of great importance that every experienced osteopath will agree to is the following from Moullin: “Diseases of the spine, hip, and other joints in children may be due, in great measure, to some constitutional taint, though it is open to question whether the influence of this is not overrated; but it is quite certain that the immediate starting point in nine cases out of ten is some chance sprain, often so slight as scarcely to have been noticed at the time.”

Before treating a sprain there are one or two points the osteopath should carefully note: first, that there is no complicative fracture; second, in

children that there is not an epiphysial separation; and, third, note peculiarities of a constitutional character that would complicate matters. Whatever is done, always give the patient the benefit of the doubt.

If the patient can be seen early, before swelling has reached the maximum, many times a very quick cure can be secured. Do not at once put the part at rest and apply cold, but examine the sprain most carefully and thoroughly and readjust first of all any bony defects; then replace the softer tissues if displaced, and next relax contractions; follow this by light massage and passive movements to reduce and combat hemorrhage and swelling. This treatment alone in a fair percentage of cases will be all that is necessary provided frequent subsequent treatments of massage and passive movements are continued to reduce and counteract inflammation and to prevent rigidity and stiffness of the softer tissues. Where the osteopathic treatment is distinctly indicated is in the readjustive manipulation. This is the reason why the treatment is so efficacious, and the patient is cured in a fraction of the usual time, and few sprains result in complications and become chronic. In sprains that have become chronic there will be found almost invariably some osseous tissue slightly displaced. After correcting this, apply careful and thorough manipulation and massage and movements to break up adhesions, to remove effusions and extravasations, to relax muscles, and to promote normal circulation. Care should be taken that there are no displaced cartilages, ligaments, tendons, or muscles.

It is well to keep in mind that the osteopathic readjustive manipulation is not an exercise or movement, but definite, specific correction of the tissues anatomically. Do not treat the displacement by any general “pommelling,” but apply the mechanical principles indicated as in any dislocation. This will mean much to the patient in more ways than one, and especially so should the sprain be so severe and complicated as to demand anesthesia for correction.

There is no objection to the employment of cold and heat; in fact, both are beneficial. Cold to prevent extravasation and swelling, and heat to remove and relieve the same, is a sound and practical method. But do not apply a wet bandage. Pouring cold water over the sprain is the best method; even better than immersing the part. An ice bag is another good way to apply cold. When the skin begins to look blanched and dull the maximum amount of benefit has been secured. Heat at the very first may be employed

instead of cold, for it has a tendency to prevent bleeding and inflammation, but the temperature of the application must be hot as can be borne or else the desired effect will not be obtained. Later on to relieve pain and rigidity, and to relax the muscles so that a better circulation will be secured, moderate heat will be beneficial. Then the application of heat and cold alternately will be of service, employed as a douche for a tonic effect, when the part is weak, inactive, and powerless after the elapse of several days. It should always be remembered that the employment of heat and cold is only of temporary benefit, so if used too long opposite effects to those desired will result.

Bandaging the sprain may be helpful, but not always. Great care should be taken as to how pressure is applied. Bandaging from periphery toward the trunk, seeing that the bandage is smooth, and padding all depressions so that the bandage does not touch bony prominences only, are necessary. Unless the bandage is applied so that an even pressure is secured, the material used not too warm, and the bandage attended to each day, the effectiveness will amount to but little.

Next, do not make the mistake of resting the injured joint too much. The function of a joint is movement, and it has been observed that prolonged rest of a healthy joint may result in rigidity, stiffness, and distension of the soft part, and even serious organic changes in the ligaments, synovial membrane, and cartilages have occurred. Consequently continued passive movements should be kept up from the inception of the injury, although it must not be carried to extremes so that inflammation, hemorrhage, or laceration will be aggravated. Moullin says: “As a rule, passive movement may be commenced from the second day with the certainty of preventing adhesions, and without the least fear.” Osteopathically, with due attention to readjustive manipulation, and care as to correct position and rest, passive motion will be allowable usually from the first day.

There is much corroborative evidence in current medical literature that bears in a general way upon part of the foregoing. The International Text Book of Surgery says: “Massage should begin early, in order to avoid, as far as possible, weakness of the muscles, and to ensure security to the position of the joints by the retention of a proper tone in them;” besides, early movement tends to reduce the effusion into the tendon sheaths around the articulation, which in some cases, particularly the ankle and wrist, may be a

very prominent feature. The Reference Hand Book of the Medical Sciences voices the same opinion; and Mumford is referred to as follows: “Immobilization for more than a few days, as under the older methods, is objectionable because adhesions are apt to form, thus causing impairment of function, and because when there is a **tubercular taint**, proper conditions for a localized tuberculosis are established.” Among other statements Holder Sneve in the Journal of the American Medical Association of June 1, 1901, says: “Immobilization of muscles is not rest. On the contrary, in all sprains the muscles should have passive exercise the first few hours and days, and active exercise after that. In the majority of cases active exercise should be instituted from the beginning. The plaster cast should not be used at all, even in cases where we have a fracture, unless it be impossible to maintain a proper position of the joint.”[42]

Again quotation is made from Moullin. These quotations are taken from the chapters on Manipulation and Massage. It will be observed he makes a distinction between the two methods. And the osteopath should carefully keep in mind not only the difference between the two, but beyond these the more fundamental treatment, readjustment. The characteristic feature of osteopathy is anatomical readjustment, and this in sprains should be supplemented by massage (superficial work), and also manipulation (deep and more or less forcible work) in order to remove stiffness, rigidity, and fibrous ankylosis.

The following is relative to forcible manipulation: “Manipulation is much more useful than division; it can be employed for such a variety of purposes. In the early stages it prevents the occurrence of stiffness or the formation of adhesions. Later, when the swelling and heat have disappeared, it is no less successful in restoring freedom and ease of movement, and afterward, when all mechanical obstructions have been cleared away by its use, it is one of the most effectual methods known for bringing back the circulation and nutrition of the part, and giving again to the muscles and nerves the energy which has so long been wanting....

“To carry this out effectively two things are needed beyond all others. The one is a sense of touch so delicate that it can appreciate the least resistance or irregularity of movement; the other an accurate knowledge, not merely of the ordinary anatomy of the part, but of the different degrees of tension that fall on the ligaments in every position of the limb.

“Each joint requires a different kind of manipulation according to its construction....

“There should be no jerking. The movements must be vigorous and forcible, but perfectly smooth; and they must be carried out thoroughly, the joint being moved to its full extent in all directions that are natural to it. Each kind of action should be combined successively with the rest, one by one, so that the tension may fall in turn upon all the different parts of the capsule.

“Movements which are especially restricted or painful, of course require most attention, but the others, though they may not be affected to the same extent, are not to be neglected. It sometimes happens if these are dealt with first, that a considerable proportion of the main obstruction is cleared away, as it were, by side attacks, so that when its turn comes it yields more readily than it otherwise would.

“Recent slight adhesions give away at once without a sound, though the sensation is generally conveyed to the hand. When they are older the noise may be as loud and clear as when a bone is broken....

“The after treatment of these cases (cases where there has been tearing and breaking of adhesions) should be in all respects the same as that of a recent sprain, only if passive motion at an early date is advisable to prevent the occurrence of stiffness in the one, it is absolutely necessary in the other.”

The following pertains to massage of sprains: “Massage, in the strict sense of the term, is a great deal more efficacious, especially with older sprains. Its action is not limited to the skin and superficial structures. These undergo immense changes, it is true; they become softer and finer while under manipulation; their strength and elasticity increase, the extreme tenderness diminishes, and the natural appearance and texture return. The surface loses its dry, harsh character and becomes warm and moist again; the livid bluish color gives away to a brighter hue, and the deeper layers of fibrous tissue yield and stretch, so that the hide-bound, shrunken condition that is often present after long disuse gradually passes off. But the good effect is not by any means limited to, or even most conspicuously shown by, this. When properly carried out, massage exerts a simultaneous influence on muscles, nerves, and vessels; in fact, on all the tissues within its reach.

"The circulation is the first thing to feel its power. It has already been explained how, after prolonged rest, the blood, as it were, lies almost stagnant in the tissues, slowly circulating through them, and neither giving them sufficient for their nutrition, nor removing from them the waste products of their action. This is changed at once. The life of the part is quickened. The veins and absorbents are emptied first, and the fluid they contain driven out into the heart, which fills more rapidly, and contracts more vigorously and firmly. Then the pressure falls in the smaller vessels, and the tiny irregular spaces, full of lymph, which extend in all directions through the tissues. These, in their turn, are compressed and mechanically emptied, their contents being driven on into the empty vessels, from which any backward flow is prevented by the valves. The circulation becomes more rapid; nutrition is carried on with greater energy, and the actual amount of the blood in the tissues at any one time so much increased that they become full and soft to the touch and regain the even and rounded contour of active health....

"It is most essential to commence as gradually and as gently as possible, working on the deeper tissues only after the more superficial ones have become thoroughly accustomed, and have been unloaded of their surplus fluid. The skin, the soft subcutaneous tissue, the muscles, and the deeper layers, must all be worked in turn. Nor should the manipulation be confined to the injured part. In a sprain of any standing, the whole of the limb is affected more or less. It is usually better to devote attention first to the parts nearer the trunk than to deal with those around the injured area, and only afterward, when the circulation is thoroughly reestablished, to manipulate the joint itself.

"The tendency is to make the sittings last too long. Deep manipulation itself rarely requires more than **five minutes**; but in dealing with a recent injury it may be advisable to spend a longer time than this over the friction and other preparatory measures, so that a quarter of an hour soon passes by. When the tenderness is very great, and the amount of swelling excessive, much longer than this may be necessary, but short, frequently repeated sittings are of greater benefit than one long one. A skillful operator, too, will often effect more in a few minutes than an ordinary rubber will in as many sittings."

A summary of the general treatments of sprains would be as follows:

1. Readjustment of parts and removal of obstructions. Osteopathy is especially adapted in these cases, for two of the primal therapeutic factors in all cases from an osteopathic viewpoint are to readjust the anatomical and to remove obstructions. One should constantly keep in mind, “a temporary displacement followed immediately by a return to place, constitutes a sprain.” The osteopath often finds that a perfect returning does not take place, and even remote lesions may affect a joint.

2. Manipulation, and massage of soft tissues, to restore circulation and to prevent and remove debris from rupture of vessels and inflammatory products.

3. The employment of cold, heat and pressure, and a certain amount of rest.

4. Anatomical readjustment and manipulation in chronic cases to break up adhesions, remove exudates, overcome the organized products of inflammation, and cure synovitis.

5. Movements both passive and active to stimulate and exercise functions of the joint.

The Spinal Column.—The osteopath is especially cognizant of the fact that many sprains occur to the spinal column. These may affect a single joint, or more or less of a section may be involved. The bones, ligaments, tendons, muscles, or spinal cord may be found injured. Even distant organs, through involvement of the circulation to the cord, or through irritation or impingement of spinal nerves and sympathetics, are frequently disordered. It is not necessary to go into detailed description, for the points bearing upon this will be found under Osteopathic Diagnosis, Etiology, and Technique, and the general description will, also, apply. Readjustment, strapping, heat, massage, manipulation, ironing, stretching of muscles, fomentation, etc., have their place. There is no doubt that sprains, strains, and blows to the spinal column are the cause of many spinal disorders and consequent visceral disturbances.

The Ribs.—Sprains of the vertebral ends frequently occur, resulting in a partial luxation, stretching of ligaments, contraction of muscles, and exudative formation in the joint structures, which often is the cause of irritation to the sympathetic nerves. The costal cartilages are frequently

strained, and may so irritate the intercostal nerve as to cause considerable pain both locally and reflexly. The treatment is essentially one of replacement, and relaxation of the softer tissues. Adhesive strips to limit movement due to respiration may be helpful.

The Innominata.—Sprains of the innominata are also commonly met with. Besides being a source of discomfort to the patient they are an important cause of pelvic disorders and leg affections. Partial displacements are the rule, the correction of which gives quick relief. Where there is considerable spasm of muscles, examine carefully the lumbar alignment. In chronic cases fibrosis of muscles and adhesions may complicate matters.

The Hip Joint.—Sprains involving the hip joint may be readily corrected, and again may be the exciting cause of serious involvement. Previous tubercular disease can be aggravated in this manner, or syphilitic changes in the joint disturbed. Care should be taken that there are no complicating displacements of the innominata or irritations to the spinal nerves. Possibly the hip may be so strained as to cause a twist of the femur in the socket and thus simulate a partial dislocation; this, in fact, would probably be termed a partial dislocation. Strain of one set of muscles about the hip joint is somewhat rare, and spinal lesions may disturb the innervation to one set of muscles. In cases of **intracapsular fracture** considerable can be done by careful massage and manipulation after union has taken place, to secure greater freedom of movement and strength of the limb. Likewise in **hip-joint disease**, after the disease is healed, massage and manipulation will be very beneficial. Care must be taken if the treatment causes spasticity of the muscles; this shows the treatment is irritative and should be stopped until the spasticity has ceased. Where the limb is shortened from either hip-joint disease or intracapsular fracture apparent lengthening may be secured by careful abductive and hyperextensive stretching.

The Knee.—The knee is the most complicated joint, and sprains are apt to be very serious. The usual treatment for sprains is employed. Occasionally the semilunar cartilages are displaced and may be a source of difficulty in diagnosis; likewise injuries to the patellar tendon and lateral ligaments. Another joint frequently overlooked is the innominate. In a number of knee cases that terminate in chronic synovitis there will be found a displacement of the innominate that is preventing recovery. A villous

synovitis may arise in strains from faulty posture, especially in the obese. Injury to the hip-joint, also, may cause strain or irritation at the knee. Occasionally tender points about the knee, especially at the inner side, are due to irritation at the hip, or possibly from the spine. Referred pain of the knee joint is of frequent occurrence.

The Ankle and Foot.—The ankle is often sprained. One should examine carefully for a possible fracture of the malleolus, and for fracture of the tibia. There may be a dislocation of the fibula, also a separating of the tibia and fibula at the ankle. The common bony displacement takes place between the astragalus and os calcis. Then the cuboid is frequently displaced, and occasionally the navicular. The treatment should first of all be directed to correction of the osseous lesions. The arch of the instep may be weakened from the ligamentous strain and be an immediate step in the production of **flat foot**. Teall is of the opinion that lumbar and innominate displacement are common predisposing causes. Faulty position of the foot in walking may be an underlying factor.

Bunions result from a malposition of the joint. **Morton's disease** due to a pinching of the metatarsal nerve will often yield to osteopathic treatment alone. There is generally displacement of the metatarsal bone. A pad worn directly under the painful point will be of benefit. In many of the local neuralgias, some anatomical displacement will be found as the exciting cause. **Hammer-toe** if not complicated with gout, rheumatism, etc., will yield to treatment if kept at persistently, otherwise surgical interference will be necessary.

Likewise various deformities of the foot and resulting neuralgias may be traced to local sprains, ill-fitting shoes, or anatomical maladjustments higher up of such a character as to affect the pedal circulation.

Flat Foot

Flat foot or weak foot is one of the common disorders that the osteopath is constantly called upon to treat. In the first place the patient should be taught to walk correctly. The feet should be parallel in walking so that the weakened muscles may be developed and strengthened. This will be difficult at first, but recovery depends upon this important point. In addition to this, special exercises, like turning the toes under and tip toe exercises,

should be persisted in for a few minutes two or three times daily. Upon the other hand, do not overdo the exercises but always carry them to a point of fatigue. These two features, walking correctly and exercising, are essential complementary measures to the adjusting treatment. In conjunction with the above, the Scotch douche at the end of the day will prove of considerable benefit.

In the technique work, first make certain that there are no innominate or spinal lesions that bear upon the circulation and innervation of the feet. Then frequently faulty walking is due to these lesions.

In recent cases, simply remolding the arches of the foot will be all that is necessary, providing correct walking and foot exercising is maintained. But in the more chronic cases considerable adjusting and remolding of the tissues, bones, ligaments, muscles and fascia, are demanded. Perfect apposition between the astragalus and navicular bones, the highest point of the longitudinal arch, should be first secured. Attention should also be given the other articulating structures down to the metatarsal bones. This reestablishes the arch and overcomes the everted tendency. Considerable repeated force is often demanded to release the fibrotic tissues, but it is the important part of this technique.

With the patient on the table, supine, place your thumb firmly at the articulation of the navicular and astragalus. Then with the other hand around the metatarsals to be used as a lever in extending, rotating and inverting the foot with the fulcrum at the thumb of the first hand, spring, thrust and adjust the arch. This requires considerable strength and exactness of application. The tissues must give freely before the result can be secured. This is often painful to the patient but should be continued and repeated to the furthest point of motion until recovery is complete. Treat as often as the condition permits. Substituting the crotch of the thumb and forefinger or the knee for the thumb will give added advantage. Follow this with thorough springing of the plantar tissues by thumb and fingers.

If this is kept up with suitable exercises and correct walking, and proper shoes (Munson last), excellent results will be obtained in the great majority of cases. Same pair of shoes should not be worn two days in succession.

Many times the anterior arch is involved, jointly or separately. Persistent adjusting and remolding of the arch tissues will secure satisfactory results

unless the bones are markedly deformed and the weight of the body is relatively too great. In this disorder, aside from paying special attention to the metatarsal articulations, the great toe requires a particular technique. For this grasp the toe firmly, exert traction until the tissue gives slightly and rotate it inward, toward the median line of the body, on its longitudinal axis. Have the patient frequently turn the toes under, or attempt to do it until the exercise can be easily accomplished.

Do not employ arch supporters except in hopeless cases. They simply splint the foot and thus further weaken the foot muscles. If the above methods are persistently followed to the point of actual adjustment, accompanied by releasing of fibrous tissue and actual strengthening of muscles through exercise, a very large percentage of cases will recover. In a few cases adhesive strips will be of benefit.

The Shoulder.—Exclusive of muscular and other strains there may be a partial dislocation. In these cases the acromial end of the clavicle is frequently dislocated, and owing to a general lack of muscular tone may be very hard to keep in place. The lower and inner part of the capsule is often affected, so that freedom of function is lacking and there is considerable pain. This is due to the thinness of the capsule and the large amount of soft tissue, so that when the arm hangs at the side the tissue is thrown into folds; and being very vascular is easily injured, so that the vascular lymph readily organizes and the part becomes stiff and unyielding. It requires patient, laborious treatment to break up and absorb this fibrous tissue. Then the long tendon of the biceps in some shoulder sprains is dislocated, but rarely. In shoulder injuries, examine also, the upper ribs.

The Elbow.—The elbow is another complicated joint. One should be careful that there is no fracture, and in children that there is not **epiphysial separation**. Extending, flexing, pronating and supinating the arm will aid much in the diagnosis. Examine well the rotation of the radius at the elbow joint, and be positive that the olecranon process drops normally into its fossa at the end of the humerus.

The Wrist and Hand.—The wrist is another joint commonly sprained. Here, also, care should be taken that a fracture does not exist. Colle’s fracture is frequent. The bursal and tendon sheaths are usually markedly

involved. The scaphoid and semilunar are apt to be displaced; also, the os magnum and the unciform.

Sprains of the **fingers** are often met with. Outside of strains to the muscles, ligaments, and other tissues the joint is apt to be somewhat impacted. Traction will correct the latter. Care should be taken that a fracture is not present. **Dupuytren's contraction** occurs from sprains or injuries, as the result of contraction of the fascia. The ring and index fingers are members usually affected. In some cases the affection will be found in both hands (symmetrical), and a spinal lesion will be the predisposing factor. Treatment every day, by straightening the fingers and stretching the tissue will at least retard the deformity, but in a number of cases surgery will have to be resorted to.

A **ganglion** or "weeping sinew" is a swelling in connection with the tendon sheath. It presents a round, firm outline, usually upon the back of the wrist. There is generally found a displacement of one or more of the wrist bones. If treatment of the joint and tendon sheath does not remove the ganglion, surgery may be utilized. **Trigger-finger** is a rare disorder. There is usually a history of local strain, which probably resulted in some thickening of the tendon. Manipulation and passive motion if continued will generally give relief.

Fractures

Immobilization and rest have been the paramount points with most physicians in the treatment of fractures and sprains. They have claimed that a sprain should be manipulated but rarely, much less a fractured bone. Rest, quiet, and fixation of an injured joint or bone have been rules that should not be violated under any consideration. In cases of sprain the great cry has been to let the joint alone for fear of spreading a possible **tubercular infection**. It is well to recall Mumford's statement that if immobilization is too long continued, should there be a tubercular taint, proper conditions for a localized tuberculosis is established. And still a word of caution here, that an osteopath should not be over zealous and should carefully weigh all possible factors, both local and constitutional, may not be amiss. In previous tubercular, syphilitic, and other diseased states discretion should be employed.

Reducing rest and immobilization to a minimum means much to the patient, not only in the loss of valuable time but in annoying and serious after effects. Many cases of sprains and fractures come to the osteopath. In sprains that have become chronic through too much rest of the part and improper treatment, almost invariably there is found displacements of bone and adhesions that should never have existed; then has followed organized exudates and chronic synovitis. In fractures and even in complete dislocations the osteopath continually observes that too much rest has been given the part, resulting in unnecessary adhesions, contractions, atrophy of muscles, and impairment of function. Treatment almost always cures the condition, or at least materially relieves. How much better if the proper treatment had been first instituted and thus a large percentage of cases prevented from becoming chronic.

Of particular interest to the osteopath is the paper prepared by Eisendrath on "Early Massage and Movements in the Treatment of Fractures and Sprains," and the discussion that followed before the Chicago Medical Society. The Illinois Medical Journal, December, 1903, contains a report.

Eisendrath said in part: "The former routine of immobilizing all fractures and the adjacent joints for a period of four to six weeks must, I feel, be subject to slight modification in the light of recent experience, and it shall be the aim of this paper to show what these changes are. When we are called to a case of fracture, it should be one's first duty after its reduction to consider how can I best aid the patient in recovering the usefulness of his or her limbs? Can we shorten the long convalescence with its resultant loss of valuable time and earning capacity? How can we most rapidly restore to the limb its normal joint functions and prevent an atrophy of muscles and an ankylosis which will require many months to overcome?...

"The use of massage and of active and passive movements in the treatment of fractures and of severe sprains has been gradually gaining in the number of its advocates through the writings of Lucas-Championniere of Paris. We owe him a great debt for calling the attention of the profession to the employment of these methods in order to prevent atrophy and ankylosis as well as to promote healing....

"Before taking up my subject in detail permit me to recall a few salient points in the surgical pathology of fracture. Soon after the injury the blood

clot around and between the ends of the fragments is absorbed and replaced by a jelly-like mass of young connective tissue cells called the callus. It corresponds to the solder which the plumber places over the ends of two pipes he desires to join. Bone begins to form at the periphery of the callus about the tenth day and advances toward the center rapidly, forming a ring of bone around the ends of the fragments so that by the end of the third week there is but slight abnormal motion at the point of fracture (exception to this is the femur). This entirely disappears by the end of the fourth week, especially in young people, and the union is firm. In the case of the femur it requires six or eight weeks. The greater the displacement of the ends of the fragment, the larger the callus and the slower the healing of the fracture.

"During these changes (callus formation) the muscles which supply the immobilized joints atrophy and the circulation in the skin and neighboring tissues is sluggish, resulting in swelling, etc., of the limb. The enforced rest causes more or less fluid to accumulate in the tendon sheaths and joints. This becomes organized and results in fibrous ankylosis of the joints and great impediment to the free action of the tendons within their sheaths. It is this atrophy, fibrous ankylosis and tenovaginitis which interfere with the restoration of the normal functions of the limb....

"Can we decrease the amount of wasting of muscles and control the stiffness of joints and tendons after fractures?

"It is the belief of the writer, based on a large experience, that the earlier use of massage, active and passive motions, will to a great extent eliminate the above conditions, which retard convalescence and in some cases cause permanent disability.

"Massage of an injured limb increases the amount of blood supplied to it, promotes the absorption of the swelling and prevents atrophy of muscles. In the case of a joint injury the exudate rapidly disappears and the articular surfaces can be again approximated so that movement is facilitated. By the cautious use of active and passive movements, either with or without the aid of apparatus, the normal functions of a joint can be rapidly restored....

"The active and passive movements of the limbs can be carried out immediately after the massage, but should only be permitted for a period of **five minutes** at first and the time then gradually increased. When a severe sprain, say the elbow or ankle, is first massaged, the pain seems to be

almost unbearable, but this discomfort as well as the swelling rapidly disappears, and it is surprising to those who have never applied this treatment how quickly the normal function of the joint reappears. The same applies to the synovitis which accompanies fractures in close proximity or even into joints."

The relief given these cases by massage, movements and manipulations by the osteopath is a daily experience, and results to him are not surprising. Then in addition to what the surgeon would do, the osteopath applies his principles of careful detail readjustment.

Eisendrath continues his paper by referring to the principal varieties of fractures and giving the treatment for each. He says that if correct treatment is carried out with proper massage and movements in fractures of one or both bones of the leg, the patient will be at work in six or seven weeks instead of three or four months, that in Colle's fracture some surgeons do not employ a splint, and that in fractures of the olecranon, massage from the first week on is of the greatest use. This part is very interesting but space forbids giving it.

He then concludes his article with citation of several very interesting cases of fractures and severe sprains. These cases are exceptionally interesting to the osteopath, but still the same good treatment and results are duplicated every day in the osteopathic school.

The doctor's contraindications to the use of early massage in fractures or sprains are the following:

"1. Tendency to displacement of fragments in oblique fractures. Under such conditions it is best not to begin either massage or movements until the union is firm (fourth to fifth week).

"2. In compound fractures until the wound is healed.

"3. Whenever the condition of the skin is such as to permit of infection; for example, the presence of blebs, or extensive abrasions.

"4. The presence of fragments which project but do not penetrate the skin."

His conclusions are:

“1. Massage, active and passive motions prevent atrophy of muscles, tenovaginitis and ankylosis so frequently accompanying and following fractures, especially those close to the shoulder, elbow, wrist, knee and ankle joints.

“2. They give far better results than complete immobilization in the majority of fractures.”

In the discussion that followed Henrotin said that for some time, “I have never put a restraining apparatus of any kind, nor have I used any lotions on any sprain, no matter how severe....

“It has taken many years to bring this subject before the profession. It is a method that is absolutely effective as regards sprains and some forms of fractures. I have treated several hundred such cases with the greatest success.” He also said that, “In treating an inflamed joint it is improper to use a restraining apparatus of any kind. I consider that the plaster cast is the bane of all inflamed joints unless there is a **specific form of infection**, a traumatic condition.” Neither does he believe that an inflamed joint should be put at rest. He says the patient is a good judge as to the amount of quiet the joint needs. He has treated Colle’s fractures and fractured clavicles without bandages or apparatus.

To sum up, the osteopathic procedure in the treatment of fractures would be as follows:

1. Immobilization in those cases especially demanding it, from the character of the fracture, until formation assures solid and firm union.

2. Manipulation and massage and movements of parts at an early period, compatible with the above, to render soft tissues pliable, to remove stiffness and adhesions, to restore a normal circulation, and to exercise and function the parts.

3. In cases of laceration of soft tissues, abrasions, etc., great care should be taken so as not to infect the parts.

4. Great care should be taken where fracture is compound, and where fragments exist.

5. In all cases, both acute and chronic, critically examine for slight anatomical deviations locally and remotely.

In dislocations the fundamentals of the above are applicable. Do not let chronic stiffness, or rigidity, adhesions, or synovitis supervene if possible to prevent.

An important consideration in all cases of sprains, fractures, and dislocations that become chronic is the probable effect upon dependent tissues by way of nerve impairment and vascular obstruction; for examples, the sprained back may readily impair organic life, the fractured elbow prevent use of the arm, the injured leg predispose to flat foot. (See J. B. Littlejohn—Osteopathic Surgery, including Treatment of Fractures, Journal of the American Osteopathic Association, Nov., 1905.)

FOOTNOTES:

[41] See also Jones' latest work, Injuries to Joints.

[42] See also Wharton Hood, Sprains and Fractures.

POSTURAL DEFECTS

A postural defect is any abnormal position, congenital or acquired, of the body, assumed in sitting, standing or walking. This leads to a symmetrical development, causes structural changes, and as a sequel, disturbance of function and organic life results.

Defects in posture are of very common occurrence. A perfect posture, in fact, is somewhat rare. Considerable is being accomplished, especially of late years, by the laity through various physical methods and exercises to correct the many defects of position in sitting, standing and walking. The originators of the many so-termed systems of exercises have gone so far as to even advertise to cure various diseases of the body as well as attempting to improve the normal tissues and structure.

Exercises, undoubtedly, have their place, particularly in the life of those of sedentary habits. Most of us do not exercise enough, neither do we as a rule get enough fresh air and pure water. But there are many defects of the anatomical that mere gymnastics can not adjust. And there are still other defects that gymnastics may decidedly aggravate. In these cases the mechanism of the body has become so deranged and disturbed that nothing short of actual readjustment can be effective.

In the consideration of postural defects there are a few points that should be particularly emphasized. First, these defects may not only be the result of laziness or carelessness, but of more frequent occurrence is some previous strain or injury to the spinal column or other parts of the body framework. Some defect of position or symmetry of the body may easily follow as a result. Here gymnastic work may reduce the defect to a minimum, but rarely can the compensatory forces of nature entirely obliterate the structural disorder, unless assisted by actual, specific readjustment. Second, in the examination and treatment of the patient due attention should be given the symmetry and figure of the body as a whole so that relation of the part to the whole and *vice versa* may be rightly proportioned. Remember that the spinal column is only one part of the body outline, thus one should consider the transverse section of the body in relation to the spinal column

and not the spinal column alone. In a word, correction of postural defects implies both structural rearrangement and molding of the contour. Do not make the mistake, for example, when correcting a deformity that involves the chest, of paying attention to the spine alone, but take into consideration the thorax as a whole of which the spine is only a part.

Round Shoulders

Round Shoulders are a defective posture with which everyone is familiar. How many children have escaped the parents' criticism to sit, stand, and walk erect? And not a few of the afflicted have not succeeded after persistently doing their best.

Round shoulders or stoop shoulders are commonly attributed to indifference. Probably a few cases are due simply to laziness and indifference, and others may be carelessness, and usually when they arrive at an age where pride of their physical demeanor and powers enters as a life factor, the child soon overcomes the postural weakness. With still others the correct, persistent physical training, as exemplified in military schools, will readjust the defect. But there is a class, and by far the largest, where round shoulders are a very real and active weakness of the physical body. And the weakness is not primarily in the shoulders as nearly everyone thinks. The stoop is a result. The origin is in the lower dorsal spinal column. Here will be found a posterior curvature that involves nearly the entire dorsal and lumbar areas. This is the real, the original cause of the larger number of round shoulders.

This backward curve of the spinal column, instead of the forward curve as it should normally be at the waist, obliterates the brace or truss of the spinal column that is so essential in maintaining an erect posture of the shoulders. It allows the individual to "fall into his stomach," to drop the shoulders, and as a consequence the chest cavity is depressed. The spine is one continuous backward bow, and when he does try to sit straight, and it is always with a constant effort, the normal, the physiological curves of the spine are not apparent.

First, then, there is a spinal weakness in the region of the innervation to the digestive organs. Indigestion of various forms is a common accompaniment. Second, there is lessened lung and heart capacity. The ribs

are depressed, interfering with perfect aeration and elimination on the part of the lungs and with normal activity and tone of the heart muscles. Phthisis is predisposed. Is it any wonder the child's blood is impoverished and anemia results from the insufficient aeration and poor digestion and assimilation? Costogenic anemia may also be a result. And, third, the shoulders are "round" from the spinal weakness and flattened chest, really an effect; but while the most noticeable, it is the least serious.

It is evident from careful observation and study of these cases that the treatment resolves itself into the treatment of a posterior spinal curvature. Shoulder braces, steel braces and jackets, and casts have very little place, if any, although there may be diseased bone of such character and severity that a cast will be necessary; this, however, would refer to treatment of Pott's disease and similar conditions.

Hence, the **treatment** is, first to replace and readjust the malaligned vertebræ. There must be an actual physical manipulation in order to correct the vertebræ at fault. This is the essential, and by far the primal, treatment for the key to the truss or brace that holds and retains the body in an erect position is then replaced.

Second, raising the depressed ribs. Remember the depressed ribs are dependent upon the spinal condition. The thorax should be treated as a comprehensive whole, not the spinal column alone.

Third, exercises are a valuable aid. The individual's part is as necessary, in a way, as the physician's, for in order to accomplish the maximum there should be consistent and appreciative work on the part of the patient. Holding the shoulders back, the head erect and the chin in, drawing the abdomen in and up, all with deep breathing by the use of the chest muscles, the patient will be able to retain the correction obtained during treatments. "Setting up" exercises are helpful. Developing the muscles of forced expiration is excellent. Thus the patient must be conscious of the work required of him and act in concert with the physician. Minute instruction on the requirements of each case is demanded.

Good food, pure water, and fresh air are necessary, particularly in the anemic. Right living and correct environment are always in order.

Painful Shoulders

Under this heading may come a variety of conditions affecting one or both shoulders causing much distress and, at times, total disability. The conditions may be the result of direct injury to the joint, systemic, or from spinal lesions. Anatomically the shoulder offers frequent opportunity to injury as it has the greatest range of motion of any joint, is least secure in its articulation, and is most vulnerable from location. Once the shoulder has been dislocated it is rarely back to normal functioning again as this injury tears the capsular ligament and stretches the structures in relation. Many times there is only a **subluxation** in which the head of the humerus is driven upwards in the fossa, usually from a fall or blow on the point of the elbow. As a rule, after such an accident, the only thing done is to rest the joint and apply a liniment and, after a time, begin the use of the arm. It is, however, painful and to save himself, the patient each time restricts movement until he reaches a point where he is unable to dress without assistance. It is then found that normal motion is reduced fully one-half and even this will be accompanied by pain on movement and in bed. A radiograph will, usually, show the condition. Articular crepitus and fibrous adhesions are present while the adjoining structures have undergone changes so that a reduction is impossible without certain preparation. Very often a trivial cause will disable a joint; a sudden movement which finds the muscles about the shoulder unprepared and the resulting lesion is so slight as to, often, defy detection. At first there will be swelling and pain but, in time, it settles down to a limited motion with more or less distress.

Bursitis.—This is a condition in which the subdeltoid bursa is involved or where there have been a number of bursæ formed from overuse of the joint. One authority reports as many as twenty-five in a shoulder. There may be, also, tenosynovitis primarily or from extension. These conditions may not be easily diagnosed at first.

Brachial neuritis (chronic) beginning with or without an acute attack is usually from a cervical lesion involving the brachial plexus but most frequently it is the 5th and 6th cervicals at the origin of the circumflex nerve. From this the deltoid is particularly affected and its contraction leads to pressure on the nerve and subsequent partial or complete paralysis. Brachial neuritis is found in an increasing number of osteopathic practicians and is the result of overwork of the arms and to strain of the upper dorsals

and lower cervicals. There are contractions of structures about the joint constantly limiting motion and pain when a strain is put on them.

Many methods for the treatment of the conditions described have been employed, all involving the same principle but none of them systematized. C. H. Spencer has worked out a technique which, while originally intended for bursitis, has been found well adapted to all conditions described. It gives a stretching of all structures and gradually breaks up adhesions, both in the joint and in the tendon sheaths, so there is no resulting irritation which could easily result if suddenly done. His technique is[43]:

"First: The patient on the side, the affected shoulder up; operator facing the patient, places one hand on the top of the shoulder, does nothing more than fixing it; with the hand grasping the forearm above the wrist, push the elbow backward, the arm parallel to and almost in contact with the body, then pull forward in the same plane. Second: Elevate the elbow with the hands of the operator in the same position as before, carry the elbow in as wide a circle as possible. Third: With the hands still in the same position, extend the forearm with traction; carry it as high in front of the patient as possible. The foregoing are designed to relieve the congestion about the shoulder, bring pressure to bear on the subdeltoid bursa and moderate traction on the supraspinatus, infraspinatus, subscapularis, teres minor and major, latissimus dorsi and the tendon of the biceps. These manipulations will be all that is possible in the more aggravated cases for some considerable period of time. As the tenderness subsides, the second group may be cautiously started, the hands in the same position as above noted, with the arm extended as nearly as possible at right angles with the body, carry the arm in as wide a circle as the pain will permit. Again, with the arm flexed at the elbow, one hand of the operator on the point of the shoulder and the forearm of the patient across the forearm of the operator, the other hand of the operator resting on the point of the patient's elbow, push down toward the middle line of the body and carry the elbow toward the head. Then flex the arm and place the back of the hand behind the patient, flexing the shoulder in front with one hand grasping the point of the elbow and pull forward. This group of movements accomplishes with greater force the same ends obtained in the previous, and the first in this group is the most effective in overcoming swelling of the subdeltoid bursa. Direct manipulation of the muscle masses and this bursa is desirable from the

first." It will be noticed in all these movements that the joint is protected by one hand of the operator while the other is grasping the arm of the patient. This is desirable as it makes the technique absolutely safe. An additional treatment will be found very effective, especially where the deltoid is involved. With the patient on the well side, facing the operator, locate the quadrilateral space which is bounded by the subscapularis above, the teres minor below and the long head of the biceps medially and the surgical neck of the humerus externally, and the circumflex nerve can be easily palpated along with the artery. If these structures are stretched and the deltoid lifted from the shoulder it will be found to free the action of both nerve and artery, one supplying the joint with nutrition and the other innervating it.

Certain conditions for which these movements are contraindicated arise and the following differential points by H. Glasscock are well to remember[44]: **"Rheumatism**: Fever in the joint, with redness, swelling and other joints involved. **Tuberculosis**: Daily temperature and other tubercular foci. **Neuritis**: Pain in the neck and shoulder muscles, also near insertion of deltoid and in the forearm, particularly musculo spiral. Pain worse at night. No pain on movement. No swelling. **Bursitis**: No pain in neck. Pain in anterior and posterior part of joint and on motion. Pain near insertion of deltoid. Arm held close to the body, motionless. **Infection**: Chill, limited motion, severe pain with temperature. **Dislocation**: Deformity with preternatural mobility. **Dislocation** of **acromio-clavicular** joint: Tenderness over articulation. Arm cannot be raised beyond right angle with the body, but elbow may be brought across the chest with external rotation of arm and raised perpendicular with the body without pain." The infected joint should never be manipulated and all conditions showing swelling, redness and pain on touch should be viewed with suspicion. Remember that all other conditions will almost invariably have vertebral lesions, primary or secondary and a permanent result will depend upon their correction.

The Prominent Hip

A hip that is prominent and larger than its fellow is of frequent occurrence. It may not be necessarily conducive to a defect in posture, but it often is. The female is more frequently afflicted with this anatomical irregularity than the male. In the first place, the female pelvis is not so

stable and rugged as the male pelvis, i. e., a mechanical wrench or fall will more easily displace the relative position of the tissues in the female. Then, in the second place, the dress of the woman accentuates irregularities of the figure, so that possibly in some instances the defect, from a diseased or deformed point of view, is more apparent than real. But of still more importance is the fact that many cases of a prominent hip are due to a lateral curvature of the lumbar spinal column. Lumbar curvatures are of common occurrence in the woman; first, the spinal column is not so strong as in man, simply on account of the physique not being so robust; second, modern dress constricts the waist by the use of corsets and many waist bands, and the weight of heavy skirts upon the waist, hips and abdomen; and, third, severe strains from childbirth. Care should be taken that there is no congenital abnormalities of the lumbar spine, or that congenital asymmetry of one-half of body, or trunk or leg is not present.

Thus the principal **cause** of a prominent hip is the lateral lumbar curvature. This, through compensatory action, renders the hip on the concave side prominent and high, while the hip on the convex side is depressed and less pronounced in appearance. Dressmakers and tailors are all too familiar with this feature of the irregularly outlined figure, and, consequently, have to resort to “padding” to round out the symmetry of the body. The mere irregularity of the figure, unfortunately, is by far the less serious part of the defect. Many ailments and diseases can be readily and directly traced to this. Not that the prominent hip itself necessarily always plays a leading part, but rather the lumbar curvature is the cause of very much suffering and misery. To enumerate the many disorders that arise from malaligned lumbar vertebræ may be unnecessary but a few will be given. A point to be emphasized is that the prominent hip often plays the role of a sign or symptom, or an effect, that an ailment or disease may be elsewhere.

In the female one of the most common causes, if not the most common cause by far, of disorders of menstruation, whether painful, profuse, or irregular, is irritation or obstruction of the lumbar spinal nerves due to lumbar curvatures. It is well known the lumbar spinal nerves control, to a large extent, the pelvic organs; consequently the osteopath pays particular attention to this area. Then certain intestinal disorders, such as appendicitis, typhoid fever, dysentery, rectal diseases, owe their origin to predisposing

lesions here; also, bladder ailments, and sexual diseases of men, and many affections of the legs, as sciatica, varicose veins, etc.

In a number of instances the prominent hip will be due to a displaced innominatum. Then a lumbar curvature will result as a compensatory condition. This reverses the compensatory act as heretofore referred to; the prominent hip, in this instance, is the cause and not the effect. To diagnose which is cause and which is effect will frequently require considerable technical knowledge and experience. The slipped innominatum then produces symptoms and disorders directly from its changed anatomical relations; the points of diagnosis are given in the chapter on Diagnosis. The prominent hip can easily be detected when the subject sits down upon an even, firm surface, or stands up, and the one side is compared with the other. In some cases where the prominent hip is due to a lumbar curvature, and the prominence is a secondary feature, the legs will be found uneven in length, but not always, for the lumbar curvature may straighten out when the patient lies flat upon the back. To diagnose the cause from effect and to differentiate the maze of signs and symptoms that may be present is not always easy even for the skilled practitioner.

The **correction** of a prominent hip is not ordinarily a difficult matter. In the cases where lumbar vertebræ are principally at fault, and these include the greater number, the problem is one of correcting the spinal curvature. Lumbar curvatures are the easiest of any of the curvatures to correct, for one is not hampered by the rib articulations, and the lumbar section presents an area where a leverage can readily be obtained. Where the innominatum is primarily at fault it is simply a matter of readjusting this, with probably some attention to the lumbar region. Care should be taken that the prominent hip is not caused by a tubercular sacro-iliac disease, by hip-joint disease, by a dislocated hip, or by an overlapping of thigh or leg bones from fracture.

Standing erect will, of course, be a valuable help, for standing with the weight on one foot will tend to make the hip on that side more prominent. But generally the reason why one favors a certain side is because the other side is weaker; a weak back, a slipped innominatum, or an injured leg are common causes. There are many cases where the skirts will have to be considerably altered after the hips have been made symmetrical.

Pendulous Abdomen

The **pendulous abdomen** is another defect that is all too common. A great many people have prominent abdomens because they do not stand properly, but a pendulous or prominent abdomen is not necessarily synonymous with a stout abdomen. They attempt to stand erect by drawing the shoulders back and extending the abdomen. If they would hold the head erect and the chin in, with the shoulders back and the chest forward, and draw the abdomen inward and upward, their figures and physiques would undergo shortly a wonderful transformation. These directions also apply to pregnant women. Drawing the abdomen upward and inward will at first require considerable effort. It certainly will not be an involuntary act for the first few days.

The sagging of the abdomen not only causes an unsightly appearance but results in great relaxation of the abdominal muscles, interferes with digestive functions, displaces the pelvic organs, and weakens the action of the lungs and heart.

The laxity of the abdominal muscles allows the abdominal organs—the intestines, stomach, kidneys, etc.—to displace downward. This tends to indigestion, constipation, inactivity of the liver, etc., and causes a score of reflex symptoms. The organs become simply weakened from a lack of proper tone. This is a frequent cause of nervous prostration. Also it is one of the common causes of prolapsed and displaced pelvic organs, because the abdominal organs sag down upon them and the pelvic organs thus receive the brunt of the gravitative effect. Internal local treatment of the pelvic organs can only be a makeshift in these cases. The lungs and heart are weakened because the abdominal organs are dragging on the chest, the lungs can not aerate the blood freely owing to the abdominal weight and to the blood being obstructed in passing from the abdominal organs through the liver to the heart and lungs. The heart is handicapped in its work through lessened chest capacity and obstructed circulation. Just “suck” up the abdominal organs and see how much easier it is to expand the chest and to breathe.

There are other causes for a pendulous abdomen, such as a weakened spinal nerve supply to the abdominal muscles and organs. The weakened nerve supply may cause a loss of tone to the abdominal organs themselves,

so that certain organs, as the stomach and intestines, become dilated and prolapsed; to the ligaments, and to the tissues and organs as a whole so that they become gravitated.

Through childbirth muscular fibres of the abdominal walls often rupture, leaving scars and a relaxed condition. Actual ruptures, hernia, of the abdominal muscles occur and cause a pendulous abdomen. Then there are cases of obesity where the pendulous abdomen is a symptom.

Much can be done with all of these conditions through osteopathic work; the patient must also help himself. The center of gravity of the body must be changed, and kept changed; correct posture and a constant effort will accomplish considerable. The “setting up” military exercises are excellent. Even in some cases of obesity the abdominal prominence can be markedly lessened by careful exercising and keeping the abdomen drawn in so that the abdominal muscles, the diaphragm, and the chest may be strengthened. For the relaxed, flabby abdomen, self manipulation of the weak muscles when lying on the back will materially aid.

Postural Curvatures of the Spinal Column

Undoubtedly, the great percentage of postural defects, or slumped states, are dependent, directly or indirectly, upon weaknesses in the spinal column. As was seen, round shoulders, the prominent hip, or the pendulous abdomen, are often initiated by spinal deviations and deformities, so naturally spinal column curvatures are a most fruitful source of direct defects of posture.

It is somewhat uncommon to find an anatomically true spinal column, although this does not preclude that one’s posture is defective, for often through pride and effort one may consciously overcome a defective posture.

It is the purpose here to offer a few suggestions relative to the development of a greater symmetry of the body. Nearly every one is more or less interested in physical exercises and development. And especially to those of sedentary habits do means and methods of exercise appeal. Curiously enough, in a way, nearly every layman looks upon defects in posture, symmetry and stature as an effect arising from lack of, or improper, exercise. He seems to be imbued with the idea that the body in most

instances is practically permanent in construction and when irregularities in figure occur certain exercises will correct the defect. Thus have individuals been prone to look upon osteopathy as a method of passive exercises. Osteopaths should believe most thoroughly in exercising, personal hygiene, etc., but the idea of osteopathic manipulation is primarily one of anatomical reconstruction, and not muscular development alone. The work of the osteopath is to readjust or to re-mold the body framework and the many tissues that clothe it so that normality of function may predominate. The manipulation is not routinism but mechanical rebuilding of the tissues so that perfect freedom of vital forces may be forthcoming.

The spinal column presents the most frequent as well as many extremely interesting phases for re-correcting work. The number of abnormalities as to contour to which it is subject are many and varied. Emphasis should be placed upon possible congenital abnormalities and developmental defects as sources of certain derangements. Any variation or combination of variations with the normal or physiological curves constitutes an abnormality or pathological curve. And as a consequence defective posture, unless thoroughly compensated, is readily initiated. Not only may the normal curves be exaggerated, lessened, eliminated or reversed, but lateral and rotary curvatures are of frequent occurrence.

Curvatures involving the cervical region to the extent of producing noticeable defects of posture are principally lateral deviations of several vertebræ. Wry-neck is probably the most noticeable disturbance. The head and neck being drawn and slightly twisted to one side is a defect that is both noticeable and painful. Another common source of postural affection is an exaggerated forward curving of the neck vertebræ. This produces a stooped appearance of the neck.

The dorsal vertebræ are often curved backward too far. This produces roundness with too decided a fullness of the upper back and shoulders. The chest may be somewhat flattened as a secondary effect but not necessarily so. Neither are the shoulders what may be termed “round shoulders,” still such a condition may occur, for “round shoulders” are more often caused by a backward swerve of the column at the waist line. There is often a shortening of the anterior structures which pull the point of the shoulders forward. Forcing them backward will aid in correcting the fault. The dorsal vertebræ may be forward from what is termed a “straight” spine; this results

in an exaggerated “braced” back position. Then lateral curvatures of the dorsal spine are common, which in time may develop into a rotary curvature; that is, the vertebræ are actually rotated on their axes. Lateral curvatures of the dorsal spine are slow and difficult to correct, for the ribs complicate matters very materially. Then, also, the vertebræ are apt to be deformed.

Curvatures of the lumbar spine, whether posterior, lateral or anterior, are common. Both dorsal and lumbar curvatures, as any one can readily see, are extremely common sources of postural defects. Erect positions of the body are maintained through the support of the dorsal and lumbar vertebræ. Stooped shoulders, one shoulder lower than its fellow, sitting humped over, sitting on the sacrum instead of squarely on the buttocks, the prominent hip, standing first on one foot and then on the other in order to rest the back, and the many allied variations of incorrect postures are largely dependent on the condition of the lumbar and dorsal spines.

It is not to be supposed that the above defects are the only ailments and disturbances that spinal curvatures cause, for, indeed, the defective posture may be by far a minor consideration. Disorders of body functions and affection of organic life itself are very often traced to the malaligned vertebræ.

The **causes** of spinal curvatures are many, but without question one of the most common causes is mechanical wrenching or twisting of the column from falls, jars, etc. Often the strain or sprain of the sections are readjusted through the inherent powers of the body, but there is a point where *vis medicatrix naturae* requires extraneous help to correct the perversion; and, naturally, such aid, by virtue of the cause of the disturbance, should be physical force mechanically applied. Other causes of spinal curvatures are contractions of muscles on one side of the column or paralysis of the muscles on one side; in either instance, muscular action is greater on one side than the other, which easily results in a curvature. This imbalance of muscular tension, whether due to the above or other sources such as overfatigue or various deleterious habits, is a prolific source of lesions. And among still other causes may be noted, bone diseases of the spinal column, compensatory deformities, and constitutional weakening and irritating diseases. Also, some occupations predispose to certain curvatures.

One can readily see that the **treatment** which is directed specifically to the cause of the vertebral deviation would be the most scientific. This is just what osteopathic work implies, direct readjustment of the sections at fault—not exercises, or routine stretching, or braces; although these latter methods may in some cases have their place as secondary aids. Of course exercises are usually physiological and may be employed, in many instances, as an auxiliary. Care should be taken to eradicate infectious foci when present.

Where curvatures are extreme, complicating and deforming the ribs, and absorbing the bodies of the vertebræ so they become wedge-shaped, and resulting from abscesses, no one can expect within reason to absolutely correct the posture. Some aggressive work can be accomplished, but a perfect symmetry will not be forthcoming. It may be well to emphasize again that where the ribs are involved the osteopath is not contending with the deformity of the spinal column alone, but in addition the entire transverse area of the body. (See also Spinal Curvatures).

Conclusion.—In concluding this rapid survey of a number of postural defects the principal lesson to be drawn is not one of developing the physique and thus perfecting a better posture, so much as curtailing and eliminating insidious beginnings of disease. These little ailments and deformities, of which postural defects may be the most noticeable, are so often the inception of more serious disorders. The anatomical structure being maladjusted, -aligned, or -positioned, easily and readily leads to consequences that require much time and patience to overcome.

Poise of body represents much to every one. Poise or correct posture coupled with careful and methodical exercise and correct breathing are material aids in constructive development, as well as in eliminating disease, for not alone may abdominal, pelvic and thoracic integrity be benefited, but the upper respiratory tract may be toned.

The most important goal that osteopathic science and art is striving for is that of a fully developed and rounded out prophylaxis or preventive treatment. When the public realizes that the proverbial ounce of prevention is an established medical reality then it can truly be said our science has reached its ultimate good. To those who are familiar with osteopathic theory, facts, and development, it is an open secret that this school holds the key to successful preventive treatment. The time is rapidly approaching

when the actual lessening of diseases will be an established fact. Then will be the universal practice of the layman going periodically to his osteopath to see if there are any small or insidious beginnings of disorder or disease.

Not only must the many deleterious habits and errors of the daily regimen be corrected, but after environmental, physiological and structural adjustment, in so far as possible, has been attained, a daily regimen to maintain the normal should be instituted.

FOOTNOTES:

[43] Journal American Osteopathic Association, Jan. 1916.

[44] Osteopathic Physician, Nov. 1919.

PROLAPSED ORGANS

Prolapse of various organs or tissues are among the very common ailments that afflict all classes. Prolapse of the stomach, a kidney, the uterus, or the rectum is a familiar term to every one. But this condition may also rest with the intestines, the liver, an ovary, or even the heart.

Outside of injuries, congenital weaknesses, and so-termed surgical disorders, there are commonly two constant forces predisposing to prolapsed organs, viz: gravitation and weakened innervation; the one, of course, is a constant factor in either health or ill health, the other is dependent upon acquirement. Here the latter, or acquired nervous weakness, will especially demand our attention.

Where tissues are torn or lacerated, or congenital malformations are present, or tissues are weakened from ulceration and with a resultant scar tissue, or certain tumors are present, the disorder must be amenable largely to surgical measures if at all.

The perpendicular position of the body favors a decided gravitation of the abdominal and pelvic organs. This gravitative effect being a constant one, many methods, both surgical and mechanical, have been devised to hold in approximate and relative position certain organs and tissues that may be prolapsed. But it is well known that outside of a certain few instances where surgical measures are clearly indicated the prevalent use of braces, bandages, supports and the like are usually poor makeshifts.

The one great feature in these cases is that tonicity to organs and supporting muscles and tissues is more or less impaired. The tissue atony may vary from mere weakness to actual tearing and separating of the fibres. The indications in the cases about to be described are to stimulate a lowered nerve supply and to increase a lessened blood supply; if this can be accomplished, supporting muscles, ligaments and other tissues will be able to restore the prolapsed organs to normal positions, thus improving functions and eliminating disease symptoms.

In discussing the prolapse of the following organs, perhaps it should be noted here that all of the abdominal organs may be prolapsed as a whole. The intestines, stomach, liver, kidneys, etc., may actually prolapse together. This is more apt to occur in persons whose abdominal walls are thin and flabby. In women pregnancy is a common cause. When the abdominal organs have gravitated, the pelvic organs, also, are very likely to be disturbed and displaced; in fact, the pelvic organs are frequently disordered this way.

Prolapse and Dilatation of the Stomach

Dilatation of the stomach is a much more common and serious affection than prolapse of the stomach, although usually the two are associated. Prolapse, or ptosis, of the stomach means simply a downward displacement of the organ. This is apt to take place in those cases where all of the abdominal organs have gravitated. There is invariably some dilatation of the organ as well.

Weakness of the abdominal walls and of the supports of the stomach constitute the principal **causes** of the prolapse. Spinal deviations that impinge or obstruct the nerve strands (or obstruct the blood and lymph supply to these strands) to the supporting stomach tissues is the most frequent cause of the ailment. General debilitating diseases, as anemia, cancer, etc., are indirect causes of weakened organs with consequent displacements.

In dilatation of the stomach the condition may be either acute or chronic. The former is found where immense amounts of food or drink have been introduced.

One of the principal causes of chronic dilatation is some obstruction to the opening from the stomach into the intestine, so that the stomach contents do not pass readily into the bowel. This leads to chronic disturbances of the stomach walls, and the food remaining in the stomach somewhat indefinitely weights down and stretches the walls of the stomach. The obstruction may be a tumor, or some stricture or adhesion from scar tissue resulting from ulceration or inflammation. The treatment of these cases comes within the province of surgical interference rather than other methods.

The second important cause of chronic dilatation is muscular weakness of the walls from poor nerve supply. This is a common cause and osteopathy is very successful in curing these cases. The splanchnic nerves are below normal, usually from a slight lateral or posterior spinal curvature. The nerve force to the walls of the stomach not being normal causes atony of the muscles and dilatation results. This nervo-muscular atony, also, results from a chronic catarrh, or from a general nutritional disorder as tuberculosis or anemia. The treatment of the former would imply direct correction of nerve and blood supply with attention to diet; the latter can be cured only through relieving the nutritional disorder of which the stomach condition is a symptom.

Dilatation of the stomach is most common in people of middle age or older. The disease is usually easily diagnosed. The symptoms may not be indicative of the trouble beyond showing that the stomach is disturbed. Indigestion, uneasiness, and nausea are common. Vomiting of large quantities of material from the stomach is likely to occur. The patient is generally emaciated, the skin is dry, the bowels constipated, and the urine scanty.

The **diagnosis**, as a rule, is not hard to make. Through the media of inspection, palpation and percussion, the careful osteopath will have little trouble to determine the size of the stomach. Kemp's[45] distinction between gastroptosia and dilatation of the stomach is as follows: "In dilatation the lesser curvature retains its relation to the diaphragm. The distance between the lesser and the greater curvature is increased, but the lesser curvature still maintains its relation to the diaphragm, with the exception that the pyloric end may extend farther over and somewhat farther down." Another instructive point relative to diagnosis the above authors make is the importance of the splashing sound. Owing to the fact that the stomach in health closes concentrically about its contents and thus adapts itself to the volume of ingesta, no splashing sound can be elicited. Three different degrees of relaxation are diagnosticated as follows: "Splashing sound, which can be elicited only during the normal period of digestion, means simple atony; splashing sound produced after the legitimate time of digestion has expired means motor insufficiency; and splashing sound produced in the morning, after the night's fasting, before liquid or food has been introduced, may mean stagnation, dilatation of the stomach, as

understood by most writers." (For a more complete outline see Dilatation of the Stomach. The object of this section is to present an outline of prolapsed organs as a whole, and to refer especially to the effectiveness of osteopathic treatment in this condition).

This is a disease where osteopathy has been particularly successful in not only relieving distressing symptoms, but in actually curing the disorder. This refers to the nervo-muscular atony type, for where there is obstruction due to stricture or tumor of the pylorus, resulting in stomach dilatation, the treatment, from the very nature of things, must be largely surgical. Stomachs that have been dilated and prolapsed several inches have been entirely restored to function and organic integrity. To **cure** these cases is a matter of stimulating nerve control and blood supply to the stomach tissues, and, often of greater importance, removing spinal impingements to the stomach nerve fibers, thus allowing nature to fully assert herself. In reality, outside of so-termed surgical cases and other cases where the stomach dilatation is merely a symptom of general nutritional disorder, the primary treatment, by far, is the spinal one. Treatment over the stomach is a decidedly beneficial treatment; it aids materially in toning both abdominal and stomach muscles; still this is mostly a secondary treatment.

Dieting is essential. Careful dieting lessens the tendency to catarrhal inflammation and reduces the work of the stomach to a minimum. Still, nourishing food is necessary and the dieting can easily be carried to an extreme. Liquids should not be taken freely. Fatty and starchy foods should be eliminated. Give the patient food at short intervals. Various nutritious meats are excellent.

In dilatation, and also general abdominal relaxation, daily abdominal treatments may be indicated. If the relaxation is pronounced, keeping the patient in bed with thorough spinal treatment two or three times a week, daily abdominal treatment, having the patient exercise abdominal parietes by drawing the walls in and up, upper thoracic breathing, and frequent feeding will accomplish comparatively quick results. The progress of each case depends very materially upon the general health, the physical status of other tissues, constitution, inheritance, environment, age, etc. Some cases will yield in two or three months, others will require two or three years in order to obtain the greatest possible benefit.

The Prolapsed Kidney

A **prolapsed kidney** is often termed a floating kidney, or movable kidney, or dislocated kidney. It is of common occurrence, especially in thin persons. Some authorities state that one woman out of every four has a floating kidney. It is more common in women than in men, and among the working class than other classes.

The condition is usually an acquired one, following severe strains from lifting, falls, injuries, etc. It is claimed by some that a floating kidney arises from congenitally weakened and relaxed tissues about the kidney, that is, the tissues that keep the kidney normally at anchorage. Thus a congenital looseness of the kidney would easily be a predisposing cause whence mechanical violence, repeated pregnancies, an enlarged liver, or tight lacing would act as an exciting cause. Undoubtedly in some instances there is a congenital predisposition, the peritoneal fold attaching the kidney to the spine being loose and the capsule of fat retaining the kidney being scanty, but osteopathic experience has amply demonstrated that the tissues anchoring the kidney may in many case become atonied and relaxed from lower dorsal spinal lesions. Rarely is a case presented to an osteopath that does not exhibit two apparently characteristic causative features, viz: spinal irregularity in the lower dorsal spine, and constriction of the zone about the waist, i. e., dropping and constricting of the floating ribs. Furthermore, correction of these lesions will almost invariably lessen the mobility of the palpable kidney.

The **symptoms** of a floating kidney are many and variable. The kidney may be slightly movable or it may be so loose that one can easily grasp it through the walls of the abdomen. Most of the symptoms are of a nervous reflex nature. Indigestion, which is likely to be very persistent, flatulency, heart palpitation, painful menstruation, irritable bladder, etc., are the most common symptoms. Still, blueness, depression and morbidness are frequently present. The most distressing direct disturbance is the feeling of weight in the abdomen, especially on standing, running or lifting. Sometimes the ureter becomes twisted and severe pain, colic and even collapse occurs. (Dietl’s crisis.)

The **diagnosis** of a dislocated kidney is not a particularly difficult matter. A little experience coupled with a delicate sense of touch will usually

readily detect abnormal mobility of the kidney. A point to always remember is that the kidney normally descends about one-half an inch with each inspiration. Care should be taken not to mistake a floating kidney for a movable spleen, although this is not likely, as the shape of the spleen is different.

The **treatment** of a movable kidney under osteopathic measures is usually successful. In the first place a number of cases require but little attention, simply toning up the general health, and especially directing attention to the abdominal walls and organs. There are a number of cases where the kidney prolapse is incidental to general abdominal laxness and weakness. In more severe cases, treating the spine, raising the floating ribs, carefully manipulating over the abdomen, keeping the bowels open, and lessening liver congestion should it arise, will suffice; in fact, will remedy a good percentage of the cases. With others, a well fitting, medium width, elastic bandage with pad underneath will be beneficial. In these cases the patient should be taught how to treat the abdominal organs, to manipulate the abdominal walls, and to replace the prolapsed kidney; particularly after going to bed this can be done successfully by the patient and will prove a decided help in obstinate cases.

Surgical measures for fixing the kidney should seldom be resorted to. If the patient will live a careful life, avoid unduly straining himself, keep the bowels normal, and have the anatomical lesions corrected, he will come very near being entirely relieved, if not absolutely. Surgical measures are not always a success. Surgeons are not operating for this disorder so often as in past years. (See Movable Kidney—Diseases of the Kidney.)

Liver Prolapse

This is commonly termed a **floating liver**. There is prolapse of the organ as well as its being abnormally movable. It is not of frequent occurrence; women suffer from it much oftener than men.

Normally, the liver is partially held in place, in the concavity of the diaphragm, by a number of peritoneal folds. The attachment of these ligaments is to the spine and the diaphragm; their principal function is to prevent extended lateral movements. Of greater importance in supporting the liver in a normal position is the integrity of the abdominal walls, and the

position of the stomach and intestines. If the abdominal walls are of normal tone the liver is very apt to be in correct position. And the rest of the abdominal organs, especially intestines and stomach, act as a cushion support. Often when the liver is displaced the remaining abdominal organs are, also, out of normal position and relation to each other; in fact, general prolapse of the abdominal viscera is a frequent cause of liver prolapse. An additional support of the liver is a certain cohesion of the liver and diaphragm, and the elastic traction of the lungs.

Foremost among the **causes** that predispose to inelastic and atonied abdominal walls are spinal irregularities, deviations, and curvatures, which impinge nerve force and obstruct blood supply. These same lesions weaken ligamentous supports of the liver and lessen tonicity of the other abdominal organs, so that local or general displacements are readily forthcoming. Strains, injuries, frequent pregnancies, etc., also act as causes that weaken the supports of abdominal tissues and organs. In a word it is very often the pendulous abdomen that is the immediate cause of a floating liver.

It is very rare to find the liver displaced to the lower region of the abdomen. The ptosis is usually somewhat slight. The organ generally rotates on descent, the right lobe being the lowest portion, owing to the attachment of a ligament, the ligamentum teres, to the umbilicus. Probably in some cases there is a congenital tendency to relaxation of the ligaments, and, thus violent exertions and atonic and flabby abdominal walls and diaphragm are secondary but important factors.

The principal **symptom** of a floating liver is a tumor in the right side, which may be low down. Palpation will usually determine this. Then the abdominal walls are flabby. Pain and bearing down of the right side are common. There is apt to be considerable indigestion. Various reflex symptoms are often present. The floating liver will seem larger than normal, as the liver is below the costal arch and much of it can be felt. Percussion will be of value in determining the extent of the disorder.

Much can be accomplished by **treatment**, especially where the displacement is of a lesser degree. Correcting the spinal lesions, toning up the abdominal walls and diaphragm, and replacing the displaced organs will be extremely effectual. The abdominal bandage may be of service. Certainly abdominal exercises will be beneficial.

A point to remember is, stimulation over the abdomen beneath the right costal arch will cause the liver to contract and retract. This is of considerable osteopathic note. The liver will often recede at least a half an inch. This is a liver reflex (Abrams).

Prolapsed Intestines

Prolapse of the **bowels**, as a whole, or, more frequent still, of a part, is undoubtedly the most common form of organ prolapse. The intestines are so situated that they readily feel the effect of gravitative influences, of atonic and anemic states, and of weaknesses and disorders of other abdominal organs.

Spinal irregularities come first as potent **causes** of bowel prolapse. The spinal nerves to the supports of the intestines, to the muscular coats of the intestines, and to the abdominal walls, are obstructed in their normal activity, and consequently those tissues to which these nerves are distributed are affected. Wasting diseases, as anemia, consumption, cancer and the like predispose to intestinal atony.

The severe mechanical wrenches, strains, frequent pregnancies, tight lacing, heavy skirts, large abdominal tumors, obesity, cause more or less general or local weakness.

The pendulous abdomen, from wrong or careless posture, and exclusive of other causes, is a common source of general bowel displacement. This form of disorder, besides being unsightly, favors abdominal stoutness. There are a number of instances where simply voluntarily holding or “sucking” the abdomen into place, until it becomes strong enough to support itself, has reduced one’s weight by five, ten or fifteen pounds. These were cases where most of the adipose tissue was about the abdomen. Thus exercising and toning the abdominal organs by keeping them in normal position rectified a dormant blood and lymph circulation, which was followed by absorption of the abdominal stoutness.

Congenital weaknesses are to be considered in many cases. The muscular ligaments may not be developed, the mesenteric attachments may be too long, and various other abnormalities may result from congenital disturbances.

Of particular local interest to the osteopath, outside of the bowels dislocating as a whole, are: first, the hepatic flexure; second, the ileo-cecal region; third, the sigmoid flexure; fourth, the rectum; and fifth, hernias. Each of these sections are of separate interest and will be considered presently.

The **symptoms** are extremely variable. Constipation, a feeling of discomfort in the bowels, nervousness, depression, lassitude and anemia are frequent. Colicky pains in the intestines, indigestion, hysteria at times, are also among the symptoms. In reality a great variety of symptoms may be present. The patient is likely to be emaciated. In some cases exhaustion is marked.

Diagnosis, as a rule, is not a difficult matter. The various neurasthenic symptoms in a lean patient with constipation, indigestion, and stomach and intestinal distress would lead one to suspect intestinal displacement. The outline or contour of the abdomen will often reveal the character of the trouble. The atonic, thin and relaxed walls of the abdomen may readily give view of the displaced organs. Then careful examination by palpation and percussion will help very materially in the diagnosis. Radiographic examination is a decidedly helpful diagnostic method.

The **hepatic flexure** is frequently prolapsed. The bowel (colon) ascends from below upward to beneath the costal arch and then angles sharply into the transverse colon, which extends directly across the abdomen to the left side. The ligaments that support this flexure are apt to become weakened or stretched and allow a descent of this section of the bowel, which is followed by constipation, indigestion, etc. The ligament especially involved is the colo-hepatic ligament. The **duodenum** may require attention. This can be raised by getting beneath it where the organ descends alongside of the ascending colon. The effect of treatment is to release tension of the duodeno-hepatic ligament which is closely associated with the portal vein, hepatic artery and bile-duct.

The **ileo-cecal region** is an area that readily becomes congested and catarrhally inflamed, especially from constipation or impaction at this point. The section often becomes atonic and prolapsed with resultant clogging of fecal matter. Owing to the close proximity of the vermiform appendix, appendicitis frequently results from the above condition. The osteopath can

do much in these cases of appendicitis. Lesions are invariably found in the lumbar vertebræ or the floating ribs are depressed.

The **sigmoid flexure** is also frequently prolapsed. The fecal mass often becomes impacted here, owing to a settling or prolapse of this part. In some cases the prolapse is so marked that it extends to the rectum below and drags on the splenic flexure above.

Lumbar and innominate lesions are the usual causes, although, it seems in a number of instances, that relaxed walls of the abdomen cause a "contraction of the diaphragm resulting in kidney displacement and followed by intestinal prolapse." The vertebral lesions, probably, first weaken the muscular coat of the bowel, then, second, the bowel supports (other than its own inherent tonicity) and the abdominal walls.

Prolapse of the **rectum** is of such separate importance that it will be but partly outlined here. As stated above, a source of rectal displacement arises from the section of the bowel above settling downward and ultimately causing invagination of one or more coats of the rectum. Dislocation of the coccyx is a potent cause of rectal disorders. Lumbar lesions, especially twists between the fourth and fifth, and fifth and sacrum are common causes of rectal weaknesses. Slips of the innominata are other causes of prolapse.

Osteopathy has had marked success in these cases. Cures may result from a single treatment to readjust the coccygeal displacement or temporarily relieve excessive physiological activity by dilating the rectal sphincter, or the treatment may demand a number of months' work in correcting general abdominal prolapse. Raising the sigmoid is effectual.

A **hernia** is "the protrusion of a loop or knuckle of an organ or tissue through an abdominal opening." Two of the common hernias of the intestines are inguinal and femoral. These conditions are most often acquired from severe straining, so that a loop of the bowel protrudes through a weakened and stretched area of the abdominal walls, though there is reason to suspect that congenital defects are often predisposing factors.

Mention of the hernia is here made because, in a way, it is a form of bowel prolapse; that is, a limited form, and osteopathy contains certain possibilities for a successful treatment. Hernia has always been looked upon

as purely a surgical disorder; i. e., remediable by surgical measures only. Where a truss has failed to give relief surgery has been resorted to. This is true in most instances, but where the hernia is in the incipiency careful abdominal exercises (this should be carried out with great care, for severe exercise may produce a hernia or increase one already existing), massage to the tissues about the hernia, attention to the bowels, and spinal stimulation corresponding to the weakened tissue, and avoidance of strains may strengthen the tissues materially about the hernia.

Occasionally a loop of the intestine will prolapse into the cul-de-sac back of the uterus. A heavy dragging pain low down in the center of the abdomen and constipation or complete obstruction are the pronounced symptoms. Careful lifting of the loop of bowel by pressure within the vagina and traction from above with a hand outside, with the patient, on her back, with buttocks elevated, gives speedy relief.

The **treatment** of the prolapsed bowels represents those measures that will replace and keep in position the displaced organs. Naturally, the spinal and abdominal treatment comes first; this strengthens intestinal ligaments, tones intestinal muscles, and contracts the abdominal parietes, and at the same time the bowels are regulated, digestion and nutrition improved, and the general health built up. In some cases abdominal supporters will be of value. In a number of instances attention to chest mobility and diaphragm tonicity will be of value. Right living, which is represented by proper diet, sufficient outdoor exercise and regular habits, is invaluable.

The really specific treatment is to correct spinal, rib and innominate deviations and abnormalities. But direct local work will be, in many instances, necessary. General abdominal manipulation is good, but this should be supplemented by careful local treatment. The hepatic flexure requires a direct stimulating and replacing treatment. The ileo-cecal section should be raised, stimulated and emptied of the fecal mass. Direct upward manipulation of the sigmoid flexure in the left iliac fossa and of the splenic flexure beneath the left costal arch is extremely efficacious. Care must be taken not to bruise the parts. Getting beneath the prolapsed area and gently and intelligently raising the bowel so that it is emptied, toned up, and vascular congestion relieved, are the indications. This requires careful work and the necessity of gentleness can not be emphasized too much. Still in all

of this treatment we should never forget the absolutely essential spinal readjustment.

Rectal prolapse requires lacol internal treatment, external tissue correction, especially of the coccyx, an innominatum or the lumbar spine, and, of much importance, deep, careful and thorough work over the sigmoid section.

Cases of bowel prolapse are every day experiences with the osteopath. The osteopathic treatment is of great value in these and a successful issue is very often the result. Cases of pendulous abdomen, of obstinate constipation, of chronic indigestion, of many nutritional disorders, of feeling pain, weight or dragging, locally or generally, in the abdomen, are very apt to be in persons suffering from prolapsed intestines.

A number of cases of bowel prolapse are associated with general prolapse of abdominal organs; that is, displacement of the stomach, kidneys, liver, spleen, etc. This general condition is termed enteroptosis or Glenard's disease. It usually requires several months to treat it successfully. These patients are neurasthenic, malnourished, and often hysteriacs. The symptoms from which they suffer are innumerable. Mechanical weaknesses, lowered vitality, poor innervation and blood supply, and auto-intoxication are causative factors.

The Prolapsed Uterus

Prolapse of the **uterus** is of common occurrence. The prolapse may be incomplete or complete; the latter when the organ is presented to the external world. Of special interest are those affections exclusive of surgical cases. Ptosis of the abdominal organs upon the pelvic organs is a common cause of uterine prolapse. The abdominal prolapse crowds uterine space, congests the uterus, weakens the ligaments, and drives the uterus downward as a wedge.

Lumbar spinal curvatures are frequent causes of prolapse, as well as other displacements of the uterus. In this region vasomotor nerves to the pelvic organs make their exit, and, consequently congestions, inflammations, and weaknesses of supports are results. Also, slips of the innominata disturb the pelvic circulatory balance. Weakness of the uterine

support from below, the vaginal walls and perineum, most often arises from lacerations at childbirth. Still, the vaginal walls may become relaxed through other causes. Tumors and extreme congestions are causes of prolapse. Heavy lifting is quite a frequent source of uterine displacements. Osteopathy is very successful in uterine prolapses; that is, any displacement of the uterus not of a surgical character. Correction of the external causes comes first. Then local treatment to replace, tone, and relieve congestion, and break up adhesions is necessary. The external treatment is usually the primary treatment. Local work is not always necessary. Lacerations and other surgical indications, of course, require surgery.

Ovarian Displacements

The ovaries may be prolapsed, the left much oftener than the right. When prolapsed, it drops backward, downward and inward.

Ovarian congestion, tumor, retroverted or retroflexed uterus, tubal disease, and pregnancy are among the principal causes. Back of these congestions, tumors and uterine displacements, are the osteopathic causes, particularly spinal and rib lesions from the ninth dorsal downward. Specific lesions at the ninth and tenth dorsals and corresponding ribs, affecting directly ovarian tissues, and lumbar and innominate lesions and abdominal prolapse disturbing uterine and tubal tissues, are the most frequent osteopathic causes. A retroverted or retroflexed uterus is often found. Uterine displacements bear down upon the ovary and cause its descent, and also disturb ovarian circulation.

As has been stated, the left ovary is more apt to be displaced than the right. This is owing to the absence of a valve in the ovarian vein on the left side, and also, this vein opens at a right angle into the renal vein; this anatomical feature easily leads to passive congestion of the ovary, and thus to diseases of the organ. Then the rectum is on the left side and large fecal masses are apt to crowd against the ovary, which tends to its displacement.

Thus it is readily seen that osteopathic treatment is very applicable to ovarian displacement unless the indications are surgical. A more or less constant burning or sharp pain in the ovarian region, with probably some feeling of weight, profuse and painful menstruation, depression, irritability,

etc., are **diagnostic**. However, a local examination will reveal the status of the ovarian position and congestion.

The same **treatment** as in other organ prolapse is indicated: toning weakened tissues, relieving congestions, replacing organ, with careful attention to the bowels and the general health. There are no tissue disorders of any part of the body wherein osteopathy is more thoroughly indicated and the results more generally satisfactory than in prolapse. And especially should it be remembered that in prolapse of various organs many vague intestinal and pelvic disorders and even ureteral and bladder disturbances may be traced to bowel dislocations and excessive kidney mobility in which osteopathic measures are often successful.

Conclusion.—The purpose of this section on Prolapsed Organs has been to supplement the various articles on Dilatation of the Stomach, Movable Kidney, etc., with an outline that may include relaxation of a part or of the whole of the abdominal viscera. The physician is all too prone to simply note the most offending or conspicuously disturbed organ instead of carefully analyzing all the features, great and trivial, that may be either apparent or marked. A general relaxation of the abdominal and pelvic organs may be found, and a nearly complete restoration take place under treatment, but still a lacerated perineum may have to be repaired before a cure is completed. Or it may be in a general abdominal ptosis that a floating kidney will resist all measures for restoration, short of surgery, and before much improvement can be obtained the kidney will have to be stitched into place. An enlarged liver may crowd the kidney out of place or a transverse colon may prolapse and drag on contiguous tissues and still the annoying symptoms be referred elsewhere. Then the primal point of general relaxation may not be in one organ, but there may be a simultaneous displacement of several.

The thorax itself may be distorted from various diseases so that the chest is narrowed, the diaphragm displaced with consequent descension of the abdominal organs, and from the latter a displacement of the pelvic.

“Far down displacement, marked changes of form, and real disfigurements of the stomach are found in some cases of kyphosis and scolio-kyphosis.”[46] The osteopath will not only find this true in some cases, but in many cases, although he recognizes as causative factors

injuries to the spine causing curvatures and postural defects as prolific sources of abdominal relaxation.

"Glenard's whole theory of splanchnoptosia is based on the relaxation of the suspensory ligaments of the intestines, especially that of the transverse colon; and Stiller, the discoverer of the floating tenth rib, says that splanchnoptosia is a descent of the atonic stomach, of the colon (especially the transverse portion), of the kidney (the right or both kidneys), exceptionally of the liver or the spleen. A descent which has been developed mostly in tender age, in consequence of general relaxation, especially of the peritoneal suspensory ligaments in individuals with congenital general dyspeptic neurasthenia, tender muscles, lean habit, and slender bone structure, manifested in a higher degree by a floating tenth rib." Stiller observed that when there is a floating tenth rib there is a displaced stomach and a floating kidney, although it is not found in every case, but never missing if the case is pronounced. The tenth ribs in these cases have only a ligamentous fastening and are as freely movable as the eleventh and twelfth.

That abdominal relaxation plays a very important part in many diseases of the abdominal and pelvic organs, in cardiac and pulmonary affections, disturbs the circulation in the legs, and is the source of many reflex affections no one can gainsay. The osteopath should always pay particular attention to tonic condition of the abdominal viscera, for relaxation of the suspensory tissues and walls, and atony and sluggishness of the organs are frequently paramount etiological factors. And the osteopathic treatment is the remedy par excellence.

FOOTNOTES:

[45] Rose and Kemp—Atonia Gastricia.

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SKIN DISEASES

Various skin diseases have been treated osteopathically with varying success. So much depends upon the cause of the disturbance and its removal, in skin diseases, that the cure does not rest so much with the mere treatment, as with the necessary skill in locating the disturbing factor. One has to be continually on his guard to locate external irritations and disorders of the digestive and genito-urinary tracts. A great deal depends upon the avoidance of external influences; eating nutritious food and having an unobstructed circulation. The leading object of osteopathic treatment is to free the circulation and thus promote a healthy and unobstructed flow of blood; in no other class of diseases is this more essential than in skin diseases. After the removal of cutaneous irritations and the correction of internal disorders, the cure of the case depends upon the removal of constrictions to the cutaneous blood-vessels. The osteopath corrects the lesions found, relaxes the muscles thoroughly and stimulates the circulation to the parts involved, and promotes a healthy activity of all the excretory organs. When the upper part of the body is affected, lesions are generally found at the atlas and axis, and when the lower part of the body is affected, lesions at the fifth lumbar are of common occurrence, although lesions may be located at various points corresponding with the seat of disturbance. The constant use of hot baths will be found a helpful measure in many skin diseases. But use of soap must be considered as too much alkali will neutralize the oil of the skin and cause undue dryness, but bran may be substituted to advantage. Cleanliness is necessary but the result sought is, also, flushing the cutaneous vessels. There are many cases where a specific vertebral lesion will cause, through the peripheral nerves, a cutaneous irritation with intense itching and discomfort. This, in turn, produces an exudate with or without a crust and a condition results which is not amenable to any local or constitutional treatment but an adjustment of the lesion will in most cases bring immediate relief. Application of this principle will aid greatly in treatment of any skin disease. In no disturbance of health is it more necessary to find the cause than in skin disease and once found to apply specific treatment.

Eczema is frequently met in osteopathic practice. It is the most common form of skin disease, comprising nearly one-third of all these disorders. For a differential diagnosis of the several varieties the student is referred to special texts. It is well to remember that the same underlying causes may be basic to the various forms, for several varieties may occur at the same time or one variety pass into another, though commonly one form is more prevalent. The limbs, face and genitalia are the most common sites, though the eruption may occur on various parts of the body.

Etiology includes a number of factors, constitutional and local. Dietetic errors, indigestion and faulty elimination comprise the principal underlying causes, often manifested through absorption of toxins and leucomains. In fact any disorder of the abdominal viscera, organic or functional, may be a predisposing factor, likewise various disorders of the pelvis, tuberculosis, diabetes, anemia, etc. should be considered. So-called gouty and rheumatic tendencies may be the constitutional basis.

The many osteopathic lesions play a very important role in lowering not only systemic resistance but of local tissue as well. This feature can not be over-emphasized.

Then local irritants, mechanical, chemical and thermal, are not to be neglected. These are usually of secondary importance. Micro-organisms are probably a complicating factor after the lowered resistance has been established. Vasomotor neurosis, through constitutional defects, toxins and the very significant osteopathic lesion, is probably an essential part of the pathogenesis.

Treatment is usually successful if the various etiologic factors are eradicated. Early treatment is very important. If the disorder is of more than local significance change the entire daily regimen of the patient. Diet, outdoor exercise and sufficient sleep should be definitely regulated. A certain amount of general treatment to improve digestion, assimilation and elimination is imperative. An unbalanced diet and over eating must be corrected. In certain moist types, eliminating fatty foods will be helpful, while in dry forms the starches and sugars should be reduced.

If there is an underlying disease this should be remedied if possible. Particular attention should be paid to constipation.

Common sense in diet, rest, change of environment and free elimination, coupled with due attention to the osteopathic lesions, will cure the vast majority of cases. The greatest difficulty arises where there is some underlying disease. The parts should be protected against irritation such as dirt, cold, soap, and too much water. Meddlesome local treatment is to be guarded against. A simple application is boric acid, rice-flour or cornstarch, or where there is much itching add carbolic acid to the saturated solution of boric acid. Substitute bran for soap for cleansing purposes.

Herpes Simplex, fever-blister, or "cold sore" comprise two principal varieties: **herpes facialis** and **herpes genitalis**. The first occurs upon or near the lips, face, neck or ears. When the herpes is on the tongue or the mucous membrane within the mouth it is commonly termed "canker sores."

Herpes genitalis is located on the prepuce, glans penis or farther back upon the penis. In the female the labia majora and minora and vestibule are the usual locations. Lack of cleanliness, sexual excitement and adherent prepuce are causative factors, though predisposing factors such as faulty circulation and disturbed innervation are to be considered.

In "cold sores" there is often some gastro-intestinal disturbance, especially intestinal stasis, cold in the head and other infections that supply toxins which irritate the nerves. No doubt there are underlying osteopathic lesions that lower the local nerve resistance or block the impulses such as vertebral and inferior maxillary lesions. The predisposing disturbance is probably due to the Gasserian ganglion.

Cold winds and excessive exposure to the sun's rays will effect the tissues over the mental and infraorbital foramina, tensing the muscles and irritating the nerves at these points. On palpation they will be found sensitive. Frequent rotary motion by tip of finger over foramina will open them and allow congestion to drain.

Herpes Zoster, or shingles, is an acute inflammatory disease characterized by groups of small vesicles, usually along the course of the intercostal nerves on one side of the body. Before the vesicles appear there is more or less severe neuralgia. The eruption is unilateral, very rarely bilateral. The nearby lymphatics are usually enlarged.

Though the intercostal nerves are the ones most frequently involved, still the lumbar, thigh, trifacial and other cutaneous nerves may be affected.

The most common lesion is an inflammation of the posterior spinal ganglion which usually involves the fibers of the entire nerve. Inflammation of the nerve outside of the ganglion will cause the disorder. Toxins from various infectious sources are often exciting causes. Vertebral and rib lesions are always found; and where the Gasserian ganglion is involved lesions of the inferior maxilla and upper cervical vertebræ are predisposing factors. Thus osteopathic lesions from traumatism, cold and wet, and imbalance of muscular tension are important. Exudates, tumors, pleuritic and pulmonary affections are to be considered as possible sources.

Treatment.—Adjust vertebral lesions and carefully raise and separate ribs if intercostals are affected. Look after vertebral origin of any other nerve or nerves if otherwise. Local application of talcum or starch or boric acid will generally be sufficient.

Urticaria, hives or nettle rash is a common affection often due to some derangement of the digestive tract. This may be a mechanical irritation or of a toxic nature. Every one is familiar with the various foods that are apt to cause the hives, shell fish, strawberries, cheese, pork, oatmeal, mushrooms, etc.

The irritation may be a reflex one from the visceral disturbance; also, there may be irritation of the pelvic organs that would give rise to the trouble. It is well known that certain drugs will produce urticarial eruptions. There are cases where the irritation is simply local due to the nettle, mosquito bites and wasp stings.

In chronic cases intestinal stasis, nervous exhaustion and nephritic diseases are important.

No doubt osteopathic lesions frequently determine the location of the wheals. These lesions affect the innervation and thus establish a basis for the reflex vasomotor effect. This is in the nature of spasm of the cutaneous vessels quickly followed by dilatation with exudation of serum. The irritant probably acts on the walls of the blood vessels.

Treatment consists of thoroughly emptying the bowels by warm water enema, correcting the diet, toning the viscera and adjusting the osteopathic

lesions. Thorough attention to the patient's environment, daily habits and occupation are of value. Warm soda baths will relieve the itching.

Acne is a common skin disorder that is characterized by an inflammation of the sebaceous glands of the nature of papules, tubercles or pustules. The face, shoulders, chest and back are the regions usually involved. It generally, appears about puberty. Blackheads is the starting point; these are accompanied with greasy skin and dust, and influenced by micro-organisms and more or less intestinal disorder.

The general or systemic health no doubt affects the local disorder, as in many skin diseases; for various intestinal derangements as indigestion, constipation, etc.; pelvic and menstrual irregularities; general ill health; anemia, etc. affect circulatory, glandular and nervous integrity. Any disturbance of normal elimination is important.

The **treatment** consists of careful attention to the general health and to the local innervation of the face or region involved. Measures that tone the bodily organs such as outdoor life, regular habits, plenty of sleep and correct diet are important. In some cases the X-ray is of value.

ANIMAL PARASITES

Tape Worms

Varieties.—Taenia solium; taenia saginata; bothriocephalus latus.

The larvæ of tape-worms are introduced into the intestinal canal by food and drink. The parasite reaches adult growth in the intestines. The larval forms are then found again in the muscles and solid organs.

Taenia Solium.—This is derived from the hog, and is the most common form in this country. When mature it is from two to four yards in length. The head is small, about the size of a pin, and provided with four cup-like suckers surrounded by a double row of hooklets, hence it is called the armed tape-worm. The head is fastened to the body by a thread-like neck, and following the neck, the body occurs in segments. The sexual organs, both male and female, occur in the center of the broad surface of the segment. The segments are about one millimeter in length and seven or eight millimeters in breadth. There are thousands of ova in each mature segment. The worm attains its growth in about twelve to fifteen weeks, after which time the segments are shed and passed. For further development the ova must gain entrance to the stomach of a pig or of man, and passing from the stomach they may reach the muscles and organs and develop into larvæ or cysticerci.

Taenia Saginata.—This is derived from beef, and is much longer and larger than the taenia solium. It is from five to six yards in length; the head is over two millimeters in breadth, is square shaped, and has four large sucking discs, without hooklets; hence it is called the unarmed tape-worm, in contra-distinction to the hooked variety. The segments are thicker and the ova larger, and they are passed and ingested in the same manner as the taenia solium.

Bothriocephalus Latus.—This is found especially in Europe and is very long, measuring from eight to ten yards; it is derived from fish, is not

provided with hooklets, but has two lateral grooves. The segments are short and wide, the sexual organs being on the narrow side of the segment.

Etiology.—Unhealthy condition of the stomach and intestines is the predisposing, and uncleanliness an important, factor in the occurrence of tape-worm. Those eating imperfectly cooked beef, pork, fish or other meats, and those handling fresh meats, are liable to be affected with tape-worm.

When the ovum is taken into the stomach the capsule is dissolved and the embryo passes into the small intestines, fastening itself into the mucous membrane, by its hooklets and suckers and grooves.

Symptoms.—Tape-worms occur in the human being at all ages. Oftentimes symptoms are absent, the expulsion of segments being noticed and thus the worms accidentally discovered. The tape-worm is seldom dangerous, but if a worm is known to exist it is always a source of considerable anxiety on the part of the patient. Severe anemia may result and be wrongly diagnosed.

There are dyspeptic symptoms, colicky pains, nausea and occasionally diarrhea. The appetite is variable, sometimes ravenous. This condition is followed by loss of flesh and various reflex phenomena, as vertigo, headache, convulsions, palpitation, choreic movements, itching of the nose and anus, paralysis, and rarely, insanity. In addition to these symptoms there may be a wrinkled countenance, sensation of a cold stream winding itself toward the back immediately after a meal, pain in various parts of the body and ringing in the ears. The decisive diagnostic symptom is to find segments of the worm in the stools.

Diagnosis.—Discovery of the ova or segments in the passages of the bowels is the only proof of the presence of a tape-worm.

Prognosis.—Favorable in all cases.

Treatment.—Prophylactic treatment is necessary. Meats should be thoroughly cooked so that the larvæ will be destroyed; and all segments of tape-worms passed in the stools should be burned—by no means should they be thrown outside or in the water-closet.

The immediate expulsion of a tape-worm is not a necessity. First of all the mode of living, and then the general state of health should be corrected. Tape-worms invariably result from a general state of unhealthiness, and

with improved health and corrected digestive processes the worms cannot exist, and in a short time will be expelled. Expulsion of the head is necessary before the case will be cured, for if the head is not expelled new segments will continue to grow.

Stimulating the liver to increase the amount of bile, and increasing the activity of the digestive glands of the stomach and intestines, by a thorough treatment of the splanchnic region and direct treatment over the abdomen, will usually be sufficient for the cure of intestinal parasites. The treatment will probably have to be repeated several times, in order that the intestines may regain a healthy tone, so that the parasite will not find favorable conditions for its existence within the intestines, and that the bile may be secreted in sufficient quantities to dislodge the worm.

Hahnemann claimed, “that during a period of comparative health tape-worms do not inhabit the intestines proper, but rather the remnants of food and fecal matter contained in the intestines, living quietly as in a world of their own without the least inconvenience to the patient and finding their sustenance in the contents of the bowels. During this state they do not come in contact with intestinal walls, and remain harmless. But when from any cause a person is attacked by an acute disease the contents of the bowels become offensive to the parasite, which in its writhing and distress touches and irritates the sensitive intestinal lining, thus increasing the complaints of the patient considerably by a peculiar kind of cramp-like colic. (In similar manner the human foetus in the womb becomes restless, twists its body and moves whenever the mother is sick, but floats quietly in the liquor amnii, without distressing her while she is well.)” This but harmonizes with the osteopathic theory and practice with regard to tape-worm, that there is an unhealthy condition of the intestines which predisposes to the affection, and consequently the cure must be a correction of such a disordered state.

During the treatment, if a light diet of milk and broths is given, it will favor an earlier removal of the parasite, by helping to remove the mucus in which the head is embedded. If this fails extract of male fern is suggested.

Ascaris Lumbricoides (Round Worm)

This is the most common parasite, and is found principally in children; it is also found in cattle and hogs. It is of a yellowish brown color and in form

resembles earth worms. The worm is cylindrical, pointed at both ends; the female is from seven to twelve inches in length, and the male from four to eight inches. They are probably introduced into the stomach by food and drink. They occupy the upper part of the small intestine, and are usually one or two in number, though they may be numerous. Occasionally they migrate into the stomach and are ejected by vomiting, or into the trachea and produce suffocation, or into the larynx or Eustachian tube, or they may pass downward to the anus, or into the bile ducts.

Symptoms.—Oftentimes symptoms are absent. There may be dyspepsia, colicky pains, mucous stools, meteorism, vertigo, fretfulness, voracious appetite, anemia, sallow complexion, headache, chorea and convulsions. Other symptoms may be present, as grinding of the teeth and itching of the nose and anus. Obstruction of the bowels has occurred. If a worm enters the bile duct obstructive jaundice occurs. A decisive diagnosis can be given only when the worm is seen.

Treatment.—Particular attention should be paid the liver, for it is here that we must seek the natural remedy in the form of bile, in order to eject and cleanse the system from nematodes.

Modes of improper living should be corrected; cleanliness is essential, and there should be attention to the general health of the patient. Thorough correction of all defects of the spinal column in the region of the splanchnics, and careful direct treatment of the bowels is indicated. The child may be put to bed and fasted twenty-four hours, then the liver strongly stimulated to increase flow of bile.

If the above treatment is not successful oil of wormwood may be employed.

Oxyuris Vermicularis

(Thread-worm; Pin-worm)

This small parasite, commonly seen in children, is from three to five millimeters long in the male and about twenty millimeters in the female, is blunt at one end and sharp at the other, and occupies the colon and rectum. They are probably introduced into the intestines in the ova, by uncooked

fruits and vegetables, or by the dirty hands of mothers and nurses of the infants. They vary greatly in number; migrate to the rectum where they deposit their eggs, and are often discharged in the feces, where they appear like pieces of ordinary white thread.

Symptoms.—Loss of appetite, anemia, restlessness and irritability are marked. The itching becomes intolerable when the worms come down in the rectum to the anus and within the folds about the anal orifice. In the female the worms may wander into the vagina where they become particularly distressing, and thus may produce excessive sexual excitement and cause nymphomania and masturbation.

Treatment.—Cleanliness of the most scrupulous kind should be demanded in every instance. Injections of cold salt water (repeated for at least ten days) and other agents within the rectum will destroy the eggs as soon as they are deposited, besides relieving the terrible itching. In obstinate cases use quassia decoction.

Attention to the general health of the patient and great care of the intestines and other digestive organs are absolutely necessary. The spinal treatment to the intestines and other digestive organs, as well as thorough direct treatment over the abdomen, is indicated.

Uncinariasis

(European hook-worm disease; Miner's anemia; Ankylostomiasis; Hook-worm disease)

This disease results from infection by the hook-worm of any of the various types. In Europe it is found in Italy, Belgium, Germany, France and Switzerland. In America it seems to be of Africo-Asiatic origin but was first discovered in the Southern states and abounds chiefly in Texas, Florida, Georgia, North and South Carolina as well as in the West Indies. Infection comes from unprotected feces that are allowed to be spread where the feet or hands may come in contact as it is without doubt that the contagion occurs through the skin. One authority states that hook-worm is rarely found except in cases where ground itch has occurred within a period of eight years. Negroes harbor the parasite and transmit it but seem immune to its effects while the poorer whites are afflicted to a large degree. The worms

are carried from some abrasion of the skin, by the blood to the heart and lungs, thence to the pharynx and swallowed, thence to the duodenum and jejunum where they attach themselves to the lining walls. Here they not only feed upon the blood but develop a toxin. The female worm is about twice the size of the male, 10 to 18 mm. as against 6 to 11 mm. and there is slight difference between the old and new world varieties. The head is provided with four hook shaped teeth which form the attachment to the intestine and it is very secure.

Diagnosis.—For years the languid, dull, expressionless, lack-luster of eye and general unambitious characteristics of the inhabitants of the great sand belt of the United States attracted attention and was attributed to laziness but the discovery of the hook-worm explained the cause. Children are stunted in mind and body and have a muddy, dirty white complexion.

At the beginning there must be a very considerable colony of the parasites to cause symptoms but as the disease advances there is a distention of the abdomen from enlargement of the spleen and liver and from flatulency. There is palpitation, shortness of breath, cardiac bruits from the severe anemia while edema of the feet and legs is rather common. The blood shows a severe secondary anemia with its coagulation time much increased. Leucocytosis is not common; hemoglobin is from one-tenth to one-half normal with erythrocytes about half normal.

Treatment.—The removal of the worms with the least possible harm to the body is indicated. Thymol is a poison which is not absorbed by the body, when carefully given, and which is very toxic to the parasite. The dose varies from eight grains for a child under five years of age, to forty-five for an adult. Thymol is soluble in fats and in alcohol, so that for a day or so before the thymol is given, and from one to four days after, no fats or alcohol should be taken. The best way to avoid poisoning by thymol is to give the patient charcoal, then no fats or alcohol is permitted until the treatment is completed. When the stools become black, the thymol is given on an empty stomach. A purgative is given a few hours later. Enemas should be used very freely in order to facilitate the removal of the injured or poisoned worms. Another dose of charcoal is given, and when the stools are black again, the patient may return to his ordinary diet. The denial of fats to the person so thoroughly accustomed to bacon three times a day is a factor

met with difficulty in dealing with patients of the ordinary class with the disease. (Clinical Osteopathy.)

Prophylaxis.—After treatment it is imperative to prevent reinfection and to do that the most rigorous sanitary measures must be instituted. All feces must be disposed of and habits of cleanliness in defecation insisted upon while negroes, who harbor the worm without showing symptoms, must be looked after as well as the actual victims. Care of the feet is important and shoes should be worn in infected regions and all abrasions of the skin protected. Drinking water must be uncontaminated which presents a problem as wells and springs are usually unprotected. Absolute and persistent cleanliness is the answer to the question of prevention.

Trichiniasis

Trichiniasis is a name given to a disease produced by the embryos of the trichina spiralis. In the adult condition the trichina spiralis lives in the small intestines. The embryos migrate into the muscles where they finally become encapsulated. Man is infected by eating insufficiently cooked pork containing the encapsulated worm, which is set free during the digestive process. About the third day they attain their full growth and become sexually mature. Each one discharges large numbers of embryos. As soon as born the young brood is carried away from the bowel and invade the muscles through various channels—principally by means of the blood stream and along the connective tissue routes. The female trichina may bring forth several broods of embryos in succession. In nine or ten days after infection the first brood reaches its destination. They attain to maturity in about two weeks after entering the muscular tissue. In this process an interstitial myositis is excited and a fibrous capsule is formed in four to six weeks. The capsule gradually becomes thicker and finally calcareous infiltration may take place.

Thorough cooking destroys the parasite. The disease is most frequent among the Germans who eat raw ham and sausages.

Symptoms.—These are sometimes absent, especially when only a few are eaten. If large numbers have been ingested, gastro-intestinal symptoms develop in the course of a few days. Vomiting, diarrhea, and pain in the abdomen may be present.

In from one to two weeks muscular symptoms develop. There is fever, muscular pain, especially during motion, and the muscles are stiff, tense and sometimes swollen. When the respiratory muscles are involved dyspnea is produced, which may prove fatal. Eosinophilia is a helpful diagnostic point. Edema, especially of the face, is an important symptom. Profuse sweats, itching and tingling of the skin have been observed.

Diagnosis.—Epidemics of this disease are more easily diagnosed than an isolated case. Among the Germans, if cases of apparent typhoid fever occur after a picnic or other feasting occasion, where raw ham or sausages have been indulged in, this disease should be suspected. Examination of the stools and of the muscles will be of aid. The worms may be discovered in the pork, a portion of which has been eaten by the patient.

Prognosis.—This depends upon the number of worms ingested. The prognosis should always be guarded. Early, marked diarrhea is favorable.

Treatment.—Prophylactic treatment is of great importance in trichiniasis. Inspection of the meat supply, is doing much to prevent trichiniasis; although the most practical way to prevent the disease is to thoroughly cook all pork and sausages. The central portions of the meat should be well cooked.

In the feeding of hogs care should be taken that they do not receive any offal, but only milk, grain, vegetables, etc.

When a person is infected with trichiniasis, thorough and prompt evacuation of the bowels should be performed at once, so that the embryos will not have time to pass into the muscles, but will be ejected from the body. This should be followed by a thorough and persistent treatment for several days of the liver and intestines; treat both the liver and intestines directly and through the spine. The object of this treatment is to render all the digestive juices active, so that they may dislodge the animal parasite, and to prevent their passing into the muscles. Also keep the bowels active for several days.

When the larval parasites have entered the muscles, a treatment cannot be applied to affect them directly, but the health of the body should be maintained if possible, and the severer symptoms, as the muscular pains, weakness and insomnia combated. Thorough manipulation, massage and

hot baths will be of special aid in relieving the stiffness and weakness of the muscles.

Filaria

(Filaria Sanguinis-Hominis)

There are two varieties. One is a thread-like worm with tapering, blunt ends, appearing in the blood at night, hence called **nocturna**, while the other is of slightly different form, appearing in the blood only by day and is called **diurna**.

The mosquito is the communicating host of the parasite. During the night, or should the patient sleep during the day, the **nocturna** appears in the peripheral circulation, while during the other interval they are probably in the other vessels, particularly the lungs.

After the mosquito has taken blood from an affected patient it requires from six to seven days for the metamorphosis of the minute filaria which are then lodged in the probosis of the mosquito and introduced into the blood of the next victim. The adult parasite is from three to four inches long and the thickness of a coarse hair, with clear sexual distinction.

Pathologically there are no distinct lesions, as the parent worm must establish one. Lymphatic engorgement may result from plugging of the thoracic duct or of a large lymphatic with consequent engorgement which may develop symptoms in the inguinal glands, pelvic and lumbar lymphatic trunks. As these varicosities develop rupture may occur; if into the genito-urinary tract chyluria or chylocele may result, or if in the abdominal cavity chylous ascites.

Lymphangitis follows a lymph stasis, which later results in **elephantiasis**. (Barbadoes leg.)

Symptoms.—Elephantiasis affects the legs, but the arms rarely; the labia of the female and scrotum of the male; occasionally the breasts and other parts of the body. Fever is present on account of the lymphangitis, accompanied by rigors and delirium and there is marked local inflammation. The attack terminates in a pronounced sweat. In deeper parts

there is deep seated pain and signs of sepsis, while abscesses may develop over the inflamed area.

The varicose inguinal glands are doughy, soft and painless, with both sides affected alike. The scrotum is affected by the extension, and at times the testes.

Treatment is surgical, as the tumors must be removed. Unless the female worm is also removed this is, however, only palliative.

Methylene blue is said to be destructive to the filaria and it is practically harmless to the human body. The only treatment is one that will aid in building up the general health.

HEMORRHAGES

Nasal Hemorrhage

(Nose bleed; Epistaxis)

Osteopathic Etiology and **Pathology**.—Traumatism, such as picking the nose, blows, and surgical operations; straining when coughing; nasal tumors and ulcerations; lesions of the atlas, or any lesion of the upper cervical vertebræ, that would interfere with the vasomotor distribution to the nose and cause local congestion or weakness of the blood vessels; obstructions to the general circulation; irregularities or suppression of the menstrual flow may result in nose bleed, as a vicarious menstruation; suppression of a habitual hemorrhoidal discharge.

Pathologically the great frequency of nasal hemorrhage is due to the great vascularity of the nasal mucous membrane. Usually in cases of spontaneous origin, bleeding is from the region of the septal artery. Spontaneous bleeding may also occur from posterior hypertrophies or adenoid vegetations. The blood flowing downward into the fauces, is expectorated in such cases, and may be mistaken for a hemorrhage from the lungs.

Treatment.—The position of the individual is important. He should assume a sitting posture, or as nearly so as possible. Holding the nostrils tightly, or plugging them with a piece of cotton, will favor the formation and retention of a clot, so that the hemorrhage may be controlled. Pressure upon the carotid artery, or upon the facial artery at the angle of the inferior maxilla, will slow the blood current and favor the formation of a clot, also pressure on the sides of the bridge of the nose may influence it. Correcting any lesions that may exist in the superior cervical region, as derangement of the vertebræ or contracted muscles, will remove obstructions or irritations to the vasomotor system of the affected region, and thus equalize the vascular system. Holding the arms above the head, and the application of ice to the nose are of aid in some cases. Also, injection of cold or hot water into the nostrils. In serious and obstinate cases, where other methods fail, a

plugging of the anterior and posterior nares should be resorted to, using absorbent cotton or gauze.

Broncho-pulmonary Hemorrhage

(Hemoptysis)

Osteopathic Etiology and **Pathology**.—Pulmonary congestion; croupous pneumonia; tuberculosis; hemorrhagic infarction; ulcers of the larynx, trachea or bronchi; gangrene of the lung; fibrinous bronchitis, carcinoma of the lung; lesions of the ribs or vertebræ from the second to the seventh dorsal inclusive, may cause diseases of the bronchial tubes or lungs, that result in hemoptysis, or the hemorrhage may be caused directly by extreme congestion resulting from the disordered vasomotor nerves; diseases of the heart, such as mitral disease, causing pulmonary congestion; aneurism of the branches of the pulmonary artery; vicarious menstruation from deranged menstrual functions; diseases of the vessel walls, or blood, as scurvy, anemia, hemophilia, etc.

Pathologically in many cases, the lesions are microscopic, consisting of ruptured capillaries. In other cases larger vessels may be ruptured, or are the seat of erosion. Many other lesions may be observed. After death the bronchial mucosa is occasionally found inflamed and the lung tissues paler than normal.

Diagnosis.—A differential diagnosis must be made between epistaxis, hemoptysis and hematemesis.

In **epistaxis** the blood may flow from the posterior nares into the pharynx; it causes coughing and a discharge of the blood may occur the same as in hemoptysis. A careful examination of the nasal region alone can determine the source of the bleeding.

In **hemoptysis** the history of the case as to pulmonary or cardiac diseases is to be considered. There is a feeling of weight and of uneasiness in the chest. A salty taste and a tickling of the throat precedes the bleeding. The blood is ejected by coughing and is bright red, frothy, very little coagula, and is alkaline in reaction.

In **hematemesis** the history would indicate disease of the stomach, spleen, liver or heart. Uneasiness, and occasionally nausea and faintness, precedes the bleeding. The blood is ejected by vomiting, and is dark, clotted or fluid, mixed with food, and is of acid reaction. In a few instances the blood due to hemoptysis may be swallowed, and vomited.

Treatment.—In all these cases of hemoptysis the patient should be placed in bed and absolute rest demanded. An attempt should at once be made to correct any lesion that may be found influencing the cause of the bleeding. Correcting lesions to the vasomotor nerves of the lungs and bronchial tubes, and equalizing the disturbed vascular area, may be sufficient in a number of cases. These lesions will be found principally in the upper dorsal region. In some cases, perhaps, there is an impairment of the trophic nerves by the same lesions, thus interfering with the tone of the vessel walls and pulmonary tissues. The diet should be light, nutritious and non-stimulating. The use of hot drinks is to be avoided. The rapidity of the heart's action should be reduced. This is best performed by thorough treatment of the dorsal spinal nerves of the left side over the heart, and by inhibition in the suboccipital region. The ice-bag to the precordia is also helpful. Iced drinks and the eating of ice is of aid. Stimulation of the systemic circulation will be of value in helping to relieve the pulmonary congestion, although the two systems are somewhat independent of each other. Also, hot foot baths and the evacuation of the bowels may be of additional value. In cases due to organic disease of the heart, the mind and body should receive absolute rest, so that the diseased areas may be strengthened as much as possible; besides a tonic treatment for the heart's action is necessary.

After the hemorrhage has subsided care should be taken that bleeding does not occur again. All irritations of the respiratory tract should be avoided. A stimulating diet, tobacco and alcohol should be avoided. Nutritious food and a moderate amount of exercise is indicated.

Hemorrhage of the Stomach

(Hematemesis)

Osteopathic Etiology.—Injuries to the stomach; local diseases, as congestion, ulcers and cancer; vicarious menstruation; a mechanical obstruction to the portal circulation; spinal lesions to the vasomotor nerves of the stomach; alterations in the blood; perforation of the stomach walls, involving a blood vessel; disease of some neighboring organ.

Diagnosis.—A careful examination of the case and of the blood ejected will be necessary to determine the nature of the cause. The differential diagnosis as to the source of the blood, whether from the stomach or lungs, was given under hemoptysis.

Treatment.—Correction of any lesions that may influence the blood pressure in the region of the stomach, is the first requisite. Treatment of the splanchnics has the greatest influence upon the vasomotor nerves to the stomach. Treatment of the vagi nerves and of the fourth and fifth dorsals, will quiet the violent movements of the stomach, and thus aid in controlling the hemorrhage. Stimulation of the cervical sympathetics and heat applied to the feet will tend to equalize the vascular system, and thus lessen the gastric congestion. The application of a broad flat ice-bag over the stomach will be of great value. Keep the patient quiet in bed. Surgical interference may be necessary.

Intestinal Hemorrhage

Osteopathic Etiology.—An obstructed circulation of the blood through the venaporta, as in diseases of the heart, lungs and liver; lesions of the vertebræ deranging spinal nerves to the intestinal blood supply; injuries caused by corroding or cutting substances; mechanical injuries to the intestines; degeneration or erosions of the blood-vessels from ulcers of the intestines, as from typhoid fever, typhus, dysentery, etc.; disordered menstrual or hemorrhoidal discharges.

Diagnosis.—The locality of the intestines affected can be approximately determined by an examination of the discharged blood. When the blood comes from the upper part of the intestines, it is generally dark and mixed with the intestinal contents, which gives it a tarry appearance. It is generally red and fluid when it comes from the lower portion of the bowels. If from the stomach, the blood is thoroughly mixed with fecal matter. Throwing the passage into water, the water is colored red when it contains blood, and if

the contents contain bile the water is colored green or yellow. Also, noting the areas of contracted muscles, as in intestinal colic, will aid in the regional diagnosis.

Treatment.—Absolute rest in all cases is necessary, the patient remaining as quiet as possible. Food, in severe cases, should not be given for ten or twelve hours. The bed-pan should be used in caring for the evacuations. Correction of the lesions along the spinal region, chiefly of the lower dorsal and lumbar regions, that are impeding the innervation to the intestines, should be attended to at once. This treatment tends to relieve any hyperemic condition of the intestinal mucosa and influences the whole vasomotor area of the mesentery. Direct treatment of the abdomen in a few cases is of great value to relieve obstructed and contracted vessels in the mesentery, but in certain pathological conditions, e. g., typhoid fever, leave the abdomen alone. Treatment (inhibition) along the spinal column from the sixth dorsal to the coccyx is helpful in all cases to quiet the peristalsis of the intestines. In severe cases cold drinks, eating of ice and an ice pack to the abdomen are of aid. In a few instances surgical measures will be necessary.

Hematuria

Osteopathic Etiology.—Congestion and acute inflammation of the kidneys, exacerbations of pyelitis, renal calculi, chronic nephritis, traumatism, tuberculosis, etc.; affections of the urinary tract, as calculi or lacerations of the ureter; calculi, cystitis, ulcerations, etc., of the bladder; calculi, gonorrhoea, parasites, etc., of the urethra; general diseases, chiefly the acute specific fevers and blood diseases; blows, wounds and traumatic influences, external to the kidneys; lesions of the renal splanchnics.

Diagnosis of the locality of the hemorrhage in the urinary tract: In hemorrhage from the **kidney** the blood is thoroughly mixed with the urine, giving a uniform color. Blood casts and leucocytes are present. In hemorrhage from the **ureters** the blood is usually molded in clots which conform to the shape of the ureter. The clots appear like small dark worms. In hemorrhage from the **bladder** the blood is not thoroughly mixed with the urine and large clots form upon standing. In hemorrhage from the **urethra** the blood often discharges without micturition. When urine is passed the blood precedes the passage of urine.

Treatment.—Rest is essential. A correction of the lesions to the renal splanchnics is necessary to control the congestion and inflammation of the kidneys. When the ureters, bladder or urethra is involved, attention must be given to the condition of the spinal column below the renal splanchnics. In all cases the inhibitory treatment to the lower spinal column and ice to the loins are of value. If surgery is indicated, do not delay operation.

Uterine Hemorrhage

Most of the causes of uterine hemorrhage come under the subject of obstetrics; others under menorrhagia and metrorrhagia. Such will be found in obstetrical and gynecological works.

Treatment.—The patient should assume the dorsal position with the buttocks raised. If any displacement of the uterus is present or if there is any foreign material in the uterus, usually such should be corrected or removed at once. Stimulation of the clitoris is a most effectual means to control uterine hemorrhage; it contracts the circular fibres of the uterus. Stimulation of the uterus directly through the vagina, and over the abdomen, and stimulation of the upper wall of the vagina, will aid in contracting the uterus. A quick, unexpected pull of the hair on the mons veneris will have the effect of closing the capillaries by shock to the nervous control (Dr. Still). Before closing the os, however, it is well to know that there is no irritating foreign material within the body of the uterus. Correction of obstructions of the vasomotor nerves of the uterus through the splanchnic and lumbar region is important. Compression of the abdominal aorta, and vaginal injections of hot water may be of aid, as will also a hot water bag at the lumbar region and ice water bag over symphysis. In severe cases inversion of the body, if it can be done with safety, may be performed. Packing the vagina is a method resorted to occasionally in severe cases.

Hiccoughs

Occasionally there is a case of hiccoughs that has been continuous for hours or even days and that all efforts have failed to stop. They are caused by an irritation to the peripheral distribution of the phrenic nerve from some gastric disturbance or a local irritant acting upon the center in the medulla.

It may follow fright or great emotion and be associated in persistent form in rheumatism, typhoid fever and other febrile diseases. It follows abdominal operations at times and is very distressing. When occurring in elderly people with pneumonia and in peritonitis with distention it usually marks the end. The same may be said in case of carcinoma of the stomach and bowels.

Treatment.—Go first to the origin of the phrenic nerve at the third, fourth and fifth cervical and, if there is a lesion as there will probably be, adjust it and note results. This will be sufficient in many cases. Failing, bring direct pressure on the nerve just above the clavicle and anterior to the sternomastoid muscle and release the scaleni muscles. After this examine and treat at the fifth and twelfth dorsals. Correct any lesions but best results will be had from inhibition at these points. Another method is to stand beside the patient and insert the fingers of both hands under the costal end of the ribs and lightly pull. Firm pressure over the solar plexus with flat of the hand is sometimes beneficial. In hysterical cases, drawing out the tongue will often be effective and it has been suggested that standing the patient on the head will stop them in short order. Tickling the nose to produce violent sneezing is an ancient remedy. Some one of these will cure the case, as osteopathy has never failed so far as recorded.

The stomach should be emptied of all irritating matter to prevent recurrence.

VARICOSE VEINS

In varicose veins there is a dilatation of the calibre of the veins and their valves are insufficient. The walls are irregularly thinned, lengthened and tortuous.

Osteopathic Etiology and **Pathology**.—The **internal saphenous** is the vein most frequently affected, although any vein throughout the body may become varicose. Commonly, varicose veins occur in the lower extremities and occasionally in the arms.

The **valvular insufficiency** is caused by stretching of the wall of the vein, thus separating the thin, free edges and leaving an interspace that allows regurgitation of the blood. The valves becoming insufficient, the column of blood in the veins has no support against gravity, and being interrupted in its course does not flow normally into collateral channels. The walls of the veins become thin, as does also the adjacent skin, thus increasing the danger of a rupture, either external or subcutaneous.

Varicose veins are most frequently found in females, following uterine enlargements. The condition may be due to any obstruction or constriction that prevents the free return of blood from the veins, such as dislocations of the hip, either slight or complete, dislocations of innominata, contractions of adductor magnus muscle affecting femoral vein, prolapse of diaphragm obstructing vena cava, tissue constrictions about the saphenous opening, garters, and, in fact, anything that might impede the free venous flow. The tendency to varicose veins increases as age advances, and many cases are found among people of middle life who have been accustomed to standing a great deal. Injuries to the pelvis, thigh or leg, lessening the nutrition to the leg, or injuries to the nerves, as vertebral dislocations in the lower dorsal or lumbar regions (the fourth lumbar especially) may be causes of varicose veins. Pregnancy or tumors in the abdomen or pelvis, causing pressure upon the iliac veins, are occasionally causes. Distention of the sigmoid flexure, causing pressure upon the left iliac vein, or distention of the cecum; pressing upon the right iliac vein, are fruitful sources, as are also diseases of

the heart and lungs. Varicose veins of the upper extremities are due to occupations requiring overuse of the arms.

Complications.—Varicocele, hemorrhoids, labial varix in the female, varix over pubes, ulceration and eczema due to disturbances of nutrition, edema and thrombus.

Symptoms.—Lower Extremities.—Cramping pains in the limbs upon rising. Fullness and heaviness of the limbs. Inspection may reveal superficial varicose veins near the saphenous opening, upon the external thigh, in the popliteal space, upon the external leg or behind the ankles. Edema and congestion of the foot and ankles occur in a few cases. Pain is quite a prominent symptom, due to pressure upon the nerve fibres. Eczema and itching are due to disturbed innervation and blood supply to the skin. Ulceration may occur, due to the bursting of a vein.

Upper Extremities.—Before the varicosity appears there is usually pain or a feeling as of a sprain in the involved region of the arm. The pain is usually confined to a muscle or group of muscles.

Treatment.—The majority of cases are due to disorders about the pelvis, hip or thigh, and the treatment resolves itself into the removal of these obstructions or constrictions. Occasionally cases are caused by partial dislocations of the hip joint, which can be easily overlooked during a hurried examination. The slipping of an innominatum is an important factor. Rest in a recumbent position, attention to the general health, and especial attention to the bowels and liver, are essential in acute attacks. Occasionally the heart and lungs are at fault. Treatment twice per week should consist of removing any of the numerous causes of the condition, and spinal treatment as well; then the leg should receive special attention. Remember, thrombi may form and the vein must, under no circumstances, be touched in the treatment. Begin by carefully rotating the leg to stretch contracted tissue about the saphenous opening, then separate the tendons of the popliteal space and follow the course of the vein to the abdomen and relax tissue about it. Keep patient off the feet as much as possible and elevate the leg when sitting.

In rupture of varicose veins the hemorrhage can be arrested by elevating the limb and applying pressure with the fingers, above and below the wound, until a compress and bandage can be applied. The support of the

varicose veins by elastic stockings will ease the pain and prevent edema in many cases, but, as a rule, it is a direct hindrance to the circulation on account of the necessity of having the stocking fit closely. Surgical operations are rarely indicated.

Phlebitis

(Phlegmasia alba dolens; milk leg)

An inflammation of a vein. In the condition described here it is a puerperal septic inflammation of the femoral vein. About the third week after confinement there is a swelling of the leg with or without redness. Great pain accompanies the condition and the temperature gradually rises to 102°-3°. As understood by osteopaths, this is the result of a partial closing of the saphenous opening during parturition so that the venous flow is partly stopped.

Treatment consists in carefully rotating the leg at the hip so that the fascia lata is spread, opening the lumen of the vein so the congestion will drain out. There will, also, probably be found innominate or lumbar lesions which must be adjusted with the result that almost immediate relief is given as a rule.

Chronic Phlebitis

The chronic form shows considerable inflammation along the line of the vein marked by tenderness, edema and thickening of tissue. The entire leg may be more or less involved through circulatory injury. In these cases will be found definite innominate lesions of a primary type or the distortion is superinduced by lumbar lesions. A few cases are quickly cleared up through adjustment that is readily secured. However, in others, there being considerable thickening of the sacro-iliac articulating tissues, some time may be required to get complete adjustment and consequent restoration of femoral circulation. In addition to this, careful abduction, flexion, hyperextension and circumduction is indicated. This last technique should be executed with great care and with due regard to pathology. If Dr. Still’s emphatic command were followed, that all maternity patients should have

both legs rotated and innominates inspected, there would be no phlebitis cases, acute or chronic.

THE RECTUM

To treat the rectum intelligently and thoroughly, requires special knowledge on the part of the osteopath. A speculum should be used in many cases when making an examination, and all abnormal conditions carefully inspected with the eye; although much can usually be noted by the examination with the finger alone. The best position in which to give an examination and treatment is to have the patient on the side, with thighs flexed upon the abdomen. In a few cases the patient may lean over an operating table.

The **objects** of **rectal treatment** are many—to relieve hemorrhoids, etc., of the mucous membrane; to correct a dislocated coccyx; to treat an enlarged prostate gland; to replace a prolapsed rectum; to tone the lower bowel in cases of constipation; to give reflex stimuli to the heart and lungs, in cases of fainting, paroxysms, etc.; to relieve severe pains in the rectum at the time of the menstrual period, and to relieve congestion, inflammation, contracted tissues, etc., of local sources; to relax spasms in croup, and to remove tension to the nervous system in some forms of insomnia. In fact, so many diseases are affected by reflex irritations from the rectum that its examination is a necessity in many cases. The phrase "when in doubt treat the rectum" was coined by a progressive student and there is an element of truth in it. Surgical assistance to treatment will be considered under hemorrhoids.

The principal need of osteopathic internal rectal treatment, is: (1) To relax all contracted and constricted fibres about the walls of the rectum and between the sacrum and coccyx. (2) To correct a dislocated coccyx. (3) To dilate the sphincters thoroughly, in order to relieve irritations about the sphincters, and to stimulate the sympathetic nerves.

Work through the rectum to treat an enlarged prostate gland, to correct a displaced uterus, and to make a more thorough examination of the uterine tissues, the Fallopian tubes and the ovaries, is a frequent occurrence.

In giving **local treatment**, cleanse the fingers and oil the index finger; then, after introducing it into the rectum relax the contracted tissues by an

upward sweeping motion on all sides. This treatment relieves all obstructions to vessels and nerves caused by contracted fibres, and tones the rectal walls. In prolapsed sigmoid, causing obstructive constipation, the finger can be used to separate the folds of mucous membrane and open the lumen of the bowel. Frequently there will be enough tone to the muscular coat so that the irritation will set up slight peristalsis and cause the bowel to draw up to a considerable degree. In children where there is much straining at the stool, the sigmoid will often be found down and by using the little finger the same results can be accomplished and much relief given.

To **dilate** and **stretch** the sphincters thoroughly a speculum or dilator should be used under anesthesia; still, considerable can be done by one or two fingers. The sphincter should be thoroughly stretched in all directions, care being taken when an instrument is used that too much force is not applied. Secure as much voluntary relaxation of the sphincter as possible. Inhibition at 2d and 3d sacral will aid. This treatment is of aid in cases of hemorrhoids and prolapse of the rectum, in constipation due to the loss of tonicity of the lower bowels, in tightness of the sphincters, in pain of the rectum, and in stimulating the heart and lungs. In cases of a prolapsed rectum, due to irritation about the sphincters, causing tenesmus, this treatment is of special value, as it gives the sphincter a physiological rest. Frequency of treatment per rectum must depend entirely on the patient and disease. It can be given daily in many cases and is frequently so indicated in acute hemorrhoids, prostatic troubles, etc.

According to Quain, the sensory nerves to the rectum are from the second, third and fourth sacrals. Some of the motor fibres of the circular muscles of the rectum are from the lower dorsal and upper two lumbar nerves; these pass by the aortic plexus to the inferior mesenteric ganglion. Associated with these fibres, are the inhibitory fibres of the longitudinal muscles of the rectum. The sacral nerves contain motor fibres to the longitudinal muscles, and inhibitory fibres to the circular muscles of the rectum. In all cases of rectal trouble, the lower dorsal and upper lumbar vertebræ may be found deranged, and thus interfere with the rectal nerves. Relaxation of the sacral muscles over the sacral foramina has a marked effect in relieving **tenesmus**. In dysentery, where there is a constant desire to defecate, a thorough upward relaxation of the sacral muscles will give great relief.

Proctitis or inflammation of the rectum is not an uncommon disorder. The disease has been divided into acute, chronic, gonorrheal, dysenteric, and diphtheritic. Foreign bodies, impacted feces, cold, purgatives, prolapse of the sigmoid, and lumbar, coccygeal and innominate lesions are the most important causative factors. The **acute** form is more frequently found in older people. The **symptoms** are tenesmus, frequent evacuations of blood and mucus (possibly pus), prolapse of the mucous membrane, feeling of fullness, and radiating pains. The gonorrheal, diphtheritic and dysenteric forms are of rare occurrence, with the exception that the dysenteric may be somewhat frequent. The **treatment** is to remove all local irritations, cleanse the bowels, and put the patient in bed. All irritating foods are to be prohibited. Use milk, soups, beef juice, soft boiled eggs and similar foods. Correct all osteopathic lesions; especially will inhibition over the sacral foramina relieve the tenesmus. Cold water in the rectum and applied to the anus will be beneficial. If abscesses occur, employ surgical measures.

Prolapse of the **rectum** is another common rectal disorder. Acute cases are especially found in children, due to straining at stool. The sacrum is more straight, and thus violent straining, coughing, etc., the more readily produces prolapse. Prolapse of the mucous membrane is the most common, although all of the rectal coats may be involved. Prolapse of the upper part of the rectum into the lower or invagination is frequently met with by osteopaths. The sigmoid may prolapse and also affect the rectum. The **treatment** is to return the mass, using an anesthetic if necessary. If it is not retained, place straps across the buttocks. Then with attention to lesions that may be disturbing and weakening the rectal walls, and thorough local toning treatment, the prognosis should be favorable. In high rectal prolapse local attention is necessary as well as deep treatment through the abdominal walls to the sigmoid and upper rectum. The use of Cole's irrigator for high enema will replace and elevate both the upper rectum and sigmoid and greatly aid in a cure. Regularity of habits and proper food are essentials.

Hemorrhoids

Definition.—A dilated or varicose condition of the plexus of veins lying in the submucous tissue of the lower part of the rectum. The dilatation of these hemorrhoidal veins may extend into the adjoining subcutaneous

tissues and mucous membrane, and the perirectal plexus and adjoining venous plexuses of the bladder, uterus, vagina and sacral canal may become involved.

Osteopathic Etiology and **Pathology**.—The chief predisposing cause of piles is man's erect position and the absence of valves in the hemorrhoidal veins. Thus a retardation or stagnation of the portal vein would cause a backward movement of the entire column. It is evident that such a downward pressure of the blood in the portal system would dilate and extend the blood vessels, to the very capillaries in the rectal region.

This retardation may arise from several causes: obstruction of the portal vein, from diseases of the liver; diseases of the heart; obstruction or destruction of the capillaries of the lungs; pressure from a gravid uterus, tumor, etc.; a general loss of tonicity of the abdominal walls, as in persons who take but little exercise; the excessive use of wine, tea and coffee; injuries to the spinal column, especially in the lumbar, sacral and coccygeal regions; a dislocation of an innominate bone; lifting; constipation; straining at stool; carelessness of the calls of nature, etc. Catarrh of the bowels may cause a congestion of the mucous membrane and consequently piles. Hereditary influence may be a factor in a few cases.

Hemorrhoids are divided into two classes, **external** and **internal**. An **external pile** is one that arises from the margin of the anus outside of the external sphincter muscle. It differs from the internal pile from the fact that it is always composed either of skin or hypertrophied connective tissue, forming a mere cutaneous tag, or else it is composed of a small cutaneous vein enlarged by a clot of blood. The **internal hemorrhoids** are composed mostly of enlarged veins and are connected by hypertrophied connective tissue. They have a free arterial supply and are covered by the mucous membrane of the rectum. They are due, usually, to an affection of the middle hemorrhoidal blood supply, thereby being a part of the visceral vascular system. Internal hemorrhoids, when protruding, can be returned within the rectum, while the external ones cannot. The venous turgescence varies in size from a pea to a walnut. They may be single or may surround the entire anal opening like a bunch of grapes.

Repeated attacks of engorgement of the veins involved, will in time change the mucous membrane or the submucous tissue, and cause catarrhal

swelling of the mucous membrane, or hyperplasia of the connective tissue. At first the hemorrhoid is usually a blood tumor, but in chronic cases it is oftentimes made up largely of connective tissue. Owing to pressure of the varicose veins, atrophy of the mucous and submucous tissue may occur. The white or slimy hemorrhoids occur when these roughened parts of the mucous membrane become inflamed and thickened, resulting in suppuration.

Symptoms.—The symptoms are quite diagnostic and need not be mistaken. Besides the appearance of tumors, there may be constipation, pain during stools, indigestion, headache and pain in the back. Hemorrhages frequently occur, and if suddenly checked, as by cold, other disturbances may occur, as congestion of the head, lungs, stomach, liver, kidneys, etc., which may result in hemorrhages from these organs. Fissures of the anus, contraction of the rectal sphincters and prolapse of the rectum may occur. Occasionally in old people there is a varicose state of the veins of the neck of the bladder, and in females, of the uterus and vagina, which causes hemorrhages of these organs. The communicating plexus of the spinal canal may be affected, causing weight, numbness and pain, so as to simulate a lesion of the cord. The patient may have a hypochondriacal disposition and be disinclined to work, especially at mental labor.

Prognosis.—Depends upon the predisposing and immediate causes, but a large majority of cases can be cured.

Treatment.—A thorough examination of the patient should be made, not only to ascertain the extent of the local trouble, but to understand thoroughly the general health of the sufferer, especially the state of the heart, lungs and liver.

Many cases of hemorrhoids are caused by lesions in the lumbar and sacral regions, and especially dislocations of the coccyx (usually anterior) and the innominata. Correcting these lesions will oftentimes cure the hemorrhoidal disorder. Simple dilatation of the rectum once a week, in addition to other treatment, is of great aid in curing hemorrhoids, not a few of the cases being cured by dilatation alone. It relaxes the tissues about the tumefied vessels. Treatment is rarely necessary above the second lumbar, (unless there is more or less of a constitutional disorder) as the superior

hemorrhoidal blood vessel of the inferior mesenteric is given off about opposite the second lumbar.

In cases where the abdominal walls have become relaxed, a treatment should be given to strengthen the abdominal muscles and viscera. Particular attention should be given the liver. Treatment should be given over the abdominal muscles directly, and also to the spinal nerves of the same region. The diet should be strictly regulated and the bowels kept loose, and stimulants, indigestible food, full meals and too much meat should be avoided. Injection of cold water before stools is a good prophylactic, and applications of cold water to the protruding pile will be of some help in relieving the congestion. A squatting position during defecation will relieve considerable strain.

Hemorrhoids in the **acute state**, within twelve or twenty-four hours from the engorgement, yield quickly to treatment. The local technique is to relax the tissues about the tumor, especially above and along the line of the vein, then with pressure at its base carefully force out the engorged blood. Follow this up by another treatment the next day and continue until normal. The vein wall, not being permanently stretched, will contract and if the irritating cause is found, there is little danger of return. Remember, in a case like this, the danger of embolism and be sure a clot has not formed. Cases of hemorrhage at stool, during or immediately following evacuation, when not from a bleeding pile, may be of considerable quantity and the source difficult to locate. It may be due to ulcerations or easily ruptured capillaries of the mucosa, but the cause will in many cases be found in the innominata and a reduction of the lesion give relief.

Rectal conditions, associated with piles, and **requiring surgery** after treatment has failed, are: **hemorrhoids**, which are of such long standing as to become organized tissue, (these will keep up continual irritation and cannot be absorbed); **saccules** or pocket, formed by folds of mucous membrane catching and holding particles of feces, gradually enlarging and ending with considerable reflex symptoms; **fistulae**, complete or incomplete, may frequently be healed by adjusting coccygeal or innominate lesions, but are apt to recur from the tract not being clean in the center or bottom; **abscesses** in or about the anus or rectum are usually traced to coccygeal, innominate, or local interference to circulation; **fissure**, complete dilatation under anesthesia to insure physiological rest of parts, is

probably the best treatment. It is suggested that a fissure may be healed by making surgically clean, touching with iodine and coating with collodium. **Papillae** are small, hard black-capped papules in the lower rectum, each one involving a nerve terminal and causing much distress. All these conditions give rise to much discomfort and with surgical assistance can be cured without much trouble. It is not necessary to make them a major operation and do uncalled-for things. The less surgery about the rectal sphincter the better.

Care of the **anus** and **rectum** after operation or successful treatment is a factor in preventing return. First, there should be soluble, non-irritating stools, which do not tend to bring about prolapse from straining. Diet and regularity contribute to this. Second, absolute cleanliness. This can only be obtained by following the stool with an enema of four or five ounces of cool water and immediately passing it. It will bring forth a considerable quantity of feces which would otherwise have been retained for another twenty-four hours. This procedure following, as it does, the stool does not in any way interfere with the normal function or create a habit. The anus should then be thoroughly washed in cool water and as thoroughly dried. Dusting with borated talcum powder, starch, etc., will prevent chafing.

GENITO-URINARY

The Prostate Gland

This gland is subject to several painful and annoying diseases, controlling, as it does, the flow of urine and exerting such a profound influence over the sexual functions. The nerves to the prostate pass between the gland and the levator ani muscle, and the secretory branches are from the sacral nerves, while Quain gives the sensory as from the tenth, eleventh (twelfth) dorsal, first, second and third sacral and fifth lumbar. Lesions affecting the prostate are occasionally found at the tenth and eleventh dorsal and fifth lumbar, while the innominate lesions are common causes of trouble. These should be corrected, if present, and local treatment given to the gland. "Massage of the prostate," says Lydston,[47] "properly performed, is one of the most valuable advances in genito-urinary therapeutics that has been developed in many years." Osteopathic technique is to place the patient on the side, knees flexed, and standing in front insert the index finger. Care must be used not to bruise the gland and it must be touched lightly when sensitive. Relax tissue about the gland, and, then, from the median line with an outward movement, massage the surface of each lobe. This influences the blood and nerve supply, while the pressure will tend to relieve congestion. Length of treatment, as well as frequency, depends entirely upon conditions. Do not make the mistake of treating the perineum instead of the gland and do not gouge it with the finger. Remember it is sensitive tissue.

Hypertrophy is most commonly met with in practice, as twenty per cent of men past middle life are said to be afflicted. It is probably not a sequence of old age, but due to chronic, congestive and inflammatory conditions. Anything which would produce these conditions—spinal lesions, excessive venery, masturbation, or other more innocent causes—would in time bring about enlargement. As the length of catheter life is estimated at six years it is of great importance that the condition be early recognized, for in advanced stages surgery is the last resort. In early stages the prognosis is good, either for a cure or to stop further enlargement, while many enlarged

ones at the catheter stage have been greatly benefited or cured. Treatment of the gland once per week is usually enough, but in older cases can be given semi-weekly. Look well to nerve and blood supply.

Acute Prostatitis is a serious and painful inflammation, causing urinary retention usually. It results from trauma, horseback riding, over exertion, gonorrhea and its maltreatment, etc. Lower dorsal and lumbar lesions are frequent. This condition must be closely watched. Inhibition of the sacral nerves will help control pain and stop any spasm of the sphincter. Cold applications to the gland externally at the perineum will aid in reducing inflammation. Local treatment should at first be given to the adjacent tissues as the gland will be very sensitive. Later direct massage will be of great benefit.

Chronic Prostatitis may follow an acute attack or it may originate as a chronic or subacute affection. Frequent micturition and dull pain, referred to the perineum and rectum, with the local examination, make diagnosis sure. The spinal lesions should be corrected and the gland massaged. This will induce absorption, by squeezing out the inflammatory products and do much toward preventing future hypertrophy. “Massage is done by the finger. The patient is placed in the knee-elbow position and massage employed for four minutes daily. The value of massage in chronic prostatitis is very great, but should be employed with much caution and never in cases of suppuration.”[48]

Prostatorrhea is often taken for spermatorrhea and any irritation of anterior sacral nerves would cause undue activity to the secretory nerves to the gland. This is easily determined.

The Seminal Vesicles can be reached just above the prostate, and if inflamed and tender or if engorged by inspissated seminal fluid, local treatment will be of benefit. Frequent massage, daily in some cases, to the gland and treatment to the sympathetic nerves above the trigone of the bladder, to the nerve fibres passing along the spermatic cord, and to the arteries directly, will be of the greatest aid in impotency.

In **Chronic Gonorrhea**, where the gonococcus has found lodgement in and about the gland, it can be more readily dislodged by massage than by any other form of treatment.

Retention of urine from nervous excitement or other minor causes, can often be overcome by local massage of the prostate.

Spastic stricture can usually be cured by work about the prostate and its innervation.

Varicocele

A varicose enlargement of the veins of the spermatic cord, epididymis and testicle. In varicocele the pampiniform plexus is usually enlarged, but all the veins of the cord may be involved. The swelling gets smaller under compression or in a horizontal position and enlarges again on standing erect. It is almost invariably found on the left side, and the testicle on the affected side is generally smaller and softer than its fellow.

The predisposing **causes** are a longer and tortuous spermatic vein on the left side; the absence of support of the veins from surrounding muscles; the imperfect valves; the entry of the left spermatic vein into the renal vein at a right angle, instead of at an acute angle like the right vein; the more liability of compression of the left spermatic vein by accumulation of feces in the sigmoid flexure; the lack of normal exercise of the sexual functions in young, unmarried adults. Lesions in lower dorsal and upper lumbar affect the condition; the eleventh dorsal particularly. A lesion at the second lumbar may cause neuralgia of the testicle with engorgement of the vein.

The exciting causes are straining during stool, heavy lifting, excessive sexual indulgence or anything that would determine more blood to the testicles. Varicocele is similar to the varicose state of the hemorrhoidal veins and may have like causes.

The **diagnosis** is easily made. The feeling of the veins between the fingers like a convolution of earth worms; dull, aching, dragging sensation, and possibly prostration, weakness and dejectedness of spirits, are characteristic symptoms. “The condition is devoid of danger, except that it often begets morbid fears on the part of the patient, usually the result of suggestion.”[49]

The **treatment** consists of regulation of the bowels, removal of such predisposing and exciting causes as may be found, treatment of the vessels along the spermatic cord, and treatment to the lower dorsal and lumbar

regions. In severe cases a suspensory bandage will give temporary relief. Surgical interference may be necessary in some cases in order to effect a cure.

Impotency

Results from treatment in these conditions are particularly gratifying and offer a great field of activity in this day of sensational medical advertising. This condition can well be classed under four heads, Exhaustive, Traumatic, Psychic and Organic.

Exhaustive Impotency is the result of functional abuse, masturbation in early life, excessive venery, coupled with intemperate use of alcohol and improper diet without sufficient sleep. It can be symptomatic in neurasthenia. There is at first irritation of the spinal centers, which causes exaggerated sexual activity, and later this is followed by complete or partial loss of function. The first step is for a radical reform in habits; regulation of the bowels, as they will likely be constipated; direction of the mind into wholesome channels, and then skillfully directed spinal treatment. Where there has been masturbation, look well for sources of irritation to the parts; a long foreskin or adherent prepuce indicates surgical aid, or there may be a lesion at the sacrals involving the nervi erigentes or, of greater importance, the pudic nerve. The innominatum can be at fault in this. The lower dorsal, ribs and upper lumbar are of importance. Kraft-Ebing says: “Conditions of absolute impotency are, however, rare, and are caused **only** by severe vertebral and nervous diseases.” Nerve irritation undoubtedly is the cause of sexual perversion (outside of heredity and malformation) so their relief is as necessary to bring about reform of habits as to effect a cure. Where the general health is affected constitutional treatment should follow. Motschutkovsky uses suspension in treating these cases with good results. The effect is to separate the vertebræ, freeing spinal nerve and blood channels. The prostate will probably be found in an irritated, sensitive condition, as well as the seminal vesicles. Treat as outlined under the prostate gland. Ligation of the dorsal vein of the penis is recommended by some authorities as tending to aid turgescence of the organ. Prognosis is so dependent on how well the patient follows directions, age, environment and general condition that it is hard to give, but as a rule is rather favorable.

Traumatic Impotency is a strictly osteopathic classification, for the reason that sexual weakness is often traced to lesions resulting from remote injuries. These injuries may be to the spine, ribs or sacrum. The lower spine may be impacted from a fall or the result of long continued riding on rough streets or the railway. This inhibits the nerve supply to the extent of often seriously impairing the sexual functions. If the cord is injured to any extent the results are more serious. Treatment in these cases has given uniformly good results. It will always be due to a specific lesion, so the examination must be thorough.

Psychic Impotency is the form most frequently met with and generally the most difficult to cure, yet it should not be if the patient's confidence can be secured, for in many cases sexual power is but slightly impaired, but owing to the suggestions given by the medical advertisers the victim diagnoses his own case as hopeless. "It is not uncommon that virility returns with the peace of mind."[50] Observe all the procedure given and then inspire hope where it can be honestly given, and if the patient is progressing favorably, other things being equal, advise early marriage under strict rules of conduct. If already married, conjugal relations should be most carefully investigated and the wife taken into your confidence. Her cooperation in correcting very possible errors in sexual matters, as well as sympathetic aid in easing the patient's anxiety and chagrin, will be invaluable. Nothing but the frankest understanding between all parties is permissible and the osteopath must be in absolute control.

Organic Impotency is the result of a cortical injury or disease. The latter is the most common, as it follows tabes dorsalis, paralysis affecting the lumbar cord, some cases of diabetes, etc. Also, any congenital malformations or absence of all or part of the organs. Prognosis in these cases is bad, as cure is seldom possible.

In no other class of cases will honesty, tact and good judgment count for so much or the rewards be greater.

FOOTNOTES:

[47] Twentieth Century Practice of Medicine, Vol. XXI.

[48] C. Kruger, Munch Med. Woch.

[49] Deaver's Surgical Anatomy, Vol. II, p. 652.

[50] Vecki, Sexual Impotence.

HEAT STROKE

(Heat Exhaustion: Sunstroke)

An affection produced by exposure to excessive heat. Two varieties are recognized; heat exhaustion and thermic fever.

Heat Exhaustion.—This is caused by prolonged exposure to high temperatures, combined with physical exertion. Fatigue, overeating, alcoholic drinking, and poor sanitation predispose. This may occur without exposure to the direct rays of the sun, the heat being artificial, or in mid-summer, in close, confined rooms the same result will be produced. There is vasomotor paralysis, the surface of the body is usually cool, the temperature may be as low as 95 degrees F., while the pulse is small and rapid.

Sunstroke or **Thermic Fever**.—This is usually caused by prolonged work under the direct rays of the sun in a humid, very hot and sultry atmosphere. This is caused by the action of the heat upon the heart centers producing a paralysis of those centers.

Pathologically, rigor mortis develops early and is marked. Putrefactive changes appear early, owing to the high temperature of the cadaver. The various organs are deeply congested, the venous engorgement is extreme in the cerebrum. There is rigid contraction of the left ventricle; while the right is dilated and filled with blood. The blood is fluid and dark. Parenchymatous changes take place in the liver and kidneys.

In heat exhaustion with lowered temperature there is a paralysis of the vasomotor center in the medulla, and the heat is dissipated more rapidly than it is produced. In thermic fever the heat regulating centers become paralyzed by the action of the excessive temperature and more heat is produced, and less dissipated than normal.

Symptoms.—Heat Exhaustion.—This may occur gradually or suddenly with a severe attack of faintness, pallor, dizziness, headache, cold perspiration and sometimes blindness as the first symptoms. Consciousness is rarely entirely lost. In severe cases there is more permanent collapse. The

pulse is rapid and feeble and there is great restlessness and delirium. Under prompt treatment mild cases may recover in a few hours, while in extreme cases death may occur almost at once from heart failure.

Thermic Fever.—In some cases the patient is struck down, becomes quickly unconscious, and may die within an hour, or death may be almost instantaneous. In other cases there is pain in the head, oppression, dizziness, nausea, vomiting and sometimes diarrhea or frequent micturition. Soon unconsciousness sets in, the face is flushed, the eyes injected, the breathing labored and there is a temperature of from 105° to 110° F. The pulse is full and rapid, the skin hot and dry and the pupils are contracted. There is usually complete relaxation of the muscles, and in some cases there is twitching and jactitation. Epileptiform convulsions are rare. In fatal cases the coma deepens, the pulse becomes feeble, rapid and irregular, the breathing hurried and shallow and death occurs in a few hours. Favorable cases are indicated by a fall in the temperature and by the return of consciousness. In these cases recovery may be complete. In some cases the patient may never be able to stand even moderate degrees of temperature, which often produce excitement, headache and pain in the cervical region. Failure of the memory, and the loss of power to concentrate the mind are sometimes sequelæ. Meningitis, epilepsy and insanity are also sequelæ.

Diagnosis.—This presents little difficulty. The history and circumstances preceding the attack are very important in making the diagnosis. The diagnosis between heat exhaustion and sunstroke fever is readily made. In heat exhaustion the temperature is **lowered**, the pulse is feeble, consciousness is rarely completely lost; in sunstroke fever the temperature is extremely **high**, there is usually complete unconsciousness, and the pulse is full and rapid.

Prognosis.—This should be guarded, depending upon the severity of the case.

Treatment.—In cases of **heat exhaustion** remove the patient to a shady place and apply water to the face, chest and spine. Thoroughly treat the upper cervical region, in order to control the impaired vasomotor centers and nerves. If the temperature is below normal a hot bath should be given. Keep the heart and lungs stimulated.

In **sunstroke**, place the patient in a recumbent position and loosen all constricted clothing, and stimulate the heart's action. The high fever is to be met promptly. Place the patient in a bath of water, to which add ice freely. The patient may also be rubbed with ice, and ice water enemata may be employed. The muscles of the neck will be found contracted, probably due to cerebral hyperemia. A thorough relaxation of these muscles will be of great aid in equalizing the vascular system. It is a good plan to thoroughly relax all the muscles along the spinal column for the same purpose. When the temperature nears normal the baths should be stopped. After the temperature has been reduced place the patient upon a cot with ice to the head. The cervical treatment should be repeated as often as necessary. The diet of the patient should be liquid for a few days. Plenty of water and stimulation of the kidneys and bowels will be found beneficial. The sequelæ are to be treated according to the condition. Much can be done for the sequelæ of heat exhaustion and sunstroke. Lesions will be found corresponding to the regions involved. Deep contracted muscles are common.

DEPARTMENT OF OPHTHALMOLOGY

By C. C. Reid

It is the desire to make this discussion on the eye the most useful possible to the whole profession. Let it be plainly understood that there is no effort to cover every phase of eye pathology but to elaborate eye diseases and therapeutics strictly from the standpoint of osteopathy. There are many very elaborate and extensive text books and even encyclopediæ written on the eye by the medical profession. The world of ophthalmic literature is extensive and profound. Just so are the elaborations on the general field of medicine. Such things as hereditary influences, congenital deformities, amblyopias, albinism, coloboma and the field of ophthalmic surgery does not concern us at the present time in an osteopathic text book. This department is dedicated to a scientific development of ophthalmic therapeutics along osteopathic lines of thought. Some things in the therapeutics of the eye concern all schools alike. For instance, proper cleanliness and antiseptic precautions in regard to the eye, dietetics, hygiene and the care of the general health. The same anatomy and many of the same methods of examination and diagnosis obtain in all schools. It is the intention to go into the opthhalmic therapeutic field in these discussions where osteopathy has a different outlook with a definite distinct reform to offer in the viewpoint of the anatomy, methods of diagnosis and the system of treatment.

How to Examine an Eye

It has been said that one should be a good general man in order to be a competent specialist. This is especially true in regard to ophthalmic therapeutics. Many systemic diseases have eye symptoms and pathology. The same blood and lymph that nourishes and bathes different parts of the body, also circulates in the structures of the eye. In the examination of the eye, heredity, occupation and environment are to be taken into consideration. Osteopathic lesions may exist from falls, strains, twists,

blows, colds and exposure and impair the integrity of the metabolic processes of the eye through the nerve connections and blood supply and lay the foundation for a great variety of eye diseases. With these lesions existing about the neck and upper dorsal, it is only required to have some insignificant local irritant to start symptoms and cause pathology apparently out of all proportion to the etiology. It is important then that one understand the nerve centers and reflexes and the osteopathic logic underlying these conditions or else he must frequently work without a satisfactory explanation of the etiology and consequently be more or less unscientific in his treatment.

The eye examination should consist of the case history, the family history, inspection, osteopathic examination, especially from the fourth dorsal vertebra to the occiput and especial examination of the eye by inspection and other methods.

1. The Case History.—Thoroughness of the doctor, or the lack of it, will be readily displayed at this point. Every little thing, as far as possible, that has a bearing on the case should be observed and uncovered in the case history. The physician should want to know every fact that helps him to better understand his case. Patience in hearing the history will often be of great assistance. It gives light on the physical and mental condition of the patient. Much can be gained by being careful and attentive. Notice carefully what he emphasizes and what he thinks is the most important. Inquire in regard to headaches, nervous symptoms, previous eye trouble and past illnesses. Get a venereal history if present, as many eye diseases are complicated or caused by syphilis or gonorrhea.

2. The Family History.—Inquire as to blindness in the family and about the age it occurred, if any. Get a venereal history if possible.

3. Inspection.—Much inspection can go on while the history is being taken. Observe the countenance, whether there is strabismus or frowning due to eye strain, photophobia as suggested by the effort to avoid the light; note symmetry. Look closely at the lashes, lids, conjunctiva, cornea and iris. Note any scales or crusts on the lids at the root of the lashes. Turn the lids for further inspection. Note the size and relation of the eyes. Exophthalmos may be due to an enlarged globe in high myopia, to Graves' disease, orbital tumor and paralysis of the extrinsic muscles, or staphyloma. In

blepharospasm there may be a corneal ulcer or a rupture of the eyeball. An exact examination must be made at the first visit in order for a diagnosis to institute the best treatment possible. Study the conjunctival sac for congestions, hypertrophy, swelling, tumors, foreign bodies, trachoma bodies and secretions. In all forms of conjunctivitis the congestion is most marked in the fornix and decreases toward the sclerocorneal junction. In iritis and cyclitis there is a circumcorneal injection, a pink or red color radiating from the cornea. Note any corneal pathology in the way of ulcers or abrasions and foreign bodies. Compare the tension of the eyes.

4. The Osteopathic Examination of the Eye.—This heading is put here in order to show what osteopathy has to offer that is distinct as belonging to our system and not practiced by any other school. Osteopathic research so far has shown that osteopathic science has much to offer on etiology and diagnosis and treatment in eye diseases. The case history, family history and inspection should require but a few minutes but they are essential to a proper examination and may aid us in what to expect osteopathically. Weak nerves will cause asthenopia. A broken arch, an innominate lesion or a slipped axis may cause weak nerves. The osteopathic eye examination then should consider the whole mechanism of the body. In case glasses are being worn for asthenopia they may readily be made unnecessary by osteopathic treatment in the correction of the lesions and building up the system. Some time ago some parents sent their daughter to me to have her eyes fitted for glasses. They stated that she had been to different doctors and opticians and no one had ever given satisfaction. They said she was all right every other way if her eyes were properly fitted with glasses. They did not want her examined or treated otherwise because she would be well every other way with correct glasses. Her vision was right eye 5-20, left eye 5-15 or about one fourth vision in each eye. A plus .87 diopter sphere combined with a plus 3 diopter cylinder in axis 90 gave her perfectly normal 5-5 vision in each eye. This gave her perfect satisfaction until she started to school in September, a couple of months later. Before the end of the first month she was having trouble with her eyes and was again sent to me by her parents. Her vision was reduced to 6-15 in each eye with her glasses on. She wondered and no doubt the parents did, if it was not another case of a misfit in glasses similar to all her previous experiences. This time I insisted upon a thorough physical examination against all protest. The following lesions were discovered: the left innominate was up and back or tilted posteriorly,

first lumbar anterior and to the right, sixth and first dorsals to the right. The case was not refracted again. I took particular care the first time and I was quite sure the refractive error was corrected. It was all explained to the parents and regular osteopathic treatment was begun. In less than a month practically every lesion was corrected, her vision returned to normal and she also was cured of an annoying backache with which she had been bothered for years. Her nerves were depleted a great deal. She got benefit in ways that she had not dreamed of. This approach to the eye is not considered by physicians in general, even the oculists. I have had about ten special courses in medical colleges and hospitals on the eye, ear, nose and throat, and I have never heard anything mentioned that would indicate any ideas of the logic involved in this case. Surely osteopathy has much to offer in eye troubles that is new and unique. The osteopathic examination of the eye then should begin with the feet, going then to the innominates, lumbar, dorsal, ribs and cervical regions. Oculists are too prone to rely upon crutches (glasses) in the treatment of asthenopia.

It is easy for the osteopath to conceive how lesions of the upper dorsal and cervical regions may occur and disturb the nerve and blood supply to the eye. This is why asthenopia appears so frequently with ordinary use of the eyes, even without abuse or refractive errors.

The Lumbar Region

The lumbar region should be carefully examined, especially for any curvature which might cause a disturbance of the equilibrium above. Compensatory curves or individual lesions would be the result with a consequent interference with the integrity of the nervous reflexes to the eye.

The Dorsal Region

The same may be said of the dorsal region as of the lumbar in regard to curvatures. There is one individual lesion in this region that very frequently exists with eye troubles, i. e., the 2nd dorsal vertebra lateral. Any of the upper four dorsals in lesion may be a causative factor in predisposing to disease of the eye but it has been my observation that the 2nd is involved most often. In severe headaches due to eye strain from refractive error, a

good diagnostic symptom is tenderness and contraction at the 2nd dorsal even when there is no subluxation.

The Cervical Region

This region should have particular care in search for individual lesions. It is quite easy to pass over some small cervical lesion that may be causing serious disturbance, especially if the neck happens to be fleshy. I have corrected cervical lesions and stopped twitching of the eyelids (orbicularis palpebrarum) and other muscles about the face.

The first case I ever saw was twenty-two years ago when I was a junior at Kirksville. Dr. F. P. Millard, now of Toronto, was a room mate of mine. He was constantly annoyed by a twitching of an eyelid. I did not find any lesion for it. We went one day to see Dr. Still at his home and told him of our difficulty. He said without examination that the 3rd cervical was in lesion. There was a senior student present whom the "Old Doctor" directed how to use the proper technique. There was a sharp pop, the vertebra evidently went into right relation, the twitching stopped. I understand the patient has had very little trouble since.

Injuries, exposure and strains to the spine may have antedated an innominate lesion and caused weak joints, muscular and ligamentous tension, local inflammations and partial immobilization of joints. All this would have its modifying effects upon the manifestation of secondary lesions from the innominate abnormality. This makes the study of the bony relations very complex and the effect upon the numerous blood vessels, nerves and other soft tissues still more complicated.

The Ciliospinal Center

Following osteopathic examination and giving proper importance to lesions below the fourth dorsal vertebra, we must remember a special significance to be attached to lesions of the **upper dorsal** in relation to the eye.

Almost any author on nervous diseases or diagnosis will discuss this center. Many of us have it not sufficiently impressed, hence I repeat some

known relations. The **ciliospinal** center consists of a nuclear group of cells in the lateral horn of the last cervical and two upper dorsal segments of the spinal cord. From this nucleus fibers pass to the anterior division of the eighth cervical and first and second dorsal nerves and become the white rami communicantes which are efferent in their function. These fibers pass to the **inferior cervical sympathetic ganglion**, thence upward with the sympathetic trunk through the **middle** and **superior cervical sympathetic ganglia**, along the carotid plexus to the vessels of the face and eye, to the glands of that region, to the unstriped muscular fibers of the levator palpebræ superioris and to the **dilator pupillae muscle**.

Any strong feeling or emotion (which of course is perceived and interpreted by the brain cortex) will cause a dilatation of the pupil of the eye. The cervical sympathetic being cut, dilatation does not take place. The rami of the cervical, first and second dorsal cut, the phenomenon stops. It is evident the ciliospinal center is under the influence of a center or centers in the brain. Bing says "There is even an idiomotor mydriasis, which may be brought about by a very vivid mental conception of darkness."

It has been noted that paralyzing lesions of the cervical sympathetic, of the last cervical and two upper dorsal segments of the cord, and of the anterior roots and rami communicantes of the same, will result in myosis.

The efferent rami are also vasomotor, secretory and trophic. It must necessarily follow that congestive and inflammatory conditions, secretory perversion of the lachrymal, Meibomian, Zeissian and perspiratory glands, and disturbance of the normal nutrition of any of the orbital tissues may result from lesions of the lower cervical and upper dorsal vertebræ.

Osteopathically we know that such a lesion may not be sufficient to be paralytic in its effect, but stimulatory. In this case we may note a pupil habitually too wide and more or less photophobia from a superabundance of light. The unstriped muscle fibers in the levator palpebræ superioris may be unduly contracted making an appearance of a slightly bulging eyeball when it is only a wide open eye.

One who has eye strain from a refractive error, overuse of the eyes, or unbalanced muscles will as a rule have tenderness at some spot in the region of the **ciliospinal** center. A mechanical lesion at that part of the spine may or may not exist in such conditions, but I believe the soreness is there

every time. This is one of the diagnostic points in differentiating **headache** of eye strain from other conditions.

White rami are only in the dorsal region and to the second lumbar and from the second, third and fourth sacral. It has been noted that lesions of the cervical vertebræ do not have as profound an effect upon the eyes as do lesions of the first three dorsal vertebræ. The plausible explanation of that is that the cervical vertebræ have no white rami from their corresponding nerves in the bulbo-spino-sympathetic-ciliary arc as have the upper dorsal.

From all the foregoing statements one can readily contemplate the intricate complexity of our osteopathic problems in relation to the eye. Combine this logic of the lesions outlined and the ramifications of the structures with their normal and perverted functions and combine it with contributing causes, such as infection, exposure, irritants, etc., and amidst the great diversity we reduce much miscellaneous, unclassified material to a degree of simplicity. Many otherwise unexplainable conditions become reasonably clear.

Dr. Louisa Burns under "The Experimental Demonstration of Osteopathic Centers" has this to say:

"Somatic Reflexes"

"In the first series of experiments, the electrodes were placed upon the nasal mucous membrane of animals under anesthesia. The muscles near the third thoracic vertebra were at once strongly contracted....

"The electrodes were then placed upon the conjunctivæ. The muscles near the second vertebra were then contracted. There were also slight and inconstant contractions of the cervical muscles....

"The electrodes were placed upon the eye ball. The muscular contractions were sometimes noted near the second thoracic vertebra, but the reaction was not constant. The cervical muscles were scarcely contracted at all.

"The electrodes were placed upon the outer surface of the eye lids. The facial muscles were contracted very quickly and forcibly, but no contraction of the muscles of the upper dorsal region were noted....

“The **superior cervical ganglion** was exposed to view, and the electrodes placed upon it. The pupils became greatly dilated, the conjunctivæ became lighter in color, and the mucous membranes of the nose and throat were also lightened....

“The **Gasserian ganglion** was exposed to view. The ganglion was stimulated directly. The upper thoracic muscles were very strongly contracted, and the blood vessels in the area of the distribution of the fifth nerve were immediately and strongly contracted. Some of the sympathetic fibers are carried by way of the fifth nerve. In order to exclude the effect of the direct stimulation of these fibers, the fifth nerve was cut, and the central end was stimulated by the electrodes. The muscles of the upper thoracic region were contracted, as before. The vessels in the area of distribution of the fifth nerve were contracted after latent period of a minute or so....

“The stimulation of the central end of the cut fifth nerve caused strong muscular contractions in the upper thoracic region, and also constriction of the vessels in the area of distribution of the fifth. Direct stimulation of the superior cervical ganglion produced effects identical with those produced before the mutilation.

“The spinal cord was cut above and below the superior cervical ganglion. This cut was made from behind, and the sympathetic chain was uninjured. The effects noted after both operations were the same, and can be described as one.

“The stimulation of any cranial structure failed to cause reflex contraction of the muscles in the upper dorsal or the cervical region.

“Stimulation of the cranial structures did not produce any vascular changes except those which might be referred to the direct effects of the electricity upon the vessel walls.

“Direct stimulation of the **superior cervical ganglion** produced the effects noted before mutilation.

“Therefore the cervical portion of the spinal cord is an essential element of the reflex arc by way of which sensory impulses from the cranial structures are able to affect the condition of the upper dorsal muscles, and also in the path by which these impulses are able to affect the size of the blood vessels of the cranial structures themselves....

“Mechanical stimulation of the tissues near the second thoracic spine was followed by a contraction of the blood vessels of the cranial mucous membranes and the conjunctivæ, by a dilatation of the pupils, and an increased secretion of saliva. These effects were practically invariable....

“The superior cervical ganglion was subjected to mechanical stimulation by the manipulation of the tissues over it. In animals, this maneuver was followed by dilatation of the pupils and by a contraction of the cranial vessels, which was soon followed, if the stimulation continued, by a dilatation which was rather persistent.

“After the **extirpation** of the **Gasserian ganglion** without the injury of the sympathetic nerves, the mechanical stimulation of the tissues near the second and third thoracic vertebræ caused the same vaso-constriction and **pupilo-dilation** as was observed in the animal before mutilation.

“After the destruction of the cervical portion of the sympathetic chain, and after the extirpation of the Gasserian ganglion in most animals, the mechanical stimulation of the tissues in the upper dorsal region did not produce any perceptible effects....

“Mechanical stimulation of the tissues near the second and third thoracic spines caused dilatation of the pupils and contraction of the vessels of the cranial mucous membranes.

“Inhibition, or the maintenance of an artificial lesion, caused dilatation of the vessels of the nasal mucous membranes and of the conjunctivæ. The eye ball was also somewhat congested. The pupils were dilated in this case also.”

The Nose and Throat in Eye Trouble

An examination of the eye would not be complete without a careful inspection of the **nose and throat**. The same nerve and blood supply that go to the eye is tied up so definitely with the nose and throat that when there are lesions of the nose and throat the eye is often affected secondarily. Just recently a case of **dacryocystitis** came into my office. After I had carefully examined her eye, spine, nose and throat, she informed me that she had been to three eye specialists before and not one of them had ever looked at her nose and throat, not to mention the spine. She had cervical and dorsal

lesions, and **diseased tonsils**. The **inferior turbinate** on the side of the dacryocystitis was curled out so that it lay against the external wall of the nose almost if not altogether blocking the entrance of the **lacrymal duct** to the inferior meatus. This was evidently the predisposing cause of her dacryocystitis.

In **neuralgia** of the eye, **blepharitis**, **obscure pain**, **conjunctivitis** and often deeper troubles you will find a bad condition of the **nasopharynx**, such as adenoids, vegetations, pus pockets, adhesions in the fossa of Rosenmuller, contraction of the soft palate, disturbed relations of the septum and turbinates, sinus trouble, poor drainage, exostoses and polyps. In eye disease all these things should be discovered if they are present, in order to get best results and in order to make a careful diagnosis.

Examination of the Eye by Special Methods

The first thing after the family history, personal history, inspection of the eye and the osteopathic examination, is to find out how well the patient can see. To test the acuteness of vision certain test letters are used. Snellen's Test Letters are good. The normal eye can read 3-8 inch letters at twenty feet. The test letters on the cards usually range in size to be read at 10, 15, 20, 30, 40, 50, 70, 100 and 200 feet. The most desirable distance is 20 feet. If at the distance of twenty feet he reads the 3-8 inch letters his acuteness of vision would be marked 20-20 or normal. Always use the distance between patient and chart as the numerator of the fraction and the number above the letters which he reads as the denominator. If he is twenty feet away, the numerator remains twenty and the denominator changes according to the line of letters seen on the test cards thus: 20-15, 20-30, 20-70, or 20-200 may express the vision. If the patient could not see the 200 feet letters at 20 feet he must be brought nearer, say 10 feet, for him to see the large letters; his vision would be 10-200. These fractions representing the acuteness of vision may be expressed in meters. Some charts have letters numbered that way.

If the vision is good enough for small objects to be clear, the near point should be taken. This would show the amount of accommodation of the eye. This is expressed in diopters.

A **diopter** is the unit of measurement of the **refractive** power of lenses. **Lenses** are numbered by their refractive power in diopters. A lens that has a curvature that will refract parallel rays of light and bring them to a focus at one meter distance is said to be a one diopter lens. This unit of measurement for the refractive power of lenses was proposed by Nagel in 1866. It soon became quite generally used.

The focal distance of a lens decreases as the strength of a lens increases. One diopter lens (written 1 D) has a focus of one meter (1 M) or 100 cm distance. A 2 D lens has a focal distance of ½ M or 50 cm. A 4 D lens has 25 cm focal distance and a ½ D lens has 100 cm ÷ ½ = 200 cm distance or 2 M. Trial cases have in them lenses varying in strength from .12 D or .25 D to 20 D of the spheric form. We will not discuss the trial case here.

Accommodation in the Eye

Accommodation in the eye is the ability of the eye to vary its focal point. When the normal eye (emmetropic) is at rest its focal point is at infinity so far as parallel rays are concerned. This is called the far-point or the "**punctum remotum**" (P. R.).

When the eye looks at letters twenty feet away it scarcely accommodates at all to get a focus, or so little that it may be disregarded in ordinary practice. Now if one brings fine print close to the eye he will find a point so close that it becomes indistinct. This point is the near-point of focus or the **"punctum proximum"** (P. P.). The range of accommodation is the difference between the refractive power of the eye when it is at rest and when the accommodation is exerted to the utmost, the difference between the P. R. and the P. P.

If one must accommodate one diopter to get a focus at one meter or forty inches distance, at thirteen inches or reading distance one must accommodate at least 3 D in order to see the letters clearly. If 3 D were the total of his accommodation he could not read at that distance but a few minutes; because the accommodation could not be held at its maximum for long at a time. Eye strain with its train of symptoms would result. Hence it is quite important to find the near-point or punctum proximum in order to judge in regard to eye strain in an emmetropic eye. If there is a refractive error, allowance for it must be made accordingly.

As a person gets older the accommodation in the eye becomes less and less until at 45 years of age he can only use 4 to 5 D of accommodation. This is so close to the amount required for reading that he has some eye strain. He begins to hold his paper farther away from him so he requires less accommodation. This condition we call “old sight” or **presbyopia.** An emmetropic eye at forty-five to fifty years of age requires a plus glass to make up for some accommodation in reading.

Frequently there are latent disturbances of equilibrium of the extrinsic muscles of the eye. This is **heterophoria.** If it is a latent convergence it is **esophoria**; if a latent divergence it is **exophoria**. The latter is more frequent. Hyper- and hypophoria are used for upward or downward tendencies. Normal muscular balance is **orthophoria**.

Cause the patient to fix on an object about thirteen inches away with both eyes; push a sheet of paper in front of one eye and watch behind the paper, the eye thus covered. If heterophoria exists the eye will move slightly from its point of fixation since it no longer sees the object. In orthophoria it will remain fixed as long as the other eye sees the object; the innervation to the different muscles is properly distributed.

A Maddox rod found in any complete trial case may be placed before one eye. Have the patient fix on a candle flame, say twenty feet away. The flame appears drawn out into a luminous line. This line can not be fused with the candle flame as the other eye sees it if there is heterophoria. The amount and kind of disturbance is somewhat indicated by the distance and direction of the luminous line and the flame. The exact amount can be measured by the use of a prism that will cause them to fuse.

Next the patient should be taken to the dark room and a careful inspection of the anterior segment of the eye should be made with oblique illumination. First use the unaided eye, then use a lens that magnifies. The 20 D plus lens from your trial case will suffice for the magnification. Note the transparency or lack of it in the cornea and crystalline lens; the depth of the anterior chamber and the appearance of the pupil and iris. Now we are ready for the ophthalmoscopic examination.

The Ophthalmoscope.—This is an instrument that commands great respect. Any one who is interested in eye troubles must have and use the ophthalmoscope if he expects to be efficient in diagnosis, upon which, of

course, intelligent treatment must forever depend. One must try and try again in order to become proficient in the use of the ophthalmoscope.

A Schematic Eye is of great assistance to a beginner who does not have clinics or patients on whom to practice. Such an eye with full directions can be obtained at almost any optical goods store. It will make the study of ophthalmoscopy easy and interesting. The pupil can be regulated to any size and the eye can be made short (hyperopic), long (myopic) or normal (emmetropic) for study.

The efficient use of the ophthalmoscope makes the diagnosis of internal diseases of the eye as easy as the diagnosis of external diseases of the eye. Only some rare conditions will puzzle, and that is true of any part of the anatomy.

The ophthalmoscope is a simple instrument; its chief function is to illuminate the interior of the eye. The value of ophthalmoscopic findings depends on their correct interpretation by the examiner.

The ophthalmoscope has a mirror to reflect the light into the eye. It has two discs on which are mounted convex (plus) and concave (minus) lenses. The larger disc has seven plus and eight minus lenses. To these may be added the lenses in the smaller disc making many combinations.

A drop of a 2% solution of cocaine or homatropine may be used as a mydriatic where one can not otherwise see clearly the fundus. If no mydriatic is used a somewhat weak illumination should be employed in order not to arouse the accommodation to much activity and make the pupil small. If there is any opacity in the media a strong illumination should be used. The room should be dark; the darker the better.

There are two methods of using the ophthalmoscope. The **indirect** and the **direct** methods. One is more useful at one time and the other at another time. By the indirect method we view the whole field of the fundus more readily but less in detail. With the ophthalmoscope before his eye the examiner's face is twelve to fifteen inches from that of the patient. When the "**red reflex**" of the eye is seen a plus 13 or 16 D lens is interposed near the patient's eye. This magnifies the field. The image is inverted. As a rule it is best seen with a +4 D lens in the aperture of the ophthalmoscope.

This method is especially more satisfactory in high degrees of myopia and astigmatism. The **optic disc** is the objective point. One may see a retinal vessel first; this should be followed to its emergence from the disc. From this point view all parts of the fundus by having the patient look in different directions. This is better by the indirect method than for the examiner to vary his position.

The direct method of ophthalmoscopy is better for detail work and in all cases except high degrees of myopia and astigmatism. It is also better in determining errors of refraction. The patient looks straight across the room. For a beginner it may be essential to dilate the pupil, hence the schematic eye as suggested.

If the examiner has a refractive error, he should wear his own glasses or correct by throwing in front of his eye proper lenses in the ophthalmoscope. Face the patient and sit on the side of the eye to be examined. Use left eye to examine the patient's left eye and right eye for the patient's right. Examiner and patient keep both eyes open. The examiner may not be able to suppress the image of his other eye and may have to close it part of the time. Catch the "red reflex" some 15 to 18 inches away and move close to the patient's eye. The "red reflex" color varies with the error of refraction, the transparency of the media, the degree of pigmentation and the size of the pupil. A blood clot will make it redder, some exudates will make it gray or yellow.

The examiner may approach as close as half an inch from the eye to be examined. Find the optic disc and examine all points of the fundus from it. Rotate in glasses to correct the patient's refractive error if he has any. The strongest plus glass with which the fine retinal vessels can be clearly seen will represent the **hyperopia** of the eye. This is true only if the examiner's accommodation is at rest. The weakest minus glass with which the fine retinal vessels can be clearly seen represents the **myopia**.

A Normal Fundus.—The color of the fundus is due to the blood vessels of the retina and choroid and the connective tissue of the choroid and sclera. Variation is due to the pigment. In the albino it is light pink. In the negro it is dark reddish. There are all gradations between the two.

The **optic disc** is the end of the optic nerve as it comes into the eye; it is circular in shape, pink in color, and sharply defined. It is about 1-16th of an

inch in diameter; about 15° to the nasal side of the pole of the eye and slightly above the horizontal. There may be a dark **choroidal ring** around the disc or part way around. There may also be a white ring caused by the sclera. As a rule there is a depression in the center of the disc out of which the retinal vessels emerge and spread out over the fundus.

The **fovea centralis** or point of clearest vision is located two and a half disc diameters to the temporal side of the disc. Around this is a circular area of light yellow, the **macula lutea**.

The subject of ophthalmoscopy has been touched upon somewhat in detail because of its great importance to the general practitioner. Every osteopathic physician should know the ophthalmoscope well enough to recognize the ordinary lesions inside the eye. When we take up pathological conditions of the eye we will have occasion frequently to refer to the ophthalmoscopic appearance. Without the use of this instrument all of our clinical field research on internal diseases of the eye is valueless. Many have told me they have cured cataract with osteopathic treatment, some say they have cured specific neuroretinitis with no sequelæ, others testify to opacities and blindness from various causes. Invariably we ask if they used the ophthalmoscope in their diagnosis and with it watched the progress of the case. Almost invariably the answer is “no, it looked like it,” “the symptoms indicated it,” or “Dr. so and so, an oculist diagnosed it as such.” Fellow Osteopaths! we can not base our claims on this kind of data. With a little study and practice the ophthalmoscope can be mastered. Not till then can we get reliable statistics on internal diseases of the eye in our case reports. Osteopathy has much to reveal to us in this field and for the sake of the science and our patients we appeal to every one to do the work here set forth.

Diseases of the Eye

Osteopathic Manipulation for Eye Diseases

A general correction of lesions should be made in order to give perfect alignment and equilibrium. Lesions that affect the nerve and blood supply will be found from the fourth thoracic to the occiput; more often at the

occiput, atlas and axis in the cervical region and the second and third thoracic in the dorsal region including the ribs.

Correction of these lesions must have specific attention in every case of eye disease that shows any tendency to chronicity or in repeated eye disease and exacerbations.

A thorough upper spinal treatment to insure good mobility of all joints and establish freedom of fluids and forces is recommended.

The **nose**, *throat* and **sinuses** should be examined for pathology. If the tonsils and pharynx are not normal the cotted index finger should be introduced into the mouth until the anterior pillar of the fauces is reached. A mouth gag may or may not be used. Massage the tonsil through the anterior pillar then move to the top and press down on the tonsil with a pumping motion. Repeat this from below the tonsil and posteriorly. Slip the finger under the soft palate and stretch it thoroughly. Clean out any adhesions and vegetations in the vault of the nasopharynx and fossa of Rosenmuller. Stretch the pillars of the fauces by pressing down on each side at the root of the tongue.

If the sinuses are diseased they should be drained. If the nose is diseased and has abundance of secretion, first use irrigation for cleanliness.

Manipulation in the nose will be of great benefit in some eye diseases as pathology there frequently has an important bearing on diseases of the eye. The nose is often too narrow and contracted. The first inch of the nose is muscular and cartilaginous; it is of even more importance to dilate the nose in contractured conditions than it is the sphincters at the lower end of the rectum. The great benefit derived from rectal dilatation has been recognized for years.

In dilating the contracted nose a wide blade nasal speculum may be used. The cotted and oiled little finger may be used where it is properly adapted in size. The dilating can be done with practically no pain and no damage to membranes or other tissues. It should not be extended beyond the cartilaginous and muscular part. Manipulation of the turbinates and tissue further back may be done if needed, by the use of instruments. The Edwards turbinate adjuster instrument (Aloe Co., St. Louis) or the Ruddy Nasal

Third Finger (Sharp and Smith, Chicago) are the best instruments so far devised for this operation.

A thorough stretching of the **eyelids**, manipulation of the **eye ball** and the points of the fifth nerve are indicated in many diseases.

The lids may be stretched by pulling them from side to side. The cotted forefinger well oiled (sterile vaseline) may be slipped into the conjunctival sac back of either lid and with the thumb on the outside the lid may be massaged or stretched in any direction. The points of the fifth nerve may readily be influenced at their respective exits about the orbit. The eye ball and deeper contents of the orbit can be profoundly treated by pressing the finger into the orbit above, below and at the sides of the bulb and pushing it in all directions as far as possible. The Ruddy eye finger instrument was devised for this deep manipulation of the orbital and bulbar structures. It is of high value. One finger may be laid on the closed eye and with a tapping motion with the other hand a vibration or oscillation of the orbital structures may be had. This is a useful treatment.

The wise selection and skillful use of these various methods of treatment for the eye will solve most of our difficulties.

This short survey of osteopathic methods will aid us in the more specific discussions to follow.

Neuralgia

A considerable number of people seem to be subject to attacks of pain in one or both eyes. These attacks of pain come at varying intervals; in some cases several times a day, in others as far apart as one or two weeks. The pain will suddenly start almost without warning and with very little provocation, and last from one to twenty-four hours. It is very severe and the patient frequently thinks something terrible is wrong. Something terrible is wrong so far as his comfort is concerned. But in these cases to which I am referring there is no organic trouble with the eye. The patient does not need glasses. There is no sign of inflammation. Vision is not disturbed. Local examination of the eye with the ophthalmoscope reveals that the fundus of the eye is normal. There is no symptom connected with the eye except pain, occasionally accompanied by a slight redness. I have had

several cases in my own practice and my attention has been directed to cases of other physicians.

These cases differ from *tic douloureux* in that there is no muscular spasm. In fact, motor nerves do not seem to be involved. The involvement seems to be largely in the **fifth cranial nerve**, usually the supraorbital, or other smaller branches of the ophthalmic division of the fifth cranial. Sometimes we note slight dilatation of the pupil with more or less congestion. This would indicate an involvement of the sympathetic branch to the eye.

The lesions discovered in these cases have been a subluxation of the occiput upon the atlas or an upper cervical lesion and frequently some involvement at the second dorsal. There has been noted also trouble in the nasopharynx such as contractures of the muscles of the soft palate and adhesions in the fossa of Rosenmuller.

Misplacements of the uterus have also been found in some cases.

Treatment

Nearly all these cases are curable with from one week to six weeks treatment. Of course the treatment must be intelligently directed after a correct diagnosis as to the cause. The cause can usually be removed. One case to which my attention has been directed was that of a woman about forty years of age who had very severe pains. With all the local treatment of the eye and otherwise she got practically no results until she had replacement of the uterus, which brought immediate relief. Other cases have no trouble on that kind but have lesions of the cervical region and on correction of these lesions the neuralgia disappears. Other cases have had the nasopharynx cleaned out by the finger operation and the stretching of the soft palate which relieved the neuralgia immediately or in a few days. Numbers of cases have been to medical physicians and had various eye remedies administered locally with no permanent benefit. Of course the treatment was administered at the wrong place.

The ramifications of the sympathetic and fifth cranial nerves are so complex and far-reaching that we must keep in mind that one or more of many causes for the trouble may exist and be quite remote from the seat of the pain.

Diseases of the Eyelids

Occasional factors are bee stings or insect bites, which completely occlude the palpebral fissure. We may have some palpebral edema from lid abscesses, chalazion, hordeolum, dacryocystitis, panophthalmia and so forth. In **hemorrhagia subdermalis** there is so much spongy tissue beneath the skin about the eye that the blood extends easily and far. The red tint will soon change to a reddish blue and then become dark, what is known as a black eye (ecchymosis). This frequently results from a blow. The skin is sharply attached around the orbital margin by tense connective tissue so the area of the hemorrhage is limited to the region of the orbit. There may be spontaneous rupture of some of the vessels by hard sneezing or coughing, especially in young children. In older people it may indicate a fragile condition of the vessels, arteriosclerosis or some trouble with the kidneys. The diagnosis of the eye condition is not difficult but the cause of the hemorrhage in that region might be investigated further. Local treatment is of some value in these conditions. They may be soothed by cold compresses. In bee stings and insect bites use an alkaline compress. Manipulation about the eye and osteopathic treatment of the neck with a view to directing a better circulation to that region will aid much.

Herpes Zoster Ophthalmia

This affection of the supraorbital branch of the fifth cranial nerve may extend to the eyelids. It may not go beyond the stage of blistering and redness with some edema. However, it is possible for it to become gangrenous and even extend to the conjunctiva and cornea. I had one case of herpes zoster gangrenosa of this region. There were several gangrenous spots as large as a dime on the forehead and extending down in the region of the eyelid. The process extended to some extent on the cornea and in healing left a condition of irregular astigmatism.

Treatment.—The prognosis in herpes zoster is always favorable under osteopathic treatment. Lesions of the cervical region will almost invariably be found interfering with the sympathetic connections of the fifth cranial nerve causing the trophic disturbance to the region. Osteopathic treatment

applied to these conditions will always hasten normalization. The affected part might be kept covered with some soothing lotion to keep the skin soft.

Hordeolum

This is commonly known as a **sty**. It is due to suppuration of the **glands of Zeiss**. It is a harmless affection but causes pain and inconvenience.

Diagnosis.—Swelling and pain with a small inflammed nodule in the palpebral margin is quite diagnostic.

Treatment.—The circulation is obstructed in this region. The effort should be made to open the circulation before pus has formed. This can frequently be done and the hordeolum aborted by carefully picking up the eyelid and rolling the nodule between the fingers. This will cause some pain but if it is kept up for a moment or two about every hour through the day with an occasional thorough treatment of the neck the sty will usually be aborted. If pus forms it should be opened as soon as it points and then the squeezing and rolling process may be employed again, which will aid rapidly in the freeing of the circulation.

Chalazion

This is a **Meibomian cyst** in the eyelid. It shows as a circumscribed swelling on the inner side of the lid. It frequently becomes large enough to produce some deformity of the lid. A chalazion is movable on the tarsal cartilage. It is a chronic condition and the cyst may become as large as a bean. There may be more than one in the same lid.

Treatment.—When a chalazion is small and not of long standing it can frequently be cured by osteopathic treatment. Introduce the finger into the conjunctival sac under the lid, and with the thumb externally, grasp the chalazion between the finger and thumb; roll it thoroughly. Squeeze and massage it two or three times a week for awhile. This, combined with a thorough treatment of the neck, will result in a cure. If at the end of six weeks the condition has not disappeared surgery should be resorted to.

Blepharitis

This is an inflammation of the eyelid. It is either **acute** or **chronic** according to the cause. Acute blepharitis may be due to heat or injury. Chronic blepharitis affects the glands of the lid causing a perversion of the secretions. There is usually the formation of crusts and scales. This condition is known as **blepharitis sicca**. In some cases infection will form little pustules at the roots of the cilia. There is soreness and aching. There may be photophobia. The nasal region may be involved. Osseous lesions of the cervical region are usually present. Refractive errors frequently exist in these cases. Occupation or environment may expose to dust or wind sufficient to keep up the irritation.

Treatment.—Change environment. See that there is thorough cleanliness of the lid. Rub or pick away all scales. Use a bland ointment. Correct any cervical or upper dorsal lesions.

Ptosis

This is **congenital** or **acquired**. In congenital ptosis operation seems to be the only treatment. Acquired ptosis is amenable to treatment frequently. The cause is some lesion interfering with the passage of proper nerve force to the levator muscle of the lid. The lesion may be at the origin of the third nerve, at the cortical nucleus in the sigmoid gyrus or in the trunk of the third nerve, or a lesion of the muscle itself. Tumor, trauma, syphilis, sclerosis, hemorrhage, gout or rheumatism, or anything that will produce a peripheral neuritis are causative factors. Lesions of the cervical and upper dorsal by reflecting back upon the nerve centers may produce a ptosis.

Treatment.—Remedial measures according to indications. Cases due to osteopathic lesions as indicated will usually yield readily to treatment. Where there are other factors treatment must be varied accordingly.

Trichiasis

This is a condition in which part or all of the eye lashes turn inward and touch the eye ball, due to cicatricial contractions in the conjunctiva and tarsus. Many of the cilia are so small in these conditions that it is very difficult to see them. A loupe or a magnifying glass must be used in order to discover them.

Dystrichiasis is a condition where the cilia come in irregularly growing in all directions, some of them turning in toward the eye ball and causing irritation.

Treatment.—An epilatory should be used to extract all of the wild hairs. Care should be taken to get out the finest ones as they will frequently cause irritation if not removed.

Entropion and Ectropion

Entropion is a turning in of the eyelid and **ectropion** is a turning out. These conditions may be spasmodic and temporary. Entropion is more often due to cicatricial contraction in old blepharitis or trachoma conditions. In some cases the condition may be corrected by the use of strips of adhesive plaster. In cicatricial conditions operation is the rule. Spasmodic ectropion may be corrected sometimes by curing the conjunctivitis. Bandaging may be resorted to. In paralytic ectropion osteopathic treatment may serve to produce a complete cure. Operative procedure should be a last resort.

Diseases of the Lachrymal Apparatus

Dacryocystitis

Dacryocystitis is an inflammation of the lacrymal sac. It is due to some lesion in the nose, malposition of the inferior turbinate or a poor blood and nerve supply to the lacrymal region as determined by cervical lesions. The sac becomes infected and we have a **dacryocystoblennorrhea.** Pus and tears are regurgitated into the eye through the puncta. There is irritation and the conjunctiva may become infected at any time, also the cornea. It is a dangerous and annoying affection.

Treatment.—Osteopathic measures have something to offer along this line. The medical idea seems to be completely surgical in recent years. The first and only thing to be done surgically is to obliterate the sac or dissect it out and curette the nasal duct, completely destroying the apparatus. Lancing does not affect a cure. By treating for a good nerve and blood supply to that region, the irrigation of the nose and a thorough squeezing of the sac each time with a view to forcing the solution in the sac down through the nasal

duct into the nose, a cure may be effected in many cases. If these cases can be gotten before infection has taken place, in the state of epiphora or the backing up of the tears into the eye, thorough treatment along the lines just indicated will in nearly all cases result in a cure.

Boric acid solution should be used to wash out the sac when pus is present. The attempt should be made to force it into the nose. Probing properly done is of value in many cases. These cases should be followed up with great care.

Treat the neck thoroughly and spring the inferior maxilla.

Diseases of the Conjunctiva

Conjunctivitis

The conjunctiva is a mucous membrane that coats the posterior surface of the eyelids and the anterior surface of the eyeball. It forms a sac, which is slit open in front in the line of the palpebral fissure.

The conjunctiva consists of three parts (1) the conjunctiva tarsi, the part on the lids; (2) the conjunctiva bulbi, the part on the eyeball, and (3) the conjunctiva fornicis, the part connecting the first and second; it is the retrotarsal fold or the region of transition, often called the fornix. The first part can be seen by everting the lids. It is adherent to the tarsus. It is covered with a laminated cylindrical epithelium. The membrane contains an abundance of lymphocytes similar to adenoid tissue. This increases with every inflammation of the conjunctiva. This is why **chronic conjunctivitis** often results in thickened lids.

The **blood supply** of the conjunctiva of the lids is from the muscular branches of the ophthalmic artery. The **nerve supply** is from the ophthalmic division of the 5th cranial and the sympathetic.

The bulbar conjunctiva continues over the cornea. It is covered with layers of pavement epithelium. Its blood supply comes from the posterior conjunctival vessels about the retrotarsal fold, and the anterior ciliary arteries which accompany the tendons of recti muscles; these two systems anastomose in the conjunctiva. Conjunctival injection or congestion shows a superficial net work of larger or smaller vessels that move with the

conjunctiva. The color is scarlet or brick red. Ciliary injection occurs as a rose-red or pale violet zone around the cornea, spoken of as peri-or circumcorneal injection. It does not move with the conjunctiva and occurs more with diseases of the cornea, iris and ciliary body.

In the **etiology of conjunctivitis** a great variety of germs are considered by different writers. Collins and Mayo give a report of "germs found in normal conjunctiva."

Bacillus Xerosis in 94% of normal conjunctivæ; Staphylococcus Albus in 79%; Pneumococcus in 9%; Diplobacillus in 6%; Staphylococcus Aureus in 6%; Streptococcus in 5%.

If this be true, and I do not doubt their statement, we are practically compelled to say that these germs at least are only secondary in the etiology of conjunctivitis. Just at this point osteopathy comes with its flood of light and makes it easily explainable why some conjunctivæ become inflamed while others do not, when all have germs present. The lesion disturbing the integrity of blood supply and nerve force to the eye is the primary cause while the presence of germs may be the aggravating cause. The lesion prepares the soil in which the germs thrive sufficiently to become an irritant. There are all gradations of this soil preparation. The more fertile the field (i. e. the more profound the effect of the lesion) the more virulent germ life may become; the resistance is proportionately less.

Conjunctivitis is **classified** for convenience in study, diagnosis and treatment as follows:

(1) Catarrhal, (a) acute, (b) chronic, (c) follicular; (2) gonorrhoeal; (3) ophthalmia neonatorum; (4) trachoma; (5) diphtheritic; (6) eczematosa (phlyctenulosa); (7) vernalis; (8) tubercular; (9) traumatic. This is the clinical classification after Fuch.

Treatment of Conjunctivitis

In order to give the best care in these cases it is quite essential that both the primary and secondary causes be given attention. Some good **germicide** or **antiseptic** is to be used with intelligence. This is in harmony with the great principles of antisepsis and cleanliness taught by osteopathy from its inception. The use of the microscope in the **bacteriology** of conjunctivitis

aids in more definite diagnosis and the selection of a proper germicide. For the Koch-Weeks bacillus, the pneumococcus and the influenza bacillus silver nitrate 1% or a 25% solution of argyrol is used; for the diplo bacillus (Morax-Axenfeld) zinc sulphate 1 gr. to the ounce is almost a specific.

A good way to prepare the zinc prescription would be:

Boracic acid and water oz. 1.

Zinc sulphate gr. 1.

The boric acid and water of course being a saturated solution. Apply one drop to each eye about four times a day. If one can not have the use of the microscope to make specific the diagnosis, the zinc solution may be alternated with the argyrol as the germicide. Ice cold applications are good in many of these cases.

Catarrhal Conjunctivitis

Acute.—mostly affects the conjunctiva of the lids in the light form. If severe it invades the bulbar conjunctiva. There is redness and swelling and increased secretion which dries at night upon the edges of the lids and glues them together. The eyes are better in the morning and worse toward evening. **Corneal ulcers** and **iritis** may arise as complications. Chronic inflammation may result.

Etiology.—Textbooks on the eye give **bacteria** as the chief cause; some scarcely mention anything else. After discussing how the bacteria get there and multiply, they usually bring in some statement to indicate that in many cases no bacteria can be found in the secretions from the conjunctiva. These latter are unaccounted for in the etiology.

Catarrhal conjunctivitis is non-specific in its origin.

The great science of osteopathy will fill in the missing links to works otherwise very exhaustive on the eye.

If the cause is due only to a passing irritant as dust, smoke, pollen or wind the disturbance may vary from hyperemia only, to a severe attack of conjunctivitis. Fuch says the majority of cases are produced by bacteria, but THAT IN NOT A FEW CASES OF CONJUNCTIVAL CATARRH THE EXAMINATION OF

THE SECRETIONS FOR BACTERIA PROVES NEGATIVE. He also says that the usual course of the disease is from eight to fourteen days, but NOT INFREQUENTLY THERE REMAINS A CONDITION OF CHRONIC CATARRH PROTRACTED OVER A LONG TIME; THAT NOT INFREQUENTLY THE NORMAL CONJUNCTIVAL SAC CONTAINS PATHOGENIC GERMS.

Some authors divide the **etiology** into (1) specific, (2) non-specific. The first they account for by irritants due to dust, heat, smoke, metal, pollen, cold, wind, glare of light, eye strain from overwork of the eyes, ametropia and chronic alcoholism. The second they account for by germ life, most often the Morax-Axenfeld diplobacillus or the Koch-Weeks bacillus, the latter germ being found in the so-called "pink-eye." It is contagious. This is one condition for which the zinc sulphate (½% to 2% solution) is almost a specific.

No doubt the irritants and the bacteria mentioned, with others, do cause much of our catarrhal conjunctivitis and that one who fails to consider properly the local conditions in practice will be sadly lacking in best results.

On the other hand many cases, treated for local conditions only by very competent men who used the best antiseptics and germicides, have very indifferent results. The acute condition would continue and gradually become chronic. From observation, study and experience there are causes aside from local irritants, ametropia, bacteria, syphilis, rheumatism or measles. There is some disturbance to the integrity of the **spinociliary sympathetic arc**. In many cases of eye disease note lesion and tenderness at the upper dorsal, the removal of which will cause improvement of the eyes. Many cases of eye strain can be relieved by correction of the first, second or third dorsal, and the use of glasses made unnecessary.

Irritation of the eye will cause more or less tension of the muscles at the second and third dorsal, and stimulation of the tissues near the second and third dorsal spines will cause dilatation of the pupils and contraction of vessels of the cranial mucous membranes; which means vasomotor, secretory and trophic disturbances.

It follows then that an **osteopathic lesion** at the second or third dorsal will cause or tend to cause disease of the eye. There may be all gradations in the effect produced, the lighter being mere tendency, while again it may be enough to set up profound vasomotor, secretory and trophic changes in

and about the eye. The first effect of the lesion may be stimulatory, and later, inhibitory. The normal resistance of the eye would be lowered and naturally, local irritants, bacteria and ametropia would have a more profound effect. This will explain how one can develop conjunctivitis in the absence of a local irritant with no bacteria present, and no eye strain.

All of these causes, or any number of them, may be acting together, and each more virulent because of the influence of the other.

Lesions of the **occipito-atlantal** joint or any of the cervical articulations may cause eye disturbance. There are no efferent ramicommunicantes in that region and the course of the physical disturbance must be greater in proportion to the eye trouble produced, than at the upper dorsal. It is important however to make a close examination of the entire cervical region in eye trouble.

What has been said on the osteopathic causes of acute catarrhal conjunctivitis applies with equal force to chronic and **follicular concatarrhal conjunctivitis.**

What has been said on the osteopathic causes of **acute** catarrhal conjunctivitis applies with even greater force to the **chronic** form. The great variety of local irritants may account for acute conjunctivitis, and does in most instances; but in chronic conjunctivitis local irritants are more often secondary or incidental while the osteopathic lesion with its effect upon the **bulbo-spino-sympathetic** ciliary arc is the **fundamental** cause. Of course some continuous local irritant, e. g., an uncorrected refractive error, excessive light, heat, dust or germ life in the environment may cause a chronic conjunctivitis. Other causes may be retracted lids (lagophthalmus) leaving the eyeballs too prominently exposed; turning in of the cilia (entropion, trichiasis or dystrichiasis) which impinge upon and irritate the bulbar conjunctiva. **Chronic blepharitis** may spread to the palpebral conjunctiva and then the bulbar. Foreign bodies in the eye, or infarction of Meibomian glands may be causes. The diplobacillus (Morax-Axenfeld) is the most common germ in chronic catarrhal conjunctivitis.

Symptoms and Course.—In mild cases the redness is only moderate. The conjunctiva is smooth and not swollen. Old cases have hypertrophy with thickening. There was a small girl who came into the office recently who had the conjunctiva of the lids decidedly swollen with some

hypertrophy. Her eyes were glued shut with pus every morning. Pus pockets were forming along the follicles of the cilia and on the direct edge of the lid. Her troubles started a year ago and got gradually worse. A few osteopathic treatments were given during three months (she was irregular in coming) and argyrol, 20%, used locally. All pus and debris were cleared off the lids and conjunctiva each time. The swelling all left and the thickening became inconsiderable; the eyes looked almost clear. On pressure there was tenderness at the right side of the second dorsal. No mechanical lesion was apparent there but in treatment that region was thoroughly loosened.

The subjective symptoms are usually worse at night; pain, heaviness of the lids; feeling of a foreign body in the eye; burning; itching and dryness in many cases.

This condition is one of the most frequent of eye diseases in adults; may be senile catarrh in advanced age. It is frequently complicated with blepharitis, ectropion, epiphora and ulcerations of the cornea.

Treatment.—The osteopathic treatment depends on the findings in the osteopathic examination. No case of chronic catarrhal conjunctivitis should be treated without a thorough examination of the whole spinal, rib and innominate mechanism. Careful and detailed adjustment should be made of any lesions that might disturb the ciliary arc, the other nerve connections, the blood supply or the body equilibrium.

This does not mean that local treatment of the eye should be neglected in any way. Any measure that will aid in getting rid of local pathology as quickly as possible should be ours. Where there is abundant secretion, silver nitrate 1% to 2% solution put on the conjunctiva with a brush when the lids are turned, or argyrol 20% to 25% dropped into the eye are among the best antiseptics for local use. If the diplobacillus is present zinc sulphate ½% solution is indicated.

The nose, nasopharynx and pharynx should never be overlooked in this disease.

Follicular Conjunctivitis

Follicular conjunctivitis is of catarrhal origin. It is characterized by the presence of follicles. There may be only a few or a great many. If numerous

they are often in rows on the palpebral conjunctiva. Microscopically they show as circumscribed masses of adenoid tissue. In this they resemble the granules of **trachoma**. Sometimes cases persist for years with little or no inflammatory symptoms. On account of the follicles this disease is frequently confused with trachoma.

We have heard numbers of well meaning conscientious osteopathic physicians testify to curing cases of trachoma with a short course of osteopathic treatment with no pathology remaining. We are absolute believers in the effectiveness of osteopathic treatment and want to give it full credit for doing all it will; but here we want to enter a plea to the profession that we need more discrimination and definiteness in our diagnosis. Technique is being emphasized and we say Amen! It is proper for us to be thoroughly competent in technique but diagnosis should be made just as emphatic because scientific technique depends upon diagnosis for each individual case.

Differentiation of follicular conjunctivitis from trachoma.

Follicular conjunctivitis occurs (1) chiefly in the young; (2) the follicles are smaller, more sharply limited, project more above the conjunctiva, are often in rows, and oval in shape; (3) the disease clears up with no bad after effects often without any treatment and the tendency is to ultimately get well; (4) it never leads to shrinking of the conjunctiva, to pannus or other destructive sequelæ; (5) it can arise without contagion and is not considered contagious although, like trachoma, it does attack large numbers of people who are confined in a small place.

Trachoma.—(1) It seldom occurs in children; (2) the follicles are larger, do not have sharp outlines, are less prominent under the conjunctiva, are round in shape and never in rows; (3) tends to lead to more or less pathology and seldom recovers spontaneously; (4) scar tissue becomes a product of the inflammation in the conjunctiva and leads to shrinking of the conjunctiva, causing in turn entropion and trichiasis. Pannus is the sure result of unarrested cases as there is a tendency to infection of the cornea from the infected conjunctiva moving over it and remaining in contact; (5) trachoma has been proved to be contagious. Trachoma bodies which are considered the infective agent have been isolated.

The use of atropine in some instances will cause a follicular catarrh which clears up on stopping the use of the poison.

Parinauds "Infectious conjunctivitis" has granulations but almost always occurs in only one eye and is accompanied with constitutional symptoms.

Treatment of Follicular Conjunctivitis.—The treatment should be directed against the inflammation. The trophicity of the nerve terminals to the conjunctiva may be altered by osteopathic lesions.

Suggestions under chronic catarrhal conjunctivitis apply here. If there is no inflammation the follicles tend to disappear, leaving no trace of pathology, hence a few osteopathic treatments of the lids and the cervical region will hasten normalization.

Gonorrheal Conjunctivitis

This disease is sometimes called **purulent ophthalmia** or **acute blennorrhea**, It is caused from an infection of the conjunctival sac with the gonococcus of Neisser. Contact with soiled fingers or linen may transfer the germ.

Symptoms.—Within 12-48 hours after inoculation the first symptoms of redness and irritation occur. This is soon followed by much swelling and tension of the lids and chemosis of the conjunctiva. There is much pain and a copious discharge of pus coming from beneath the lids. At first the pus is yellow or yellowish green.

Later the symptoms begin to subside; there is less tenseness and heat; the lids can be more readily everted and the discharge ceases after 6 or 8 weeks. The puckered conjunctiva becomes rough and granular.

In these cases the **prognosis** is always grave; more so than in ophthalmia neonatorum. The eye is almost always marred in some way. One of the great dangers is involvement and destruction of the cornea. If the cornea becomes hazy soon after symptoms begin it is not a good omen. **Ulcers** will likely form and then there is a tendency to puncture the cornea. In mild cases the cornea may escape without injury. In severe cases it is likely to ulcerate. If it perforates, the anterior chamber is emptied and the iris prolapses into the perforation; adhesions take place and there is healing

with reformation partially of the anterior chamber. An adherent leucoma is the result with practical loss of vision. There may be a bulging of the cornea known as anterior staphyloma. The iris and ciliary body may become involved, causing iritis and cyclitis, or the whole inner structures may be affected making a **panophthalmitis** with **atrophy** of the eyeball.

The cornea is affected by the infective material direct or the nutrient vessels to the cornea at the limbus may be obstructed by the extreme swelling and pressure.

Complications of arthritis, rhinitis, septicemia and endocarditis may arise. If there is none of these, at least there is a general debilitated condition which needs attention.

Treatment.—The treatment should be **local** and **constitutional**, The diagnosis should be made quickly from the history, symptoms microscopically, and local cleansing begun at once and followed diligently. Excessive discharge should be wiped away with cotton. The conjunctival sac should be thoroughly irrigated every hour or oftener if necessary to keep it clean. This is to be done day and night. A saturated solution of boric acid may be used, or corrosive sublimate one grain to the pint, or permanganate of potassium solution 1-5000. The irrigation should be followed by the free use of argyrol 25%. This procedure will keep the eye clean and be the means often of saving the cornea from destruction and the eye from blindness.

If there should be ulceration of the cornea a drop of atropine ½% should be used in the eye often enough to keep the pupil dilated and the ciliary body at rest.

Osteopathic physicians no less than other physicians should not neglect this local, careful, persistent, antiseptic cleansing of the eye in such cases. The osteopathist can do more. He is not limited to antisepsis even in this kind of work, however important it might be. The unaffected eye should be carefully protected. Buller's shield should be used.

The osteopath should give thorough treatments to the neck and the fifth nerve.

Supporting treatment to the system according to indications should be given e. g., bowels, kidneys, nerves, muscles, joints as in constipation,

nephritis, neurosis, rheumatism, arthritis, endocarditis, septicemia, rhinitis etc.

Ophthalmia Neonatorum

This is an **acute purulent conjunctivitis** in the new-born. Neonatorum comes from a junction of the Greek word Neos—new, to the Latin word natus—born; new-born. This disease is the bugbear to the obstetrician. He must always be on the lookout for it and act promptly in order to save sight. Every general practician should make a careful study of this disease if he expects to treat children.

Sixty to seventy percent of conjunctivitis neonatorum is due to the infection with the gonococcus of Neisser. It usually comes from a gonorrheal discharge from the genitals of the mother. The nurse or anyone who handles the baby might be the agent in the transmission of the infection.

The disease is not always of gonorrheal origin. Some cases are due to the pneumococcus, streptococcus, diplobacillus or one variety of staphylococci.

Thus there are two varieties or types of ophthalmia neonatorum; a severe type which is **gonorrheal** or specific and a mild type which is non-specific.

In some states there is a law which requires the use of silver nitrate in the eyes of all babies at birth. Every baby's eyes should be thoroughly washed at birth, with boric acid and where there is the least suspicion of gonorrhea silver nitrate 1% or argyrol 25% should be used. A routine use of one of the silver salts would be good practice.

Symptoms.—Gonorrheal cases begin usually the third day after birth, non-gonorrheal, on the fifth or sixth day. Both eyes are usually involved, one worse than the other. The lids swell much. There is chemosis of the conjunctiva which may put the cornea in a pit. The discharge is abundant. It is yellow or greenish yellow.

The disease gradually declines and the discharge ceases in six to eight weeks. The conjunctiva is thickened and looks granular. May be some cicatricial changes.

The chief danger is to the cornea, more so if it becomes hazy the first two days. Corneal lesions seldom occur in non-specific forms.

If the cornea is involved perforation is likely, with a general inflammation of the eyeball (panophthalmitis) followed by atrophy (phthisis bulbi).

Complications such as rhinitis, meningitis, endocarditis and general septicemia may occur.

Diagnosis is made from the onset, character, symptoms and course with the use of the microscope.

Prognosis.—Delayed or improper treatment in these cases will likely be fatal to sight as sloughing of the cornea will occur. With prompt and proper care the prognosis is favorable.

Treatment.—Mild cases (non-specific) are treated in the same manner as simple conjunctivitis. In severe cases (specific) clean the eye carefully and apply cold compresses of gauze 15 to 20 minutes at a time every hour or two. Keep the gauze on a block of ice and change every few minutes. If the cornea is involved heat may prove more satisfactory. There must be constant removal of the discharge. Wipe away the excess and irrigate freely with boric acid at least every hour day and night and more often if necessary. After each washing use a solution of argyrol 25%. Once a day silver nitrate 1% solution may be used and washed out with a salt solution.

If the cornea should ulcerate the treatment need not be altered.

The attendants should be carefully instructed as to the importance of the care and the contagious nature of the pus.

Antisepsis and cleanliness here is more essential, effective and exclusive than in any other disease of the eye. Wisdom in the use of antiseptics is a strong point in the armamentarium of every progressive osteopath.

Trachoma

This disease is known as **granular lids** or **granular conjunctivitis**. Although the germ has not been discovered, we know this is an infectious disease. A roughness and hypertrophy of the conjunctiva develops. There is

development of follicles or granulations. Later these products are absorbed and cicatrization of the tissues follows.

Cause.—Trachoma is found most common in Egypt and Arabia. It spreads easily in crowded institutions. It is in many instances a mixed infection with the Morax-Axenfeld bacillus, Koch-Weeks bacillus and the gonococcus.

"Trachoma bodies" have been discovered which are claimed by some to be a causative factor in the disease. These small bodies are not found in all cases however.

Spinal lesions of the cervical and upper four thoracic vertebræ will disturb the blood and nerve supply to the eye which will predispose to the disease should some of the virus or germs of trachoma be present. In practically all these cases there is tenderness if not an actual twist at the second and third thoracic.

Symptoms.—A small boy came to our clinics complaining that his left eye was smaller than the right. No inflammation or swelling was prominent. The eye looked normal except slightly smaller than the right. On turning the lid granules in the fornix of that eye were readily noticed. Trachoma had a good start. The tissues were so hypertrophied in that region that the eye could not be opened quite as wide as the other one, hence the impression that that eyeball was smaller. The granulation often develops so insidiously that the victim may have the disease for months before he realizes he has a bad eye. When symptoms appear there may be photophobia, lachrymation, gluing of the lids from a scanty secretion, pain, and blurring of vision. The granules are gray, translucent and roundish under the conjunctiva.

Hypertrophy increases to a certain height when cicatrization and contraction begin. The duration may be years. The more the hypertrophy the longer the duration and the greater the contraction. (Note here that treatment should be directed toward combatting the hypertrophy by establishing circulation).

Sequelæ. I merely mention the sequelæ here: pannus, ulceration of the cornea, trichiasis, dystrichiasis, entropion, ectropion, symblepharon, xerosis, corneal opacities. For the explanation, pathology and treatment of

these sequelæ not covered in this treatise, see any good works on diseases of the eye as Weeks, Fuchs or De Schweinitz.

Treatment of Trachoma.—In reporting cases of trachoma treated and cured by osteopathy we should be sure of our diagnosis.

The treatment is antiseptic, hydrotherapeutical, osteopathic and operative. A saturated solution of boric acid should be used. Argyrol 20% is good if there is much secretion. Nitrate of silver 2% and copper sulphate are still used in some cases to advantage as claimed by some physicians. The osteopath should count on careful cleanliness.

Hot compresses over the eyes are often very agreeable.

Operations are often performed for trachoma. The granules are rolled out with Knapp's roller forceps, and other methods.

Grattage is practiced with some wonderful results. It is done as follows: Get some fine sand paper and cut it in strips about one-half inch wide by three or four inches long. Put it in alcohol in a vessel for ten to fifteen minutes. Pour off all the alcohol except a few drops that will cling to the vessel by capillary attraction. Touch a match to the residue. This will burn just enough to make the sand paper absolutely sterile without burning the latter. Put the patient under somnoform. Use a small artery forceps to grasp the edge of the eyelid, roll the lid back over the artery forceps to expose all granulations clear to the fornix. Use a protector to the eyeball. Now with the sandpaper quickly scrape or curette away all of the trachoma bodies and granulations. Repeat the process on the other eye if it is involved. Wash out well with a saturated solution of boric acid and bandage the eyes for a few hours. This will cause considerable swelling and inflammation. Use cold applications and keep the eyes disinfected. I have seen some very good results from this method.

Osteopathic.—Following the sand paper operation a thorough treatment of the cervical and upper dorsal region would add considerably to the rapidity of the patient's recovery and sense of well being. General tonic treatment is of special benefit in nearly all trachoma cases as they are subnormal in their general health.

One form of technique which has been used by myself and others to advantage in these cases is as follows: Sterilize the fingers carefully,

lubricate with vaseline or K. Y. the forefinger of the right hand. With the left hand raise the upper lid and introduce the forefinger of the right hand with the thumb above. Catching the lid between the thumb and finger squeeze and massage the whole structure clear to the fornix as thoroughly as possible. Repeat the process on the other eye.

A technique used by Dr. Edwards of St. Louis is as follows: After sterilizing and lubricating the forefinger lift the lid and introduce the finger as far as possible into the orbit pushing the fornix back into the orbit. This stretches all the tissues around the fornix, opening up a better conjunctival and palpebral circulation. The ciliary vessels and nerves are stretched and stimulated. It is rather surprising to one who has not tried it, how far the finger can be introduced into the orbit.

One set of nerves that should be especially studied and considered in trachomatous conditions is the cere-brobulbo-spino-sympathetic-ciliary arc. This has already been elaborated. All spinal lesions should be carefully diagnosed and corrected.

Dr. T. J. Ruddy's third finger eye instrument is very useful in these conditions in restoring normal circulation about the orbit.

See that the nose and throat are normal.

Phlyctenular Conjunctivitis

By some this disease is considered an **eczema** of the conjunctiva. This will at least enable us to get an idea of the conjunctival pathology. What is said of phlyctenular conjunctivitis applies largely to its corresponding disease of the **cornea-phlyctenular keratitis**. Scrofulous ophthalmia is applied by some because so many of these phlyctenular patients have **scrofula**. Herpes conjunctivæ is used as a name because of the small blisters or blebs that form in the beginning stage. Little red eminences develop near the limbus (sclerocorneal junction). They are cone shaped, slightly elevated about the surrounding tissue. There may be one or several, usually not more than one or two. After a few days the cone breaks and on top appears a small gray ulcer. There is further breaking down and the cone disappears leaving an ulcer on level with the conjunctiva. Vessels are congested about it. There may often be noted an area of small vessels, fan

like in shape, running from the outer region of the conjunctiva to the ulcer or phlyctenule.

Etiology.—This is a disease of frequent occurrence in children, mostly among the poor classes. Such things as eczema, dirt, adenoids, scrofula, rhinitis, malnutrition, abuse of tea and coffee and exanthematous disease are mentioned by oculists as causes. I have no doubt any or all these conditions predispose to phlyctenular conjunctivitis.

De Schweinitz in "Diseases of the Eye," 1916 edition, p. 242, says: "The exact cause of ocular lesions, or phlyctenular eruption, has not been determined."

I have met Dr. De Schweinitz and heard him lecture on the eye. I consider him one of the best eye specialists in the country. His experience and study with the eye dates over many years and his book has gone through eight editions. He is professor of ophthalmology in the University of Pennsylvania; Ophthalmic Surgeon to the Philadelphia Polyclinic Hospital, the Philadelphia General Hospital etc., etc.

His opinion represents the summary of the investigation of the ophthalmic profession the world over and through all the past down to the present time. "The cause of phlyctenular conjunctivitis is not known."

Bacteriology.—At times in the ulcers have been found the staphylococcus pyogenes aureus and albus. They are also found in a normal conjunctival sac. They could not with logic be taken as a causative factor; at least they would be only secondary.

If oculists and other students of the eye all had a good deep osteopathic vision to throw light upon these problems many causative factors would take on a new meaning. Such supposed causes as have been mentioned, e. g. eczema, adenoids, rhinitis and malnutrition may easily be secondary to the osteopathic lesions. Micro-organisms may be enabled to act because of trophic and circulatory disturbances to the conjunctiva through disturbed nerve connections from lesions in the cervical and upper dorsal regions. Herpes zoster is purely a trophic nerve disturbance manifestation on the skin as blebs or blisters with more or less neuritis. Any lesion that would affect the integrity of the function of the fifth cranial nerve might easily manifest itself as herpes of the conjunctiva.

We believe the osteopathic lesion is primary and fundamental in the causation of most of our phlyctenular conjunctivitis. Of course insanitation, scrofulous diathesis and the exanthemata play their role. A good diagnostician should figure out the relative importance. The history, onset and examination will usually eliminate these conditions.

Symptoms.—Lachrymation, photophobia, blepharospasm and injected vessels are the chief symptoms. There is pain as well as fear of light. The child fights examination.

The attack subsides in ten to fourteen days unless there is multiplicity of blebs. Some patients have repeated attacks for months or years. Many of these cases in medical clinics keep coming for months with repeated attacks. Never leave out careful osteopathic treatment.

Prognosis.—This is favorable for a final cure. If there should be multiple blebs and frequent recurrence and the cornea is invaded, the prognosis is not good for perfect sight. The pathology goes deep enough to affect Bowman's membrane of the cornea disturbing the substantia propria. This causes a macular condition of the cornea which impairs sight.

Therapy.—Diet should be bland; the eyes should be protected from irritants; yellow oxide ointment should be used in the eye once a day or 10% argyrol. The ointment is preferred. Moist warm compresses on the eye are comforting. A boric acid wash in almost all conjunctival trouble is good. If there is much irritation giving a suspicion of iris involvement a drop of atropine ½% should be used. The general regimes of living should be regulated.

Osteopathic treatment should be directed toward building up the general health and correcting all lesions, especially that may have a specific bearing on the eye trouble. Such lesions will be found more often at the first, second and third thoracic, but may be anywhere from there to the occiput.

Vernal Conjunctivitis

This disease is known by many as **vernal catarrh** or **spring catarrh** of the conjunctiva. It is a chronic inflammation which sets up changes in the conjunctiva and tarsus. This disease may be confused with trachoma unless one observes closely. There are broad flat papillæ on the conjunctiva. These

papillæ may readily be taken for granulations. They are larger than the granules in trachoma. They somewhat resemble the arrangement of cobble stones. The conjunctiva has a bluish-white filmy appearance called by some, milky shimmer.

The disease was thought at first to appear only in the spring, hence the name vernal. Many cases continue through the year with exacerbations in the spring. It occurs more often in boys. Both eyes are attacked. It may heal and leave no trace. It may last from four to twenty years.

Causes.—Almost all works on the eye say the cause is not known. De Schweinitz says, "Definite information in regard to the cause of this disease is lacking." There may be a micro-organism which has not been discovered.

I wish to call the attention of the osteopathic profession to the great fact that there are numbers of diseases of the eye as well as of other parts of the body about which the medical profession are entirely "at sea." This gives valuable ground for scientific research by our profession.

My experience with this disease is not sufficient for me to speak with any positiveness or finality as to its cause. The altered trophic parts and the very chronic condition existing leads me to the firm belief that we will ultimately find the cause as a mechanical lesion affecting the trigeminal or sympathetic (or both) nerve connections. Glare of light and local irritants act only as secondary causes. Nasal disease may be associated and act as a cause.

Symptoms.—There is photophobia, some mucus, slight pericorneal injection, redness of the conjunctiva of both the bulb and lids; that of the lids is thickened and of dull pale color due to sub-epithelial hyaline thickening. The fact that there is no pannus, and flat granulations and recurrence with spring, marks it from trachoma.

Prognosis.—Under medical treatment it is unfavorable; may last twenty years. Slight opacity of the cornea may develop.

Treatment.—The eyes should be protected with dark glasses. Cold compresses give some relief. Boric acid is good as a wash. Yellow oxide of mercury ointment may be of service as an antiseptic and alternative. If nasal disease exists, it, of course, should be treated according to indications. Fundamentally the lesions in the spine in the cervical and upper dorsal

regions should be specifically corrected. When enough cases of vernal catarrh have been observed and treated osteopathically much light and benefit will be brought to bear upon this obscure and intractable disease of the conjunctiva.

Diseases of the Cornea
Anatomy

The cornea with the sclera forms the outer coat or tunic of the eye ball. The cornea is in front and forms one-sixth of the envelope. It is a segment of a smaller globe than that of the sclera. It is about 12 mm. horizontally and 11 mm. in the vertical diameter. Its thickest part is at its junction with the sclera where it is about 1 mm. This junction is called the limbus. The cornea is inserted into and rests on the sclera like a watch crystal. The fibers of the cornea pass continuously into the sclera, however. The normal cornea is transparent. Most morbid changes of the cornea cause a diminution in this transparency. In old age a narrow gray line near the corneal margin makes its appearance. This is known as the **arcus senilis**. There is a little strip of perfectly clear cornea between the arcus senilis and the limbus.

The cornea has five layers. These layers should be noted with care, as in wounds of the eye, foreign bodies in the cornea and ulcerations, the results depend much upon which layers are affected.

1. The **anterior epithelium** consists of pavement cells of several layers. This layer of the cornea may be damaged or scratched off in large patches and still it will heal readily leaving no trace of the injury.

2. The **anterior elastic lamina** or **Bowman's membrane** is very thin and homogeneous; it is just beneath the epithelial layer and forms a resisting sheath to prevent damage to the next layer.

3. The **stroma** or **substantia propria**. This layer composes about nine-tenths of the cornea. It is composed of minute connective tissue fibers between which lie some stroma cells or corneal corpuscles. Some of these cells are fixed while others are motile. The motile ones are the white blood-corpuscles which move about in the lymph passages of the stroma. They increase in any irritation of the cornea.

4. **Descemet's membrane.** This is a tough homogeneous hyaloid membrane back of the stroma. When the stroma is diseased and breaks down Descemet's membrane may be sufficient to prevent a puncture of the cornea.

5. The **Endothelial layer** is a single layer of flattened cells which coat the posterior surface of Descemet's membrane.

The margin of the cornea is in relation with three membranes, the conjunctiva, the sclera and the uvea (iris and ciliary body). In a disease of the cornea, a conjunctivitis, an iritis or a cyclitis is easily started.

The cornea contains no vessels. It is nourished by imbibition. At the limbus there is a rich network of marginal loops supplied by the anterior ciliary vessels. From these loops the blood plasma passes into the stroma of the cornea.

The nerves of the cornea come from the ciliary nerves and the nerves of the bulbar conjunctiva. These are from the trigeminus and the sympathetic. The nerves extend numerously in the stroma passing forward through Bowman's membrane into the epithelial layer. This makes the cornea very sensitive to the touch.

Examination of the Cornea

Note the size and form. Both may be modified by morbid processes. Note the surface with regard to curvature, evenness and smoothness. In **keratoconus** the curvature is greatly increased. Noting the reflex images in the cornea and comparing these with those of a normal cornea will show any variation in curvature. Also any **unevenness of the surface** may be noted by the irregularity or distortion of the images. Uneven spots on the cornea may be **depressions or elevations** from loss of substance; **wrinkles or collapse** from lowered tension.

If the smoothness or polish of the cornea is lost it looks like glass that has been breathed upon or greased. It is lusterless and dull.

Note also the transparency of the cornea and determine the form, extent and density of the opacity; whether it is diffuse or in spots; in the deep or superficial layers. A magnifying glass should be used in the study of

opacities. According to the density of the opacity of the cornea it is known as a **nebula** or a **nebulous opacity**, a **macula** or a **leucoma.** The nebula is the least noticeable and the leucoma is the densest opacity. A leucoma is a condition of complete opacity. The cornea looks white.

Defects in the corneal epithelium may be made to show clearly by the use of a 2% solution of fluorescein which stains them green.

Note the sensitiveness of the cornea by touching it with the end of a thread, a little cotton or a shred of paper. The sensitiveness is diminished or lost in glaucoma and some other diseases.

Diseases of the Cornea

Almost all diseases of the cornea have some form or degree of inflammation. **Keratitis** is the word generally used for inflammation of the cornea. In order to aid clearness in discussion there are various subdivisions of keratitis made by different writers. Suppurative and non-suppurative are the principal types. In **suppurative keratitis** there is always some destruction of corneal tissue which on healing leaves an opacity with partial loss of vision. Germs gain entrance into the tissues usually from the exterior and some form of ulceration results.

The following classification is taken from Fuchs:

Suppurative Keratitis.—(1) Ulcer of the cornea; (2) Serpiginous ulcer; (3) Keratomalacia or Xerosis; (4) Keratitis neuroparalytica.

Non-suppurative Keratitis.—(A) SUPERFICIAL: (1) Pannus, or keratitis with blood vessels; (2) Phlyctenular, or keratitis with vesicles. (B) DEEP: (1) Parenchymatous or interstitial.

In keratitis there is first an infiltration or the increase of cells in the substantia propria or the parenchyma of the cornea. This is the exudate of the inflammation. It causes the cornea to look more or less dull or cloudy. The disease may clear up at this point or go on to suppuration. If it clears up it is known as **resorption**. If the lamellæ of the substantia propria are not destroyed by the process, resorption takes place with no loss of substance. The exudate disappears and there is perfect transparency of the cornea again. There may be slight damage of the stroma preventing perfect

transparency. Resorption of the exudate may not be quite complete which may become partly organized and left permanently fixed in the cornea. Cases resorbing without destruction of the stroma are forms of the non-suppurative keratitis group.

If the stroma breaks, suppuration occurs. This is the second stage and is associated with a localized destruction of the cornea. These cases are known as **suppurative keratitis** or **ulceration of the cornea**. The disintegration begins in the most anterior layers of the cornea. A slight depression in the cornea can be noticed. The infiltration is all about the ulcer, getting less as it is more remote from it. If the floor and walls of the ulcer are foul with the infiltrate it is known as a **progressive** ulcer. **Sloughing** may continue to spread the ulcer.

If the cloudiness around it disappears and the ulcer acquires a smooth transparent base and edges it is known as a **retrogressive** or clean ulcer.

The disintegrated areas of the cornea may be replaced by newly formed tissue. This is the third stage or that of **cicatrization**. This new tissue is connective tissue. It is opaque, leaving a permanent opacity.

Stages of keratitis:

Suppurative.—(1) Infiltration; (2) Suppuration and (3) Cicatrization or Reparation. The suppuration is progressive or retrogressive.

Non-suppurative.—(1) Infiltration; (2) Resorption.

In the diagnosis of a keratitis one should look at it very carefully. A loupe which has thick plus sphere lenses will magnify the field and may be of great assistance in observing closely the condition.

If the cornea is clouded and dull the trouble is recent and if there is no loss of substance it is an infiltrate (first stage). If there is loss of substance it is a progressive ulcer (second stage.)

If the surface is lustrous but cloudy the trouble is an old one and if there is loss of substance it is a retrogressive ulcer; if no loss of substance it is a cicatrix.

Frequently blood vessels grow in from the margin in ulcerations of the cornea. This is usually a process of healing of the corneal ulcer. The advent

of the blood vessels is favorable. After healing the blood vessels gradually disappear. They never entirely disappear from large cicatrices.

In some cases new vessels accompany the inflammatory process and like the exudate are a part of the clinical picture of the disease as in parenchymatous or interstitial keratitis. Pannus also has vessels. They are not in the cornea but are in new tissue deposited upon it.

Symptoms appearing in keratitis:

1. **Ciliary injection** or a red area encircling the cornea. If the keratitis is severe there will be considerable inflammation of the conjunctiva which may hide to some extent the ciliary injection.

2. **Iritis or iridocyclitis** may set in. The iris and ciliary body are in such intimate relation with the cornea that these structures are very subject to involvement in any severe keratitis. With iritis would come danger of **synechiae** or adherence of the iris to the anterior surface of the lens.

3. **Hypopyon.**—In suppurative keratitis there is some exudate into the anterior chamber of the eye. This exudate drops to the bottom of the chamber and looks like pus had gathered in the bottom of the aqueous. This condition is called hypopyon.

4. Other symptoms which are frequently prominent are **diminished vision**, **pain**, **photophobia**, excessive **lachrymation** and **blepharospasm**. Edema of the lids and conjunctiva may occur.

Intelligent treatment of keratitis of course is based upon the exact conditions present. Great care in diagnosis and treatment should be exercised.

Ulcer of the Cornea

Inflammation of the cornea sets in from some cause. There is an infiltrate into the substantia propria. A spot becomes cloudy and the surface over it becomes dull; at this point the epithelium breaks down or exfoliates and the loss of substance in the parenchyma is the beginning of an ulcer.

Cause.—The cause may be constitutional or local. The causes usually thought of from the medical standpoint may be noted in such books as

"Diseases of the Eye" by De Schweinitz or Weeks. I wish especially to call attention to the fact that there is frequently a primary and underlying cause of corneal ulcers not mentioned in any medical texts, i. e. the osteopathic lesion. By this I mean more than the spinal lesion although the subluxation lesions that result from the occiput to the fourth dorsal are of most importance. Any tension or change of tissue in the cervical region that may interfere with perfect freedom of circulation of blood to the tracts and centers in the cord, is to be considered. The osteopath of course should take into consideration all causes primary and secondary and govern himself accordingly.

Symptoms and Course.—There is a gray area surrounding the ulcer at first, also the floor is grayish in color. In this condition it is known as a **progressive** ulcer or a **foul** or **unclean** ulcer. This cloudiness or gray area may increase in size and the ulcer keep spreading, or it may go deeper even to perforation of the cornea.

Some ulcers advance or spread on one side and heal on the opposite side so that they creep along on the cornea—these are the so-called **serpiginous ulcers**.

With corneal ulcers there is irritation, pain, photophobia and increased lachrymation. There is usually some ciliary injection which is an indication of involvement of the iris and ciliary body. If iritis occurs there is contraction of the pupil with slow reaction. **Hypopyon** may develop. With iritis and the exudate there is likely to be adhesions between the iris and the lens known as posterior synechia.

A few corneal ulcers are asthenic and do not have irritative symptoms and yet are dangerous.

When the ulcer begins to heal it is called **retrogressive**. Dead tissue is cast off; other tissue becomes transparent from resorption. We have a **clean** ulcer. Symptoms disappear and cicatrization begins. Vessels extend to the ulcers and soon it is leveled up with the corneal surface. Cicatrization may leave it slightly below the corneal level or above it.

If there should be perforation of the cornea from the ulcer there may be **complications**, e. g. keratocele, loss of aqueous, dislocation and expulsion of the lens, intra-ocular hemorrhage, flattening of the cornea, fistula of the

cornea, glaucoma, intra-ocular suppuration, prolapse of the iris into the opening, etc. These complications and sequelæ that occur occasionally will not be considered here.

After healing is complete by cicatrization there is opacity of the cornea in proportion to the depth and size of the ulcer. In months and years of time there is some clearing of the opacity so that small superficial opacities may become invisible.

Treatment of Corneal Ulcers.—Most ulcers of the cornea are quite amenable to proper treatment and the prognosis is favorable. Neglect or wrong treatment is very dangerous. The treatment is local and constitutional. Often the ulcer is kept going by unwholesome constitutional conditions.

Local Treatment.—This varies according to the stage of the ulcer, whether progressive or retrogressive. In a progressive or foul ulcer if due to trauma any foreign bodies should be removed. If the ulcer is a result of pathology of the conjunctiva it is of primary importance to treat the conjunctival condition.

In mild cases of ulcer a dressing over the eye with atropine ½% to keep the pupil dilated is sufficient local treatment. The bandage protects the eye from bright light and other environment and the atropine puts the iris and ciliary body at rest preventing complications and giving nature her best chance to work.

If the ulcer is rapidly progressive, warm compresses an hour or two a day are good; iodoform sprinkled on the ulcer or actual cautery may be used. In the retrogressive stage (clean ulcer) healing has begun and we desire to get as near as possible a resistant transparent cicatrix. Yellow oxide ointment is useful at this stage.

Osteopathic.—The local measures just mentioned are not incompatible with osteopathic theory or practice. They are merely adjunctive in getting nature's reaction toward normalization, as also are hot and cold applications. Osteopathy comes in now in a most important and fundamental way with the constitutional and specific lesion treatment. The **bulbo-spino-sympathetic-ciliary arc** has been mentioned and explained. Through this important nerve connection with the eye, profound and

wholesome effects on the eye may be gotten by osteopathic treatment. Frequently lesions of the occiput, cervicals and upper dorsals will affect the integrity of the ocular structures through disturbances of nerve and blood supply.

The stomach, bowels, liver and kidneys should be carefully noted in corneal ulcers. Poor circulation, indigestion, constipation and auto-intoxication may have an important bearing on the recovery of the ulcer.

Xerosis or Keratomalacia

This is a disease of the eye in children due to insufficient nutrition of the cornea. Hereditary influences, depleting diseases and lesions affecting the trophic nerves to the eye are causes.

Treatment consists of building up the nourishment of the child, correction of lesions and careful dieting. Hot applications to the palpebral region helps to bring the blood supply to the eye for local effects.

Keratitis Neuroparalytica

This disease is due to a paralysis of the 5th cranial nerve. The cornea becomes slightly cloudy. The epithelium gradually sloughs away. An ulcer may or may not form. Pain and lachrymation are absent because of paralysis of the trigeminus. There is usually ciliary injection.

Treatment.—The most important treatment for this unfortunate condition is manipulation to restore the integrity of the 5th cranial nerve and the blood supply to the eye. Cervical, spinal, nasal, nasopharynx treatment should be given. Spring the inferior maxilla.

A drop of atropine (1%) should be used locally because of the ciliary injection. Warm compresses used locally will help. The healing usually leaves some opacity of the cornea. Keep the eye bandaged to protect the cornea.

Pannus

This form of keratitis is superficial and is characterized by the formation of blood vessels in the cornea. It is caused by some irritative influence. Most often it is a complication of trachoma.

If the irritation can be removed the vascularity gradually recedes, leaving a clear cornea unless the deeper structures of the cornea have been involved.

Phlyctenular Keratitis

This disease is an involvement of the cornea with an eczematous process similar to phlyctenular conjunctivitis. There is more likely to be ciliary injection and iritis, in which case atropine should be used. The treatment is the same otherwise as for phlyctenular conjunctivitis.

Parenchymatous or Interstitial Keratitis

This is shown by a diffuse inflammatory infiltration of the substantia propria of the cornea. Part or whole of the cornea of one or both eyes may be involved. Very fine blood vessels may invade the deep structures of the cornea.

Cause.—Syphilis, tuberculosis, rheumatism, diabetes and rachitis are systemic diseases found back of this trouble.

Symptoms.—Irritation, lachrymation, photophobia with ciliary injection are the chief symptoms.

Treatment must be local and constitutional.

Locally atropine should be used. Dark glasses should be worn or the patient must be kept in a dark room. Treatment to the trigeminal nerve and tissues of the orbit should be given.

Constitutional treatment should be spinal with the idea of arousing all the forces of the body to greater activity. Careful dieting should be followed according to indications.

The infiltration and blood vessels will ultimately disappear. Sometimes enough may remain to cloud the vision.

Diseases of the Iris and Ciliary Body

The iris and ciliary body have the same blood and nerve supply. That is, they are supplied by the same set of vessels and nerves. For this reason it is practically impossible to have an iritis absolutely independent of a cyclitis or some inflammation of the ciliary body. If the iris is the primary seat of the trouble there are certain symptoms that may indicate such a state. However, when we are treating the iris or diagnosing conditions of the iris we must remember that the ciliary body is very likely more or less involved and may be the primary seat of the trouble.

In **iritis** there are some symptoms which are caused from the hyperemic condition of the eye, such as a slight change in color. The pupil becomes rather inactive, there is some ciliary injection with photophobia, lacrymation and pain. In case of an exudate in the iris there may be thickening, and the exudate in the anterior chamber of the eye will form a **hypopyon**. Sometimes the small vessels will break and there will be a little bleeding which will be mixed with the debris in the bottom of the anterior chamber. This is known as hyphemia. There are likely to be adhesions between the iris and the anterior capsule of the lens known as posterior **synechia**. The pupil is more or less irregular. If atropine is dropped into the eye to dilate the pupil, parts of the edge of the pupil will be adhered while the other parts dilate making it very irregular.

In case of cyclitis there is an exudate from the ciliary body into the posterior chamber. This may cause a total adherence of the iris to the crystalline lens. With the ophthalmoscope, opacities in the vitreous may be noticed. These are exudates. The tension of the eye is liable to increase a little at first but as the exudates absorb there is more or less softening. Vision is low. Also in cyclitis there is ciliary injection, photophobia, lacrymation and pain, similar to that of iritis. Pressure on the eye ball will reveal a very tender condition around the sclerocorneal junction or over the area of ciliary injection.

The causes of iritis, cyclitis or iridocyclitis frequently are systemic conditions and infection such as syphilis, rheumatism, gonorrhea, tuberculosis, infectious diseases and metabolic changes, it may be of traumatic origin or sympathetic. Fuchs says “There are many cases of iritis for which no cause can be discovered and therefore which cannot be placed

under these causes." We agree with him and advance the theory of cervical and upper dorsal lesions or trouble in the sinuses, nose, nasopharynx or throat. No doubt osteopathy can throw some important light on the causes of diseases of the iris and ciliary body. The nose and throat should be examined in all these cases.

Treatment.—Atropine must be used in the sore eye to put the iris and ciliary body at rest and dilate the pupil to draw it back from the lens so that adhesions may not form. Warm compresses will give much comfort. Sweating should be brought about. All fluid should be reduced to a minimum. Diet should be very moderate and the bowels kept unusually free. The eye should be protected by dark goggles. Thorough treatment of the neck and upper dorsal region with attention to the nose and throat should be given. Constitutional treatment should be given according to the indications mentioned under causes. If annular synechia or total posterior synechia form or there is atrophy of the eyeball operative work may be needed. Also for injuries, tumors, anomalies and so forth of the iris see the latest medical works on this subject.

Diseases of the Choroid

The **choroid** is the vascular tunic of the eye. With the iris and ciliary body it forms the **uvea**. The iris and ciliary body are rich in nerve terminals and when inflamed; pain is a prominent symptom. The choroid has no sensory nerve terminals. When it is involved alone; pain is not present however severe the pathology. Embryologically Descemet's membrane is a part of the uvea. When the uveal tract is diseased we frequently note symptoms of a descemetitis as a turbidity of the anterior chamber and spots on Descemet's membrane. When one part of the uvea is inflamed the tendency is to pass to the other parts because of the intimate blood supply.

Choroiditis

There are many forms of choroiditis given by writers according to the clinical picture and the pathology.

Symptoms.—No pain is experienced unless there are complications. Vision is altered in some degree. The use of the ophthalmoscope may reveal

opacities in the vitreous. Pigmentation spots and exudation may be noted in the fundus. In disseminated choroiditis spots of exudate appear in the fundus which go on to atrophy, leaving irregular circular light patches.

Treatment.—In all forms of choroiditis careful diagnosis of constitutional conditions should be made and treatment given according to indications.

Nasopharynx and orbital treatment as outlined under manipulation for diseases of the eye should be given.

Rest and protect the eyes. Secure free elimination.

Panophthalmitis

By injury or otherwise pathogenic germs are introduced into the eye. The trouble begins as a **suppurative choroiditis** and rapidly spreads to all the eye structures. The vitreous chamber becomes filled with pus.

Symptoms.—Pain is severe and sight is lost early. The conjunctiva and lids are much swollen. There is a mucopurulent discharge. The cornea becomes gray and may slough. In about two weeks the inflammation subsides and the globe passes into atrophy.

Treatment.—Elimination must be thorough. Spinal treatment for keeping up strength. Cervical, upper dorsal and nasopharynx treatment for the eye. Moist hot compresses to the eye. Operation, incision for drainage, or evisceration may have to be performed.

Sympathetic Ophthalmia

The other eye may become inflamed by the process from the panophthalmitis passing around through the circulation or the continuous structures. All symptoms of a general inflammation appear and vision gradually diminishes.

Treatment.—In panophthalmitis of one eye always watch the other eye closely. If it becomes irritable or shows any signs of being affected the diseased eye should be promptly removed, especially if vision is lost in that eye. If no irritation occurs, continued conservative treatment of the

panophthalmitis may result in a subsidence of the disease without the well eye becoming affected.

Sympathetic inflammation rarely develops earlier than a month after injury to the exciting eye. Sooner than that or even a few minutes after injury there may be some signs of sympathetic irritation and the symptoms continue with no evidence except a slight circumcorneal injection. It should be treated like iritis. A thorough toning of the system by spinal treatment should be given. Order a limited diet. Secure free elimination.

Glaucoma

Glaucoma is essentially an increase in the intra-ocular pressure. All other symptoms of the trouble may be traced to this condition.

In **Primary Glaucoma** the increase in pressure sets in without any discoverable antecedent disease of the eye.

In **Secondary Glaucoma** the increase in pressure is due to some other disease of the eye. It is a symptom, a complication or accessory and is confined to the eye diseased.

Primary glaucoma affects both eyes, but not always at the same time. Fuchs says primary glaucoma constitutes about 1% of all eye diseases. It is often mistaken for iritis or iridocyclitis and treated with atropine which is contraindicated. It may be regarded as beginning cataract and time lost in expecting it to become ripe. These delays and wrong treatment have caused much blindness.

Palpation with the finger or the use of the tonometer may readily detect any increase in tension. A correct diagnosis must be made early and proper treatment instituted if vision is to be saved.

Primary glaucoma may or may not have signs of inflammation. If the tension rises suddenly inflammatory symptoms develop (acute) while if the increase in tension develops gradually these symptoms are lacking (simple).

Acute primary glaucoma—Symptoms.—First stage, rise in tension, vision obscured, sees a colored ring around lights, cornea dull, pupil dilated and sluggish, some ciliary injection. The attack may clear up for a day or for weeks. Gradually the symptoms become permanent after repeated

attacks. Second stage, when the attack comes there is much pain, visual power fails rapidly, may be edema of the lids and chemosis of the conjunctiva, all symptoms become much exaggerated, the cornea becomes cloudy. After a violent attack the vision is more or less permanently damaged. Third stage, after many attacks the optic nerve becomes excavated and atrophy takes place.

Simple Primary Glaucoma

Symptoms.—Tension comes gradually; no inflammatory signs; pupil somewhat dilated and sluggish, the cornea may look slightly smoky. With the ophthalmoscope a cupped disc may be noted. There is gradual diminution of sight, which begins by contraction of the field.

There are many theories advanced as to the cause of intra-ocular tension in glaucoma. (Fuchs, Weeks, De Schweinitz).

Treatment.—Eserine is used instead of atropine. The object is to contract the pupil and draw it away from the side wall of the eye ball so the sinus (Schlemm's canal) and the pectinate ligament (the filtering angle) may become free. The good effect of this is more marked in inflammatory glaucoma. In simple primary glaucoma miotics do little good.

Reports from osteopathic treatment of this condition have been favorable in a number of cases. Careful manipulation of the structures of the orbit with the finger or with Dr. Ruddy's third finger eye instrument is good in restoring better circulation of the lymph and blood. Special attention to the venous drainage should be given. Treat the points of the fifth nerve, the nasopharynx and cervical region, spring the jaw. Treat second dorsal.

Have the patient avoid strong emotions or excitement. Keep the bowels free and use only a very bland diet.

Iridectomy is considered the best operation in glaucoma.

In the treatment of secondary glaucoma the other diseases or complications must be considered in conjunction with the foregoing treatment.

Diseases of the Lens
Opacities or Cataract

Symptoms.—Beginning opacities can best be recognized with the ophthalmoscope. Advance opacities can be seen at a glance with the naked eye.

Vision is disturbed according to degree and location of the opacity. If the opacity is in the center of the lens and the periphery is transparent they see better when the pupil is dilated. When the opacities are in the periphery of the lens they see better by day. Muscæ volitantes and polyopia are present until increasing opacity closes up all clear areas shutting out these visual perversions.

There are many clinical varieties of cataracts which may be studied in works on ophthalmology.

Causes.—Some interference with the nutrition of the lens accounts for the condition. Heredity is supposed to play a part in some cataracts. Rickets, convulsions, traumatism, old age, some drugs (ergot), inflammation of iris, ciliary body and choroid are given as causes. Cervical and upper dorsal lesions and disease of the throat, nasopharynx and nose will interfere with perfect circulation and drainage of the orbit, and may well have much to do with many idiopathic cataracts.

Treatment.—Many cases have been reported cured by osteopathic measures. Correct lesions and treat to establish free nerve force and circulation of blood and lymph to the orbit. Manipulation of the orbital tissues and mild vibration of the bulb are measures of value. More hope may be held in symptomatic, toxic, secondary and progressive cataracts. The process may be stopped and in many cases there is hope of a clearing.

Diseases of the Retina

The retina lines the back part of the eye ball. It comes forward to the ora serrata. It consists of ten layers which have been demonstrated microscopically. One layer of it passes over the ciliary body and back part of the iris to the pupil. The fibers of the optic nerve spread out over the retina. The point of entrance of the optic nerve is the papilla. It is to the

inner side of the posterior pole of the eye. The retinal vessels emanate there. The macula lutea is the yellow sensitive spot at the posterior pole of the eye. The fovea is the center of the macula. The rods and cones constitute the external layer of the retina. This layer is the light perceiving stratum. For vision to be perfect all the other layers must be perfectly transparent. The visual purple is a chemical substance in the rods that gives the retina a purplish-red color. The light shining into the eye forms images which are converted into nervous stimuli by chemical action of the visual purple and by physical changes and fibrillations in the rods and cones.

Retinitis

Symptoms.—The ophthalmoscope must be used in diagnosis. There is at first cloudiness of the retina; the outlines of the papilla become indistinct. We may note light patches of exudates. The vessels are more tortuous and often there are hemorrhagic spots. Opacities in the vitreous due to the exudate may be seen. Vision is disturbed in proportion to the inflammation. Weeks or months are required for recovery. Atrophy may set in and cause blindness.

Cause.—Many general diseases are found back of this trouble, e. g. albuminuria, diabetes, leukemia, syphilis, gout and arteriosclerosis. Idiopathic cases occur with none of these diseases present, which gives a field for osteopathic research.

Treatment should be directed against the general disease when present. For local effects treatment should be given to all the centers and localities that affect the trophism, nerve supply and circulation to the eye. Protect the eye by dark glass or confinement to a dark room and complete rest. Keep the bowels free and produce diaphoresis.

Optic Neuritis

This disease when manifest in the eye ball is called papillitis. If back of the bulb it is **retrobulbar neuritis**.

Symptoms of papillitis.—Pupils are dilated and sight diminishes. The color of the papilla is altered to a white, reddish or gray and may show

extravasation of blood. The papilla is swollen (choked disc), the arteries are thin and the veins are engorged. It takes months for the inflammation to clear. Atrophy is likely to occur.

Causes.—Brain diseases are the most frequent cause, e. g. tumors. Syphilis, febrile diseases, nutritive disturbances, lead poisoning, heredity and growths in the orbit are cited as causes.

Symptoms of Retrobulbar Neuritis.—There is little or no change in the papilla. The diagnosis must be made mostly from the way the vision is affected. The rule is a central scotoma in the field of vision. The first colors to disappear are red and green. In the acute form there is quick disturbance of vision. The eye looks normal outside and shows practically no change inside.

Cause.—Toxemia, cold, influenza; nasal, nasopharyngeal and sinus disease (ethmoids), and infectious diseases are causes. Idiopathic inflammation of the optic nerve is noted by most oculists. Here the profound effects of spinal lesions upon the eye adds some important light.

Treatment of Papillitis and Retrobulbar Neuritis.—In each individual case the treatment requires consideration of the causal factor. There may be required constitutional treatment in many cases. In others the cause may be found in the nose, nasopharynx, or spine. Effort should be made to remove the lesion in each case. Diaphoresis will aid in acute stages.

Atrophy of the Optic Nerve

There are many causes for this condition such as optic neuritis, meningitis, acute infectious diseases, locomotor ataxia, arteriosclerosis, nasal disease, syphilis, traumatism, alcoholism, exposure, embolism of the central retinal artery, diabetes and poisoning. Diagnosis must determine the original cause.

Treatment.—I have mentioned conditions in the nose as frequently accounting for various eye troubles. If these atrophies of the optic nerve can be gotten early, many of them will be influenced very favorably by osteopathic treatment. Spinal treatment to direct the circulation to the area of the orbit at the base of the brain is beneficial. Regulation of the patient's diet, habits, methods of living and so forth is important. Excessive mental

strain, excessive sexual intercourse and stresses of every kind should be prohibited. Special treatment should then be given according to the causal factors entering into the case.

Eye Strain and Its Reflexes

For the subject of refraction and refractive errors such as the different forms of hypermetropia, myopia and astigmatism the reader is referred to the many excellent works on ophthalmology which cover these subjects quite thoroughly. They are only used here in the relation to eye strain and its reflexes. The osteopathic logic here given should be combined with a reading of the refractive errors in such works as Fuchs, Weeks, De Schweinitz and others.

Asthenopia

Eye strain, weak sight or asthenopia embraces the group of symptoms dependent upon fatigue of the ciliary muscles or of the extraocular muscles.

There are three varieties of asthenopia. (1) Retinal or nervous, (2) muscular and (3) accommodative.

The symptoms are headache—frontal, fronto-temporal or fronto-occipital. It may extend into the neck between the shoulders. Eye balls may be tender, diplopia at times, may be photophobia, lachrymation, congestion of the eye, itching and burning of the lids.

Accommodative Asthenopia.—In this form the ciliary muscle is fatigued. The cause is usually overuse of the eye when hyperopia and astigmatism exist; sometimes in myopia or presbyopia.

Treatment.—In this form the treatment is the proper fitting of glasses and improvement of the general health.

Muscular Asthenopia is due to tiring of the extraocular muscles, usually the internal rectus. This may result in a phoria or a non-paralytic squint.

Ametropia may exist but asthenopia may come even in emmetropia due to overuse of the eye.

Treatment.—Correct ametropia if present, with glasses. Exercise the weakened muscle. Correct the nerve supply to the weak muscle. Treat cervical and upper dorsal. Manipulate tissues of the orbit. Spring the jaw. Correct any nose and throat pathology.

Nervous, Neurasthenic or Reflex Asthenopia.—The cause is supposed to be some functional disorder, more often found in females. May be due to too dim or too bright light, overuse of the eyes. Hysteria may follow ametropia.

Treatment.—Often the treatment is troublesome and the case is very obstinate according to old school methods. Rest, hygiene, general health and habits are looked after. The cause must be found or the treatment cannot be specific.

These are the different forms of eye strain as ordinarily classified. Now as we study the reflex symptoms from these and attempt to trace out the reflexes from an osteopathic point of view, we may find some more definite causes of these conditions and consequently some methods of treatment not found in standard text books might naturally suggest themselves.

Reflex symptoms that have been traced to eye strain by ophthalmologists are as follows:

Constipation, indigestion, heartburn, nausea, vomiting, nervous attacks, fear of impending calamity, irritability, despondency, insomnia, restless sleep, epilepsy, nervous twitchings and enuresis. All these symptoms have been seen to disappear after eye strain was corrected. There is no absolute way of proving that all these symptoms have existed because of eye strain. The existence and disappearance of some of them at the time of treatment for eye strain may be a coincidence. It is evident that eye strain in varying degrees may produce a train of symptoms similar to many above mentioned.

A patient, nervous, anxious, uneasy, and despondent, constipated, and having some indigestion, showed on examination contractures and tenderness at the third dorsal. It was found he was suffering from eye strain from overuse of glasses that were too strong for him. The eyes were refitted. He was wearing a

(R)+4.50 D. S. = +.50 cyl. Ax. 180.

(L)+4.50 D. S. = +.50 cyl. Ax. 90
for close work and a (R)+2.00 D. S. = +.50 cyl. Ax. 180
(L)+2.50 D. S. = +.25 cyl. Ax. 90
for distance. The new glasses were—Reading—
(R)+3.00 D. S. = +.25 cyl. Ax. 180
(L)+3.00 D. S. = +.25 cyl. Ax. 180
Distance:
(R) + 1.50 D. S. = +.25 cyl. Ax. 180
(L) + 1.50 D. S. = +.25 cyl. Ax. 180

He was fitted two years previously. At that time the stronger glasses were correct. Eyes change more or less constantly, especially between the ages thirty-five to fifty-five years. When glasses are fitted, a weak ciliary muscle after a rest may become stronger and allow weaker glasses to be worn.

If a young person is fitted for myopia, in a few years he may discard his glasses as presbyopia develops. A person fitted correctly, who has a strong ciliary muscle may not be able for awhile to see as well with the glasses as without them. After they are worn awhile the ciliary muscle will cease its efforts to accommodate so much and the glasses give the desired effect. In some cases the doctor's reputation to fit glasses properly may suffer at the hands of such people who sometimes refuse to take glasses, or after getting them refuse to wear them.

In the case of the man just mentioned a refitting quieted the nervous symptoms—he became more cheerful and ceased to worry. Indigestion and constipation improved. The soreness and contractures were overcome in a few treatments.

Now let us ask the question, why is it that eye strain will cause nausea and vomiting? Also why will indigestion affect the eyes by causing "spools" in the vision?

A little osteopathic logic, based as it always is or should be, upon anatomy and physiology, may throw some light on this subject. No doubt every one of us has demonstrated many times clinically that indigestion from overeating will cause soreness and contractures at the third and fourth dorsal, the nerve center in the spine for the stomach.

The reflexes between the viscera and the eye are complex and difficult to follow. In giving the probable course of the nerve reflexes from the optic nerve to the third nerve Dr. Louisa Burns suggests the following: “The nerve elements of the retina start the impulse; it passes over that portion of the optic nerves which enter the anterior quadrigeminates, the cells of the quadrigeminates where the impulses are coordinated, then by axons of these cells to the lateral or viscero-motor nucleus of the third nerve, thence to the cells of the ciliary ganglion, and by the non-medulated (sympathetic) fibers of these, the short ciliary nerves to the non-striated muscles concerned, viz: the ciliary muscle, some fibers of the levator palpebral and the sphincter of the iris.”

The third nerve arises in the floor of the aqueduct of Sylvius from two nuclei; a lateral nucleus which is a viscero-motor group of nerve cells, and a central nucleus or a somato-motor group of cells. The somato-motor nucleus supplies all the extrinsic muscles of the eye except the external rectus and superior oblique which are supplied by the sixth and fourth respectively. The nasal branch of the ophthalmic division of the 5th sends fibers to the ciliary muscle. Association fibers connect the nuclei of the 3rd, 4th, 6th and 7th. The evidence is in favor of the 10th or pneumogastric having such association fibers.

We noted four places in the brain to which the optic tracts go before the radiations reached the center of sight in the occipital lobe. If we cannot follow all the reflexes through the brain and cord at least with the facts we have it is not difficult to imagine abnormal impulses coming over the third nerve from a straining of the ciliary nucleus, thence over viscero-motor fibers in the lateral horn of the cord, over the white ramicommunicantes, through the sympathetic ganglia, over the splanchnics to the stomach, producing abnormal peristalsis, nausea and vomiting. In turn we would have the somato-motor nerves to the muscles affected as before described, contraction and congestion of muscles of the spine.

When we have patients consult us and describe a train of symptoms like nausea, vomiting, nervousness, frontal and occipital headache, we should have eye strain in mind and inquire for lachrymation, photophobia, itching and burning lids and congestion of the eye. Any of these things should make us think of testing for ametropia in its various refractive errors, as

well as a careful spinal and a nose and throat examination. General physical and laboratory diagnosis should not be neglected.

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DISEASES OF THE EAR, NOSE AND THROAT

By J. Deason

Diseases of the Ear

Methods and Technic of Examination.—The external ear may be examined by direct inspection with or without the aid of artificial light. The external auditory meatus may be examined by means of a simple conical ear speculum and reflected light from a head mirror. This method requires considerable practice but efficiency can and should be attained because it can be used under all conditions and therefore is a reliable method.

The Holmes electric auroscope which we use and recommend for examining the meatus and ear drum, is very efficient but like other electrical equipment is not always dependable. There are many electrical equipments for examining the ear, but so far I have found none other than the one above mentioned that is worth space in an instrument cabinet.

To examine the meatus, grasp the pinna and draw it firmly upward and backward. This tends to straighten the canal so that the aural speculum may be inserted well into the external canal. It must be remembered that the auditory canal is always sensitive and while there is really little danger of doing any harm by exercising ordinary care, the patient is always afraid of being hurt and one can accomplish better results by practicing careful technic.

If the electric auroscope is used, the eye should be placed very close to the lens and every part of the canal, walls and drum membrane carefully examined. The Holmes auroscope has a small tube and bulb, pressure upon which will vary the air pressure in the meatus and cause the drum to move. This must be done very carefully because in very thin, atrophic membranes there is some danger of rupturing the drum.

Diseases of the Auditory Meatus

Inspissated Cerumen, or hardened ear wax is one of the most common affections of the meatus. The cause in some cases can be traced to lesions of the mandible, but in many cases the cause is unknown.

Treatment.—Protect the clothing by means of a towel or rubber neck piece. By means of a soft rubber ear syringe, wash the canal thoroughly by forcing warm soap solution into it. I prefer concentrated liquid castile soap (any good soap will do) diluted about one to four in water as warm as the patient can bear it. The soap solution is contained in a pus bowl held tightly against the neck under the ear. There is little danger of using too much force with the soft rubber syringe.

In most cases the hardened cerumen will be dislodged by the syringing only. If this cannot be done, it may be well to discontinue the treatment until the following day. The solvent action of the soap solution will further reduce the hardened mass and it usually can be removed by syringing the following day. This method is preferable in many cases because patients dislike the pain which usually accompanies the use of a curet.

The dull loop curet is the most efficient and safest instrument for removing hardened cerumen that the syringe may fail to dislodge. This instrument must be used with great care because the membranes, long protected by the covering of cerumen are hypersensitive and bleed easily.

After removing the cerumen, the canal should be thoroughly dried and lubricated with some non-irritating lubricant. It is also well to place a small pledget of absorbent cotton into the external opening to protect the sensitive membranes from the cold, air and dust.

In drying the canal I prefer to use a small aluminum applicator, twisting a small piece of absorbent cotton on the end in such a way as to cover the tip well, thus making any injury from its use impossible.

Atrophic Meatus

Sensitive or itching ears as the patient commonly describes it, is a very common disease caused by any atrophic condition of the membranes of the auditory meati and frequently found in common with auditory or other cranial nerve deficiency or degeneration. The direct cause of the irritation is the collection of particles of dry cerumen.

Treatment.—The local treatment consists of syringing with warm (118° to 120°F) soap solution until all of the scaly cerumen has been removed. The canal is then dried and lubricated as described above. Several such treatments may be required after which I prefer the use of the continuous irrigating ear cup, using salt mixture instead of the soap. The same salt mixture as is recommended for nose and throat irrigation is satisfactory. After such irrigations the application of phenol-glycerine (10% phenol in glycerine) seems to be an efficient treatment.

The local treatment must, of course, be accompanied by corrective treatment to the mandible and upper cervicals.

Furunculosis

There are three acute affections of the ear which may usually be diagnosed from their points of tenderness or pain. Pain upon moving the lobe or pinna indicates furunculosis. Pain on pressure posterior to the angle of the jaw or externally in front of the ear indicates middle ear infection and pain on pressure over the mastoid region suggests mastoiditis.

Probably the most common of the painful diseases of the external meatus is furunculosis, which is a subcutaneous infection of the lining membrane of the meatus. The point of swelling may usually be seen but in some cases the entire canal is closed.

Treatment.—In all cases of occluded pus, drainage must be obtained, but in the early stages of furunculosis, it is not always possible to determine the place of "pointing" or the most desirable point to lance. As soon as the place of "pointing" can be located it is advisable to lance deeply by means of a curved paracentesis knife. The parts are thoroughly cleansed and anesthetized by applying phenol and neutralizing with alcohol. The external parts are first painted with alcohol to prevent "burning" from any phenol which may be dropped upon them. A small cotton applicator is used, applying the concentrated solution of phenol or the crystals (using only a small amount of phenol) to the affected parts and immediately neutralizing with alcohol. Care must be observed not to apply any phenol to the drum membrane and the operator must be sure that the action of the carbolic acid is completely neutralized by a liberal application of alcohol.

The knife blade is placed beyond the furuncle, its curved point turned outward and quickly drawn forward through the furuncle, cutting deeply. The canal is then packed with a pledget of cotton dipped into phenol-glycerine.

If the place of pointing cannot be seen, palliative treatment may be applied by thoroughly cleaning the meatus, drying and applying a phenol-glycerine pack. Heat may be applied by means of a therapeutic lamp. Any electric light bulb or the dry electric pack will do. The external parts are well lubricated with paraffin oil and the heat applied continuously or intermittently until the pain is relieved.

Infection of the Meatus

Infections of the meatus are frequently secondary to, or accompanied by furunculosis. The treatment, therefore, is similar to that of furunculosis.

Always try to locate the point of infection, lance or curet, apply phenol or other chemical germicide, neutralize, dry and pack with phenol-glycerine. After the point of infection has been thoroughly drained, cleanliness and protection from dust or further infection is all that is necessary.

In all cases of infection of the external meatus, suspect middle ear abscess as a cause. There may be a pin-point opening through the drum, from which the infection has originated and is being maintained.

Otomycosis or fungus infection of the auditory meatus is rare. It usually resembles other infections symptomatically, but often without pus. A microscopic examination will serve to diagnose the condition.

The treatment consists of thorough cleansing, drying and the free application of alcohol. Alcohol is dropped into the ear until the canal is full and a pledget of cotton applied to retain it. Usually two or three applications are sufficient to effect a cure.

Eczema of the auricle and meatus is of two types, the squamous or scaly form and the sclerotic form. Both forms are chronic and may be readily diagnosed by the appearance.

Treatment.—Some cases are very difficult to cure but we have had excellent results with the following treatment: Careful adjustment of

cervical and mandibular lesions; thorough treatment of any local infections of head or neck; direct application of phenol-glycerine, local cleanliness and protection from irritation.

Diseases of the Middle Ear

Clinically the middle ear consists of the tympanic cavity and its contents, the Eustachian tube and the mastoid cells.

Acute Suppurative Otitis Media

Acute infections of the middle ear result from acute nasopharyngeal affections such as colds, influenza, measles, mumps, whooping cough, etc. Bathing in contaminated water often results in infection to the middle ear through the Eustachian tube.

Diagnosis.—Earache, pain on pressure under the angle of the jaw and sudden deafness are the symptoms. (There are also the common febrile symptoms.) The chief physical signs are: redness and bulging of drum membrane, and contraction and tenderness of upper cervical muscles.

Treatment.—If the patient is seen before the drum has ruptured it is seldom necessary to lance the drum if the proper treatment is given promptly.

Drainage must be obtained and maintained by catheter aspiration through the tube irrigation of the nasopharyngeal cavity, irrigation of the meatus by means of the continuous ear irrigator and application of dry heat over the affected part. Heat is best applied by means of a therapeutic lamp. (Any lamp with reflector that will furnish proper heat is efficient as there is no virtue in colored light.) The skin surface over the ear, side of face and mastoid region is first well lubricated with some mineral oil to prevent blistering and the heat is applied either constantly or intermittently. A pledget of absorbent cotton dipped into phenol-glycerine is placed in the meatus and forced loosely against the drum. This should be removed every few hours and a fresh pledget put in.

The neck and upper dorsal muscles should be kept relaxed and adjustive treatment given frequently.

Under this treatment the pain should be relieved and the bulging of the drum should disappear in from two to twelve hours. If this is not accomplished or if the condition grows worse, the drum should be lanced. See some text on otology for technique. In my experience, very few cases have required paracentesis.

It must be remembered that treatment should be continued regularly and for some time after the pain and other symptoms have been relieved or a recurrence is probable. Patients should have daily treatment until the physician is sure that no complication or recurrence is likely to result.

If the patient is not seen until after the drum has ruptured, the same treatment may be applied except the irrigation or syringing of the meatus. This, in case of ruptured drum, may force pus into the mastoid cells resulting in mastoiditis. Instead of syringing, the auditory meatus is cleaned by means of a cotton applicator or by aspirating with a catheter. At all times drainage through the meatus must be maintained until the drum begins to heal.

Acute Mastoiditis

Acute mastoiditis results from acute or chronic otitis media. In some cases the otitis media may have been only a mild attack.

Diagnosis.—There is no one symptom that is positively diagnostic but a number of signs and symptoms must be considered as follows:

1. Always suspect mastoid complications in acute otitis media and watch for this complication daily. Most cases have some mastoid inflammation.

2. Pain or swelling over mastoid. Pain may not be present, but usually is, sometimes radiating over temples and eye on affected side.

3. Tenderness on pressure not always present. May be very marked. Tenderness extending to tip or above ear means extension of infection. If persistent tenderness over tips with marked swelling and discoloration—operation is indicated.

4. Swelling, not always present, but sometimes very marked. If extreme swelling and bluish discoloration—usually means operation.

5. Temperature varies from normal to 104° or 105° F. Temperature of more than one or two degrees means systemic absorption and suggests surgical drainage. Streptococcus or staphylococcus infections cause higher temperatures and require drainage earlier than other infections.

6. Transillumination not positive, but of some value. Like X-ray, usually shows dark, because of inflammation, but must rely upon symptoms, as above.

7. **Microscopic.**—Stain for pus, bacteria and bone debris. Hematoxylin stain shows dark bone particles if there is bone disintegration.

8. **Blood Count.**—If absorption, there will be some variation in proportions of leucocytes. Any high leucocytosis shows systemic absorption and the natural attempt to overcome the infection.

Non-Surgical Treatment.—1. Drainage must be maintained from middle ear through tube or drum or both. Catheter aspiration through tube. Sometimes gentle inflation to clear the tube, followed by aspiration is effective.

2. If drum is ruptured, aspirate middle ear by catheter or by Moore's method or both. **This is very important.** If no aspirating machine, use syringe and pump meatus and tube persistently. Dry meatus and keep well open.

3. Patient should be kept in bed if symptoms are marked, with light diet and bowels well open.

4. **Heat.**—Apply oil or other lubricant over whole side of face and head and apply heat by means of "therapeutic" lamp intermittently. Thirty minutes light on and fifteen minutes light off. The light-heat (any electric lamp with reflecting shade will do) is much better than hot water bottle or electric pad or sand bag. The heat must be kept going day and night if symptoms are marked until the pain has entirely subsided. Heat is most efficient in the early stages. After symptoms are well marked, the ice pack is more desirable.

5. If drum is not ruptured, heat may be applied by means of Deason's continuous irrigating cup. Start at 116° F. and gradually increase to 123° F. if patient can bear it.

Surgical.—If drum has not ruptured and symptoms continue, it is best to make free incision of drum,—keep open and apply (2) above.

Indications for Mastoid Operation.—There are no definite signs, symptoms or tests that will determine positively when operation should be done. If the above non-surgical methods are practiced, few cases will require operation, but many will develop into chronic mastoiditis and so it is very difficult to decide whether a mastoid operation should or should not be done. It is best to explain thoroughly the possible complications to the patient and relatives and request them to assume responsibility. Mastoid operations are attended by very little danger when properly done.

Signs and Symptoms Suggesting Operation.—Acute otitis media with mastoiditis.

(1) Persistent pain and swelling not relieved by non-surgical treatment.

(2) Marked protruding of posterior wall or meatus.

(3) Marked tenderness, swelling and discoloration above ear or over tip of mastoid.

These with temperature of more than 102° usually are enough to demand immediate drainage.

(4) Any evidence of extension of pus under skin of neck below tip. A positive indication for drainage.

(5) Any indications of brain or meningeal involvement such as very marked and persistent headache, partial or total loss of consciousness, etc.

(6) Indications of labyrinthine involvement such as marked vertigo, etc.

(7) Sudden cessation of discharge means obstructed drainage from middle ear or from mastoid into middle ear and if drainage cannot be restored by aspiration, this means operation.

(8) The whole clinical picture must be carefully considered at all times. Take no chances. Advise operation before someone else finds it too late.

Chronic Mastoiditis

Cause.—Always from unsuccessfully treated acute form or from chronic suppurative otitis media.

Non-surgical treatment.—See chronic suppurative otitis media. We have had a few cases that were seemingly permanently cured by non-surgical treatment, but believe they are rare.

Indications for Operation.—1. Recurrent exacerbation of acute or chronic otitis media.

2. Constant discharge which resists treatment for chronic suppurative otitis media.

3. Continued pain or recurrent pain and swelling following acute otitis media.

4. Open sinus into mastoid either external or through meatus.

5. Cholesteatoma.

6. Symptoms of labyrinthine or brain involvement following acute otitis media.

7. Definite evidence of bone disintegration in mastoid.

As stated above, none of these are definite indications. The whole group of signs and symptoms are to be considered.

Chronic Suppurative Otitis Media

Etiology.—Chronic suppurative otitis media usually results from an unsuccessfully treated acute otitis media. If in acute otitis media there has been bone erosion or extensive destruction of the mucous membrane by a virulent infection, chronic suppuration is likely to result. A persistent mastoid infection following otitis media is likely to result in chronic otitis media and this is strong argument for early mastoid operation.

1. Otitis media resulting from some virulent infection such as the recent influenza pandemic or scarlet fever is always more likely to result in mastoiditis and chronic suppuration of the middle ear.

2. Such infectious agents as streptococcus, staphylococcus, long-chain pneumococcus or bacillus influenzæ are likely to result in chronic

suppurations.

3. Lowered vitality from any cause.

4. Inefficient drainage from failure to aspirate the Eustachian tube, delayed perforation or failure to lance drum sufficiently early.

5. Mastoid necrosis, which maintains drainage into the tympanic cavity.

6. Abnormal granulations, polypi, etc. in tympanic cavity.

7. Chronic inflammation with suppuration of the epipharynx or Eustachian tubes.

8. Cholesteatoma resulting from perforated drum and growths of epithelium extending into the middle ear cavity.

Diagnosis.—The diagnosis is easy because nearly every case of discharging ear without pain is chronic suppurative otitis media. The determination of the exact nature of the condition present is not only very important but very difficult.

Differential diagnosis consists in determining the nature of the infecting organism and the nature and extent of the pathology.

1. Direct examination of the external meatus after drying with cotton applicator usually determines the location and extent of perforation of the drum and the general nature of the discharge, whether purulent or mucopurulent. Very rarely one finds a serious discharge which means a very slight infection or discharge from non-infective inflammation. The presence of whitish or greyish pus, mucoid and stringy, usually means pneumococcus infection. Greyish, purulent non-mucoid discharge usually indicates streptococcus or bacillus influenzæ infection. Yellow, purulent discharge suggests staphylococcus infection. The general appearance of the discharge, however, cannot be considered of important diagnostic value because most chronic suppurations are mixed infections, because of long exposure to external contamination.

2. After cleaning the meatus, several smears should be made directly from the opening in the drum. By staining with methylin blue or gentian violet, the nature of the bacterial infection can be determined and this is very important.

By staining another smear with hematoxylin and washing in water, any dark irregular particles, bone debris, may be found, which means bone disintegration. This too, is very important.

3. Transillumination is sometimes of value. The mastoid may be transilluminated by placing a good rubber covered transilluminating lamp over the mastoid and observing the external meatus through an aural speculum. If the mastoid is free from infection the light will pass through and illuminate the meatus.

4. The X-ray plate is, of course, the best means of determining the nature and extent of mastoid involvement.

Treatment.—This is certainly one of the most difficult diseases of the ear that one is ever called upon to treat and the physician should be cautioned against offering a favorable prognosis. Perhaps the most difficult thing about its treatment that the doctor has to learn is that practically none of the so-called antiseptic washes do any good, but on the other hand they often do harm. Certain general principles are important and the treatment must depend upon the nature and extent of the infection and pathology present in each case.

The constitutional treatment consists of everything that will increase the patient's general resistance and certainly all lesions of the cervical, upper dorsal and mandibles must be properly adjusted, but this is not enough. All spinal lesions that may exert an influence on metabolism and elimination are of important consideration. The diet, habits and environment of the patient must be considered.

A careful examination of the nasopharyngeal tract may reveal some other focal infection, such as chronic tonsillitis, pharyngitis or sinuitis, which is maintaining the infection through the Eustachian tube. There may be a focal or general infection of some other part of the body, which is reducing resistance or causing a hematogenous infection of the tympanic cavity or mastoid cells.

Drainage must be maintained in all cases, both through the Eustachian tube by catheter aspiration and through the drum by aspirating and drying. If the perforation in the drum is small or in the middle or upper part, it should be opened down to the floor so that the contents may be more easily

removed and better drainage established. It is well first to thoroughly cleanse the meatus and tympanic cavity by syringing with salt mixture (salt 3 parts, borax 2 parts and soda 1 part, a teaspoonful to a half pus bowl of water) at from 116° to 118° F. After syringing, the meatus is carefully dried, and the middle ear cavity aspirated through the tube and drum opening. The advantage of this simple treatment is thorough cleanliness and drainage with the minimum of irritation. This treatment given daily or thrice weekly will often cure the case.

Staphylococcus and streptococcus infections usually respond to the following treatment: After thoroughly cleansing as above, the meatus and tympanic cavity is syringed with a one to four or one to five dilution of Dakin-Carrel solution (Hyclorite may be used instead) followed by aspiration, the fluid being drawn through the tube, thus preventing reinfection from that source.

Pneumococcus infections do not respond to either of these methods of treatment. The pneumococcus, because of its capsule, is not affected by antiseptics, but on the other hand the irritation of the tissues caused by their use, only gives the infective agent a better opportunity for growth.

In pneumococcus infections we have found the following method efficient: Thoroughly cleanse the meatus and middle ear cavity by salt mixture syringing, aspiration and drying. The meatus and tympanic cavity is then filled with a neutral mineral oil. The oil is also pumped through the Eustachian tube. It is the purpose to fill the entire cavity and its openings so thoroughly that no air can enter. In some cases we have used bismuth paste after the oiling with excellent results. The pneumococcus is aerobic and if all air can be kept away for a considerable time, it furnishes an unfavorable culture environment with little irritation to the membranes.

Surgical treatment.—The presence of bone debris indicates bone disintegration in the tympanic cavity or mastoid cells. If the mastoid cells are thus involved there is little chance for direct treatment. If such cases do not respond in a short time to any of the above methods of local treatment, ossiculectomy or mastoid operation may be necessary. Some specialist surgeons claim from 80% to 90% favorable results from mastoid operation in such cases.

Non-Suppurative Otitis Media—Catarrhal Deafness

Deafness is any impairment of normal hearing and is that symptom next to pain and chronic discharge that causes the patient to visit the doctor. If acute diseases of the ear, nose and throat could always be successfully treated, there would be little trouble from the symptoms of chronic pathology. It must be understood that catarrhal deafness is a symptom of chronic otitis media and is, therefore, seldom of recent origin.

Etiology.—Chronic otitis media is nearly always the result of the extension of infection through the Eustachian tube and has come from some acute or chronic nasopharyngeal infection. Chronic colds, pharyngitis, tonsillitis, sinuitis, etc., resulting in acute or chronic otitis media either with or without suppuration, constitutes the beginning of catarrhal deafness.

Symptoms.—There is seldom any pain with this disease. Some cases have an occasional acute attack with pain and other symptoms of acute otitis media.

Deafness, varying with the progress of the pathologic changes, is always present. The patient in the early stages will seldom admit that he suffers from deafness and often he is honest because he may not realize that he cannot hear normally until his otitis media has progressed to the second or third stage. Most patients, in fact, do not become alarmed about their hearing until it is too late to restore normal hearing. For this reason, physicians should be on the lookout for such conditions and should advise special treatment early.

The human species in its present environment, depends much less upon the organs of special sensation than do the animals of the wild, and they may therefore be very deficient in sight, hearing, smell, etc. without actually realizing this loss.

In addition to deafness there are other symptoms such as occasional or constant fullness or feeling of “stuffiness” as the patients express it, due to partial or complete occlusion of the Eustachian tubes. Tinnitus aurium or head noises is very common and often the most annoying symptom. Autophony, or the loud sound of the patient’s voice to himself, which often causes him to speak low and indistinctly, occurs in the later stages. Presbyacusia, or the inability to adjust the hearing apparatus to variations in

pitch, commonly occurs in the second stage and is evidenced by the fact that the patient does not hear when more than one person is talking. Paracousis or perverted phenomena of hearing, such as the better hearing of some persons in a noisy environment, is a symptom of the third stage of otitis media and often means an unfavorable prognosis, so far as marked improvement in hearing is concerned.

Pathologic Stages.—For convenience of discussion we may consider chronic otitis media in three stages.

The First Stage.—The active pathology is limited to the pharyngeal portion of the Eustachian tube with some inflammation of the membranes of the tympanic cavity. Closure of the tube followed by absorption of the oxygen causes a decreased pressure in the tympanic cavity and thus a retraction of the drum, decreased movement of the ossicles and a general decrease in function of all tympanic structures. Deafness in this stage may be very marked, especially if the Eustachian occlusion has occurred from some nasopharyngeal acute inflammation. There may be pain but there is always a characteristic "fullness" and sometimes dizziness. Deafness in these cases varies with weather changes. If proper treatment is had in time, the progress of the pathology can be stopped and every case can be restored to normal hearing.

The Second Stage.—The active pathology has extended throughout the Eustachian tube causing marked occlusion and some stenosis. There is further inflammation of the tympanic structures with an increase in the symptoms of the first stage. The drum membrane is less movable but there is no fixation of the ossicles. Pressure upon the bulb of the auroscope causes movement of that part of the drum to which the malleus is attached. The drum is thicker, more retracted, and less movable than in the first stage. Presbyacusia is common and often marked, but there is no paracousis. More than 90% of these cases can be materially improved and many can be made to hear normally if proper treatment is given in due time.

The Third Stage.—The active pathology in the third stage consists of an involvement of the entire mucous membrane lining the Eustachian tube and tympanic cavity. These membranes are all chronically hypertrophied. The Eustachian tube, however, is sometimes fairly well open, but the ossicular attachments are more or less fixed by hypertrophied tissue and adhesions

and the drum is markedly retracted, thickened and usually very immovable. The deafness is usually quite marked, head noises are commonly present and often very annoying. Patients usually do not notice a variation in their hearing from weather changes. Presbyacusia is present in 80% of cases and their hearing for low tones is much reduced.

Unless there is a complicating nerve affection these cases hear well by telephone, which means that they can also use an electric hearing instrument to advantage. These cases can never be restored to normal hearing, but many of them (30% of my cases) can have some improvement and in most cases I believe the progress of the pathology can be stopped, and this is always well worth while because their hearing is likely to be entirely lost if something is not done.

Psychologic Stages.—There are three rather distinct psychologic stages in catarrhal deafness. The first, the period in which most patients refuse absolutely to admit that they are deaf even to the aurist upon whom they call for treatment. They insist that they hear perfectly if people would only speak distinctly. This is partially true, because up to the third stage of deafness the voice can be fairly well heard if people would only articulate clearly. In the second stage patients admit that they don't hear well, but insist that they are going to recover normal hearing and often resort to various kinds of injurious treatment. In the third stage they give up all hope of ever regaining their hearing, become morose, and avoid company. These psychic stages do not always correspond with the pathologic stages given above.

Diagnosis.—The external auditory meatus, drum membrane and ossicular chain, constitute the apparatus whose function is that of conduction of sound waves to the perception apparatus of the inner ear. The function of the conduction apparatus varies inversely with the progress of pathologic change in these structures. The perception apparatus, the structures of the inner ear, are not necessarily affected by middle ear pathology, but on the other hand, sounds transmitted by bone conduction not only seem louder but they last longer because the "escape of the excess" of sound thus transmitted is hindered by deficient conductive mechanism. This explains why such persons hear well by telephone and why the tuning fork, whose base is held to the mastoid (provided there is no nerve affection) may be heard for a greater time than normal. Likewise the prong

of the vibrating tuning fork when held near the concha is heard for a shorter time than normal, because of the deficient function of the conduction mechanism.

Tuning forks are known by their number of vibrations per second, such as 16, 32, 64, 128, etc. Three or more forks are required to make an accurate measurement of the conduction and perception functions—a low fork about a 32, for the low tones, 128 or a 512 for the medium tones and a 2048 for the high tones.

A good set of forks should be selected and standardized, i. e., the normal bone and air conduction of each fork determined by testing it on a number of persons whose hearing is known to be normal. For the general practitioner who cares only to get a general idea of the extent of the pathology, one fork of medium pitch such as a 128 or 512 will be sufficient.

To measure the function of hearing, the fork is set into maximum vibration, its base held against the mastoid and the patient is asked to state when he no longer hears it. This length of time in seconds is recorded as "bone conduction." The fork is then held near the concha and the patient again states when he does not hear it. This length of time in seconds is recorded as air conduction.

Normal Hearing

Tuning Fork Test.—The normal time rate in seconds set of forks is as follows:

Fork	32	64	128	512	2048	4096
B. C.		25	30	30	20	10
A. C.	tone	70	90	90	40	20

The tuning fork test, carefully made, is the only known method of measuring the functions of the various structures concerned in audition.

The Whisper Test is made by producing a clear whisper from residual air only, which should be heard about twenty feet by a normal ear.

The Watch Test is made by using some loud ticking watch (I prefer an Ingersoll), holding it first near the ear until the patient recognizes the tone, and then taking it beyond the hearing distance and approaching the ear until

it is heard. I prefer also to move away from the ear until the limit is reached and strike an average of this with the above results. The average eighteen size Ingersoll watch can be heard for from 100 to 150 inches by the normal ear.

The practical test for the patient is his hearing from the spoken voice, and is the most reliable so far as permanent results are concerned.

Low Tone Limit.—The lowest limit of hearing is about sixteen double vibrations per second, but the lowest practical limit is about thirty-two. There are few people with normal hearing and with musically trained ears who can recognize a definite tone lower than this, so I consider the thirty-two fork sufficiently low for all practical tests.

Conduction Deafness.—Low tones are lost in tympanic involvement or conduction deafness, and are diagnostic in such cases, but are of no particular value in nerve deafness except when that is complicated by catarrhal deafness.

Practical Hearing Limits.—The human voice varies from about 60 to 150 double vibrations per second, and most sounds that we really need to hear are less than 700 vibrations per second. This is the reason for using the low forks, 64, 128 and 512.

Measurement of Nerve Force.—To measure auditory nerve force, the fork (say the 128, whose normal B. C. is 30 seconds) is set into vibration and held gently and with even pressure against the mastoid and the patient is asked to tell or signal the doctor when he ceases to hear the tone. Two or more tests may be made to determine the patient's personal equation, but the use of control forks (the 64 and 512) will show any such error. Granting that there is no complicating pathology, tympanic or labyrinthine, the number of seconds of hearing over 30 will be the patient's auditory nerve force. For example, if he hears the fork 30 seconds his hearing will be thirty-thirtieths or normal. If his hearing is 25, 20, 15 or 10 seconds, his auditory nerve force will be respectively 25-30, 20-30, 15-30 or 10-30.

By means of this method an accurate measurement of the functions of hearing can be made and a definite prognosis can be given. I never use any of the various named qualitative fork tests for hearing, because they have no value to one who employs this system.

FOOT NOTE—In the chart T is used, meaning that tone is heard, while S indicates sound but no tone.

FOOT NOTE—It is not the purpose to give any detailed or differential methods of diagnosis because if one cares to treat these diseases he will of course, study a special text on this subject. The methods here given are only for the general practician who wishes a general idea of the condition present.

Summary of Diagnosis of Different Stages of Catarrhal Deafness

First Stage.

1. Fork	32	128	2048
B. C.		35	20
A. C.	T	70	40

2. The drum is only slightly retracted but freely movable.

3. Whisper heard from five to twenty feet.

4. Ingersoll watch heard from 30 to 150 inches.

Second Stage.

1. Fork	32	128	2048
B. C.		40	20
A. C.	T	60	40

Note that the tone of the 32 fork is heard, the 128 fork has increased in bone conduction and reduced in air conduction but that the bone-air ratio is direct, that is the patient hears longer by air than by bone conduction. Note also that the high fork is still normal.

2. The drum will be found retracted but that part to which the malleus is attached is still movable when tested with the auroscope.

3. The whisper is heard from two to ten feet.

4. The Ingersoll watch is heard from six to sixty inches.

5. Presbyacusia but not paracousia is present.

Third Stage.

1. Fork	32	128	2048

B. C.		45	15
A. C.	S	20	30

The typical diagnostic points in third stage catarrhal deafness are: 1. Tone for the 32 fork is lost. 2. There is an inverted bone-air ratio for the medium fork. The drum is retracted and the malleus fixed. 4. The whisper may be heard at less than one foot or not at all. 5. The Ingersoll watch is heard less than six inches from the mastoid. 6. Paracousis Willisiani is present.

For the general practician this is important because he can make a rather definite prognosis.

Treatment.—The treatment will be given briefly because space would not permit of lengthy discussions of details of methods and technic.

FOOT NOTE—Note that the patient hears the tone of the low fork, that the 128 fork has its bone conduction slightly increased (30 to 35) that the air conduction is slightly decreased (90 to 70) and that the high fork remains normal.

A careful examination should be made for some source of focal infection about the nasopharyngeal tract. Chronic or subacute tonsillitis, pharyngitis or sinuitis or root abscess are often a cause, and not much will be accomplished in improving the otitis media until these focal infections are found and properly treated. The original cause of these focal infections may have been some bony lesion, but to successfully correct such lesion now does not mean that the source of infection will be removed.

Auto-intoxication from gastro-intestinal disease is common. In my cases, 80% of the third stage have chronic constipation or other chronic gastro-intestinal affection.

In many severe acute affections of the nasopharynx the inflammatory process has left the Eustachian tube occluded or stenosed and the pharyngeal fossa filled with adhesive bands. It is not uncommon to find the epipharynx and pharyngeal fossa filled with partially atrophied adenoid tissue or if the curet method has been used for removing adenoids, there is often connective tissue adhesions and any or all of these may prevent the normal ventilation of the tympanic cavity by way of the Eustachian tube.

In such cases surgical removal of these obstructions and dilation of the tube is necessary. My practice has been to give a general anesthetic (nitrous oxide or somnoform will be sufficient in many cases) and by means of an

adenotome (La Force or Cradle, I never use a curet) remove all adenoid tissue. Then by means of the finger I carefully remove any adenoid tissue in the posterior nares and pharyngeal fossæ that the adenotome may have failed to get and also dilate the pharyngeal portion of the tube by inserting the finger.

This operation if carefully and thoroughly done and if preceded and followed by the proper surgical cleanliness and supportive treatment, will when indicated, accomplish excellent results. The after treatment is even more important because if this is not well done, no results or even unfavorable results may occur. The after treatment consists of daily irrigations of the nasopharynx, thorough attention to upper thoracic, cervical and mandibular lesions, aspiration of the Eustachian tubes and other local treatment to the nasopharyngeal membranes. After the operation has been done it is best to do no digital manipulation of the pharynx for from three to six days. After this time digital treatment, gentle dilation of the Eustachian orifice to maintain its patency, stretching of the soft palate to reestablish proper nerve function and the application of deep pressure in the pharyngeal fossæ to stimulate the otic ganglion is important. This treatment is not massage in any sense but definite, purposeful, manipulation and if carefully done will be followed by excellent results.

Since the origin of this method of treatment, there has been much comment on its value and many have tried or at least they thought they tried it with unfavorable results. The causes of failure are, attempting treatment in cases impossible of cure, or poor diagnosis, improper technic of operator or incomplete operative procedure and inefficient supportive treatment.

It must be understood that not all cases of otitis media even in the beginning stages require the above method of treatment or will be benefited by it. Those cases which have resulted from other causes than acute pharyngitis seldom require such radical methods of treatment.

In every case, the cause must be found and consistent treatment given. In my experience, the radical method of treatment has not been found necessary in more than twenty per cent of cases of chronic otitis media. In the other cases the treatment consists of removing sources of focal infection (about forty per cent) and normalizing nasopharyngeal reflexes by osteopathic and local treatment (about forty per cent). In all cases, the

treatment must be complete. To remove thoroughly all obstruction from the epipharynx and leave a source of focal infection in the tonsils will accomplish little, or to remove carefully all pharyngeal obstruction and all sources of focal infection will not restore normal functions of the middle ear structures if the osteopathic lesions and gastro-intestinal perversions are neglected. Surgery in itself, even though carefully and thoroughly done, is not efficient treatment and this is why the medical specialists fail in this disease. After the necessary surgery has been done, then normal tone must be restored to the various tissues involved. Normal reflex mechanisms must be reestablished and this can be done by thorough and efficient osteopathic corrective work and the proper local treatment directly to the structures affected.

Meniere's Symptom Complex

This is a form of catarrhal deafness with all the characteristic pathology of the first or second stage, but in which, due probably to sudden tubal occlusion, there results a marked variation in the intralabyrinthine pressure and there are, therefore, the symptoms of conduction deafness combined with labyrinthine involvement somewhat resembling Meniere's disease. There is dizziness or even vertigo, with head noises, but not the marked prostration and nausea which characterizes Meniere's disease.

Treatment.—The treatment is the same as in the first stages of catarrhal deafness and the prognosis is always good. The labyrinthine symptoms are usually completely relieved as soon as the middle ear is ventilated.

Diseases of the Inner Ear

Acute Suppurations.—Acute suppurative diseases of the labyrinth occasionally result from the extension of infection from the tympanum but they are certainly very rare. Such conditions may result from acute suppurative otitis media in which there has been an excessive collection of pus without rupture of the drum or drainage through the tube but this very rarely occurs and after drainage has been established, labyrinthine infection is hardly possible.

Diagnosis.—Labyrinthitis is of several forms but in general, there are the symptoms of labyrinthine involvement such as: nystagmus, vertigo, nausea, vomiting, headache, earache, deafness and febrile symptoms. When labyrinthitis is suspected, an aurist of much experience should be called into consultation at once.

Treatment.—Suppurative labyrinthitis is not in itself a fatal disease but dangerous complications may result because of the close proximity to so many delicate structures. Threatened meningeal infection requires surgical drainage, but unless meningeal infection is imminent, surgery is contraindicated. Since the mortality, considering dangers of complications, is not high (about 10%) and since such operations are very complicated and require great surgical skill, we may conclude that surgery is generally contraindicated.

Non-surgical treatment consists of keeping the patient quiet in bed, liquid diet, and good elimination. Drainage through the middle ear or Eustachian tube must be maintained.

Deep manipulation of the cervical structures will help to maintain lymphatic drainage but any treatment which necessitates much movement of the head should be avoided until the symptoms of vestibular irritation have ceased.

Non-Suppurative Labyrinthine Diseases

Meniere's Disease.—This disease is caused by hemorrhage into the labyrinth with the following symptoms: There is sudden and intense vestibular irritation such as vertigo, marked tinnitus, nausea, vomiting and complete deafness on the affected side. There may also be cerebral disturbances and loss of consciousness.

The Prognosis depends upon the extent and severity of the pathology. It is probable that those cases in which recovery occurs quickly are not true cases of Meniere's disease but have some causes other than labyrinthine hemorrhage. Such cases are perhaps Meniere's Symptom Complex.

The Treatment consists of complete rest in bed, light diet, and good elimination until the marked irritation has passed. It has been my practice to

carry out further treatment similar to that of the treatment of nerve deafness to be given later. Many of these cases will make complete recovery.

Nerve Deafness

The term "nerve deafness" is generally used very carelessly to apply to any chronic or non-suppurative process of the labyrinthine structures other than those mentioned above, which cause impaired hearing.

Nerve deafness is not an uncommon disease. In my cases of deafness there has been some involvement of the labyrinthine structures or auditory nerve in 27% of the cases examined. I think the reason for most authors putting the percentage of nerve deafness much lower than this is because of inexact methods of diagnosis. The above percentage is based upon the actual measurement of nerve force. See measurement of nerve force under non-suppurative otitis media above.

A careful study of cases by the method of actual measurement of nerve force, shows that there are two distinct forms of nerve deafness. In one there is only a deficient function of the structures of the labyrinth, due perhaps to some perverted physiologic function, and this form we may call auditory nerve deficiency. The other form of nerve deafness, due probably to an actual degeneration of the nerve or its end organs in the labyrinth, may be properly known as auditory nerve degeneration.

Auditory Nerve Deficiency.—A study of our case reports shows that in 64% of the cases in which the nerve force was 16-30 or higher (more than half) favorable results were obtained, provided that there was no complicating labyrinthine affection. These cases have been classed as "nerve deficiency" and the pathology as functional. A favorable prognosis (64%) may be offered.

Example of tuning fork findings:

Fork		32	64	128	512	2048	4096
B. C.			18	20	20	20	10
A. C.	T		50	60	60	40	20

In addition to the tuning fork findings the voice and watch test will be reduced to from one-tenth to two-thirds normal. The patient often

complains of itching meati and dry nares. There are usually no signs or symptoms of labyrinthine affection.

Treatment.—The treatment consists of local treatment to the nasopharynx, tubes and meati as described under the treatment of chronic otitis media. Everything should be done to build up the patient's general health and improve the local nutrition. It is highly essential to search the entire system for sources of focal and general infection. Auto-intoxication from chronic gastro-intestinal disease was found in 90% of our cases. Any treatment therefore that will restore normal gastro-intestinal function is indicated. Recently we have had some excellent results from colonic irrigation and the proper adjustment of diet in such cases. Any source of focal infection must of course receive proper attention.

The osteopathic corrective treatment consists largely of careful attention to lesions of the splanchnic area because of the importance of normal digestion, metabolism and elimination. This is certainly a most important part of the treatment and should never be neglected. Upper cervical and mandibular lesions have much to do with the local nutrition to the ear structures and these must not be neglected. The fact that we almost constantly find evidence of deficient nutrition to the meati and drums in this disease together with lesions of the mandible, suggests a local osteopathic cause.

Auditory Nerve Degeneration.—In those cases in which there is a measurable deficiency of nerve function of less than half the normal we have found that very few respond to treatment. (See table above.) The cause has therefore been attributed to a structural pathology and the condition called auditory degeneration.

Example Table:

Fork		32	64	128	512	2048	4096
B. C.			10	12	8	5	2
A. C.	S		20	25	15	7	5

There is usually very marked impairment of hearing for voice and all other sounds. The Ingersoll watch may be heard five or ten inches, but usually not at all, and the whispered voice heard only a few inches or not at all. There are nearly always signs and symptoms of labyrinthine deafness

and evidence of tone islands. The deafness in these cases is usually progressive regardless of any treatment.

In this disease there is nearly always an associated affection of the labyrinth as shown by the high forks. The fractions represented by the high forks will agree in proportion provided there is no labyrinthine involvement.

Our results in auditory nerve degeneration have been measurable improvement in only 2% of the cases treated. The prognosis is therefore very poor and I believe we should always tell our patients frankly that there is almost no chance for improving their hearing in such cases. The treatment is the same as that given for nerve deficiency and because of the general good that may be had from treatment, that is, the improvement of the general resistance, it is often well for the patient to have such treatment to stop the progress of further special sensory degeneration.

It should always be our purpose to treat the patient rather than to treat some particular organ only and if this method is followed, our general results will surely be much higher.

Diseases of the Nose

Method of Examination.—For use in nasal examinations and treatment, a suitable chair with adjustable headrest is of much value because if the patient is not comfortable and in a convenient position, the work is very difficult. A few instruments, such as the following, are very essential: A sterilizer for instruments, head mirror and reflecting lamp, nasal speculum, tongue depressor, tonsil pillar-retractor, a nasal packing forceps and a few aluminum cotton applicators. These instruments are few and comparatively inexpensive, but are of more practical value than a lifetime collection of electrical apparatus. Any physician can readily learn the use of these instruments and the methods of examination by attending the clinical sessions of our conventions. Methods and technic of treatment, however, require much practice and experience to develop efficiency.

Acute Rhinitis

This disease, commonly known as a “cold in the head” is one of the most common, and because of the complications which so commonly result, a disease which really requires careful consideration.

Etiology.—The predisposing cause is reduced resistance and individual susceptibility to air-borne irritants and infective organisms.

Direct exposure of some insufficiently protected part of the body such as the feet in cold, damp weather, exposure of some unprotected part of the body to draughts or exposure of the whole body to slightly reduced temperature for a considerable time, are the common causes. In cold weather, it is very important that the proper indoor humidity be maintained, because the drying of the mucous membranes renders them susceptible to infection. This disease is not only contagious at times but may even become endemic from some specific and virulent organism.

The complications which may and often do follow such infections are laryngitis, bronchitis, pneumonia, etc. and any one or more of the focal infections, such as sinuitis, tonsillitis, or middle ear infection. A focal infection thus caused may become chronic and render the patient constantly susceptible to head colds. In fact in those persons who suffer from chronic head colds, there may nearly always be found some focal infection, such as the above named, and it is often impossible to get permanent relief until such sources of focal infection have been properly treated.

The influence of gross structural lesions, osteopathic lesions of the cervical and upper thoracic region, vertebræ and ribs must not be overlooked because they exert a powerful influence upon the blood supply, particularly the venous and lymphatic drainage and upon the autonomic nervous mechanism, which regulates the physiologic control of such functions.

Gross structural abnormalities of the intranasal chambers, such as deflected septum, enlarged turbinates or cellular turbinates, which cause deficient or abnormal breathing space, may cause and maintain head colds.

Diagnosis.—The diagnosis is usually easy. Nasal congestion with the usual “stuffy” feeling of the head, sneezing, headache, etc. are well known symptoms. On direct examination the nares are congested, there is a watery

discharge and all of the membranes of the nasopharyngeal tract are congested.

Treatment.—If there is ever a demand for good, thorough and specific osteopathic work, certainly it is demanded in such cases. I am an advocate of thorough, deep relaxing treatment followed by specific adjustment in such cases.

Complete rest in bed with light diet and careful attention to the elimination are very essential. Perhaps the most difficult problem is to convince the patient that a head cold is really a serious disease and demands thorough and prompt treatment. Every ear, nose and throat specialist has had ample opportunity to know that most of the really serious complications of the head and neck result from the lack of prompt and proper attention to head colds.

The local treatment consists of irrigation of the nasopharynx followed by oil spray to protect from further irritation and the maintenance of proper drainage from the sinuses and middle ears. I am not an advocate of the so-called "antiseptic sprays" because they neither destroy bacteria sufficiently to be effective nor do they maintain drainage.

In all cases, the physician should be ever watchful for the complications and should not hesitate to call consultation of a specialist when such symptoms develop.

Purulent Rhinitis

Persistent inflammations of the nasal membranes are usually of a purulent nature or at least have had such a cause in the beginning.

Etiology.—Purulent rhinitis may be a result of an unsuccessfully treated infection of the nose or throat following some disease of childhood or early life. It may be due to infection at birth. Commonly there is a subacute or chronic sinus infection that maintains the infection of the nasal mucosa. Polyps, enlarged or cellular turbinates, adenoids or adhesions in the epipharynx, often retain the secretions and cause chronic rhinitis. In many cases I have found that osteopathic lesions of the cervical or upper thoracic region are effective causes of chronic rhinitis.

The Pathology consists of hyperemia, hypertrophy and exfoliation of the cellular membrane. The turbinates and all membranes become enlarged and thickened and the breathing space is usually greatly decreased.

The Symptoms are nasal obstruction, and mucous or mucopurulent discharge with usually hypersensitiveness, which causes sneezing and other symptoms common to "head colds."

Treatment.—The same treatment as given above for acute rhinitis applies here. A thorough examination should be made for all of the various causes given above and the proper corrective treatment given for any or all such causes.

Chronic Hypertrophic Rhinitis

Etiology.—Chronic rhinitis is usually a result of an infective rhinitis and has for its cause any one or more of the various causes given above under purulent rhinitis.

Pathology.—The pathology in chronic rhinitis varies with the cause, but is usually characterized by a series of changes beginning with infection and hyperemia and followed by an actual and usually marked hypertrophy of the interstitial tissue. The posterior ends of the inferior or, less often, the middle turbinates are usually enlarged and extend backward into the pharynx.

The Symptoms are much the same as in purulent rhinitis, except that the purulent discharge is often not present. These cases usually suffer from chronic head colds, headaches and persistent nasal obstruction. The senses of smell and taste are usually impaired and there is a nasal twang to the voice.

Treatment.—In these cases, it is common to find osteopathic causes which prevent proper drainage from the head and neck and this is important because, if all the local causes are properly corrected, this is not sufficient to effect a cure.

Surgical treatment for the removal of polyps, synechia, adenoids, adhesions, correction of septum, or hypertrophied or cellular middle turbinates is often essential and certainly infected sinuses must be properly

drained. We have had cases in which root abscesses seemed to be active causes, but it must not be thought that surgery and surgery alone is likely to cure chronic rhinitis, and I want to caution against the wholesale removal of turbinates for such conditions. The mere fact that the turbinates are enlarged is not sufficient reason for their removal. There has been a cause for this enlargement and turbinotomy or turbinectomy does not remove this cause. Cautery is worse, because it seldom accomplishes more than very temporary results and often leaves the membranes worse than before. Cautery destroys mucous membrane, leaving a dry and easily irritated surface which is often impossible to normalize.

The proper surgery, carefully done, followed by efficient osteopathic corrective work and thorough irrigation of the nasopharyngeal tract with the necessary oil spray protection after irrigation, will constitute efficient treatment. Treatment, thorough and long continued, will in due time restore nutrition, drainage and normal reflex nerve control to the tissues. Treatment after surgery is essential.

Intranasal Treatment.—Many cases are caused by the retention of secretions under the turbinates and in the superior vault. In all cases, therefore, it is essential to thoroughly free all possible retention cavities by means of a small cotton-wound probe before irrigation. The intranasal membranes are adrenalized and anesthetized and a thorough examination is made using a good reflecting lamp, nasal speculum and cotton tipped probe. Every part of the intranasal region is inspected for sources of purulent discharge, mucus collections, synechia and for hypersensitive areas. The probe is curved at the end and passed under each turbinate and drawn forward and backward with considerable pressure to insure that any collection of foreign matter is thoroughly removed. Every part of the intranasal region should be thoroughly treated in this way. The hiatus semilunaris must be kept well open to permit free antrum drainage and all other sinus openings should be kept free from any obstruction that may block the drainage. This particular technic requires great care and practice, but it is very effective and so commonly we have found that this work thoroughly done will reduce much and in some cases all of the turbinate hypertrophy rendering surgery unnecessary.

Atrophic Rhinitis

As the term suggests, this disease is just the opposite from hypertrophic rhinitis in that the membranes are shrunken, the nares are wide open and usually the membranes are coated with a mucopurulent discharge, accompanied by a bad odor. It is a chronic disease and progressive in nature.

Etiology.—Deficient nutrition, systemic or local, or some degenerative infective process constitutes the cause. Some cases may be traced to syphilis, but this is certainly not always the cause. Chronic sinuitis, the cause of which is some virulent infection, is often the cause. Too much or incorrect surgery and cautery is certainly a cause in many cases.

Pathology.—The marked atrophic appearance, the retracted turbinates, the excessive purulent or mucopurulent foul discharge are characteristic and diagnostic.

The tissues underlying the mucous membranes are shrunken, and atrophic and this tissue has usually been replaced, sometimes almost completely, by connective tissue, and thus the blood supply is markedly deficient.

Treatment.—In chronic cases, those in which the atrophy is well progressed, there is no hope of restoration to normal conditions, but I believe that the progress of practically every case can be stopped and that, in most cases, a permanent cure can be effected under proper treatment.

Every possible source of focal infection, such as sinuitis, pharyngitis, tonsillitis, etc. should receive proper attention promptly. After this has been done and sufficient time allowed for normalization, a blood count may reveal some other source of focal or general infection, which may be reducing the general resistance.

Auto-intoxication from some gastro-intestinal affection is commonly a cause and must receive proper attention. The general health of the patient must be restored and maintained.

Thorough osteopathic treatment must be given for any cause of lowered nutrition, local or general. The failure, I believe, in medical practice (They admit failure in this disease) is due to the lack of attention to the restoration of normal nutrition. Why drain a sinus and leave an atlas or upper thoracic

lesion which decreases the local nutrition and leaves these membranes susceptible to further infection?

Before and after surgical drainage, irrigation of the nasopharyngeal tract. Thorough irrigation to cleanse every part. Hot irrigation (one gallon of salt mixture solution, salt 3 parts, borax 2 parts, and soda 1 part, a tablespoonful to the gallon at 118°F. to 123°F.) to cleanse, to free all parts from infection and to restore blood supply to the affected parts. Frequent irrigation, daily for a sufficient time to thoroughly sterilize and restore circulation. After each irrigation, an oil spray (any non-irritating petroleum oil) is applied freely to protect the membranes from irritation and further infection.

Before each irrigation a thorough probe treatment, as described under hypertrophic rhinitis, should be given that the membranes may be thoroughly freed from all retained secretions.

After the membranes are once clean, the sinuses free from infection and the blood supply reestablished, the treatment may be reduced in frequency to three times weekly, but the treatment must be continued for months or even years to effect a permanent cure. The patient can be taught to do his own irrigation after the disease is well under control. All irritating sprays, chemical cauteries, etc. must be avoided. The so-called “antiseptic sprays” do harm by irritating the membranes and certainly do no good, because they do not cleanse the parts. They only serve to deodorize, but actually accomplish nothing in the way of cure. It has been my experience that iodine and the silver salts in any of their various preparations are not efficient but that they actually do harm. My experience indicates that practically every case can be cured if the proper treatment is given for sufficient time.

Pharmacodynamics

If I may be pardoned for discussing things pharmacological in a text on practice, I want to urge that chemicals as such, are usually a failure in treatment. My results from various series of experimental work both laboratory and clinical, show quite conclusively that there are very few, if any, chemical substances that have actual value by virtue of their chemical properties alone. There are, however, cases in which chemical agents may

be used to advantage to obtain desirable physical results and physiologic reactions.

The salt mixture mentioned above increases the solvent power of the water for mucus, pus, and other collected material and it also renders the water less irritating to the mucous membranes. Other than this, it has no value so far as I know. This solution is certainly not antiseptic or germicidal, further than that cleanliness may be considered an antiseptic procedure.

The phenol-glycerine (10% phenol and 90% glycerine) which we have recommended, is somewhat germicidal, non-irritating, except to the nasal mucosa, is a protectant to inflamed membranes in some instances and is also somewhat hygroscopic. These virtues to the limited extent that they may be of advantage, depend chiefly upon physical qualities.

Adrenalin in high dilutions (1 to 5000 to 1 to 10,000) is of value in retracting the erectile tissues of the nares for purposes of examination and for obtaining better drainage, etc. It also constricts the small blood vessels and thus reduces the chances for hemorrhage or absorption of narcotic drugs which may necessarily be used as local anesthetics. The effects of adrenalin are very temporary and it is, therefore, of little value in treatment.

Following irrigation I have used the petroleum oils (liquid petrolatum) to advantage as a protection to the mucous membrane. One-half gram each of menthol and camphor and two or three drops of cinnamon oil to the pint of this oil, is readily dissolved and produces a pleasant, soothing effect to inflamed membranes, but further than this, the added substances have no particular value. The above named chemical agents constitute, except in rare instances, my stock of “drugs” for treatment purposes.

Hyperesthetic Rhinitis—Hay Fever

There is perhaps no disease in which there has been more speculation concerning the etiology than in hay fever, and while osteopathy has accomplished a wonderful advance in the treatment of this disease, I am not sure that the cause or causes are yet thoroughly understood.

Etiology.—The theoretic causes of this disease may be expressed in the various names which have been given to it as follows: The term Hay Fever

suggests that it is a febrile condition caused by hay pollen irritation. Peach cold, Rose cold, Rose fever, Rose catarrh, Rye fever and Ragweed fever suggest similar specific causes. Idiosyncratic coryza means nothing and this probably expresses what the theorists know about its cause better than any other name. Hysteric rhinitis suggests a probable psychic cause, which certainly does exist in some cases. If I may be pardoned, and I know I never will be, let me suggest just one more name—"Respiratory Reflex Inefficiency."

Intoxications.—Auto-intoxication from focal infections or from gastro-intestinal perversions certainly have an important influence either directly or as predisposing factors and should always be carefully considered in treatment.

Osteopathic Lesions.—Osteopathic lesions, such as interosseous, muscular and ligamentous, seem to function as predisposing causes by their general effects upon the system. It seems probable that their effects upon the organs of metabolism and elimination are of greater importance than any direct or specific effect in causing the immediate symptoms. In practically all cases lesions of the upper thoracic vertebræ and ribs and of the cervical region are present. It is my opinion that such lesions are more often secondary than primary.

Respiratory Reflex Inefficiency.—Measurement of nerve force in these cases shows that none are really possessed with "an excess of nerve force," but that practically all vary from two-thirds to four-fifths normal, showing that probably all cases are deficient in nerve force.

This instability of the nervous system can be explained, I believe, in the theory of peripheral reflex insufficiency. As evidence of this the following facts may be cited:

1. It is known that peripheral irritation of almost any nature, to the mucous membranes of the nasopharyngeal tract, will excite an attack in susceptible individuals.

2. That any treatment which tends to increase the resistance of these membranes will prevent or relieve an attack.

3. That peripheral inhibition to these surfaces will temporarily relieve an attack.

4. That complete normalization of these membranes will make the patient resistive to the so-called specific irritants, such as pollen, dust, etc.

5. That the mucous membranes of the entire respiratory and gastro-intestinal tract react to irritants to bring about "the hay fever state" and that any treatment which tends to normalize these membranes, renders the patient more resistive to hay fever attacks.

Exciting Causes.—There is no doubt that various air-borne irritants, such as pollen, dust, chemical fumes, emanations from animals, etc., act as exciting causes of acute attacks, and yet there are cases that develop acute attacks out of season or at a time when it seems that there could be no air-borne irritation. From evidence which will be offered later (see prognosis) I am led to believe that probably all susceptible cases can be made entirely resistive to the air-borne irritants.

Pathology

Functional Pathology.—Certainly in this disease there is ample evidence of marked perversions of function or functional pathology. Kyle believes that in many cases the cause of local irritation lies in "some chemical change in the constituents of the mucus-secreting glands," and "it is a well known fact that in many cases of hay fever the irritation is not limited to the nasal mucous membrane. The eyes and mucous membrane of the stomach and bladder, and even the intestines may be markedly irritated."

These chemical changes in the secretion of the mucous membranes, together with the excess of uric acid would seem to point either to a general perversion of the secretory mechanism or to a deficient elimination, or to both. The periodic occurrence may be accounted for by assuming that the systemic strain is sufficient to initiate the symptoms. The fact that the attack is actually delayed or hastened in susceptible individuals by the late or early beginning of hot weather, and that these cases get relief by going to a more moderate climate is further evidence of this.

Again we are reminded of Dr. Still's teaching, that the body maintains its own chemical laboratory which adjusts or tends to adjust its work to the needs of that body, but under abnormal strain this adjustive mechanism may

fail to meet all of the demands of function. It seems here that the osteopathic concept may easily include all environmental causes as well as internal causes in the predisposition to deficient function or disease.

Structural Pathology.—During the attack there is a general catarrhal inflammation of all nasopharyngeal membranes, accompanied by a watery discharge and marked swelling of the turbinates. Sensitive areas may be found on the middle turbinate and opposite wall of the septum. Probably it is this hypersusceptibility to irritation that causes the attack from the air-borne irritants.

The pseudo-membrane which may be found covering a part or all of the mucous membranes of the nares probably results from this irritation and is formed for the purpose of protection.

Clinical Types.—Clinically, three rather indefinite types of hay fever may be recognized, viz.: Vernal, those cases which have their attack sometime during May, June or July; Autumnal, in which the attack occurs in August or September and usually lasts until the beginning of cold weather, and an indefinite or pseudo form occurring at any time of the year, with no characteristic attack, as in the other forms, but with indefinite symptoms resembling hay fever.

Symptoms and Diagnosis.—Patients usually go to the physician self diagnosed. The characteristic sneezing, the watery discharge from the nose, and the irritation of all membranes of the nasopharynx and conjunctiva will serve to make a diagnosis in most cases. Direct examination will reveal the nasal congestion and other characteristic pathology as described above.

Termination.—Most cases of the autumnal form, unless successfully treated, continue with equal or increased severity until after the first or second frost, when they usually terminate in asthma, bronchitis or sinuitis, which lasts for several weeks or months. Each year the attack lasts longer and is more severe and the asthma occurs earlier and is more severe.

Treatment

Intranasal Surgery.—Intranasal abnormalities, such as deflected septum, spurs on the septum, hypertrophied turbinates, polypi, etc., which materially reduce the breathing space, usually demand surgery. Nasal

surgery, carefully and properly done, is always a great aid and often absolutely essential to the successful treatment of hay fever and asthma, but nasal surgery carelessly done frequently does more harm than good.

The correction of a deflected septum or the removal of a spur on the septum by submucous operation often aids materially in the prevention of pressure irritation, increases the breathing space and normalizes drainage from the sinuses.

Surgery is therefore very essential in many cases of hay fever, but surgery is never the all essential part of the treatment, because if the proper after treatment is not given, the surgery alone will seldom result in either temporary relief or cure.

Focal Infection.—The importance of focal infection of the sinuses, tonsils, teeth and occasionally other parts, such as the nasal cavities, epipharynx, middle ear and mastoid cavities cannot be overestimated. Such conditions may be effective in causing hay fever, by causing direct infection of the membranes of the nasopharyngeal tract or by auto-intoxication.

Digital Surgery, for the removal of adhesions in the posterior nares and pharynx, is in my opinion, very essential, and this work should be done thoroughly. Massage of the soft palate or pharyngeal walls is of no particular value. All adhesions and adenoid tissue must be removed because this removes an effective source of constant irritation and focal infection and tends to normalize the direct and reflex nerve mechanism.

The practice of the radical intranasal technique as originated by J. D. Edwards, D. O., is indicated, I believe, in some cases in which the crushing of cellular middle turbinates, or the breaking of adhesions is indicated, but I am not yet ready to accept this theory of “curetting” the mucous membrane by radical digital technique. The fracture of the turbinates is not necessarily a bad technique provided they are properly readjusted as Dr. Edwards does it, but to fracture and not readjust is a dangerous practice. The efficiency and safety of any method depends upon the operator’s definite knowledge of what needs to be accomplished and how it is to be done.

There are contraindications to digital, as well as any other kind of nasopharyngeal surgery, such as: (1) Acute infection of any part of the nasopharyngeal tract; (2) evidence of sinus involvement; (3) septal

deflections, spurs and hypertrophied turbinates, which would not permit such work without undue trauma.

There are certain other precautions such as thorough cleanliness of the parts to be treated; aspiration of the sinuses before and afterward, and the use of a finger of sufficient size which will not produce undue trauma. In my opinion very few doctors have such fingers.

Failure in accomplishing results is due to three things, viz., (1) Insufficient knowledge of diagnosis and prognosis; (2) insufficient knowledge of what should be accomplished and the technique of doing it, and (3) the necessary additional or supportive treatment.

It is a great mistake to think that the removal of adhesions in the pharynx or nares is sufficient, because if this is not followed by the proper supportive treatment, no results or even bad results will frequently occur. This treatment is not a massage in any sense, but a definite operative procedure and requires as much care and skill as the removal of adenoids or tonsils.

Space will not permit an explanation of the digital technique and the radical treatment should not be attempted without some definite knowledge of the methods and technique.

Intranasal Treatment.—The intranasal method of treatment as explained above under hypertrophic rhinitis is very effective and if carefully and thoroughly done is in most cases just as efficient as intranasal digital surgery. This treatment followed by irrigation and oil spray and nasal packing will be found effective in most cases if the treatment is properly done.

Nasal Packing.—Thorough packing of the nasal cavities after all sources of focal infection have been removed and after thorough cleansing has been done, by means of long strips of absorbent cotton is effective in reducing the swelling and irritation.

The Radical Packing Method.—This method can be done best in a hospital. The nares are prepared as for surgical operation, by complete retraction of all erectile tissue, thorough cleansing by irrigation and the application of a local anesthetic. Anesthesia need not be complete. A careful examination is then made for any synechia, or focal infections. Packing

should never be done until the doctor is sure there is no sinus involvement. The entire nasal cavity is then packed very firmly with sterile gauze. This is best done by means of a special packing instrument or long nasal packing forceps, using narrow gauze contained in tubes. In some cases the nasal cavity is lubricated before packing.

The packing should be done early in the morning and removed just before bed-time, so that the patient may sleep. This treatment is repeated daily until all signs and symptoms of nasal irritation are gone and then replaced by irrigation and oil spray.

If this treatment is properly done, there will be a complete sloughing of the pseudo-membrane followed by a restoration of normal and resistive tissue. The results of our two years' experience (we have tried this on only a few patients each year) are very encouraging. Relief from the symptoms are very prompt and seemingly more permanent than from other methods.

Treatment of Auto-intoxication.—All sources of focal infection are thoroughly treated. Sinus infection is very common and must receive proper attention before any other treatment can be effective.

Our experience shows that many cases have auto-intoxication of gastro-intestinal origin. The hospital care of such cases makes possible the thorough cleansing of the colon by irrigation and the reestablishment of an acid producing flora which seems to prevent fermentation.

Osteopathic Corrective Work.—Thoroughness of treatment for the removal of all causes is the secret of success. To successfully remove the immediate sources of auto-intoxication by treating a sinus infection or by thoroughly freeing the colon from fermentation products means only temporary results if the underlying causes are not corrected. A thorough osteopathic examination is necessary to determine such causes and certainly such treatment should not be neglected.

Correction of all cervical and upper thoracic lesions and particularly the clavicles and ribs is important. These lesions seem to be the result rather than the cause, but normal respiratory functions seemingly cannot be maintained unless such treatment is done.

Sinuitis

Acute or chronic inflammatory disease of the nasal accessory sinuses with or without suppuration is more common, I believe, and is responsible for more complications and chronic affections of the nose and throat than is generally known.

Etiology.—The cause in most cases lies in unsuccessfully treated acute infections involving the nose and throat. Abnormalities of the nasal respiratory passages such as deflected septum, enlarged or cellular turbinates, adhesions resulting from cautery or careless surgery, causing deficient drainage, constitute the local causes. Underlying some of these direct causes, lesions of the cervical region which impair the nutrition to and drainage from the head are to be considered.

Symptoms and Diagnosis.—Acute or chronic headaches and neuralgic pains of the head are common symptoms. Acute sinuitis of the frontal sinuses is accompanied by marked and persistent frontal headache and pain in the eyes. In infections of the maxillary sinus there is usually pain over the affected part, but there is often referred pain to other parts of the head. Sphenoidal sinuitis usually causes general headache with no definite location.

By direct examination of the nasal cavities a purulent or mucopurulent discharge may be seen and the source determined. In many cases, however, the pus may be retained or insufficient in amount to detect by direct examination.

Transillumination in a dark room by means of a good transilluminator will usually show a darkened area over the affected part. The average battery equipments commonly sold for this purpose are of little value. The X-ray plate when properly done, is more dependable than the transilluminator.

In some cases, all of these methods fail to locate the affected sinus and the cause can be found only by opening into the sinuses, aspirating with a catheter and making microscopic examination of the aspirated material. The microscope is indispensable for this work. Every suspicious discharge should be stained until pus is found and except in well defined cases, this is the only practical method of positive diagnosis.

Treatment.—Local treatment of the nasal cavities by retracting the turbinates and irrigation will be successful in many cases, but unless there is a large normal opening the pus will not drain sufficiently and probe treatment is required. In acute cases in which the pain is marked, osteopathic treatment of the cervical region, deep relaxation of the submaxillary structures and the application of heat over the affected part, together with the local nasal treatment should be given, but if this does not relieve the pain within twenty-four hours, the sinus should be opened and thoroughly drained. If efficient drainage is not established early the symptoms will usually increase until the pain is almost unbearable and serious complications may result.

In practically every case of acute sinuitis, I believe it is best to make a good, free opening into the affected sinus first and secure complete drainage by catheter aspiration. If this is properly done every case will recover much more quickly and without complications or danger of chronic infection.

Non-Suppurative Sinuitis

Cases of non-suppurative sinus involvement are not at all uncommon. The so-called "Vacuum sinuitis" which results from a closure of the normal opening, resulting in inflammation without pus formation, is responsible for many of the complicated cases of referred pain, which are so often improperly diagnosed. Chronic headaches and the various symptoms of fifth nerve affections, the neuralgias of the head, are frequently caused by non-suppurative sinus involvement.

Treatment.—The treatment consists of establishing good drainage and proper ventilation of the affected sinus or sinuses followed by thorough intranasal treatment as explained above. The osteopathic corrective work must not be neglected.

Syphilis of the Nose

In osteopathic practice syphilis is not a common disease. The occurrence of syphilis of the nose is still more rare but certainly should be recognized.

Diagnosis.—The local lesions of the nose are of two types, those of acquired syphilis and of congenital syphilis.

There are three characteristic manifestations of acquired syphilis as follows. The primary lesion or hard chancre is a firm, indurated ulcerated mass with only slight discharge. Chancre of the nose is exceedingly rare. In secondary syphilis there is the mucous patch, the result of mucous membrane necrosis. In tertiary syphilis the local lesion is the gumma or more commonly, the ulceration left from necrosis of the gumma. These lesions may appear from a few to many years after the initial infection, but they never follow immediately. The lesions may appear on almost any part of the intranasal structures. They resemble the lesions of atrophic rhinitis but in atrophic rhinitis there is never the extent of destruction that so frequently results from tertiary syphilis.

Treatment.—It has been my practice to refer all suspected cases to Dr. F. J. Stewart for differential diagnosis and treatment and his method of the use of salvarsan has proven efficient.

Epistaxis—Nose Bleed

The causes of nose bleed may be divided into two general groups, local and constitutional. The first group consists of trauma directly to the nose either external or internal, from nasal operations and other causes. The presence of a cluster of thin-walled veins on the anterior part of the septum which readily rupture from slight cause, constitutes perhaps the most common cause of nose bleed. The ulcers of atrophic rhinitis or syphilis occasionally cause bleeding. Malignant growths of the nose may cause frequent and profuse hemorrhage. The constitutional causes of epistaxis are, the acute fevers, cardiac and arterial diseases, which cause excessive tension; and cases of altered composition of the blood such as the anemias, malaria, purpura, chlorosis, hemophilia, etc.

Diagnosis.—Direct examination of the nose will usually reveal the cause. If there are no signs of trauma or rupture of the anterior group of vessels and the bleeding does not respond quickly to packing of the affected side, there is either a rupture of a large vessel, which requires long continued packing, or it belongs to the class of constitutional disease.

If there is evidence of some necrotic disease of the nose or if there are areas of exposed bone or cartilage from careless surgery, these may usually be seen and the point of bleeding located.

Treatment.—Cold applications, irrigation of the nares with cold normal salt solution and the application of an absorbent cotton or gauze pack is usually sufficient to stop the average case of epistaxis from any cause. The direct application of cold to the lower cervical region will cause capillary restriction.

There are many cases in which the membranes of the nose have lost their tone due to various irritants or from deficient nutrition to the parts. These are cases of a wholly different type from that of the well known necrotic diseases such as atrophic rhinitis and syphilis. Hay fever is a result of such a cause. The treatment in such cases consists of removing any local causes or osteopathic lesions and then normalizing the resistance of the membranes by the methods described under the treatment for hay fever.

The treatment for those cases of epistaxis due to constitutional disease depends wholly upon the causative factors and the proper treatment of these. Any local treatment in such cases will be expected to produce only temporary results.

Diseases of the Nasopharynx

The nasopharynx may be the location of acute or chronic inflammations, neoplasms, malignant or nonmalignant, processes of atrophy or hypertrophy, adhesions, etc. It is important to remember that the nasopharynx admits the Eustachian tubes and supports four superficially located ganglia of the fifth nerve.

Acute Nasopharyngitis.—Acute inflammatory processes of this region may result from rhinitis, infections of the lower pharynx, focal infections of these parts or from direct involvement of its own structures.

The symptoms are post nasal tenderness and mucus dropping. Some patients experience the sensation of a foreign body in that location. The thick, adherent collections of mucus are difficult to dislodge and sometimes are so persistent that they cause nausea. There is usually occlusion of the Eustachian tubes, resulting in partial deafness, tinnitus and often dizziness.

The Treatment consists of thorough cleanliness by irrigation and osteopathic corrective work to the cervical region. It is also essential to keep the anterior neck structures particularly those of the submaxillary region, thoroughly relaxed to maintain efficient drainage.

Chronic Nasopharyngitis

This is one of most common diseases of the nasopharyngeal tract, causative of many complications and yet perhaps the least recognized in proportion to its significance. The frequent occurrence of adhesions of the pharyngeal fossæ, hypertrophied membranes, enlarged spongy extensions of the inferior and middle turbinates (the posterior turbinate bodies) occlusion of the orifice of the Eustachian tubes and chronic, excessive secretion of thick mucus all show that this disease has either gone unrecognized or at least has not received proper treatment.

Treatment.—Complete surgical removal of all abnormal growths, adhesions, etc. as described under the treatment of chronic non-suppurative otitis media and this followed by thorough irrigation and other methods of local treatment described above are efficient. The successful treatment of this disease requires time. There has been a partial or, in some cases, almost a complete loss of the normal functions of the nerve reflex mechanism of these parts, peripheral reflex inefficiency and this must be restored. Efficient and long continued treatment of the lesions commonly found in the cervical and upper thoracic regions will do much to restore these normal functions, but this alone without the surgical treatment will never effect a permanent cure. Neither will the surgery and local treatment alone effect a cure. The whole treatment is required.

Adenoids

Adenoids are the hypertrophied lymphoid tissue of the nasopharynx. They occur commonly in children, as a result of acute inflammations. Possibly the suckling process of the child produces a partial vacuum of the epipharynx and thus causes excessive blood supply to the part and therefore excessive growth of these soft tissues.

Adenoids, however, are not confined to children but frequently occur in adults. In all cases they are a source of much annoyance and often the cause of acute and chronic disease.

Symptoms and Diagnosis.—Mouth breathing, head colds, partial deafness, etc. are the common symptoms. The flattened nose, the high arch of the hard palate and the stupid appearance of the face are diagnostic. By direct palpation to the nasopharynx the nature and extent of the adenoid mass can be determined and this is the best method of diagnosis.

Treatment.—Many methods of non-surgical treatment have been employed, but there is nothing as satisfactory as complete surgical removal. Adenoid tissue has no known function different from that of other lymphoid tissue and there is always sufficient to perform any necessary function without excess of adenoid growth. The excessive adenoid growth is in every case a detriment to normal development, because it impairs nasal respiration and usually causes chronic nasopharyngitis and thus reduces resistance against all diseases of childhood. There is therefore, no excuse, much less a reason, why excessive adenoid growths should not be removed surgically, provided it is properly and thoroughly done.

The operation for removing adenoids requires in children, a general anesthetic. In adults, a local anesthetic is used by some operators. I have found it best to first break the adenoid mass away from the side walls of the pharynx digitally. A LaForce or Gradle adenotome is then used to remove the adenoid mass. If either of these instruments is properly used it will always remove the greater part of the adenoid mass without undue trauma or injury to any of the pharyngeal structures. Curets should never be used because they almost never remove the adenoid mass properly, but they usually do injure the pharynx. Many cases of pharyngeal adhesions, Eustachian tube occlusion and nasopharyngitis result from direct injury caused by curets.

After the adenoid mass has been removed the finger is inserted into the pharynx and any adenoid growths in the posterior nares are removed. The pharyngeal fossæ are also thoroughly freed from adenoid tissue and adhesions and the orifices of the pharyngeal portions of the tubes are gently dilated. This method insures complete removal of all excessive adenoid

tissue, and normal functions of the nasopharynx. Adenoids thus removed do not return.

After the surgical work has been completed the nasopharyngeal tract should be thoroughly irrigated with hot salt mixture solution. This thoroughly cleanses the membranes, hastens healing, prevents hemorrhage and avoids post-operative infection. Irrigation of the nasopharynx should be continued for some days or until all evidences of inflammation have ceased. The pharynx should then be examined to be sure that no adhesions have developed from inflammation, but if the operation is carefully done, complications will never result.

Diseases of the Oropharynx
Acute Pharyngitis

Acute inflammations of the pharynx alone or in common with inflammations of other parts of the nasopharyngeal tract are common. This disease is most common as a result of the acute infections affecting the nose and throat.

Etiology.—The predisposing causes are focal infections of the nasopharynx, such as tonsillitis, sinuitis, etc. Deficient nutrition or anemia of the pharynx or systemic anemia are common causes. Lesions of the cervical, upper thoracic and hyoid are common predisposing causes. Undue exposure of the neck in susceptible persons or too much or too tight clothing about the neck may also predispose to inflammations of the pharynx.

The exciting causes are the acute infections, colds and focal infections. Perhaps the most common exciting cause is tonsillitis, acute or chronic.

Symptoms and Diagnosis.—The characteristic dryness of the pharynx, pain and persistent coughing are diagnostic. Upon direct examination, the reddened, swollen appearance of the pharynx and posterior pillars can be seen.

Treatment.—The treatment should be general and local and should be determined by the causes and conditions present. This disease is usually an acute infection and like other acute infections, the usual systemic treatment should be applied.

The local treatment consists of thorough cleansing of the nasopharynx (by irrigation if the patient can permit) and the frequent (or occasional as required) use of some gargle until the inflammation has subsided. Any cleansing nonirritative solution may be used for a gargle. Equal parts of peroxide, alcohol and glycerine, a tablespoonful to a half glass of very warm water or ten to fifteen drops of phenol-glycerine to a half glass of warm water will make a good cleansing gargle.

The osteopathic treatment consists of corrective work to the cervical, upper thoracic and hyoid and thorough relaxation of the submaxillary musculature to obtain good venous and lymphatic drainage. If sufficient care be taken to avoid trauma, digital stretching of the soft palate and pharyngeal muscles by the use of the finger internally, is very efficacious.

Chronic Pharyngitis

Chronic pharyngitis may be hypertrophic, atrophic or granular. In hypertrophic pharyngitis the pathologic changes have passed beyond the stage of hyperemia and there is always hypertrophy or hyperplasia, usually the latter, of the pharyngeal membranes. These changes in most cases, have extended to and involved all of the nasopharyngeal membranes.

Chronic granular pharyngitis, or so-called clergyman's sore throat, has a similar pathology to that described above, but with swollen and inflamed lymph follicles. This condition seems to be a result of excessive use of the voice.

Chronic atrophic pharyngitis has a similar etiology and the diagnostic signs are also similar to atrophic nasopharyngitis with which it is usually associated.

Etiology.—The causative factors are similar or the same as those of nasopharyngitis. Lesions of the cervical and upper thoracic and chronic focal infections such as tonsillitis, sinuitis, etc. are the common causes.

Treatment.—The nature of the treatment should be determined by the causes found. The nature of the pathology requires long continued treatment and careful attention to all causes. Thorough osteopathic corrective work, the removal of all sources of focal infection, proper attention to any gastro-intestinal perversions which may be causing auto-intoxication and thorough

cleanliness of the parts by gargling with some cleansing, non-irritating solution and by irrigation.

In most cases there is a considerable collection of adhesions in the nasopharynx or posterior nares or in both. Enlarged “posterior turbinate bodies” and the extension of the inferior turbinates into the pharynx are also common results of the hypertrophic process. Complete surgical removal of this excess tissue and the after treatment as described above under chronic nasopharyngitis are frequently required to obtain complete and permanent results.

These cases can be successfully treated if the proper attention is given to all possible causes in each individual case. It is the individualization, the specific and detailed attention to the cause or causes, and such treatment continued for sufficient time, that will obtain results.

In atrophic pharyngitis, normal nutrition to the parts and usually to the entire system must be restored. Many such cases are secondary to systemic anemia or to rheumatic intoxication. A careful examination should be made for evidence of systemic causes. In many cases, I believe that thorough osteopathic corrective work applied to the mid and lower spine is the most essential part of the treatment. Other than this the local treatment as described under atrophic rhinitis applies here.

Tonsillitis

There is perhaps no other organ of the body, diseases of which have caused a greater variance of opinion relative to treatment than the tonsils. There are those who believe that every hypertrophied, atrophied, or infected tonsil together with its fellow of the opposite side should be removed. There are also those who believe that no tonsils, regardless of their pathology, should ever be removed. These are the radicals and their views are not at all in keeping with present day facts.

Those physicians and surgeons who have tried to arrive at some safe conclusion on this subject, believe that there are certain methods of non-surgical treatment which are effective in many cases and they also believe that in other cases, tonsillectomy is imperative.

Functions of the Tonsils.—Many and varied functions for the tonsils have been held by various theorists such as: the absorption of the products of salivary digestion; the secretion of an amylolytic ferment; that they are atavistic structures and therefore have no function; that they eliminate systemic toxins; that they serve as culture tubes for the production of vaccines; that they protect the deeper cervical tissues from bacterial invasion; the theory of internal secretion and a score of other theories which so far, have never been substantiated by either clinical or experimental evidence.

The hematopoietic theory or the theory of blood formation has a rather definite basis because such a function would be possible from the histologic structure. The formation of small lymphocytes has been attributed to tonsil tissue (Flemming) and this view has been generally accepted. Some of the lymphocytes however, find their way through the epithelial walls into the crypts and are discharged as “mucous plugs”, while others are carried by the efferent lymphatics into the circulatory system. In this respect, the tonsils, like other lymphoid tissue, produce lymphocytes which are essential constituents of the blood. This function is particularly marked during the growing period, but this function is also highly developed in all lymph nodules during this period, and in the growing child there is an abundance of such tissue and thus it seems that the tonsils, while important to the growing child, would not be at all indispensable structures.

Some physicians claim to have observed deficiencies in growth and development of children whose tonsils had been removed during the first ten or fifteen years of life, but this is not commonly accepted. The tonsils have their greatest cellular activity during the growing period and unless chronically hypertrophied they atrophy during adult life.

Tonsillectomy

We may safely conclude from this evidence, that in the growing child, it may be well to retain the tonsils providing they are not directly affected in such a way as to endanger the general health of the child, but that there is little, if any, danger in their early removal. In adults, there seems to be no reason why they should not be removed in cases in which there is evidence

of involvement beyond restoration by treatment or those cases in which there is evidence of toxic absorption.

When surgical removal of the tonsils is indicated, the complete removal or tonsillectomy should always be done. A careful and complete enucleation of the tonsils when properly done will never be followed by any untoward results other than the temporary surgical sore throat. There is never any excuse, much less a reason, for partial removal of the tonsils or tonsillotomy, because such operations never accomplish the desired result and they nearly always require tonsillectomy later.

In association with a reputable vocal teacher I have studied the results of tonsillectomy on the voice. In none of the twenty cases studied was there any impairment following the operation, but on the other hand sixty per cent were improved either in range of pitch, quality or endurance, in addition to their being more free from laryngitis, pharyngitis, etc. for which the operation was done. Doctors Ruddy, Edwards and Reid of our profession have told me of similar experiences, so I am certain that tonsillectomy properly done will in selected cases, improve the voice.

Acute Tonsillitis

Acute tonsillitis is an acute infectious and often a contagious disease characterized pathologically by inflammation of the tonsils. Some authors differentiate between follicular tonsillitis in which the crypts or lacunæ are involved, and parenchymatous tonsillitis in which the parenchyma is involved.

Etiology.—The predisposing and exciting causes are the same as in other acute infections of the upper air passages except that there is usually a chronic tonsillitis as a result of some previous attack.

Symptoms and Diagnosis.—The symptoms also are similar to other acute infections of the nasopharyngeal tract, with sore throat, variable temperature, headache, etc. By direct examination of the pharynx, the protruding masses with white or yellow patches are readily seen.

Treatment.—Infection, drainage and elimination are three words inseparable in the therapeutics. The local treatment (I doubt if many will agree) in either acute or chronic tonsillitis is essentially the same—radical

aspiration drainage. In all cases, except young children who will not permit it, I place a vacuum cup directly over the tonsil and apply as much vacuum as can be obtained. This treatment will, when properly done, empty the crypts of all pus. This accomplished, each crypt is probed with a cotton applicator dipped into phenol-glycerine.

Cervical and upper thoracic treatment and deep relaxation of the sub-tonsil tissues to increase the normal blood supply and to decrease congestion by drainage elimination are essential. The lower thoracic and lumbar should receive due attention for the purpose of increasing general elimination. The diet and other treatment are no different from that in other infectious fevers.

Peritonsillar Abscess

(Quinsy Sore Throat.)

Peritonsillar abscess results from the collection of pyogenic bacteria and pus formation between the tonsil and the pillars of the fauces. It is perhaps a result of the closing of an infected crypt causing deep penetration of the pus.

Diagnosis.—The symptoms are those of acute tonsillitis but usually more marked and with one tonsil decidedly more protruding than the other. In some cases the location of the abscess can be seen and it is comparatively easy to open with a knife or probe, but in many cases the abscess is so situated that it cannot be located except by exploratory probing.

Treatment.—Drainage by direct incision of the abscess pocket is indicated as early as a definite diagnosis can be made. There is no definite technic to be followed except to observe certain general principles. If the "pointing" of the abscess can be located, it is comparatively easy to make a good, free, direct incision and accomplish complete drainage. In many cases the only way to locate the pocket is to employ a probe or small, long, scalpel and explore between the pillar and tonsil until the pus pocket is found. As soon as this is located the pus pours out around the probe and this gives the location. Free drainage by means of a liberal incision should then be made. Aspiration of the pus pocket and filling with phenol-glycerine is

effective after drainage has been obtained, but a liberal drainage must be maintained.

The non-surgical treatment as described under acute tonsillitis is to be applied here.

Chronic Tonsillitis

Chronic tonsillitis usually is the result of one or many attacks of acute infections of the tonsils. Occasionally cases of marked chronic tonsillitis occur in which the patient denies ever having had an acute attack.

The pathology consists of hypertrophy of the lymphoid tissue and connective tissue.

Diagnosis.—The purpose in diagnosis is not to determine whether the tonsil is hypertrophied but to determine whether the tonsil is causing any local or general physiological perversions and if so, whether local treatment or surgery should be applied.

The direct examination should be made very carefully, because otherwise a bad tonsil may be readily overlooked. The mere fact that a tonsil is large or has open crypts from which a whitish mass may be expressed does not mean that such a tonsil is directly responsible for local or systemic physiologic perversions.

The examination should be made by means of a tongue depressor, tonsil retractor and a good head mirror and reflecting lamp. Every part of the tonsil and surrounding pillars should be carefully examined. Firm pressure applied against the tonsil from in front and behind will often force material from the crypts or out around the capsular margin. Any such material thus expressed should be examined microscopically. By probing the crypts with a small pointed cotton-wound probe and staining the material obtained, the condition of the deep parts of the tonsil can be determined.

The symptoms in every case, are to be considered with the microscopic findings, but there are cases in which either of these, together with appearance on direct examination, is sufficient to determine the advisability of tonsillectomy.

In general, we may say that the following factors would indicate tonsillectomy.

1. Chronic, recurrent tonsillitis with or without complications, which does not respond to non-surgical treatment.

2. Positive evidence of arthritis of any form with microscopic evidence of some virulent organism, such as staphylococcus, streptococcus or long-chain pneumococcus, present deep in the tonsillar tissue.

3. Any persistent discharge of pus from the tonsil in which the microscope shows the presence of virulent bacteria and which will not be relieved by treatment.

4. Markedly hypertrophied tonsils which directly interfere with the voice, deglutition or respiration and which do not respond to treatment.

5. Persistent focal infections of the middle ears, or sinuses or root abscesses which do not respond to treatment and in which case there is a virulent infection of the deep parts of the tonsil, shown by microscopic examination.

The above are only general conditions and there are probably many other indications or groups of symptoms that would indicate tonsillectomy. In most cases, unless the findings show positively that tonsillectomy should not be delayed, we advise treatment. If treatment does not restore to normal, it will probably reduce the time of the surgical sore throat following the operation.

Non-surgical treatment.—The local direct treatment, as we practice it, consists of: 1. Direct aspiration by means of the tonsil cup, applying from fifteen to twenty inches of vacuum. 2. Application of phenol-glycerine by means of cotton applicator to the full depth of each crypt. 3. Irrigation of the crypts by means of a catheter and hot salt mixture solution. 4. Syringing of the crypts by means of the catheter and phenol 10%, alcohol 20% and glycerine 70%.

The digital treatment of the tonsil consists of: 1. Applying pressure against the anterior pillar thus forcing the contents out of the tonsil, the Ruddy method. 2. By the bidigital technic, the front finger of one hand inside, posterior and inferior to the tonsil and the fingers of the other hand outside exerting deep pressure and opposing the finger inside. In this way

the tonsil can be lifted forward and upward and its contents expressed. The digital treatment is not as effective as that described above.

The osteopathic corrective treatment consists of adjustment of the atlas and axis and the mandibular articulation and the obtaining of free movement of the hyoid and the relaxation of the submaxillary musculature and other deep structures.

This treatment, if followed persistently, will relieve the local symptoms of a very high percentage of cases of chronic tonsillitis, and in many cases even the systemic complications will be relieved. Whether in cases of systemic absorption this is the preferable treatment I am not sure, because, once the local condition is improved the patient will usually refuse operation and even if the physician finds definite evidence of toxic absorption he cannot convince the patient that his tonsils require surgery.

MENTAL DISEASES

BY

L. Van H. Gerdine and A. G. Hildreth.

INTRODUCTION

The subjects herewith presented, while including certain of the most important sections of mental disease, make no claim to completeness either in the subject matter presented or in the attempt to cover the entire field of the psychoses. They cover those portions, however, with which we have come in closest touch at the Still-Hildreth Sanatorium, and in which we have the most complete records. I have been aided in the compilation of the essential facts and statistics by the able staff of the institution and wish to acknowledge especially the valuable cooperation of Dr. C. M. VanDuzer in the Dementia Praecox group, Dr. H. P. Hoyle in the Manic Depressive group, Dr. B. L. Jemmette in the group entitled Delirium, Confusion and Stupor, Dr. J. C. Snyder in the Senile Dementia group and Dr. G. S. Elkins in the Involutional group. The opinions concerning each type held by Dr. A. G. Hildreth are appended under its appropriate heading. I wish to state emphatically that the sole treatment carried out in the Macon Institution is specific corrective work upon spinal lesions, and it is upon this treatment that the statistics are based which are to be found throughout the text. These records cover more than 700 cases, including complete histories of the patients with the physical and mental findings on examination; these represent, therefore, by far the largest body of statistics ever accumulated in the study of osteopathic results in mental disorders. While the results naturally vary in different types of mental disease the grand total shows that more than one-half of all patients admitted recovered. Details for each group will be mentioned under its appropriate heading. While adjuncts such as diet and hydrotherapy have been utilized; we certainly cannot attribute any curative value to their influence.

It should be further emphasized that in no case whatsoever has medicine been used as a curative agent. And the same may be said of surgery. It has

indeed been conclusively proved even in the medical world that medicines and surgical procedures are absolutely ineffective; from the osteopathic viewpoint this of course is perfectly reasonable since the theory calls for definite lesions as causative factors and these lesions can hardly be reached other than by the osteopathic method of correction. The results obtained, therefore, could only be attributed to the genuine osteopathic principle enunciated by Dr. A. T. Still who kept in close touch with the work and gave it his approval up to the time of his death. He had always maintained that the osteopathic principle could accomplish remarkable results in this field and considering the previous inefficiency of any other method his confidence has been fully justified.

Dementia Praecox

This condition refers to mental disorders arising usually during the period of puberty or adolescence, therefore, between the ages of fourteen and twenty-five for the most part, although apparently similar cases may arise in later years. The term dementia refers to mental deterioration and enfeeblement, while "praecox" signifies adolescence, though some writers infer that the term praecox may be used to indicate the early or precocious development of the mental enfeeblement. Certain it is that in most cases deterioration, with its resulting symptoms of mental enfeeblement giving rise to the term dementia, usually occurs in time, though by no means always early. It is a chronic progressive disease which may terminate in a complete loss of mentality; in other cases it may become arrested in any stage and remain so permanently; in still others it may recover, though this is rare. By reason of the variability of the symptoms, three groups are generally recognized, first suggested by Kraepelin. Each is differentiated by more or less characteristic symptoms and referred to under the head of the Hebephrenic, Catatonic and Paranoid types, although all have certain symptoms in common and there are mixed types.

Etiology.—According to the authorities some form of hereditary factor can be found in some fifty per cent or more of all cases; this is supposed to create a predisposition, a natural weakness of the nervous system, which renders it unable to bear the ordinary storm and stress of life, so that the mechanism becomes according to the French expression, "wrecked upon

the rock of puberty or adolescence;" in other words, a premature giving way of the nervous system, being inherently unable to stand the strain of life. Another suggestion is that it represents the outcome of abnormal types or reactions of the individual to the environment, with a failure of proper adjustment to surroundings and the formation consequently of mental problems which to the patient are incapable of solution. This may be called the psychological theory. The most commonly accepted idea, however, is the physical causation. According to this the disease results from auto-intoxication, the intoxicant arising from the disturbances of the glands with internal secretions, more particularly the sexual glands. This endocrine theory is supposed to be supported by the fact of the appearance of this disease most commonly at the time of puberty and shortly thereafter.

The osteopathic conception fits in very well with this latter view, inasmuch as the spinal lesions are quite capable of explaining not only a disturbance of innervation to the glands with the resultant interference in their normal secretion, but also could produce disorder of the circulation and nutrition to the brain.

Symptomatology.—Although each variety of Dementia Praecox has special symptoms characteristic of the type there are certain symptoms common to all forms, and these will be first considered. All the functions of the mind in the course of time tend to become disturbed and to be weakened, but in the earlier stages we find marked differences as regards the disturbance of different functions, thus memory and orientation in most cases seem good; on the contrary, attention and association of ideas somewhat poor. Emotional life is almost always markedly affected, even in the beginning. Very commonly at first there is depression to be followed later by expansive feelings and then by apathy in general. The will power is altered early and the conduct is apt to be peculiar. The judgment becomes impaired. All of these symptoms mentioned are deviations from the normal in the patient and therefore presuppose that the patient was formerly normal. This should sharply differentiate the praecox group from cases of defective development (imbecility or idiocy). In this latter group there is an arrest of development of the mind, whereas in praecox there is a loss in a developed intellect. We see a young patient, for example, who has lost interest in things about him, neglects his work at school or at home, remains alone for long periods of time and seems unwilling to mingle with other

people. He gives the impression of one depressed and worried about something he is trying to solve, perhaps he mutters to himself or gives way to unprovoked laughter, he may refuse to eat, or to talk unless questioned and may even then not answer. When he does talk it will be discovered that he knows perfectly well where he is, and knows people around him and understands everything that is going on; his memory will be found good, he can usually recall past incidents and tell what he has been doing recently. As the condition progresses, however, while the patient may still for a long time retain fair orientation and memory for past events, his accumulation of recent ideas will be found poor, so that he will recall them with difficulty. We notice that it is difficult to get the patient's attention and concentration seems to be impossible, he may answer a direct question, but immediately seems to be occupied with other thoughts and it takes some little effort to gain his attention again. If he continues to talk it is plain that the association of ideas is poor, giving rise to disconnected phrases which usually come forth sluggishly and without show of emotion. Dissociation of ideas occurs; that is, different ideas expressed may practically contradict themselves. For example, the patient may say he is a king and yet when asked to sweep the floor will do it perhaps without hesitation, not considering that is hardly the kind of work a king would do. The dissociation is also marked in the contradiction found between the content of the thought and its associated emotional idea, for example, the patient may speak of a near relative as dying recently, yet with no show of emotion, even with a meaningless laugh. This dissociation may ultimately result in complete incoherence, in which no sense can be found whatsoever in his speech. Emotional indifference is noticeable early and sluggishness of reactions to stimuli, even failure of such reactions; the patient will neglect himself, stay away from meals, express no desires and make no complaints. In the earlier stages, however, the patient who may have been for some little time apathetic, suddenly without apparent cause becomes angry, noisy, and possibly violent and destructive, again gradually relapsing into his quiet, apathetic state. The thought content is commonly associated with delusions, that is obviously false ideas, but which the patient is unable to perceive are false. Delusions of persecution are most common, the patient feeling in a dim way that everything is not right; and in attempting to explain to himself the reason, often attributes causes to people or forces outside of himself, and on account of the feeling of bodily discomfort, also by reason of the

depression, he explains the external forces as unfriendly to himself. Hallucinations may be present and furnish the material around which the delusions form; on the other hand hallucinations may result from the delusions. By hallucination is meant a false sense perception, as the patient may state he sees someone before him who is not there, or that he hears voices from individuals who are not around him; he may also complain of receiving electrical shocks, or wireless messages, which he usually states come from his persecutors. Symptoms of this nature form a good example of the so-called split personality, or "schizophrenia," wherein certain idea complexes are split off from the main personality and address themselves to the main portion, the patient attributing these noises (voices), sensations (visceral and tactile), tastes and smells to an objective rather than a subjective source and subsequently forming delusions. However, unless we are dealing with the paranoid form the delusions are fragmentary, transient and absurd.

Hebephrenia.—This is a progressing mental enfeeblement, terminating usually in deterioration, and without showing marked peculiarities in thought or action aside from the progressing deficiency. The patient appears in general inactive, lacking in energy and ambition, indifferent, depressed, incapable of much concentration and hence the efficiency becomes progressively impaired until he is unable to accomplish anything. From time to time there may be periods of confusion, depression, passivity, at other times periods of excitement.

Catatonia.—In this form the general symptoms are similar to those of the simple type above described with the addition of the special symptoms referred to as catatonic excitement and catatonic stupor. The excitement period is manifested by an unrest and monotonous activity, stereotyped actions and speech, the patient constantly repeating some act, such as moving the hand, foot or head over and over again in the same way, or repeating the same word or phrase indefinitely. This occurs apparently involuntarily, the actions being automatic in character. The patient who has been in a semistuporous state may pick up a glass or chair and without show of emotion break it against the wall. In catatonic stupor the patient may show in the lighter degrees a simple loss of interest and feeling with sluggish reaction to stimuli, or a profound inactivity and stupor in which state he cannot apparently be reached by any stimuli; nevertheless, he

apparently retains consciousness. In this type we observe the interesting symptom of negativism in which the patient always does the opposite of what he is requested, or refuses outright to obey any command. There may be a refusal of food so that the patient has to be fed by a tube, mutism may be present, the patient may go for weeks or months without saying a word; stereotype of attitude results in cataleptic poses and rigidity, in which the patient may maintain any particular pose for a prolonged period of time, and if placed in some other attitude may similarly retain the new attitude for a long time. This constitutes the so-called wax like rigidity, the patient reminding one of a wax figure. Pathologic suggestibility occurs in which the patient imitates movements, or repeats words and phrases that are spoken or performed before him.

Paranoiac Form.—In this type delusions predominate and are characterized by variability, inconsistency, illogicality and transitoriness on the one hand, with many gradations to the opposite extreme where they become more or less fixed, and often dovetail into each other forming apparently a systematic whole. They tend to be usually of a persecutory and hypochondriacal character and in later stages when the mind is distinctly weakened are often of a grandiose type. Sometimes the patients have some kind of explanations for them and at other times none whatsoever, and they are often curiously dissociated from the emotional accompaniment. The patient may state there is poison in his food, in an indifferent tone of voice or even with a laugh; he may claim that his teeth are all set in wrong and offer no explanations to these obviously false ideas. The patient commonly thinks that somebody “has it in for him,” someone will do him mischief, will kill him, that people are talking about him and criticizing him, everything that he hears or reads he thinks has some bearing on himself, so-called “delusions of reference.” Hallucinations may be present, the patient hearing voices, or receiving impressions or ideas which he claims come from without. These external impressions he misinterprets as voices or forces which are accusing, threatening and slandering him. Later on, the patient tends to change from the depressed persecutory stage to an expansive one, when he claims he is some celebrated person, king or president, or pope. The impairment of the judgment is clearly demonstrated in these cases since the patient who may claim to be the king of England may beg the attendant to change his place at the table or for a postage stamp.

Pathologic Anatomy.—This is obscure. Since a certain proportion of cases recover, there can evidently be no degenerative changes at the outset, though some cases deteriorate fairly early, others only after several years. In some chronic cases there have been observed degenerative changes in the cortical cells.

Diagnosis.—First, the common age of onset during puberty and adolescence, fourteen to twenty-four in the vast majority of cases, this being the only common mental disease occurring during this age period. Second, the progressive character terminating in mental enfeeblement or deterioration, that is "dementia" proper. Third, the evidence of defect or deficiency symptoms indicating that the patient's mind has altered in the sense of deterioration from its former normal condition, whereas, in imbeciles or idiots the mind has failed to develop in the first place. Fourth, in the earlier stages particularly the marked dissociation of the brain powers, some being well maintained as memory and orientation (that is knowledge of time and space), others being weakened, such as judgment, power of attention and the like. Fifth, the early appearance of the emotional defect, a remarkable indifference and apathy of the patient to people and surroundings, the patient being unsocial and taking no interest in anything. Sixth, all the peculiar motor reactions, which are mentioned above under the catatonic head, and which very rarely occur in any other mental disorder. Seventh, the delusional content nearly always refers to the patient's exterior, forces outside of him, people or things which are exerting an unfavorable influence upon him, delusions of persecution and reference. The patient practically never accuses himself, as is the rule in cases of true melancholia, never blames himself, but always the other party or the other force outside of him. Eighth, the delusions of grandeur are usually indicative of a stage of deterioration.

Prognosis.—Some authorities are inclined to doubt if any case ever completely recovers, claiming that in apparent recovery it may have been a question of mistaken diagnosis, or that the recovery is more apparent than real, that the patient is not truly well, or will have a relapse, so that a permanent cure will be impossible. Other authorities admit the possibility of recovery though in a very small minority of cases. The statistics of the Still-Hildreth Sanatorium, covering more than two-hundred fifty cases show total recoveries of at least one-third. This includes all types and all stages of

progress, many being advanced on entrance. Of the less advanced cases and those of not more than two or three years' standing there have been some fifty per cent recovery. Many cases make improvement or become stationary in greatly improved condition, but are not included in the thirty per cent. Of the three types, the catatonic offers the best prognosis, the hebeprhenic the poorest, while the paranoiac occupies an intermediate position.

Treatment.—Of the etiologic factors above mentioned, that of auto-intoxication, resulting possibly from endocrine disturbances or other sources, is most generally accepted in the medical world and agrees excellently with the osteopathic point of view. Spinal lesions are regularly found more particularly in the dorsal region, which are quite capable of disturbing the innervation to the glands; therefore, their nutrition and activity. A correction of these before the disturbance has continued too long, and hence before deterioration has set in, should theoretically normalize the glandular condition and therefore prevent deterioration and enable the patient to recover. Such is the probable explanation of the results, and in many cases the recoveries were obtained in patients previously considered hopeless.

Remarks by Dr. Hildreth

In a great majority of the cases the cause lies in the interference between the fourth dorsal vertebra and the eighth, which analyzed means a disturbance of the great splanchnic nerves, through whose interference would be caused the toxic condition and even the sexual disturbance described in so many cases from standard authorities. The same lesion, if deep seated enough, could produce an interference with the vasomotors and reflexly interfere with the circulation to the brain. In many we also find a first, second or third cervical lesion. The effects of these lesions on the equilibrium of the circulation to the brain are easily traced through the superior cervical sympathetic ganglia. These lesions, namely, the mid-dorsal and upper cervical, especially when corrected in the earlier stages, have thus far proven to produce successful results. In a lesser number of cases we find the cause to be from the first to the fourth dorsal vertebræ; our reasoning here being that the interference or the physical disturbance

must be so deep that it reaches and interferes with the deeper nerve currents, both downward and upward, thus disturbing the equilibrium of the circulation to the brain. We have found this class to be the hardest to respond to treatment; however, that may be due to the fact that the physical defects at that point are harder to correct. Osteopathic treatment applied to the lesions above described without question offers therapeutics of intrinsic value to this class of patients.

Delirium, Confusion and Stupor

This clinical group has become well established, not only in its recognition from the dominant symptoms as indicated above, but also from rather definite causes. The immediate cause seems to be an abnormal blood state, or so-called toxemia, which may result from infectious diseases, or states of exhaustion, or autointoxications, or foreign poisons; the poison acts as an irritant to the brain. In states of exhaustion so-called “fatigue bodies” are formed and are apparently toxic in character. The autointoxicants may have various sources, such as chronic kidney disease, or diabetes, and the like. The most important of the foreign poisons are alcohol and morphine. This morbid group is further characterized not only by a toxic cause and dominant symptom complex of delirium, or confusion, or stupor, but by a similar onset and course. The onset is usually acute and the course somewhat wave like, gradually reaching a climax and subsiding, or resulting in death or becoming chronic. To emphasize the clinical symptoms of confusion which is so important the term “acute confusional insanity” has often been used, or “amentia,” according to the common German terminology. Hallucinations also play a prominent part, particularly those of vision; hence, another common appellation, “acute hallucinatory confusion.” Heredity is mentioned at most as creating a predisposition, though often the personal and family histories show no such evidence whatsoever. Intellectually there is a definite lack of orientation, the patient is unable to identify himself or his surroundings in time and space. He cannot clearly understand what goes on around him, that is, consciousness is “clouded;” the clouding may be of such extreme degree the patient’s mind becomes blank, due to complete psychic inhibition. This is referred to as stupor. The emotional life plays a secondary role subordinate to the intellectual content. The patient may be greatly excited for example,

resulting from a frightful hallucination. The hallucinations are mainly of the visual type and are almost always present. The patient lives in a perpetual state of sense deception as if he were constantly dreaming; the hallucinations for the most part are of distressing, disagreeable or even frightful character. These may give rise to delusions, which are manifold, often fantastic and usually transitory.

Physical changes are always found associated with the disturbed mental status. If it arises during the active stage of an infectious process there is of course the high temperature and all other physical signs of fever. In a certain number of cases with temperature no definite signs can be found indicative of any of the well known fevers, hence has been called by various names, such as “Bell’s Delirium,” “Acute Mania Gravis,” or “Acute Febrile Delirium.” This ordinarily runs an acute rapid course with very high temperature, very marked delirium, followed by stupor and usually death from exhaustion. Even though no temperature be present the physical condition reminds one very much of that found in fever diseases. There is the lost appetite, resulting emaciation and malnutrition, insomnia, exhaustion, etc.

Osteopathic Theory.—While it may be admitted that the various factors mentioned above may take part as exciting or predisposing causes, it is obvious that in numerous instances mental disorders do not arise whatsoever, even when the patient is subjected to these factors. There must necessarily be other elements essential to produce the psychosis. The osteopathic theory comes in at this point to fill in and complete the chain of causes and to initiate the onset by the introduction of the idea of nutritional and circulatory disturbances resulting from the spinal lesions.

The records of the Still-Hildreth Institution show 18 of the toxic type, in which the poison is derived from without, who were treated, with 17 recoveries. There were 25 cases connected with the infection and exhaustion group, with 20 recoveries.

Remarks by Dr. Hildreth

In this group we have to do with blood disorders, resulting from the infections, conditions producing exhaustion, and the various toxins, or poisons, whether originating within the body or derived from without.

These disorders are largely functional in character, resulting from brain irritation due to the toxemia or disturbance to the centers of nutrition. The main object of the osteopathic treatment, therefore, is to aid elimination and regulate and build up the nutrition. In most of the patients the physical lesions are found in the mid-dorsal area, chiefly from the 4th to the 7th, and in the cervical region, the 1st to the 3d. In aiding the kidneys in elimination the 10th and 11th dorsal vertebræ must be looked after. These conditions commonly respond very rapidly to the treatment and represent one of our most successful groups so far as results are concerned.

Manic Depressive Psychoses

The psychoses which are brought together under this classification include mental disorders which at first glance would appear to be of very wide variation, namely, conditions of maniacal excitement and those of depression. Further consideration, however, reveals the very evident reasons why they should be united as sub groups under the one head. The fact that these two mental states of seemingly opposite characteristics often appear alternately in the same individual, that in certain cases of each type there is a wave like feature in the nature of the attack and the frequency with which they tend to recur, together with other points of similarity in respect to duration, prognosis, etc., tend to point to their very close relationship. Kraepelin was the first to draw attention to these facts and advocate the present convenient and widely accepted classification of these disorders.

The outstanding feature is the disturbed emotional state which dominates and overshadows all other symptoms and is fundamentally the same whether expressed through the excitement of mania or the depression of melancholia.

Etiology.—Heredity is considered an important factor. Various authorities claim to have demonstrated direct hereditary influences in as many as eighty per cent and more of cases. Individual predisposition resolves itself into a matter of constitution and temperament in which there seems to be a greater tendency among those who are subject to the emotional extremes.

Early adult life is by far its most frequent period of onset, though it may arise also somewhat later. In certain cases the beginning of the disorder

dates from some psychic or emotional shock. Just what importance these factors have as causes is little known since other cases develop in which the constitutional element alone seems responsible and no immediate exciting cause can be demonstrated.

The osteopathic viewpoint emphasizes the all important influence of spinal lesions as exciting factors. In individuals who have a tendency to this reaction their presence disturbing the cerebral circulation and nutrition may act as the direct causative factor.

Manic Phase.—The manifestation of this condition is brought about by the release of the inhibiting influences which normally govern all psychic function. Various terms as hypomania, acute mania, delirious mania, etc., have been used to differentiate the different degrees in which the symptoms appear.

In the milder types we find the following symptoms present. There is a marked feeling of well being. The patient, having lost sight of his personal limitations, feels a consequent exalted opinion of himself. His conduct is often rather boisterous, he talks a great deal, often swearing and using obscene language. He is inconsiderate of others and tries to impose his will upon those about him. There goes with this a certain unstability of the emotional tone as manifested by the quickly changing feeling of good humor, irritability and anger. There is a rapid flow of ideas with a marked loss in the ability to concentrate and direct thought. The ideas which pass through the mind do not coordinate themselves toward a definite goal, but deviate from the course of consecutive thinking by any passing association. Again there is a restlessness and activity beyond all normal bounds. The individual feels strong physically and mentally. The appetite is unusually good and if activity is not too extreme there may be a gain in weight. The period of sleep is diminished and the feeling of fatigue is reduced.

In the more exaggerated cases the flight of ideas becomes more marked, the associations are more rapid and superficial and the attention is focused but momentarily. Illusions and delusions may be present due to the imperfect preceptions from inability to concentrate attention and from abnormal associations. Rhyming speech, disconnection of phrases and even apparent incoherence are often present. The state of mind may be such that the patient tears his clothing, breaks up furniture, jumps, dances and shouts

and often will not take time to eat. The most extreme cases which refuse food over some period of time progress rapidly to exhaustion and measures to conserve strength become imperative.

Depressive Phase.—In this phase of the disorder are encountered manifestations which are in direct contrast to those presented in the manic phase. In place of the exalted emotional state there is a depression. There is a tendency to worry over trivial matters of the daily routine and of instances in past life. Introspection is the predominant mental attitude and the whole outer world is colored by the inner feeling of worry and uncertainty. Replacing the rapidity of thought in the manic phase there is a distinct slowing of mental processes in the depressive phase. Thinking is more difficult and labored, questions are answered slowly and with an apparent effort and there is usually a tendency to avoid social life.

Again replacing the excessive activity in mania the depressions show a retarded action. There is disinclination or disability toward any effort either motor or mental. The patient feels weak and incapable of effort, the body assumes a bent attitude and the facial expression is one of despondency. The appetite is usually impaired with resultant loss of weight, the bowels are sluggish, the period of sleep reduced.

In the more exaggerated cases the retardation may be complete. Introspection is carried to the degree where the patient tries to take unto himself the responsibility for all the sin in the world. He himself is the arch sinner and he feels himself the subject of punishment by divine wrath in a manner in which no other individual was ever punished. Also the introspection tends to produce various hypochondriacal ideas. The patient may feel that he has contracted some incurable disease and that certain bodily functions have ceased operating.

Mental processes become not only retarded and difficult, but actually painful, a symptom which has been termed psychalgia. Suicidal tendencies are also quite frequently present.

In extreme conditions the patient may become so retarded in thought and activity that he apparently receives no stimulus from the outer world. He lives in a more or less stuporous state, even requiring that food be administered by tube.

Circular Insanity and Mixed Forms.—In addition to the conditions in which simply mania or melancholia are manifest there are certain cases which show variations and combinations of these forms. A common type is that in which there is an alternation of the manic and depressed conditions. The patient may pass directly from one state into the other, or there may be an intervening period of lucidity. The term circular insanity has been applied to this type. Other variations are those in which there are recurrences of the manic or depressive attacks often at more or less regular intervals, each recurrence being a practical repetition of the preceding.

There is also possible a considerable intermingling of the characteristics of the two types. In the manias may occur difficulty of thinking, passing feelings of depression and even almost stuporous conditions. In depressions there can exist a marked degree of restlessness and activity and a rapidity in the flow of ideas.

Prognosis.—The outlook for recovery from the individual attack is good. The attack may last from a period of days to one of a number of months and recovery comes with rarely any evidence of mental deterioration. There is a tendency to recurrence of the trouble. In fact recurrence is the rule rather than the exception. In the osteopathic handling of these cases it has been the endeavor to demonstrate that the correction of lesions had a tendency to lessen the duration of the individual attack and reduce the tendency to recurrence. Judging from the experience thus far gained in the observation of cases under treatment during the attack and the comparative few recurrences reported both of these aims have been attained.

Treatment.—The osteopathic measures are aimed at the correction of the spinal lesions, especially those located in the upper dorsal and the cervical regions. Some reflex effects from lesions in more remote areas may have their influence so that it is wise to look to the correction of any other structural variations when present.

Remarks by Dr. Hildreth

The mental disorders of this type are purely functional and may cover a broad scope as to causes; however, from the osteopathic viewpoint a great majority of them seem to have as their specific exciting cause, lesions in the upper dorsal and upper cervical regions. The treatment should be applied

specifically to the cause which may range anywhere from the 1st to the 8th dorsal, or from the 1st to the 3d cervical, covering the nutritional and circulatory centers and thus controlling the nutrition and circulation to the brain. There can be no question but what the osteopathic theory of adjustment of physical defects forms the basis of permanent cure, since many of our recoveries had been previously under other methods of treatment without results. Our records cover over 200 cases with recovery in more than two-thirds, and very few recurrences up to the present.

Involutional Psychosis

In the mid years of life, between forty and sixty, a decline begins, which in the older years results in decay; it is especially true at this period of the sexual life and the organs underlying it. While these organs undergo a very definite change constituting the so-called climacteric period in women, it is not at first sight so evident in men; however, the evidence is that a somewhat similar process, though much slower, tends to occur in the male. Associated with the decay of the sexual organs is a disturbance presumably of the internal secretions; if this latter disturbance takes place slowly and evenly the body may not notice any marked changes; on the other hand, if it takes place more quickly, or unevenly, it may give rise to distinct symptoms which indicate a disturbance of the nervous system in general and often even of the mentality. Hence, the significance of the term, Involutional Psychosis. In a large majority of cases the mental disorder is marked by the dominance of depression and is frequently referred to as melancholia. For a long time it was considered that this represented a special mental disorder having little or nothing in common with other psychoses. In recent times Dumas has studied this group very carefully and shown that it in reality has very much in common with the depressed phases of the Manic Depressive Group of psychoses. Kraepelin himself, who was the first to demonstrate the unity of the Manic Depressive Group, has accepted the conclusions of Dumas and incorporated the Involutional Depressions as a sub type of his Manic Depressive Psychosis. Among etiologic factors have been mentioned hereditary elements, which have been claimed to have been found in at least fifty per cent of all cases, forming presumably a predisposition; it is also stated that a predisposition may be acquired through various debilitating causes. Exciting factors are claimed to be present, such as mental shock,

grief, worry and the like. The disease would then seem to occur when we have a combination of exciting factors and predisposition. Careful consideration will show, however, that no such mental disturbance occurs at this age in many people who show evidences of such predisposition and of exciting factors, therefore it would seem that still other causes were necessary; if we consider the suggestion above mentioned that there are atrophic processes taking place in the sexual glands leading to a loss of the internal secretions and if we further consider that this may take place unevenly and in an unbalanced way, thus aiding in giving rise to the symptoms, we will find a definite point of contact for the osteopathic conception. Osteopathically considered, we may say that the spinal lesions lead to a disturbance of innervation and nutrition to the ductless glands, and therefore produce disordered secretions in those patients developing the disease, whereas such a condition may not be present in others who at the same age period do not develop the psychosis.

Symptomatology

The emotional tone of depression dominates the picture. Associated symptoms are anxiety, fears, particularly of impending danger, the loss of interest in the external world, with a concentration of attention upon self; psychic distress is usually present, often to an extreme degree, leading apparently to real mental pain, so-called psychalgia. Delusions are usually present and manifold in variety; they mainly refer to the patient himself and are of a self-accusatory nature; they frequently refer to notions of sins having been committed, also unworthiness of the patient, of poverty, nihilistic ideas, either about his own body or external things. He may claim for example that he has no stomach or kidney, or heart, that the external world is unreal and the like. His motor reactions become retarded, or even in the more extreme cases inhibited, producing a form of stupor. The inefficiency which results along with the psychic pain and distress may determine suicidal tendencies which are very frequent. Orientation is usually good, the patient remaining aware of his own identity and that of his surroundings; the judgment of course is impaired so that the patient is unable to appreciate the unreality of his delusions; as a result he sees no hope in the future and on account of present sufferings prefers death to life. The patient may remain in a perfectly passive mood, giving the appearance

of extreme depression, paying no attention to the surroundings, possibly mute, giving no regard to the necessity of the toilet, paying no attention to his clothing and the like. This may continue for hours or days. Food often has to be forced on him, possibly even by the tube; the result is usually more or less emaciation and may result in marked malnutrition; similarly the sleep may be seriously interfered with, even though the patient is quiet. The resulting loss of sleep and malnutrition sometimes lead to the death of the patient. On the other hand, the patient may moan and wring his hands in anguish, walking up and down, crying out that he is a sinner and that he wants to die and the like. This is the so-called melancholia agitata.

The physical symptoms of importance are sleep disturbances, poor appetite, with emaciation, cyanosis, often a subnormal temperature, low blood pressure, slowed heart action and weakened circulation. The hair may become gray, the skin dry and harsh and indeed any of the signs of senile decay may appear.

Diagnosis and Prognosis.—These depend partly upon the mental symptoms, partly upon the physical. On the mental side is to be emphasized marked depression, with the relatively clear orientation, resembling the depressed phase of Manic Depressive insanity; also the dominance of the self-accusatory delusions. On the physical side the age period, and the evidence of previous attacks, even though very slight. The prognosis from the study of the mental symptoms depends on the presence or absence of signs of defect, or deterioration, as for example foolish and silly delusions. On the physical side the presence or absence of conditions like kidney or arterial disease; in general, it may be said if the physical findings are negative and the mental symptoms show no deterioration there should be a good outlook, particularly if the condition has not become too chronic.

A favorable outlook is always possible if the disease is treated early and the lesions disturbing the activities of the glands and of nutrition and the circulation are corrected and if the other physical findings are negative and signs of deterioration absent.

Since this is probably only a sub-group of the Manic Depressive Psychoses, as has been mentioned above, the results obtained under osteopathic treatment are noted under the Manic Depressive group.

Remarks by Dr. Hildreth

Our experience with this class of cases invariably lead us to the nerve centers which regulate and control the process of nutrition and circulation; it is a matter of keeping up normal equilibrium of all organic life and especially the circulation to the brain. The basis of the treatment therefore is to be found in the nutritive centers, as well as those centers which control the circulation to the brain, the ductless glands, etc.

Senile Dementia

Senile Dementia may be defined as an abnormal weakening of the mind arising in old age. As the word dementia implies, the intellectual change is quantitative rather than qualitative, the prime characteristic of the disease being mental loss rather than mental perversion.

It is commonly stated that a most important cause of the disease is the general malnutrition incident to age. Since only a small proportion of the aged develop dementia, this is probably only a cooperating factor. Other causes mentioned are overwork, emotional strain, traumatisms, intoxications (especially alcoholism), cerebral arteriosclerosis and perhaps heredity.

Pathologic Anatomy.—The disease is organic, the brain exhibiting definite pathological tissue changes. There is an atrophy of many nerve cells and a proliferation of neuroglia fibers, so that the cerebrum becomes shrunken and hard, with thickened meninges and thinned cortex, and shows a loss of weight. The cerebral arteries may or may not exhibit sclerosis, thrombosis, or miliary aneurisms, with resultant areas of softening. The cells show pigmentary degeneration and many of the association fibers have disappeared.

Onset.—The onset of this dementia is usually very gradual, the condition not being recognized until rather marked. It occurs mainly in the seventies and later and in the late sixties, being rare before sixty. It often follows financial reverses, emotional shock, or various diseases. The earliest symptoms are a change in the person’s disposition, slight disorders of memory, and trivial lapses of various sorts.

As the disease progresses the symptoms become more marked and fundamental, involving not only the intellectual but also the emotional and volitional phases of consciousness. Interest in the outside world begins to flag, attention to wander, perception to be incomplete and inaccurate, association of ideas to be slow, memory to weaken and judgment to be impaired. Memory of the most recent incidents is the first to be lost, of recent years next, and then of middle age so that the patient may not recognize his own children or know, for example, that his wife is dead; finally the memory even of youth is lost and the patient is to all intents and purposes a child, his condition being an exaggeration and aggravation of that commonly known as "second childhood."

Several forms of Senile Dementia exist, of which the most common is probably the simple or non-delusional type. Other forms are fundamentally the same as the simple, but with certain superimposed symptoms. Fairly early in this type it becomes unsafe for the patient to continue in business. Due to impairment of memory and judgment he is apt to lose his property. Soon his work is poorly done or neglected entirely. He becomes garrulous and annoys his associates with tiresome repetitions of childish reminiscences, continually wandering from one subject to another. His speech becomes incoherent and his sentences fragmentary. He grows untidy and indifferent to the ordinary niceties and conventions of life. His appetite is either poor or voracious; in the latter case the weight may keep up fairly well. He may be either apathetic or turbulent. If the former, he seems stupid, indifferent, and sleepy. He is credulous, docile, and very suggestible. Patients of the turbulent type are restless and always moving about, either depressed or elated, giving unreasonable orders and then contradicting them. Sleeping poorly, they are apt to get up and wander about the house at night. In men, prostatic disease may cause a recrudescence of sexual feeling. Patients of either type eventually become filthy, soiling their clothing, etc. Even in well advanced cases, however, senile dements are often able to perform well certain habitual activities, such as signing their names, or playing certain games, such as checkers or dominoes.

Confusional Type.—Another form of Senile Dementia, which may in severe cases usher in the attack, but which usually, when present, is sequent to the simple form, of which it is a more severe grade, is the confusional. The additional symptoms of this type are probably due to defective

elimination and the consequent toxicity. Usually unsystematized delusions, and sometimes hallucinations are present. Except for a possible occasional period of remission the confusion is continuous. It varies greatly in degree, now being mild and passive and again active, perhaps developing into delirium. Orientation as to both time and place may be lacking. Such patients may ask for dinner a few minutes after a meal, go to bed at noon, be unable to find their own room, or to recognize their own children. They are apt to be obstinate and peevish. Delusions vary in type but both these and the hallucinations are usually painful and, being referred to the patient's associates, give rise to the thought that they are trying to kill or otherwise harm him.

Delusional Type.—A third type of Senile Dementia is the paranoid form. Dements of this type, owing to delusions of persecution and auditory hallucinations are sensitive and suspicious. Such cases may sometimes show good orientation, apparently unclouded minds, and little evidence of senility, requiring careful study to differentiate the condition from true paranoia. A patient may, on account of hallucinations of taste and smell, refuse food in the belief that it is poisoned. Members of his family who are devotedly caring for him are suspected of designs on his money, and this suspicious attitude frequently leads to unjust wills. The delusions and suspicions may be entirely concealed from the family. Wealthy paranoid elements are peculiarly apt to become the prey of scheming adventuresses, particularly in case of the above mentioned sexual recrudescence, and marry them. Opposition of the family is regarded as part of their general persecution or as due merely to their desire to get the estate. Some patients merely appear odd, suspicious, untidy, peevish, and childish. Some have expansive delusions and exhibit the euphoria so frequently found in syphilitic dements.

Senile Delirium.—A fourth type has been described by some psychiatrists under the title of senile delirium. This may appear as the initial form of the disease or as an acute attack in one of the above forms. It is characterized by great incoherence and restlessness, entire absence of orientation, and numerous rapidly changing delusions and hallucinations, the condition resembling delirium tremens. It is probably due to some somatic cause, such as nephritis, pneumonia, or cystitis, which is often fatal.

Complications may arise in Senile Dementia, such as apoplectic strokes, hemiplegia, epileptiform seizures and aphasias.

Prognosis.—It is evident from the pathology of the conditions that the prognosis is not at all good when the disease is well advanced. It is a chronic disease and usually progressive until death, which is due to one of the complications, malnutrition, or especially pneumonia. However, many cases have shown improvement, and in incipient stages recovery. A cure of advanced cases being impossible, the important consideration is prevention or arrest in its incipiency.

It is evident that this can be done only by preventing, or removing as far as possible, the predisposing causes. A glance at the list of these shows that much depends upon the cooperation of the patient by regulating his habits of life. Physical and mental overstrain must be avoided, deleterious habits, such as the use of intoxicants or narcotics given up. Much can be done by osteopathy to eliminate the effects of these upon the organism. Cardio-vascular and renal symptoms are very important and should be watched for in order that early treatment may check the process initiated. To this end the patient's habits and diet must be regulated and treatment instituted to relieve toxicity and promote elimination. Lesions must be corrected, special attention being given to the lower dorsal that affect the kidneys, the upper dorsal that affect blood pressure, and both the upper cervical and upper dorsal that affect the blood supply and nutrition of the brain.

Arteriosclerotic Dementia.—This is a mental enfeeblement arising sometimes in the fourth, but chiefly in the fifth, decade of life, and associated with symptoms of arterial hardening.

The cause is arteriosclerosis, which may be secondary to some form of nephritis. The arterial hardening may be general or may be confined to the arteries of the cerebrum. It is likely that the arterioles supplying the cortical cells are especially involved in an atheromatous condition. The disease is organic, chronic and progressive. Hemorrhage, embolism, or thrombosis may occur, producing focal lesions and areas of softening, with hemiplegia, aphasia, etc.

The earliest symptoms may be headaches and dizziness. The blood pressure is usually found to be high but not invariably. An atheromatosis may be present in some one of the palpable peripheral arteries, such as the

radials. Further symptoms on the physical side are quick fatigue, loss of energy, numbness and paresthesias of the extremities, and somnolence in the daytime or perhaps insomnia at night. Strokes may occur, usually slight and temporary, probably due to spasm in a degenerating artery or perhaps to serous effusion. Toxic symptoms appear, due to disorder in kidneys, liver, and other organs. Epileptiform seizures are possible. Mentally the patient shows impairment of memory, and perhaps some confusion and hallucinations. Rarely stupor occurs. He may be agitated and irritable or melancholy and depressed. Suspicious and persecutory ideas of the paranoid type may appear; also hypochondriacal ideas.

Osteopathic Theory.—In these psychoses of the older years of life the termination is usually dementia, which means mental enfeeblement, and which results from degenerative changes in the brain substance. As has been shown it is largely a nutritional question and the nutritional condition varies tremendously in different elderly people; it is well known that many old people preserve their brain powers fairly well to the end; on the other hand others fail relatively early, some even in the fifties; these cases of earlier failure are referred to as the "presenile type." The osteopathic conception would be to find out the source productive of the nutritional disorder and correct it at the very outset, therefore making it quite possible to prevent the disease process from taking place. The prognosis then in the earlier stages is very good.

Remarks by Dr. Hildreth

While many cooperating factors may be found in the causation of the mental disorder of elderly people, our experience shows there is always very definite disturbance of nutrition and the nutritional centers. We find chief physical interference between the 3d and 8th dorsal vertebræ, most definite as a rule at the 4th, 5th and 6th, with the corresponding ribs on the right side. Contributing causes may be found in other areas, associated with the disturbances of the heart and circulation and of the kidney. In the cardio circulatory disorders we find abnormal spinal conditions in the upper dorsal region and especially the 5th rib on the left side. In the kidney disorders we find the lesions usually at the 10th, 11th and 12th dorsal. The above mentioned areas in general represent the centers of control of the splanchnic

nerves and therefore the important processes of digestion, metabolism and assimilation. Specific treatment applied to these points is very helpful and results in marked improvement and indeed in relieving the patient's symptoms completely when in the earlier stages of the disease.

DEFECTIVE CHILDREN

By Raymond W. Bailey

It is our purpose here to impress on osteopaths the almost unlimited possibilities in the study and treatment of mental conditions of children, which heretofore have been considered hopeless. Osteopathy has demonstrated that it has much to offer to this class of defectives but the profession has not thoroughly appreciated its great possibilities. It has been the custom to send these children to institutions where they have received care with some attempt toward education but with absolutely no effort being made through physical treatment to overcome their debility. We shall show that the osteopathic lesion is of prime importance in these cases, and that we have been slow to realize the efficacy of osteopathic treatment for such seemingly hopeless children. We cannot emphasize too strongly the importance of accepting and treating these cases wherever possible.

The mental diseases are considered under two general heads: (1) Inherited, and (2) Acquired Tendencies.

1. Inherited Tendencies.—In this class are those cases arising from poor endowment of the protoplasmic structure through lowered vitality of the parents or other progenitors. These taints may come from either parent, or both, and may exist in the offspring from some preceding generation. Such diseases are constitutional and are amenable to supporting treatment in direct proportion to the amount of endowed energy inherent in any given organism.

Of the inherited tendencies, we have two kinds:

1. Congenital Diseases. (a) From any influence of an inherited nature not directly acting on the environment of the parent while the fetus is in utero, and

(b) From any influence which directly affects the development of the ovum through imperfect fertilization coming through either parent or both.

2. General Impairment.—This condition exists (a) Where a similar defect has existed in foregoing generations and is strictly hereditary;

(b) Where general vitality is diminished from such causes as neuropathic parents, or where there have existed constitutional defects, such as tuberculosis, syphilis, epilepsy, alcoholism, abuse, overwork, strain, acute inflammatory diseases, and poor health of the mother during gestation; also consanguinity.

(c) Premature birth tends to impairment physically and mentally of growth of organism and frequently leaves its manifestations of marasmus, rachitis and other nutritional disturbances.

(d) Prolonged labor may leave its mark on the child where more or less asphyxia has occurred resulting in obstruction to cerebral circulation.

Causes acting after birth to the already impaired germ cell and resulting in many of the afflictions of early life, both mentally and physically, are

1. Traumatism.
2. Convulsions.
3. Rachitis.
4. Infectious fevers.
5. Meningitis.

All of these seriously affect the metabolism within the newly-born, a process which is begun, doubtless with difficulty, and susceptible to easy derangement, and the same effect magnified with growth into its subsequent mental and physical deformity.

2. The Acquired Tendency.—In this the second great class are those conditions arising subsequent to conception where germ plasm is healthy but growth is arrested by some external factor either intra- or extra-uterine. Thus the acquired tendency may be given to the fetus in utero and not be considered congenital as in case of injury affecting health and growth of otherwise healthy conception. In short, the acquired has its beginning at conception or subsequent to it while the congenital is previous to conception or already inherent in the germ plasm leading to conception.

Any influence which retards the

1. Inherent capacity of cell for growth or,

2. Adequate blood supply either in quantity or quality results in enfeebled offspring and these causes are enhanced by

(a) Traumatism	or Injury
(b) Drink	or Abuse
(c) Dirt	or Unhygienic surroundings
(d) Depravity	or Ignorance

Factors entering into acquired tendencies affecting offspring direct are divided into three classes, those:

I. Before Birth such as

(a) Abnormal condition of mother's health during pregnancy as in disease of any nature, mental or physical or

(b) Injury to fetus direct by blow, fall of parent, or instrument.

II. During Birth from:

(a) Abnormal labor from any cause.

(b) Primogeniture.

(c) Premature birth.

III. After Birth.

(a) Traumatism.

(b) Toxic causes such as scarlet fever, whooping cough, meningitis, measles, mumps and exanthemata.

(c) Convulsions.

(d) Nutritional disturbances.

Consanguinity or intermarrying of blood relations, or in-breeding results in:

1. Instability of the nervous system.

2. Intensifying of constitutional defects.

3. Decrease in size of offspring.

4. Predisposition to disease through lowered vitality.

5. Impairment of reproductive function.

Immediate consanguinous offspring may manifest a high degree of intellectual or physical attainment but successive processes tend to neurotic types and are prone to physical weaknesses and insanity. This practice is found among Quakers and Jewish peoples, inhabitants of the Islands north of Scotland, in isolated rural localities, and among African tribes.

Mental Deficiency in Children

Synonyms.—Amentia; feeble-mindedness.

There are three grades of amentia:

1. Morons: those whose mental age corresponds closely to their chronological age or is nearly normal.

2. Imbeciles: those in whom there is a wide disparity between the mental age and the chronological age.

3. Idiots: the lowest form of arrested mentality or those whom it is impossible to teach.

Definition.—Mental deficiency is a pathological stage in which the mind has failed to attain normal development.

Various degrees of intelligence or mental capacity in man lie between:

(**1**) **Genius** such as Bacon, Newton, Plato, Galileo, Shakespeare.

(**2**) **Lesser Ability** but still conspicuous in development such as our great leaders in science, literature, reform and the arts and medicine, furthering, each their respective causes. These merge easily into

(**3**) **Average** mass of mankind.

(**4**) **Dullards** or those of inferior intelligence.

(**5**) **Feeble minded**, merging imperceptibly into

(**6**) **Imbeciles** and by insensible gradation into

(**7**) **Idiots** and gross idiots.

The mentally defective is wholly incapable at maturity of adapting himself to his environment or local conditions in order to maintain existence independent of any external support.

Dementia is a disease of the mind or that which was once possessed, and by some neuronic disturbance is lost totally or partially.

Insanity is a disturbance of neuronic function which may or may not end in degeneration of brain tissue.

Physiology.—The normal brain begins its development shortly after fertilization of the germ cell, by the expansion of the anterior end of the rudimentary spinal cord into four primary cerebral vesicles. These develop into a series of elaborate infoldings, each with multiple cells around them. At or about the sixth month of fetal life this embryonic brain assumes the shape of the adult brain, minus the secondary fissures and convolutions which are characteristic of full development.

At birth there are sometimes many convolutions and the brain weighs from 280 to 330 grams. Growth is then rapid and at six months it weighs from 560 to 680 grams;

At one year, 750 grams. It continues to increase until

At 12 to 14 years it weighs 1150 grams in the female, and 1300 in the male;

At 20 to 21 years the weight is 1244 grams in the female and 1374 in the male.

Growth is slow from this time until at 25 to 35 years the average weight of the brain is 1269 grams (45 oz.) in the female, 1421 grams (50 oz.) in the male.

This growth of the brain is due, first to the rapid multiplication of nerve cells and, secondly, to the individual enlargement of each nerve cell. These cells arise from the floor of the four primary vesicles and are each similar to its fellow. They finally show differences in feature and become characteristic in size and shape which process continues throughout life. This process of differentiation of nerve cells results in the peculiar laminated appearance of the brain cortex. At the period of lamination, the nerve cells throw out delicate processes which pursue definite directions

throughout the brain mass constituting a system of association fibers which link together in a most complicated manner all parts of the brain, and are called the association fibers of Flechsig. Projections from these cells form the various pathways by which the brain is connected to the various parts of the body.

Nerve cells in the different parts of the brain mature at different periods, those areas which have to do with the highest intellectual functions, viz., the frontal and parietal regions, maturing last.

At the seventh month of intrauterine life the brain cell is a small round type of neuroblast, undifferentiated, lying in a matrix. The cells increase in size until about the second week (extra-uterine) of life, tiny processes begin to develop. At the third to fifth year these cells are mature and possess axons, dendrons and geminules. These communicate, forming the above named association system conveying impulses to and from all parts of the cerebrospinal system. They multiply and elaborate after puberty into a complicated system up into middle life after which growth ceases and they slowly diminish.

Greatest Growth is between the first appearance of the primitive brain and the end of the sixth month of life (extra-uterine), hence it is during this period that any adverse conditions relative to development of nerve cells may cause the greatest damage.

Mind and Brain.—Whatever may be the connection between these two, we know that the former develops with the growth of brain cells and fails with their decay. **Amentia** is associated with the incomplete development of brain cells and **Dementia** is coincident with their degeneration and death.

Pathology—Brain.—Structural abnormality of the brain tissue may exist without variation of mentality or defect. Early observers gave these gross defects as a cause for amentia. However, it has been demonstrated beyond doubt by microscopic examination of cerebral neurosis that cellular changes occur and that imperfect and arrested development exists and is an essential basis of amentia.

Histology—Blood Cells.—Cortical blood cells in the ament are

1. Numerically fewer.

2. Irregular in arrangement.

3. Imperfectly developed.

4. Microscope reveals changes proportionate to the deficiency during life.

Blood-vessels in Amentia show no marked changes from those of the normal brain. Hyaline degeneration may be present; also pigmentation. These conditions are not constant in amentia hence cannot be considered causal.

Neuroglia in Amentia.—Sclerosis and hypertrophy occur in a large proportion of cases. This is diffuse throughout the brain, with here and there certain circumscribed areas forming nodules.

Nerve Fibres of Cortex in Amentia.—Association system fibres are always diminished in number and not so complicated.

Clinical Varieties of Amentia.—There are two varieties of amentia and conventionally for sake of study we must arrange them into those from

(1) Congenital causes and (2) acquired causes.

Among those which arise from congenital causes we have the microcephalous and Mongolian types. In both cases there exist constitutional taints through successive or immediately forgoing generations of such diseases as syphilis, tuberculosis, epilepsy, and acute alcoholism affecting proper collaboration of germ cells previous to fertilization and hence impaired germinal endowment through a weakened nervous system.

Those arising from acquired causes are from injury to mother or fetus.

Macrocephalus.—A person whose skull measures less than seventeen inches in its greatest circumference. This class comprises less than 10% of all aments.

Cause.—The type is neither a freak reversion of the species to a lower grade of development nor accidental, but due to an inherited blight on the nervous system arising from constitutional disease, alcoholic and sexual excesses, consanguinous unions and too numerous latter-life pregnancies in undermined health states. They come entirely from neuropathic stock and their brothers and sisters are degenerates. Many dwarfs exhibit this type.

Characteristics of Microcephaly.—(1) Circumference of skull diminished; (2) Brain smaller; (3) Stature small (5 feet); (4) Rarely live to advanced age; (5) Die of tuberculosis; (6) Mostly imbeciles and idiots (few morons).

They have their sensory impressions intact and are generally vivacious and muscularly active, even restless. They have good sight and hearing and are highly initiative but have not the ability to any sustained effort. They are actively observant and the majority are affectionate and well behaved. Some are unsteady in walking, others are helpless, and about one-half are subject to epileptic fits.

Mongolian Amentia (Mongolism).—This type (Kalunk or Tartar variety) received its name from Dr. J. Langdon Down from their facial resemblance to members of the Mongolian race. They number about 5% of all aments including the semi-mongols who have only a few of the characteristics of this type.

Cause.—Eleven out of twenty-five are from syphilitic origin. Glandular or nutritional defects are suggested as a cause. They will show negative Wassermann test and positive tuberculin tests. Uterine exhaustion and ill health of mother during gestation are factors suspected of entering into this condition. The latter-born of large families are frequently affected.

Pathology of Mongolian Idiocy.—The brain of the Mongolian ament is considerably under-sized and has less convolutions and is more shallow. The pons, medulla, and cerebellum are about half the size of ordinary feeble minded types. The cells by microscopic examination show an immature condition. This lack of brain development results in deficient expansion of base of skull, hence the characteristic physiognomy. There is no glandular abnormality.

Description of the Mongol Type.—This type is distinguished by characteristics of skull, eyes and tongue and is usually observed at birth.

1. The skull (Brachycephalous) is rounded and diminished in size particularly through the antero-posterior diameter. The face is flattened, there being no recession of frontal and supra-occipital regions.

Eyes.—The palpebral fissures are narrow and slope obliquely downward and inward. Lids inflamed.

Tongue protrudes, is large and marked by large papillæ and scored by transverse fissures due probably to tongue sucking, predisposing to inflammation of the mucous membranes.

Ears are small and round and have poorly developed and irregular lobules.

Nose is short and flat and has triangular nostrils.

Teeth are soft and ill formed and tend to decay.

Hair is usually scanty and wiry and very dry.

Cheeks are flushed. Palate is high and narrow and mouth is open, and lips are cracked. Adenoids exist in all cases.

Hands and Feet are broad and clumsy. Flat foot and knock-knees are common. Skin is rough, coarse and dry.

Abdomen is large and mushy. Umbilical hernia often present.

Circulation is rarely good, causing blueness and coldness of extremities, with sores and chilblains. Heart lesions are frequent. Lesions of a chronic inflammatory nature in respiratory and digestive tracts exist. Nasal and bronchial catarrh and diarrhea are common. Mongols die early (about 14 years) usually of phthisis.

Available statistics show the various types and variations of these conditions in great detail; however, the above will enable the reader to classify and properly diagnose in given cases. It is not the writer's intention to portray here what is easily a treatise by itself.

Osteopathic Consideration of Amentia.—During a period of five years, observation of the various types has led me to believe that much can be done to correct circulation to cerebral structure with consequent development of brain tissue and function, where discoverable trauma exists. From all available sources there is traumatic interference in from 15 to 45% of these cases, according to different authors. Where history involves constitutional findings (syphilis, tubercular, glandular and chronic alcoholism) I have treated them with the intent of relieving only until the next phase of the condition would appear. Where trauma alone exists and the family history is good, I know the case is in the field of osteopathy alone, and can be developed to a degree limited only by the intelligent care

of those having the case in charge. Especial attention should be given to discipline, housing, sanitation, personal hygiene and general environment.

Lesions.—Atlas, generally rotated. Rarely posterior but frequently resting beneath a posterior occiput. Lateral mass on the posteriorly resting portion of misplaced atlas will become interlocked with transverse process of axis in a few instances, combining the amentia with a progressive inflammatory tendency to the middle ear which by successive abscesses ultimately destroys structure and function; possibly traumatic epilepsy, and surely catarrhal inflammations in all mucous membranes of the head.

Many bony and ligamentous irregularities exist in the various types of mental defective where the cause is inherited weakness, nutritional diseases or kindred sources. Spinal luxations exist singly and in series, causing various palsies, spastic muscles, and deformity. Postural defects, particularly of ribs and costal cartilages cause functional disturbance throughout the thorax and abdomen.

Treatment.—Invariably the care of aments entails wisdom of procedure. Reconstruction is the prime object in every instance, hence time and number of treatments must not be considered. Treat to **correct structure; teach** as far as possible; **train** always.

Deft and intelligently applied technique are certainly required in the correction of these cervical lesions. Treatment should be given thrice weekly (never less than twice for progress) with definitely established mental tests before, to discern the mental level, and at succeeding periods of three months each, noting progress, if any. The Binet-Simon scale or some other available mental test should always be made and record carefully kept of each case for your own benefit as well as the patient's. After six months, if no appreciable gain is shown treatment is discontinued and the case must be cared for in another manner as beyond your special field of effort. Usually it is apparent by the end of the third month if anything can be done to improve the mentality. The physical advantages, in some cases warrant continued treatment where there is no appreciable mental gain. Institutional care of these types is the only practical means of handling them properly from an osteopathic standpoint, as it requires some one properly equipped to make your tests and keep your record;—it is sufficient for the doctor to do the work demanded. They can thus be classified and progress

systematically shown. The higher grades must be taught and though self dependence may never be attained they can in many cases by training be capable of useful pursuits and quite frequently remunerative work. It makes for happiness at least to keep them busy and forestalls the mischief that would otherwise result. Even imbeciles can help in routine work of an institution or home, and idiots may, by training, gain some power of self help and cleanliness. Training depends on the individual capacity for such in each case—his habits, and general character of his propensities. Prevention of their marriage should be positive and for prevention of their propagation this and their sterilization by operation are the only two measures at hand. Sterilization, however, is repugnant to some elements of society and could be abused, hence the segregation of aments would appear to be our only solution at present. The ultimate intention of treating any case is to use any measure tending to stabilize the nervous system. Corrective effort alone is not sufficient but these osteopathic endeavors in conjunction with proper discipline, good food, regular rest and personal hygiene both mental and physical and a scrutinizing restriction tending to any kind of excess is rendering the osteopathic procedure in such cases rapidly indispensable for the treatment of amentia.

POST-OPERATIVE TREATMENT

By GEORGE A. STILL

At the convention of the American Osteopathic Association held in Boston in 1918, I gave a short talk on the above subject, and during the day after I had given the lecture, two women and one man, graduate osteopaths, asked me if I really meant to convey the impression that we actually gave osteopathic treatments to recent surgical cases. I do not know whether I convinced them or not, but I do know that they convinced me that there are people practicing osteopathy who have absolutely no concept of its merits and underlying principles.

To my surprise I have found that a great many osteopaths who consider themselves absolutely "pure" are just a bit startled at the thought of handling post-operative complications by treatment. These are invariably fellows who have had most of their experience in office work, and who do not come in contact with acute cases. Still it is difficult to conceive how a man can believe that osteopathy is specific for certain diseased conditions and not for others. As a matter of fact osteopathic treatment has not proved itself more satisfactory in any field of therapeutics than it has in post-operative conditions.

The common post-operative conditions are pneumonia, pleurisy, backache and headache, nephritis, vomiting, neuritis, phlebitis.

Taking up these subjects and discussing the least serious first we would of necessity discuss pneumonia last, as it is the most serious, and is less influenced by other conditions. It will also serve to illustrate many of the details in treatment.

We will therefore briefly take up the other conditions and then discuss pneumonia more fully.

Vomiting

We believe there is no question that a good part of the prevention of anesthetic vomiting is in the preparation of the patient, including a good cleaning out of the bowels without debilitating cathartics. In other words, the vomiting is increased if the alimentary tract is loaded, or if on the other hand it has been irritated to the extent of losing its tone. Combining a careful preparation with a straight ether anesthesia and osteopathic treatment to the neck and splanchnics we have been able to eliminate any serious post-operative nausea. I do not recall a case in the last few years that vomited on the following day unless the condition for which they were operated was one that essentially in itself would cause vomiting; for instance if the patient had peritonitis and had been vomiting due to the toxic ileus. They might even vomit after the abdomen had been opened. This could hardly be called “post-operative” vomiting.

The improvement in our records in post-operative vomiting is in proportion to our increased faith and use of the osteopathic treatment. Time and again patients have told us that they had taken anesthetics before and were sick from three to five days and even a week. Invariably we have been able to surprise these patients by the fact that they were sick less than a day.

The usual treatment with bismuth sub-nitrate, cerium oxylate, sour wine and the other usual remedies were not used in any case or in any amount. No drugs whatever were employed.

Backache and Headache

There is practically no difference in the post-operative headache and the office headache. There is of course the usual multiplicity of causes, and as a matter of fact in this condition treatment can more nearly approach the ordinary office treatment, and the results are about the same. As for backache, we find that speed of operating and not keeping the patient under the ether too long has a marked influence. Also we have a four inch Seely mattress on the operating table which helps some. Treatment does the rest and does it effectively. For this complication even the ordinary nurse knows enough to give a treatment of some sort.

Neuritis

Nine times out of ten the post-operative neuritis is really a local osseous lesion, a slipped innominate, rib, vertebra, clavicle, biceps tendon or something of the sort, and responds quickly to a specific treatment.

Phlebitis

This complication usually comes on quite late after an operation and at first it is sometimes hard to differentiate it from a neuritis. Absolute rest of the involved part with lower spinal treatment gives relief, but under no circumstances should the affected part be freely moved while there is active inflammation. The reason for treatment of the lower spinal area is that practically always one of the saphenous veins is involved.

Nephritis

This complication is to a very big extent eliminated by a careful urinalysis prior to the operation, and careful preliminary treatment in indicated cases, and in other cases the postponement or if necessary complete elimination of the operation where it is not a case of life and death. Where the condition does appear we have found it the hardest of the post-operative complications to control. Indeed it is the only one that we have not found very easy to manage.

We do not vary the treatment for a post-operative nephritis from what we would use in any ordinary case of nephritis. We have observed treatment of this condition in many cases under medical management, and while we are satisfied with the osteopathic treatment comparatively we are not yet satisfied that we have it developed to its greatest efficiency.

Pleurisy

This condition in nearly every instance can be corrected with one or two treatments of a twisted rib unless it is the pleurisy of a beginning pneumonia. As far as the pain is concerned the simpler type hurts as much as the one that is going to develop a real complication. For this reason relief obtained by a single treatment often seems little short of miraculous to the patient.

Pneumonia

When I took charge of the surgical work at Kirksville, osteopathy was not used in post-surgical treatment. Post-operative vomiting was treated medically, as were other post-operative conditions, including pneumonia. Cases of a real major surgical nature rarely got an osteopathic treatment.

The idea seemed to be that osteopathic post-operative treatment had to be along the same lines as it would be for such an illness as lumbago, brachial neuritis, or ordinary pneumonia, and other non-surgical conditions where the patient could be placed for giving a treatment in a position that was not permissible following an operation, as it would work great harm to the wound.

It seemed to me that if osteopathy was effective in a case of ordinary non-surgical pneumonia, it should certainly be good for a case of pneumonia that was post-operative and that all we had to do to handle the condition was to apply a new technique of treatment that could be used on a patient who had a surgical wound. All we had to do was to so manipulate the spine that we would get the results locally, and yet handle it in such a manner as not to affect the wound.

Many laymen, and even some physicians of our own school, express surprise at the suggestion that we do much osteopathic work in the after care of surgical patients. But the fact is we have worked it out so that now, except for pain, during the immediate after effects of the operation drugs are absolutely not used in our hospital for any of the post-operative complications. The opiate immediately following the operation, is really a follow up of the anesthetic, and we use that as rarely as possible. Needless to say, there are cases such as un-united fractures, extensive adhesions, etc., where the emergency conditions positively call for some relief of the pain for a short while, but that is the only condition that we cannot control with mechanical treatment.

I am very glad that I had the confidence to give this an early trial and a thorough trial, without being afraid to leave off the drugs. The big field, however, where osteopathic treatment has won the most impressive success and proved itself a most absolute specific, is in the field of post-operative pneumonia with which I am proud to announce a one hundred per cent.

success for combined osteopathic treatment in my fourteen years continuous surgical work. Not to have lost a single case is partly due to luck. In other words, with any series of serious cases, it is impossible but that there be some fatality finally.

Post-operative cases have one advantage along with their disadvantage. While they have the shock of the operation to contend with, and the weakened condition from the disease for which they were operated, still except in extreme emergency they would not have been operated on unless they had a good heart and good kidneys and a good blood pressure, so that in cases in which we are most concerned in combatting pneumonia, we usually start with a patient who has those organs in a healthy condition.

First Post-operative Pneumonia Cases Treated Osteopathically.—At the Chicago Convention in 1911, I reported the first post-operative pneumonia cases that had been treated osteopathically. I believe at that time that there had been only three cases. At that meeting I mentioned the fact that some of the doctors and some of the internes who treated those cases felt sure that they were not treating them properly because they could not get away from the idea that pneumonia needed strychnin and other drugs. One of these cases got well in three days from the developed lobar pneumonia symptoms. The results were so miraculous that the young man treating it began to doubt whether it could have been pneumonia. He could not understand how he, a senior student, could overcome this dreaded disease by merely working on the spine. He could not believe that osteopathy, a science that he had been able to learn himself, so easily could cure a condition that he had thought must be almost necessarily fatal.

One of the weaknesses of osteopathy is the fact that there is no mysticism about it. It is so simple that any person with ordinary intelligence can learn to use it, and yet it is so simple that it takes an unusual intelligence to be able to grasp the fact that it is the therapeutic discovery of the age. Many, many times I have had young internes and students cure genuine lobar pneumonia and do it with such obvious ease that it caused them to wonder, in a way, if it really could be pneumonia. It is bred in our very tissues to look for some mysticism, something impossible to understand, something supernatural, something connected with the Unknown associated with the treatment of disease and accordingly it is just human nature to find it

difficult to believe, even when we see it, that a simple method of treatment can actually effect a cure.

Real pneumonia, as we understand it, is a consolidation of the lung tissues characterized by fibrosanguinous exudate into the pulmonary tissues and spaces, associated with one or more particular germs as exciting factors and proved by the physical tests and the character of the expectoration. How many cases have been cured that had not entered consolidation I do not know because up until the time of actual consolidation there may be a question as to whether or not they would have had pneumonia. I know that many cases with marked symptoms of pneumonia have failed to develop under treatment or the case has been aborted.

Pneumonia lacks a great deal of being a self limited disease. The number of cases with beginning symptoms that fail to develop is too great to be ascribed to coincidence. Of course I know that some of these might have been only pleuritis, some only neuritis, etc. However, in giving the statistics of pneumonia cures we will give only those in which pneumonia developed and showed a hardening or consolidation of the lung tissue. In these cases there can be no argument as to whether there was pneumonia.

When we have an acute condition associated with the symptoms of consolidation, we can hardly be confused as to the diagnosis. We may make a mistake in our physical findings, but hardly after a little experience, and certainly when we are sure of the physical findings there will be no trouble in naming the disease.

The Clinical Findings.—Post-operative pneumonia is a little different from the common pneumonia. It always comes on a little more insidiously. One has to watch for post-operative pneumonia more closely than he would for the attack that we may meet in ordinary practice. A patient may have considerable pain from his wound, may have some pain in the back from the position he is in; there may be headache, and an upset feeling from ether; and the pain comes in the chest. All these symptoms are forerunners of pneumonia, but the pain in the chest is not noticed until it gets quite severe. In other words, there are other things to annoy the patient as well as the attendant, and at first, this condition does not cause complaint. A strong and healthy individual who feels a pain in his pleura, which is the forerunner of pneumonia, knows it at once, because that is the only distress

he has. His entire attention is attracted and he asks for a physician's help. But in the post-operative case, the physician has to keep a look out in order to prevent a case from getting well under way before it is recognized.

As an example of this I had a case of a man who was with a party driving an automobile and they tried to cross the railroad track in front of a train. This patient I speak of was one of the survivors. He had a fracture of the femur, fracture of the skull, fracture of three ribs, and otherwise more or less bruised up. Naturally the preliminary work consisted in getting the ribs and legs attended to as well as possible and looking out for cerebral hemorrhage or meningitis.

This patient developed consolidation in both lungs in spite of regular treatment, and it precipitated on him very rapidly, partly masked by the disturbed breathing from other sources of irritation. We put him on hourly treatment, but after a few hours his condition from the injuries and the pneumonia was such that his wife asked us not to treat him any more. She put it this way, that she knew he would die in spite of all that could be done and as long as he was going to die he might as well die easy. Every time he was treated it had the effect of bringing him out of his stupor, and he would complain, and she thought it would be a kind act to let him slide off into the next world uncomplaining.

Pneumonia in a case of this sort cannot be handled with kid gloves if we wish to save the patient. We must give firm, strong treatment. Light treatment in this condition will do no good. Indeed light treatments in any sort of pneumonia are of little avail. Many times I have changed internes in a pneumonic case that was not responding and the results were immediate. That is, the turn for the better was obvious from the beginning of the good strong treatment.

The case above mentioned was treated a good part of each hour for twelve hours. He had no strychnin, no oxygen, nothing but treatments, but he got well and is now living, and aside from a limp has no evidence of either his injury or his illness.

Some cases, in private practice, may get well on a treatment a day, but I would hate to handle the kind of cases we get in that manner. I have had severe cases, especially hemorrhagic cases, where the treatment was almost continuous for hours preceding the crisis. Of course, after the crisis we can

ease up. On the other hand, it is not infrequent that a few good strong early treatments, given at the beginning of a case absolutely stop it. I have seen cases where a consolidation area of the apex of the lower right lobe as large as the palm was easily outlined, and this together with the clinical symptoms would be cleared up in two or three days.

There is no possible medical method by which this can be done. Medical authorities agree that under their treatment pneumonia runs an unshortened course; in other words, a course in the individual case that has not been affected by the medication. Medically, even where the crisis occurs early, the consolidation persists for some time, but I have seen it cleared up time and again under osteopathic treatment in the length of time that could have been brought about only by osteopathic treatment.

I have previously called attention to the fact that many of the medical text books on physical diagnosis mention a point that is a very practical and very plain demonstration of the efficiency of osteopathy in pulmonary conditions. These books only mention this fact without pointing any moral or drawing any conclusions. The point is this: that frequently when a professor is having a class or a section of a class examining a case of pneumonia, they will outline the size of the consolidation at the beginning, the instructor marking it off when he makes the first examination; then after the students have examined it, by percussion, palpation, etc., possibly a dozen or twenty of them, the later students will find that the area has shrunken perhaps an inch. This fact has been frequently noted. It is said, indeed, that if careful examination is made it will always be noted.

How Manipulative Treatment Benefits

Doubtless this proved that accidental manipulations of the ribs helps clear up the congestion about the real consolidation and reduces some of the dull area. Very likely this explains some of the cases of partial or real results from spondylotherapy. Naturally, scientific osteopathic treatment would necessarily magnify such results very much.

It is a great wonder with the obvious failure of medical treatment in pneumonia, that at least some crude from of manipulative treatment has not been devised by those practitioners. We have already mentioned that the treatment of post-operative cases varies mainly in the manner of applying it.

In other words, when we raise the ribs we keep the patient on his back, in treating the spinal centers we treat with patient on his back, and the physician who has no grip in his hands will not be able to treat a post-operative pneumonia to any advantage.

In these cases one has to get at the patient's back by reaching under and the weight of the patient helps to give the treatment, but a strong grip is necessary. It is much safer for the wound to handle the patient in this way but not infrequently beginners wear their knuckles pretty nearly off before they get the finer technique; after which it is easy. In raising the ribs there is no more difficulty in treating in this position than there is with a patient who can sit up or turn from side to side and in some cases a patient can, of course, be partially turned.

Theory is all right but in these cases practice has been added to it in something over three hundred cases treated in this manner, and in this manner only. I have had no case die. None of my cases had oxygen and none of them had strychnin or alcohol unless it was a person who had used alcohol constantly or daily and in these cases I consider that the system has become sufficiently used to it that it is practically a food and that sudden withdrawal is apt to bring on delirium. It is not necessary in those cases that indulge deeply now and then, but it is advisable in those that take a small amount regularly, just as they take food. These patients are used to a constant heart stimulant and its withdrawal is also apt to be reflected in the heart action. These are the only cases in which I have ever authorized anything in the way of a chemical stimulant of the heart during pneumonia.

You will undoubtedly recall that in reading the newspaper accounts of men who are big enough and prominent enough to have bulletins in the newspapers when they are dying, that almost universally the next to the last bulletin was that oxygen is being administered. The last bulletin announces the time of death. You will also note that in case the patient lives that oxygen then is not mentioned, and a few days later the patient is all right. My observation is that the use of oxygen may attract the attention of the family, it may attract the attention of the patient, but as for any actual benefit on the patient I do not believe it is in the least helpful, and that the only treatment for pneumonia is osteopathic. I am so convinced of it that I am using only that method.

As to strychnin, some say strychnin must be given. Some say it must be given at the crisis, and others say it must be given from the inception of the disease. I do not believe the majority of cases will do as well under strychnin. I know they will not do as well under strychnin as under osteopathic treatment. I will not say they will not do as well as if under no treatment. It is possible that there would be an occasion for its use at the crisis, and I have seen such cases, and I have used it while studying medicine. I used it at the crisis, and I used it in cases where I am convinced that it helped them over the crisis, but I am also convinced now that by osteopathic treatment they would have done still better and the crisis would not have been so acute. In other words what strychnin does in favorable cases, osteopathic treatment does better in all cases.

In our post-operative cases study the charts and you will see that they do not have the acutely violent crisis that usually occurs under other treatment. They are under better control and if we can get them near the beginning, as we usually do, we can keep up the resistance so that where they would otherwise have a hard crisis they have an easy one. Instead of having a temperature of 105, pulse 165, respiration 70, or such a condition, they are more apt to run a temperature of 102, pulse 120, respiration 35 or 40 and they go through it without that suddenness and acuteness that is common under other methods of treatment.

In several instances, as an example of showing how this resistance is kept up, I had letters from boys in the camps. One letter told of a wide epidemic of severe tonsillitis. In one group of soldiers there were three osteopaths who treated all the men and this was the only group that was not sent to quarantine. This group developed sore throat and was treated osteopathically and the sore throats checked so that quarantine was unnecessary.

Among the detailed reports in the A. M. A. Journal there will be nothing about this, nor about many other instances where osteopathic treatment, given by men forced to remain in the ranks, has done things that medicine cannot do. These examples are too frequent to be coincidents. If I had had three cases of post-operative pneumonia and they had all got well, it would not be surprising. If I had ten cases and they all got well, there are medical hospitals that have been this lucky. But there are no medical hospitals in the world that can report one hundred cases or two hundred cases or three

hundred with developed pneumonia and all lived. The percentage of pneumonia cases that die now in medical hospitals, is much less than formerly. But the cause of this is not vaccine, antitoxin or drugs. It is due to the fact that pneumonia cases now, like typhoid, are given very little medicine and are turned over to general nursing treatment; that is, in the best medical hospitals.

The mortality is in inverse ratio to the drugs given. The advance medical teaching is against so much drugs in pneumonia, though of course the hick doctors use it because they are practicing medicine of the by-gone age, before Andrew Taylor Still forced on the world the idea partly started by homeopathy, that the less drugs the better. Homeopathy failed in not quite discarding drugs and in not having a substitute that reproved drugs.

As a matter of interest I wish to mention that while in medical college I had the advantage of being taught surgery by the greatest surgeon that ever lived, John B. Murphy. I only wish that circumstances could have permitted me to have shown him what osteopathy could do in post-operative conditions, because Murphy was a broad minded man and no man living ever thought less of orthodox medicine and old fashioned drug treatment than Murphy.

He and the Old Doctor would have been great friends had they ever met. Murphy, whom I considered a most wonderful surgeon, and whose skill I never hope to approach, stated to me many times while a student that he lost more cases from post-operative pneumonia than any other condition and that in upper abdominal conditions like gall bladder, stomach, and similar operations, post-operative pneumonia constituted the most of his mortality.

This great man was afraid of post-operative pneumonia, while I, a much less skilled surgeon, am no more afraid of post-operative pneumonia than I am of something occurring in a distant state because with osteopathic treatment, we have eliminated post-operative pneumonia as a fatal condition.

PART SECOND

INFECTIOUS DISEASES

Fever

Fever is due to various causes, so that a definite statement cannot always be given as to the cause of fever in every disease. Each fever case, like all other disorders, is a law unto itself; different causes are found in different cases. Moreover, often only theories, and not absolute facts, can be given.

Fever may be present when a local disease assumes a constitutional character or when the constitutional character is manifested from the beginning of the disease. Fever may be a systemic disorder or a symptom of disease, and is characterized by an increase of body temperature. Other symptoms are usually present, as an accelerated pulse, disturbances of distribution of the blood, increased catabolism, and disordered secretions.

Etiology.—In infectious diseases fever is due chiefly to the action of various toxic or harmful agents, produced by the disease, upon the fluids of the body and upon the nervous system. Disturbances of the thermogenic centers and nerves of the brain or cord by harmful agents, or by lesions of the anatomical structures affecting these nerves, are sources of fever. Also disturbances of the vasomotor centers (in the medulla and auxiliary centers along the cord) and nerves are causes of fever in many instances. A disturbed or lessened function of the nerves controlling sweating is an important factor. The multiplication of micro-organisms in the body, acting directly on the tissues or by producing toxic substances which affect the nervous system, is a fruitful source of fever. A few cases may be caused by direct affection of the nervous system, as is shown by appearance of fever in epileptic attacks, or by the passage of a catheter into the bladder. In a large number of all cases a demonstrable cause can be found upon careful examination, whether the fever be due to a necrosed mass of tissue, the introduction into the system of decomposed food, infectious diseases, a lesion of some anatomical structure affecting a thermogenic, vasomotor or sweat center, a lesion to the innervation to the heart (vagi and cervical sympathetic) causing a rapid heart, or a lesion to the lymphatic system.

Treatment.—The treatment of fevers in a general way consists principally of thorough inhibition to the posterior spinal nerves of the upper cervical region in order that the center of the vasomotor system in the medulla may be affected, probably by the way of the superior cervical ganglion of the sympathetic. Thus the entire vascular system is equalized, for there is always a disturbance in the distribution of the blood in fever and if the center controlling the nerves that govern the lumen of the blood-vessels can be brought under control, there will result an equalization of the vascular system; if such occurs, health must ensue. Besides the vasomotor nerves to the blood-vessels being affected by this treatment, the nerves governing the lymphatics and the sweat glands will also be controlled. The sweat glands as a rule are rendered active by affecting directly the innervation of the glands, also the glands are controlled indirectly by the blood supply; this aids materially in lessening the temperature of the body. Treatment for a few minutes to the upper posterior cervical region would also affect the thermogenic centers and nerves of the brain reflexly in the same manner as the vasomotor and sweat centers and nerves are affected, thus tending to equalize the mechanism of the thermogenic system. Besides this action on the vasomotor, sweat, and the thermogenic nerves, there is produced an increased exhalation of moisture from the lungs, on account of an increase of vascular area in the lungs through vasomotor action. Also the large vascular area in the abdomen, under control of the splanchnic nerves, becomes constricted. Thus there is brought about a lessening temperature by evaporation, heat radiation, and perspiration; and an increased action of the general nervous system, a stronger cardiac force, an equalization of the vascular system, and a more perfect elimination of toxic properties by the skin, kidneys and lungs; consequently a reduction of the fever.

The foregoing treatment is successful to a limited extent, only in such cases where causative factors of the fever are involving the predominating centers controlling the heat production or dispersion and the vasomotor system directly; for if the lesion that is causing the disorder should be affecting an auxiliary center along the spinal cord instead of the predominating center, as is oftentimes the case, treatment of the predominating center would be useless as far as any permanent benefit is considered; although a temporary effect will be gained by lessening the fever at that point. Consequently, in many cases, the lesion lies within the jurisdiction of auxiliary centers which are situated at various points along

the spinal cord. When such is the case, it will be of little benefit to give the cervical treatment. In such instances the lesion to the auxiliary center would have to be removed in order to cure. One cannot depend upon a set rule to reduce a fever; determine the cause, as in any other disease or symptom, and remove it.

In addition to the treatment to the cervical region and along the spinal column, as are indicated upon an examination, attention should be given to the heart's action. The equilibrium between the accelerator and inhibitory nerves (cervical sympathetic and vagi) should be maintained. The interchange of gases in the lungs should be rendered as nearly normal as possible; this is best accomplished by raising and spreading of the ribs from the second to the seventh dorsals, particularly in the region of the fifth and sixth. Also stimulation of the vagi will aid by increasing the motor power of the lungs. The kidneys and bowels should be kept active so as to favor a rapid elimination of various toxic properties; besides they have control over large vascular areas. Treatment over the ureters will prevent any clogging that might occur in them from a condensation of the urine. Attention, also, should be given the tissues at the fifth lumbar and over the iliac vessels to influence the circulation in the pelvis.

The **food** of the patient should be liquid—milk, soup, broths, etc., and almost any quantity of water allowed if called for, given little at a time and at frequent intervals. The room should be well lighted, ventilated, clean and kept at an even temperature.

Two points should always be remembered relative to fever:

First—That there are many causes of fever; and in order to reduce the fever the cause must be determined and removed, the same as in any disorder. A definite fever treatment cannot be given any more than a definite constipation treatment; the case must be seen in order to determine the cause.

Second—The reduction of fever is not necessary; the fever should be treated only as a symptom of disease when it exists as such. In fact, fever is beneficial, for it is one of nature's methods to relieve an over-burdened system from harmful agents, unless the temperature is excessive and continuous and is likely to cause more harm than the primary trouble.

Absolute **rest** in bed always is of decided benefit in lessening the temperature.

Hydrotherapy is of immense value in reducing a fever. It is an agent that has been greatly used, and if applied intelligently cannot but be of aid. There is much ignorance in regard to the principles and practice of hydrotherapy, not only among all classes of people, but among well informed practitioners in medicine. The most important function of the skin is as a heat regulator. Knowing this fact, the osteopath treats the vasomotor nerves that control the cutaneous circulation and the nerves that control the excretion of the skin; the nerve supply being from the cerebrospinal and sympathetic nerves. In many difficult and obstinate cases hydrotherapeutic measures should be used to aid the skin in regulating the temperature, as well as to enhance system functions for the same reason that osteopathic manipulations are given. Maintaining an equilibrium in heat production and heat dispersion is necessary in order that the standard of the body temperature may be kept; and the amount of the arterial blood circulating within a tissue determines its temperature.

The principal effect of water as a thermic agent when applied externally is due to the influence of the action of the water upon the cutaneous circulation. Lesser effects would be the mere extraction of heat from the body by evaporation and the equalization of temperatures of two bodies coming into contact. As the body is endowed with compensatory powers, this latter means would apply only to a limited extent. The temperature of the water used is important, as the colder the bath the less effective would its power be in reducing internal temperature. When a cold bath is used there is a driving of the blood away from the surface on account of the contraction of the peripheral vessels; consequently increasing the cutaneous circulation and cooling by radiation is prevented and less heat is lost. A collateral hyperemia occurs in the underlying parts which acts as a protection to the deeper tissues. The cold also inhibits the vasomotor nerves controlling the abdominal splanchnics, and thus a larger amount of blood passes to this immense vascular area. On the other hand, when a warmer bath is used the effect is opposite, and a lowering of the temperature is the result. The cutaneous vessels being dilated, the superficial blood is rapidly replaced by blood from the deeper vessels, thus allowing a cooling of the body to a large degree.

In the various fevers where hydrotherapeutic measures are employed, the object to be gained by such methods is not primarily an anti-thermic one but an anti-febrile reaction; consequently the use of cold water is employed. In mere heat reduction the warmer water would be more effective; but by the aid of the colder water the cause of the increased temperature, as in infectious fevers, is lessened; besides a refreshing and stimulating effect upon the entire system is gained. Thus the aim of the cold bath and friction, is not primarily to subdue the temperature by heat radiation or evaporation, but to correct disturbances governing the formation and the dissipation of heat caused by infectious fevers, and, moreover, to stimulate the nervous system, prevent heart failure, increase the eliminating power of the skin, kidneys and lungs, and to influence the corpuscular and chemical constituents of the blood to a more normal condition.

The full cold bath and friction (Brand Method) is commonly employed in infectious fevers. The half bath, wet pack, or sponging may be used. The modus operandi of each is given under the hydrotherapeutic treatment of typhoid fever.

Typhoid Fever

(Enteric Fever)

In writing of these acute diseases which are self-limiting, it is understood that osteopathy aborts, overcomes symptoms and otherwise changes conditions frequently. When this occurs the case is not typical and it is a typical case which is here described.

Definition.—An acute, infectious disease caused by the bacillus typhosus. It is characterized anatomically by hyperplasia and definite lesions of Peyer's patches and mesenteric glands, and enlargement of the spleen, and clinically by its slow onset, often diarrhea, abdominal tenderness, tympanites, fever, headache, and rose colored spots on the abdomen.

Osteopathic Etiology and Pathology.—Lesions to the lower dorsal and lumbar regions are always found, which impair the innervation and vascular supply of the intestines and cause defective nutrition. This is the most important predisposing cause, although general lowered vitality from

overwork, improper food, unhygienic environment, and insanitary surroundings, are also of great importance. It is possible that one's vitality may be so lowered that the bacillus of Eberth, if of sufficient numbers or virulency, will find a suitable medium wherein to multiply and grow, and thus the spinal lesions found in these cases are the result of reflex irritation. But the most probable underlying cause is the spinal lesion, and given two individuals with equal likelihood to infection, one with the spinal lesions and the other not, the former within all probability will be the more likely to suffer an attack. The severity and extent of the osteopathic lesion undoubtedly bears a direct ratio to the probability of attack from an infectious disease. Typhoid fever usually occurs between the ages of fifteen and thirty years. Some families are more susceptible than others. The autumn months, especially after a dry, hot summer, favor the disease. One may be reasonably certain that whenever there is a case of typhoid the individual has not been careful as to diet, or drinking water, or some rule of health, and wherever there is an epidemic it can always be traced to insanitary surroundings, the water supply, contaminated garden truck or other food, sewage, etc.; although this does not preclude the probability that the osteopathic lesion or lowered vitality of Peyer's patches and mesenteric glands from other causes are important and many times primal etiological factors. The specific poison may be so virulent that practically no one escapes and again those of lowered vitality only will succumb to an attack.

The **exciting cause** is a special micro-organism, the bacillus of Eberth. The contagion may be carried through the air from one person to another, but this is rarely the case. Though the water is the most common mode of conveyance, the bacillus has been found during epidemics in both water and milk. The water may be contaminated by the intestinal discharges which have not been properly disinfected. Extreme cold does not destroy the typhoid germs. Milk may be infected from the milk-can being washed with the contaminated water or the unclean hands of the milker. In fresh milk the germs multiply rapidly. Salads, celery, ice and fruits may be contaminated. Oysters have become infected while being fattened or freshened. It is thought by some that the poison is not eliminated from the sick in a condition capable of transferring disease to a healthy person, but must undergo changes in the soil before it is able to cause the disease in another. Typhoid fever may be caused, however, by direct contact with the stools.

Filth, sewers, or cesspools do not directly cause the disease, but they form a suitable medium for the preservation of the typhoid germs.

Pathologically, the characteristic lesions in typhoid fever consist of changes in the lymphoid elements of the bowels. These changes are most striking in the solitary glands and Peyer's patches. The alterations which occur may be divided into four well defined stages: (1) **Infiltration**—the glands are enlarged from infiltration and there is marked cell proliferation, particularly Peyer's glands in the jejunum and ileum and to a lesser extent those in the large intestine. The glands become pale and prominent. Occasionally the solitary glands, which are usually deeply imbedded in the submucosa, become prominent also.

Microscopically, the capillary blood-vessels are at first considerably dilated, but later become more or less contracted, giving an anemic appearance to the follicles. The adjacent mucosa and muscularis may become infiltrated. The cells have the character of lymph corpuscles, some of which are larger, epithelioid in character, containing several nuclei. From the eighth to the tenth day this medullary infiltration reaches its height and then undergoes either resolution or necrosis.

(1) **Resolution** takes place by a granular or fatty infiltration of the cells. This produces pitting of the swollen follicles, which may cause small hemorrhages.

(2) **Necrosis.**—With all the severe cases of cell infiltration, hyperplasia of lymph follicles reaches a stage where resolution is impossible and necrosis occurs. The necrosis is partly due to the choking of the blood-vessels and partly to the direct action of the bacilli. The necrosis may involve only the superficial layers of the mucosa or it may extend deep into the muscular coat and even perforate the outer or serous coat. Usually, however, this does not extend below the submucosa, mucosa, or muscularis. Not all of the patches necessarily slough, but as a rule it is always more intense toward the ilio-cecal valve.

(3) **Ulceration.**—The extent and depth of the ulcers depend upon the amount of the necrosis. Large ulcers are sometimes formed, especially in the lower end of the bowel, by the union of several. The edges are swollen and undermined. The base is usually smooth and formed of submucosa. Perforation of the bowel occurs in a small percentage of cases; more

commonly the ulcers heal. The perforations may be multiple, but rarely exceed two in number.

(4) **Healing.**—Cicatrization begins about the fourth week. This granulation tissue covers the floor. It is sometimes formed with connective tissue and a new growth of epithelium results. The gland is ultimately replaced by a depressed scar with a smooth, pigmented surface. The majority of deaths occur before this stage is reached. The gland structure is never regenerated.

The **mesenteric glands** show intense hyperemia and later become enlarged and softened, but rarely ruptured. The glands at the lower end of the ileum are markedly involved.

The **spleen** is enlarged, softened, and diffluent. Occasionally rupture occurs. Infarction is not a rare occurrence.

The **liver** shows parenchymatous and granular degeneration, and the cells are found to contain much fat. Infarction abscesses and acute yellow atrophy occur in rare instances. Diphtheritic inflammation of the gall-bladder sometimes occurs and the bile is thinner and paler than normal.

The **kidneys** also show parenchymatous degeneration. They are pale in appearance, with slight cloudy swelling. Microscopically, there are seen granular and fatty infiltration of the cells of the convoluted tubules. Rarely, there is acute nephritis which may be hemorrhagic. There may be miliary abscesses in which typhoid bacilli have been found by some observers. Diphtheritic, but more frequently catarrhal, inflammation of the pelvis of the kidney may occur. Catarrh of the **bladder** is not infrequent and even sometimes diphtheritic inflammation is present. Rarely orchitis is encountered.

Hypostatic congestion of the **lungs** is not uncommon. Gangrene and hemorrhagic infarction are sometimes present. Lobar pneumonia may be a complication.

In the **larynx** ulceration is sometimes met with bacilli, however, have not yet been found in these ulcers. Diphtheritis of the pharynx and larynx may occur. Catarrhal or croupous pharyngitis may occur; while swelling of the follicles of the pharynx and base of the tongue is frequently noticed.

Peritonitis is always present in fatal cases in which perforation of the bowel has taken place. The perforation may occur in ulcers from which the sloughs have already separated, or it may be caused by a necrosis of all the coats. Extensive peritonitis may occur without perforation, and is probably due to extension of the inflammation to the peritoneum.

The **heart** may be affected. Endocarditis is rare, while pericarditis is much more frequent. Myocarditis is frequently met with, the cardiac muscles presenting parenchymatous and rarely hyaline degeneration. The **arteries** are frequently found to be involved. These conditions (obliterating arteritis and partial arteritis) may affect the smaller vessels, especially those of the heart, but more commonly affect the arteries of the lower extremities. Thrombosis of the veins, especially of the femoral, and more rarely of the cerebral veins and sinuses, occurs.

Granular and hyaline changes in the voluntary **muscles** may occur. This degeneration does not affect the whole muscle but involves only certain fibres. Regeneration takes place during convalescence.

With the nervous system meningitis is rare. The peripheral **nerves** are frequently the seat of parenchymatous changes. The ganglia of the trunks of the vagi present an inflammatory change.

The **blood** presents little change. During the first two weeks the red corpuscles gradually decrease in number until the first week of convalescence, after which they gradually increase in number. There is often a marked decrease in the number of leucocytes. Leucocytosis is absent. The hemoglobin is always reduced.

Symptoms and Course.—The incubation period varies from a few days to two weeks or longer. During this time the patient may feel in his usual health, but more often there is a feeling of languor and indisposition to exertion, loss of appetite, slight coating of the tongue, nausea, headache, chilliness, but seldom a decided rigor, pains in the back or legs and nose-bleeding. Any of these symptoms may be present and last usually from a few days to a week or more. These symptoms increase in severity and the patient takes to his bed. The invasion as a rule is gradual.

The **first week** dates from the onset of the fever which generally (but by no means in all cases) rises steadily during the first week a degree or a

degree and one-half each day, reaching 103 or 104 degrees F. The pulse is quickened to 90 to 110 per minute and is full, of low tension and sometimes dicrotic. There is great thirst, also a coated tongue. The skin is hot and dry and there is rather intense headache. Unless the fever is high there is no delirium. The sleep is disturbed and there may be mental confusion and wandering. Cough with some thoracic oppression is not uncommon at the onset. The abdomen is slightly distended and tender. There may be either constipation or diarrhea. The spleen is somewhat swollen and a rose colored rash appears on the skin of the abdomen and chest.

During the **second week** the fever remains high and exhibits the continued type, the morning remission being slight. The pulse is accelerated. The headache disappears, but there is marked mental dullness and slowness and there may be a mild delirium at night. The tongue is coated and the lips are dry. The abdomen is tympanitic and tender. Diarrhea replaces constipation. The case may prove fatal during this week from the result of nervous or pulmonary symptoms, hemorrhage, or perforation.

The fever changes in the **third week** from a continuous to a remittent type. The pulse ranges from 110 to 130. The patient is very weak. Complications may arise, as pulmonary symptoms, feebleness of heart, intestinal hemorrhage, perforation, and peritonitis.

In favorable cases during the **fourth week** the fever begins to decline and the general and local symptoms gradually disappear. In protracted cases the **fourth** and **fifth** weeks may present the symptoms of the third week. Frequently the following aggravated symptoms are added: stupor, delirium, increased weakness, rapid, feeble pulse, and distended abdomen. Heart failure and inflammatory complications increase the danger.

During the **fifth** and **sixth weeks** a few cases will show irregular fever. Great care should be taken that complications do not occur.

The **fever** is the most important and characteristic symptom and from the temperature alone a diagnosis may be made. During these stages of development, which is the first four or five days, the temperature rises steadily; the evening temperature being about a degree or a degree and one-half higher than the morning remissions, reaching 104 or 105 degrees F. at the end of the first week. When the **fastigium** is reached the fever persists with slight morning remissions. At the end of the second and throughout the

third week the temperature becomes more remittent and there may be a difference of three or four degrees between the morning and evening temperature. During the last stage the fever falls by **lysis**, forming a more or less regular step-like line of descent. The stage lasts from one week to ten days.

When the disease sets in with a severe rigor the fever frequently rises at once to 103 or 104 degrees F. In the lightest forms the fastigium may be almost absent; defervescence setting in upon the first day of the fastigium and in many cases defervescence occurs at the end of the second week and the temperature may fall rapidly, becoming normal in ten or twenty hours. This fall in the temperature may take place without any apparent cause or it may follow an intestinal hemorrhage. The temperature often falls many hours before the blood appears in the evacuations. The occurrence of peritonitis is also marked by a sudden fall in the temperature. **Hyperpyrexia** in typhoid fever is not very common except just before death.

After the temperature has been normal for several days there may be a sudden rise of the temperature to 102 or 103 degrees F. This may persist for a couple of days and then return rapidly to the normal. These **recrudescences**, as they are called, are quite common and are caused most frequently by errors in the diet, constipation, excitement or mental emotion. These elevations in the temperature are found most frequently in children and persons of a nervous temperament.

Afebrile Typhoid is of very rare occurrence. The patient has all the characteristic symptoms of typhoid fever with the exception of a fever.

The **rash** is highly characteristic. It appears about the eighth or tenth day, usually upon the skin of the abdomen or chest, rarely found elsewhere on the body. It consists of a variable number of rose colored spots distinctly elevated, and disappear on pressure. These spots last three or four days and appear in successive crops. Vivid red erythematous eruptions upon the chest and abdomen are commonly seen during the first week of typhoid fever. Urticaria is rarely seen.

Sweating characterizes some cases of typhoid fever, but generally the skin is dry. This may occur with or without chilly sensations or actual rigors. In some cases there may be recurring paroxysms of chills, fever, and

sweats and they may be mistaken for intermittent fever. Edema of the skin may occur and is usually due to anemia or cachexia and sometimes to nephritis. Local edema may occur as the result of vascular obstruction, particularly thrombosis of the femoral vein. There is a peculiar musty odor exhaled from the skin in typhoid fever, particularly if the skin has been neglected. In all protracted cases **bed-sores** are likely to develop. The **hair** is apt to fall out but is generally renewed. The nails also suffer and ridges can usually be observed upon them.

Intestinal symptoms are very inconstant. Usually there is constipation at the onset and this may persist throughout the disease although a moderate diarrhea may occur throughout the disease. The severity of the diarrhea is due most probably to the degree of the catarrh rather than to the extent of the ulcers. It is probable that the discharges are more frequent when the catarrh involves the large intestine. The number of discharges average, as a rule, from two to four or more daily. The stools are either fluid or of the consistency of jelly, of a grayish-yellow color, alkaline in reaction and are very offensive.

Hemorrhage is a serious symptom, but by no means always fatal. This usually occurs in cases of considerable severity and it generally occurs at the time of the separation of the sloughs during the third week. When it occurs quite early in the disease it is generally the result of hyperemia. It may be so slight as not to be noticed by the eye or it may be from one to three pints. Intestinal hemorrhage, however slight, is always a grave symptom. There may be symptoms of collapse and fall of temperature, or it may occur without any symptoms.

Meteorism is an almost constant symptom, and when excessive adds to the seriousness of the case and corresponds generally with the extent of local lesions. Abdominal tenderness and gurgling upon pressure in the right iliac fossa may be present; pain is generally absent, and when present is usually slight.

Perforation almost invariably causes fatal diffuse peritonitis and is the most serious complication. It may occur at any time but is most common between the second and fourth weeks. It is usually indicated by sudden acute pains in the abdomen and symptoms of collapse. As a rule symptoms of **peritonitis** appear at once; distension of the abdomen, great tenderness,

and rigid abdominal walls. Vomiting, pinched features, and rapid, small pulse shows general collapse of the circulatory system.

Bronchitis is almost invariably present as an initial symptom. It is indicated by the existence of sibilant rales. The cough is generally slight.

Hypostatic congestion of the **lungs** and edema, due to enfeeblement of the cardio-pulmonary circulation, in the latter part of the disease are not infrequent.

The **pulse** as a rule is not very frequent and is generally not in proportion to the fever until late in the disease; 90 to 120 is the usual range. During the first week it is about 100, full, and frequently dicrotic; later it becomes more rapid, feeble and small. In severe cases during the extreme debility of the third week the pulse may reach 150 or more (the so-called running pulse). During convalescence the pulse occasionally becomes subnormal and bradycardia is met with more frequently than after any other acute fever.

The **blood** presents definite changes, some of which are important. In cases where there is profuse sweating or copious diarrhea, the red corpuscles may be relatively increased; this is due to the loss of water. In most cases there is little change until the end of the second week. During the third week there is generally a decrease in the number of corpuscles and of the hemoglobin, which is always reduced. **Leucocytosis** is always absent. The white corpuscles are slightly diminished especially toward the end of convalescence.

During the first week there is generally persistent headache, sometimes neuralgia. There are a few cases in which the effects of the typhoid bacilli or their poison is manifested in the **nervous system** from the very onset. There are violent headaches, retraction of the head, rigidity, photophobia, twitching of the muscles, rarely convulsions, all indicating meningitis as which it is occasionally diagnosed. It must be remembered however, that all nervous symptoms may occur independently of a lesion of the nervous system.

Delirium may exist from the onset, but it usually is not present until the second or third week and only in the severer cases. As a rule it is most marked at night. It is generally of the low, muttering type, very seldom

maniacal. When the patient picks at the bed clothes or grasps at imaginary objects there is indication of danger, as it is a serious symptom. Convulsions are rare.

The **urine** is diminished in quantity, high specific gravity, and of dark hue. Both urea and uric acid are increased and the chlorids are diminished during the first stages. About the stage of decline the urine becomes light in color and greater in quantity than normal. The specific gravity is lowered, urea and uric acid are diminished, and the chlorids are increased. Febrile albuminuria is very common but of no special significance. Acute nephritis may develop as a complication. Pyuria is not an uncommon complication and post-typhoid pyelitis may also develop.

Malarial fever may be associated with typhoid, especially in malarial districts. Persons with tuberculosis, epilepsy, chorea, and other forms of chronic nervous diseases are liable to typhoid fever. In epilepsy and chorea the movements and fits usually cease during the attack of typhoid fever.

Varieties of Typhoid are numerous and are named with reference to the degree of severity which varies from extreme mildness to extreme severity.

The **mild** or **abortive** form is of frequent occurrence. The onset is usually sudden. The symptoms are similar to those of a typical case but much milder and appear earlier than in the usual type. This form runs its course in about two weeks. The fever usually reaches 104 degrees F.

In the **severe** or **grave** form there is high fever and the nervous symptoms show a profound intoxication of the system. The grave types are those associated with serious complications or those cases which set in with pneumonia, Bright's disease, or cerebrospinal symptoms.

In the **latent** or **ambulatory** form (walking typhoid) the symptoms are very slight, the patient being hardly sick enough to go to bed. The symptoms may be of this character throughout the attack, and the patient may be able to be up and about. In other cases the first symptoms are very mild, but later they may develop symptoms of the severest type.

The **Afebrile** form is rare. **Hemorrhagic** typhoid is a very fatal but rare form. In this type there are cutaneous and mucous hemorrhages.

Diagnosis.—As a general rule typhoid fever is easily recognized. The Widal test should be made. At times the diagnosis may have to be delayed

until the distinctive signs appear, especially in those cases which come on with severe headache, delirium, twitching of the muscles, and retraction of the head. In these cases the diagnosis of cerebrospinal meningitis is invariably made, until the appearance of the colored spots on the abdomen, which must decide the diagnosis; cerebrospinal meningitis being a rare disease and typhoid fever with severe nervous symptoms quite frequent, it is more probable that it is typhoid. At least one-half of the cases termed brain fever belong to this class of nervous typhoid.

Prognosis.—A positive prognosis can not be made, as even the mildest cases are liable to have severe complications develop at any stage of the disease. Under osteopathic treatment the prognosis is undoubtedly more favorable than with the treatment of the older schools. If the osteopath can see the case early, the first week, there is always a chance to abort the attack. In all cases there is the probability that the attack will be shortened; this is a common experience. Price of Mississippi, has treated many cases, and invariably when the patient is seen early the attack has been shortened to thirteen or fourteen days, whereas under other treatment the disease runs the usual course. Adsit of Kentucky, White of New York, and the staff of the American School of Osteopathy (Kirksville), as well as many others, have had the same experience. And if the attack cannot be aborted or shortened there is the further probability that the severity will be lessened and complications prevented. The prognosis is always more favorable in winter than in summer, and especially favorable in children. More women die than men, and fat persons stand the disease badly.

Treatment.—Typhoid fever is one of the diseases that practitioners of all the schools are agreed that drug therapeutics avail but little in its treatment. The treatment of the older schools consists of prophylaxis, good nursing, attention to hygienic principles, dieting, and hydrotherapy. All of these have their places and are recognized by the osteopathic school. But the above methods are of the defensive only—allowing the disease to run its usual course and reducing the likelihood of complications. On the other hand the above treatment coupled with osteopathy, not only attacks the ravages of the disease defensively, but of more importance, the disorder is attacked offensively. Herein is where attacks are aborted, or shortened, or severity lessened, or complications prevented. The efficacy of osteopathy is due to

the ability of the osteopath to treat disease, not only prophylactically and palliatively, but of more consequence, aggressively.

The correction of the spinal lesions in typhoid fever is of first importance. This treatment effects a tendency toward equalized circulation of the intestines. The vasomotor nerves are disturbed by the above lesions which in turn produces stasis in Peyer's patches and the mesenteric glands. Reversely some of the spinal lesions may be due to reflex stimuli, for "Kirk ... states that muscular contractions produced by reflex activity are often more sustained than those produced by direct stimulation of the motor nerves themselves."[51]

Prophylactic treatment is very essential, for typhoid fever as a rule is a preventable affection. Modern hygienic and sanitary resources enable a community to reduce the number of cases to a minimum. The number of cases in a locality depends almost directly upon the condition of the water supply and drainage. Care should always be taken in regard to the source of drinking water and milk. During an epidemic the water should be boiled for half an hour before being used. The patient should be isolated. In hospitals they should have special wards; in families a special apartment should be given them. Hygienic principles should be followed as in other infectious diseases.

The methods of disinfection must be rigid to prevent the spread of an infection. The excreta (stools, urine, vomitus, and sputum) are to be received into a bed-pan or any appropriate receptacle containing half a pint of carbolic acid (one to twenty). Three or four pints of the carbolic acid (one to twenty) should then be added to the bed-pan and the contents mixed carefully before emptying. All utensils used in handling the excreta are to be carefully disinfected by the same material, and dried. After every stool the nates of the patient should be cleansed by a cloth compress, wet with a solution of carbolic acid (one to forty) and the cloth burned. The sick room should be thoroughly ventilated each day. All utensils used about the patient in feeding should be boiled in water immediately after using. The bed and body linen is to be changed as soon as soiled and these, with all changed bath towels, blankets and rubber sheets, should be received in a sheet rinsed in carbolic acid (one to forty) and placed where they may be soaked in the solution for four or five hours. The clothes are to be boiled for half an hour. The rubber blanket is to be washed in the solution, dried and aired.

The **General Management**, careful nursing and a regulated diet, is of paramount importance in the treatment of typhoid fever. The patient should be placed in bed as soon as the disease is determined and there remain until the end of the attack. The room should be well ventilated and have a sunny exposure if possible. The single woven wire bed with soft hair mattress and two folds of blankets is best. A rubber cloth should be placed smoothly under the sheet. When a good nurse cannot be had, the attending osteopath should write out directions regarding diet, bed linen, and utensils, and the disinfection of the excreta.

A liquid **diet** should be administered. Milk is most commonly used; care being taken that it is thoroughly digested. If milk is not borne well by the patient, other foods, as whey, sour milk, buttermilk, and broths may be substituted. Give food that is easily digested and which leaves but little residue. When milk is used alone, three pints at least may be given to an adult in the course of twenty-four hours; and it should always be diluted, preferably with plain water. Beef juice, mutton or chicken broth may also be used when milk is not agreeable. Albumin water, prepared by straining the white of eggs through a cloth and adding an equal amount of water, is an excellent food. Well strained, thin barley gruel is considered by many an excellent food for typhoid fever patients. Cases not able to take nourishment into the stomach, on account of vomiting and other causes, should be fed rectally to support life. Do not force feeding to an unwarranted degree.

Recently a number of new diets have received commendation. These include the “high calory” diet, which includes three pints of milk with one of cream, two to eight ounces of milk sugar, eggs, butter; sometimes cereals, toast, potato, and other soft foods are given. A full sugar diet, as of candy alone, is based upon the immediate absorption of sugar, its value as a source of energy, and the fact that a plentiful carbohydrate supply lessens the danger of acidosis.[52]

The best drink for fever patients is pure, cold water and they should be encouraged to drink freely of it. Barley water, ice tea, lemonade, or even moderate quantities of coffee or cocoa, may be given.

By **Osteopathic Treatment** many cases of typhoid fever may be aborted, if treated correctly, during the first week. If the stage of necrosis of Peyer’s

patches has set in, one can either lessen the severity of the attack or, at least, shorten the usual course. During the stage of infiltration, treatment to the intestinal splanchnics (chiefly from the ninth to twelfth dorsal, the innervation to the jejunum and ileum) and careful treatment over the abdomen is indicated. This treatment will tend to lessen the intestinal catarrh and diminish the infiltration and cell proliferation of the lymphoid elements of the intestines, and thus produce unfavorable the conditions for the bacillus of Eberth. In other words, increase the tone and activity of the intestines so that the micro-organisms of typhoid fever will not find the proper tissue-soil in order to grow and multiply.

All cases of typhoid fever present lesions in the dorsal or lumbar spine and this is really the great predisposing cause of typhoid fever. Correcting these lesions is absolutely necessary in order to abort the disease. Some patients may have such a lowered vitality to begin with that the recuperative powers of the body cannot be rendered forceful enough in a short time to combat the effects of the micro-organism. Carefully raising the cecum is very effective (A. T. Still), but this must be done with the greatest of caution and judgment. Dr. Still considers a posterior condition of the third, fourth and fifth lumbars as typical in typhoid and that it inhibits the lymphatics to the intestines.

R. L. Price has had excellent success in shortening the usual typhoid course. His first treatment is to thoroughly empty the bowels by enemata. This is followed by spinal, liver and splenic treatment, and a liquid diet.

E. C. White has also treated a large number of typhoid cases with marked success. He prefers to employ the Brand method (and it must be properly used) from the start. He is, also, a thorough advocate of the spinal treatment. In cases of constipation give a very light treatment over the left iliac fossa. With all patients observe careful dieting. White believes that many lesions of the spine arise from reflex irritations during acute attacks. Careful, frequent attention to the spine is demanded.

Hildreth, relative to abdominal and spinal treatment, writes as follows: “In the abdominal treatment of typhoid fever, too much care cannot be exercised; or in the spinal treatment, too much judgment used in giving just the right kind of manipulation. There can be no question relative to the seat of the disease, and consequently there should be no trouble in knowing

where or how to affect the nerves to control the same. That Peyer's patches or the right iliac region is always involved, we all know. The spinal treatment should be applied from the eighth dorsal to the first lumbar inclusive; this affects all the lesser splanchnics and thus controls the circulation of the entire bowel. And this treatment should be given, according to the symptoms indicated, in each and every case. If the patient is constipated, then the treatment should be more of a stimulative character, but if diarrhea is present, as is commonly the case, the treatment should be an inhibitory one. In the above I always finish with a very careful treatment of the floating ribs on the left side; this affects the lesser splanchnic nerves. In all cases I always carefully treat the lower two or three lumbar vertebræ, which directly affects the hypogastric plexus of nerves, and thus controls the circulation to the lower bowel.

"In all cases I always treat the bowels directly, more or less, but this treatment **must** be given with the very greatest **care** and the best judgment, always governed by the condition of the bowel. By no means manipulate the bowel, but just lay your hands flat on the abdomen, and with the most gentle pressure inhibit the peripheral nerves, thus either quieting an excited peristalsis or equalizing a disturbed circulation. And with this treatment remember that the two specific points in typhoid fever are the lower dorsal and lower lumbar nerves.

"The above treatment is used, of course, in connection with all the other necessary treatments, such as dieting, nursing, sponging, relieving the headaches, etc. I am unalterably opposed to ice-packs for the bowels in typhoid, for the reason it is too much of a shock. Cold cloths are good and much better than ice, and should always be used instead of ice."

After the disease has become thoroughly established always make it a point during each visit to examine the entire length of the spinal column carefully and readjust any tissue, whether it be vertebra, rib, or muscle, that may be found disordered. The bowels are to be watched carefully and if constipated, they should be moved with a light enema. Great care must be taken not to treat the abdomen roughly, if at all, after the first week. The treatment might be very injurious to the structures diseased. A light treatment over the liver and kidneys each time is a wise precaution. The heart's action, should be watched carefully. In addition to the

hydrotherapeutic treatment, the general fever treatment should be employed. The patient should usually be seen twice a day.

Abdominal pain is best relieved by light treatment over the abdomen and by thorough treatment of the lower dorsal or lumbar region. Applications of hot water will be helpful.

Meteorism can be relieved by raising the lower ribs and by direct treatment to the abdomen. A change of diet may be beneficial. When gas is in the large bowel an enema may be given to remove it.

Diarrhea and **constipation** are best controlled by the usual treatment given the spine in such cases, and over the abdomen and the liver. Light enemata may be given for constipation. The stools should be examined when diarrhea occurs, as the presence of curds may cause the aggravation.

Hemorrhage from the bowels demands absolute rest. It is probably better to have the patient use the draw sheet for the evacuation. Immediate and thorough treatment must be given to the spinal column in the region of the intestinal nerves to the diseased area, so that existing lesions may be corrected and the vascular area of the mesentery equalized. Ice should be given freely and an ice pack placed over the abdomen. Food should be restricted for ten or twelve hours. If the peristalsis of the intestines is increased, an effort should be made to control it through the vagi and splanchnic nerves.

In **perforation** hot applications, rest and thorough treatment of the innervation to the peritoneum are of value, but immediate operation is usually advisable.

Insomnia is best relieved by attention to the cervical region. Relaxation of the muscles in this region and a quieting treatment to the posterior occipital nerves, coupled with cold sponge baths, will usually induce sleep.

In **delirium** attention to the circulation of the brain, by careful treatment of the vasomotor system, and the Brand method of baths will relieve this distressing symptom.

During **convalescence** the patient should be restricted from any mental or physical exercise for a week or ten days and then should move about with care. Solid food should not be given for ten days or two weeks. If the temperature has been normal for ten days, it is then safe to allow such food

as eggs, milk puddings, and milk toast. If diarrhea should persist, being due to ulceration, the diet should be restricted and the patient confined to the bed. If constipation is troublesome relieve it by enemata.

There are several beneficial effects obtained by **hydrotherapeutic measures** that should receive careful consideration. Probably it is of the least significance to lower the temperature; other beneficial effects being of greater importance. When the baths are systematically carried out, (1) there is obtained a general improvement of the nervous system, the mind is rendered clear, muscular twitchings are lessened, sleep is induced and the heart's action strengthened; (2) the respiration is stimulated, thus diminishing the liability of lung complications; (3) the activity of the renal function is increased, consequently allowing more rapid elimination of toxic matter; (4) reduction of the temperature, and overcoming ill effects of high fever.

A cold water bath, or what is generally termed the Brand method, is commonly employed. The following plan is usually followed. When the temperature is above 102.5 degrees F., rectally, a bath of 70 degrees F. is wheeled to the patient's bedside and he is placed into it for ten or fifteen minutes. The patient should be lowered into the bath by means of a sheet. Enough water is used to cover the body and neck of the patient. The head is sponged and the limbs and trunk are rubbed **thoroughly** during the entire procedure. When the patient is taken out he is wrapped in a dry sheet and covered with a blanket. This procedure is gone through with every three hours if the case is severe, otherwise once every seven or eight hours will be sufficient.

The luke-warm bath is occasionally used in private practice when one is unable to use the Brand method. A bath of 90 degrees F. is employed, which is gradually cooled ten or twelve degrees, after the patient has been placed in it, by pouring cold water on the patient. This bath is found very helpful. Also in private practice the cold pack is found satisfactory. The patient is wrapped in a sheet wrung out of water at 65 degrees F. and cold water is sprinkled over him. Whenever there is objection to any of these methods the body may be sponged off with tepid or cold water when the temperature rises above 102.5 degrees F., rectally. One limb should be taken at a time and then the trunk, occupying altogether some twenty or thirty minutes.

The Great War brought the subject of typhoid vaccination before the world with emphasis but its results are not, as yet, in shape so an unbiased opinion can be formed. The army medical department will tell us that it was an unqualified success but we do know that there were serious outbreaks among inoculated troops who were living under most hygienic surroundings in America. There were, also, outbreaks among protected troops in France to the extent that the medical authorities felt called upon to warn all medical officers that vaccination should not be considered as protecting against unsanitary surroundings and that great precaution must be observed, the same as under non-vaccination conditions. This does not imply implicit confidence.

It is, also, a historical fact that the Japanese army, during the Russo-Japanese war had as low a rate of typhoid without vaccination as can, probably, be shown with it in this war. At that time they depended entirely upon pure water and sanitation.

See reports of typhoid fever in A. O. A. Case Reports as follows: C. M. T. Hulett, Series I, p. 7, J. H. Wilson, Series III, p. 3, F. E. and H. P. Moore, and F. A. and E. S. Cave, Series IV, pp. 4 and 5.

In **paratyphoid fever**, an acute infectious disease caused by the paratyphoid bacillus, the treatment is the same as for typhoid fever. It is milder and similar to typhoid fever.

Typhus Fever

Definition.—An acute, infectious disease; characterized by sudden invasion, high fever, marked nervous symptoms, a peculiar maculated and petechial eruption and a termination by crisis about the fourteenth day.

Etiology and **Pathology**.—Typhus fever is becoming less frequent than formerly and is rarely seen in this country. It was very destructive during the Great War, particularly in the Balkan states. Filth, over-crowding, famine, intemperance and bad food are the predisposing causes. Typhus fever is highly contagious and is transmitted by the pediculus corporis (cootie) as was first discovered by the American Red Cross workers in Serbia. Probably infection may come by contact and fomites. The specific organism is the bacillus typhi exanthematici (Platz).

Pathologically, there are no constant lesions. There is a general hyperplasia of the lymph follicles, but no ulceration. The blood is dark, thin and lessened in fibrin. Hypostatic congestion of the lungs and bronchial catarrh are frequently met with. The liver, kidneys and spleen are found to be somewhat enlarged and softened. The petechial rash remains after death.

Symptoms.—The **incubation period** is about twelve days. The onset is usually sudden, ushered in by chills. The temperature quickly rises to 104 or 105 degrees F. There is headache, pains in the muscles, especially of the back, and early, profound prostration. The pulse is at first full and strong, 100 to 140, but soon becomes weak and frequent. There may be distressing vomiting. The face is flushed, the eyes injected, the expression stupid, and there is generally low, muttering delirium. The tongue is furred and white, soon becoming dry. The bowels are constipated and the urine is usually scanty and of high specific gravity. There is great thirst. Conjunctiva injected; pupils contracted; early prostration.

The **eruption** appears about the fifth or seventh day. It first makes its appearance upon the abdomen and chest. It rapidly extends all over the body with the exception of the face. The eruption is of two kinds—rose spots, which disappear upon pressure, and those which become hemorrhagic (petechial); pressure has no effect upon them. During the second week the symptoms are increased. The tongue is dry, brown and fissured, and sordes appear on the teeth. Retention of the urine, due to paralysis of the bladder, is common. The breathing becomes more rapid and the heart's action more feeble; the patient may die from exhaustion. This ushers in the typhoid state with low, muttering delirium, ataxic symptoms, subsultus, tremors, and maybe bronchial symptoms. In favorable cases the crisis occurs at the end of the second week. Patient sinks into a sound sleep, the temperature falls rapidly, there is profuse sweating and a critical diarrhea but the patient now gains rapidly.

Convalescence is usually rapid; relapses rarely occur. The urine is scanty, high colored and frequently albuminous. Bed-sores are common. The temperature continues high, reaching 106 degrees F., or more, with slight nocturnal remissions. In fatal cases the fever often rises to 108 or 109 degrees F. just before death.

Diagnosis.—The sudden onset, frequent chills, early profound prostration, character of the rash, history of exposure to the poison and unhygienic surroundings decide the diagnosis. During an epidemic there is usually no doubt, but in sporadic cases the diagnosis is sometimes extremely difficult.

Prognosis.—This is usually grave, but the mortality rate is being greatly reduced in consequence of the better sanitary arrangements.

Treatment.—Typhus fever is highly contagious and great care should be taken in controlling the disease. Isolation, disinfection and extermination is imperative. So far as known none of the osteopaths have had experience in the treating of typhus fever osteopathically, but there is no reason why the disease should not be treated with the same success as is met with by osteopathic treatment in other diseases. It is claimed that the disease should be treated in the open air, in tents, as the recovery of the patient and the safety of the attendants are greatly favored.

For high temperature, besides the treatment given to remove any disorder that may be found, the general fever treatment is indicated, and hydrotherapy would also be of aid—sponging the surface of the body, or the use of the bath. Asthenia is wherein the greatest danger lies, and a stimulating treatment along the spine and to the heart should be given; although correction of the primary trouble may be sufficient. Hydrotherapeutic measures, the systematic use of the cold bath, would be of service the same as in typhoid fever.

Headache and delirium which are apt to arise, caused by too much blood in the head, may be relieved by treatment of the cervical spine. Also cold applied to the head will aid. The bowels should be watched carefully; treat the splanchnics thoroughly and the intestines and liver directly. Nourish the patient as in typhoid fever by nutritious liquids—milk, broths, etc.

Although typhus is now a comparatively rare disease, an outline has been given to emphasize what correction of unhygienic conditions and insanitary surroundings will accomplish. It is particularly a disease of filth.

Malarial Fever

(AGUE)

Definition.—An infectious disease caused by the hemocytozoon of Laveran. "It is characterized by paroxysms of intermittent fever of the quotidian, tertian or quartan type, a continued fever with marked remissions, a pernicious or rapidly fatal form, and a chronic cachexia with anemia and enlarged spleen." (Halbert). The varieties of malarial fever are: intermittent fever; pernicious intermittent; remittent fever; malarial cachexia; masked intermittent; malarial hematuria.

Osteopathic Etiology and **Pathology**.—Malarial fevers are caused by a parasite known as the hematozoon of Laveran. Three varieties of the parasite have been separated, corresponding with the three leading forms of the affection. The parasite of tertian fever is about as large as a normal red blood-corpuscle, beginning as a small hyaline ameba in the red blood-corpuscles. The parasite of quartan fever is very similar in its appearance to the tertian parasite but smaller; its ameboid movements are slower and the red blood-corpuscle embracing it shrinks about the parasite, assuming a deeper greenish color. The parasite of the estivo-autumnal fevers is still smaller. "If only one group of parasites exists the paroxysms—quartan intermittent—will occur every fourth day. Double quartan infection will result in paroxysms on two successive days with an intermission of one day. Infection by three groups of parasites will create daily paroxysms—the quotidian intermittent. Infection by more than three groups is rare." (Anders). Only in the earlier stages of development, small hyaline bodies are to be found in the peripheral circulation; being, in the later stages, in the blood of certain internal viscera, spleen, and bone marrow, particularly.

It is an accepted fact among medical observers that to the mosquito, *anopheles*, is due the spread of malaria and it has been the subject of much investigation in all parts of the world. The mosquito becomes infected from biting an individual whose blood contains the malarial parasite, this is then developed in the mosquito to maturity and later is transmitted to the next subject bitten. This explanation would show why certain localities favorable for the breeding of mosquitoes are particularly given to malarial outbreaks. Low, marshy grounds, banks of rivers, small ponds, etc., as well as warm weather, are needed to produce the conditions for the development of the *anopheles*. As the country has developed the intensity and extent of malaria has diminished until it is now confined largely to the southern states. It is practically unknown in the northwest and in the St. Lawrence basin.

Regions which have never had cases, however, have developed them when the *anopheles* has appeared. Whiting notes cases in Southern California, the result of the insect being brought in by ships from Mexican or Central American ports. In certain regions the *anopheles* is present but has not apparently come in contact with a malarial victim, so is incapable of spreading the disease. Also in colder climates this species is harmless.

By draining the lands and preventing the breeding places, the number of the pests is reduced, while the screening of houses and care against exposure to the bites make it possible to live in malarial sections and not become infected. Naturally the resisting power of a patient is called into account when bitten by the mosquito. Where it is epidemic the inhabitants will be found, generally, poorly nourished or debilitated from climatic or other conditions. This renders infection easy, for immunity must come from the ability of the blood to combat the invading parasite.

The **osteopathic predisposing causes** for malaria are usually interference with the vasomotor nerves to the spleen and liver, as these two organs are so concerned in maintaining the stability of the blood tissue. Ligon, of Alabama, notes that most cases have lesions between the ninth and twelfth dorsal on the right side.

The chief **morbid changes** are clue to the direct effect of the malarial parasite upon the blood. There are also changes in the liver, kidneys, and spleen, which changes usually vary with the duration and intensity of the disease. The disintegration of the red blood-corpuscles, accumulation of the pigment thus formed, and the toxin engendered by the malarial parasite are responsible for the morbid lesions of the disease.

In **pernicious malaria** the blood is more or less hydremic, and the discs are seen in all stages of destruction. The spleen is enlarged and soft and the pulp dark from the accumulation of the pigment, and spontaneous rupture has occurred in a number of cases. The liver is swollen and turbid; pigmentation occurs, but is generally only visible by means of the microscope. By the aid of the microscope all the tissues of the body, even the brain, may be found to be pigmented.

The **spleen** in **chronic malaria** is greatly enlarged, firm, pigmented and the capsule thickened. The **liver** is enlarged, the color varying from a slight gray to a deep slate gray, according to the amount of pigment. The **kidneys**

may be enlarged and deeply pigmented, as is also the mucous membrane of the **stomach** and **intestines**.

R. W. Connor observes that the kidneys and liver are most noticeably involved, vasomotor obstructions the rule, the spleen in the majority of cases shows engorgement and that special attention to these centers will give the best results. He invariably finds spinal lesions from the seventh dorsal to the first and second lumbar, most frequently the eighth, ninth and tenth dorsals. A lowered vitality predisposes to infection from the bite of the mosquito.

Symptoms.—Intermittent Fever.—This form is what is known as fever and ague, in which chills, fever and sweat follow each other. The period of incubation varies from six to fifteen days, but it may be months after exposure before the first paroxysms set in. The paroxysm is usually preceded by a feeling of uneasiness and discomfort, sometimes by nausea or headache. The paroxysm consists of three stages, cold, heat and sweating.

In the **cold stage** the chill usually begins gradually; it is generally intense, the teeth chatter and the body shakes violently. The skin is cool and pale, the lips are blue, the face is pinched and the patient looks very cold. During the chill the temperature rises rapidly. Nausea, vomiting and headache are common. The pulse is frequent, small and hard. The urine is increased in quantity and of low specific gravity. The chill lasts from a few minutes to a couple of hours.

The **hot stage** succeeds the chill. The skin gradually loses its coldness and becomes hot. The face is flushed, there is great thirst, the mouth is dry, and the tongue is coated. Usually at the termination of the chill the temperature has reached its maximum level, from 104 to 106 degrees F. The pulse is full, and there may be a throbbing headache. The duration of this stage is from half an hour to three or four hours. During the **sweating stage** drops of perspiration appear upon the face; the perspiration soon becomes profuse, extending all over the body. The temperature soon falls, the headache disappears and in a couple of hours the paroxysm is over.

The entire duration of the paroxysm is from eight to twelve hours; the patient usually feeling perfectly well between the paroxysms. The spleen is enlarged. If the paroxysms of fever occur daily at the same hour they are

called **quotidian** intermittent fever; if every other day they are known as **tertian** intermittent; and if every third day they are called **quartan** intermittent. If there are two paroxysms in the same day the term **double quotidian** is used; if the paroxysms occur a couple of hours later each successive day they are called "**retarding**;" if a couple of hours earlier they are named "**anticipating**."

Remittent Fever.—(Estivo-Autumnal Fever).—This is characterized by a continued fever with paroxysmal exacerbations and remissions. It occurs especially in warm and tropical climates. In temperate climates it usually occurs in the late summer and fall. It is also termed bilious remittent fever on account of the intensity of the gastro-intestinal manifestation. The estivo-autumnal parasite is the exciting cause.

It is very often preceded by malaise, headache, nausea and vomiting. The onset is usually gradual and the chill may be wholly absent. As a rule, however, a chill generally occurs at the onset, but it is less severe than that of intermittent fever. After the chill the temperature rises rapidly to 102 or 104 degrees F. or even higher. The pulse is full, rising to 100 or 120. There is violent headache, flushed face, pains in the limbs and loins, nausea and vomiting, and delirium when the temperature is very high. The urine is scanty or even suppressed, slightly albuminous, sometimes bloody, high colored, and deposits a sediment of urates. Jaundice is not infrequent; the spleen is enlarged and herpes labialis is quite common. After six to twenty-four hours the symptoms abate and slight sweating occurs. The temperature usually drops to 100 degrees F., the headache disappears and vomiting ceases; this is followed by a new exacerbation of fever at the end of about twelve hours, generally without the chill; and this hot stage is in turn again followed by the remission. These attacks may last three or four weeks.

Pernicious Malarial Fever.—This is rare in temperate climates and is always associated with the estivo-autumnal parasite. The principal types are the cerebral and algid.

The **cerebral type** usually begins with a severe chill; sometimes, however, the chill is absent. The patient is violently seized with grave cerebral symptoms, as acute delirium or sudden coma. The comatose condition lasts from twelve to twenty-four hours when consciousness

usually returns, the primary paroxysm rarely proving fatal; it is, however, often followed in a short time by fatal relapse.

The **Algid** variety is characterized by intense prostration and extreme coolness of the surface with the internal temperature high. The gastric symptoms are extreme nausea and vomiting. The pulse is feeble; the breathing frequent and shallow. There is intense thirst. The voice is feeble and indistinct. The mind is clear. The urine is suppressed. In this type the parasites gain entrance to the gastro-intestinal mucosa, sometimes forming distinct thromboses of the smaller vessels. This form may be confused with yellow fever.

Malarial Cachexia.—This is a chronic condition which often occurs in cases that have not been properly treated or in persons that live in malarial districts and are constantly exposed to the infection. The two most striking symptoms of this condition are anemia and an enlarged spleen or "ague cake." There is fever at intervals, but chills rarely occur. The skin is of a dirty yellow color. The spleen is greatly enlarged and the blood is profoundly anemic. There is debility, and frequent sweating, and the hands and feet are cold. The digestion may be deranged and there may be slight jaundice. Sometimes there is edema of the feet and even dropsy occurs. Hemorrhages of the various mucous surfaces are common. Paraplegia and orchitis are rare symptoms. These cases usually do well under proper treatment, and if the patient can be moved from the malarial district.

Masked Intermittent.—Malarial neuralgia most frequently involves the supraorbital branch of the trigeminus; also the occipital, the intercostals, sciatic and brachial nerves may be affected. Such forms of malaria are called "masked malaria." In this form there is no fever and as a rule it is very hard to diagnose. A blood analysis should be made to confirm the diagnosis. In some cases one or more stages in the paroxysm of intermittent fever is omitted; this is especially true with the chill, in which case it is termed "dumb ague." Malarial cachexia is also sometimes called "dumb ague" and both are found among the older inhabitants of malarial districts. Persons living in malarial districts are sometimes affected with constipation, headache, loss of appetite, nausea, vomiting and a languid feeling; this is called "latent intermittent fever." Frequently "bilious attacks" are of a malarial origin.

Malarial Hematuria.—Hemorrhages may occur from the mucous membrane in all severe and persistent types of malarial infection. It is a frequent symptom of the pernicious variety. The parasites destroy the red blood-corpuscles; this is the cause of the hemoglobinuria. Prostration and anemia are marked. In **blackwater fever**, a tropical disorder, acute hemolysis, is the cause of the hemoglobinuria.

Diagnosis.—This is usually easy. The characteristic stages of the paroxysms, the periodicity, residence in malarial districts and the alterations in the blood will usually remove every doubt as to the diagnosis.

Typhoid Fever may simulate malarial fever, but a careful analysis of symptoms and blood examination will differentiate.

Prognosis.—This is almost always favorable under early and persistent treatment. The unfavorable symptoms are uremia, hemorrhage and marked jaundice.

Treatment.—Attention should first be given to **prophylactic measures**. Environment, isolation of the patient, and destruction of the mosquito are important considerations. Cases of malarial fever present distinct lesions in the vertebræ and ribs corresponding to the vasomotor nerve supply of the spleen and liver. The most common lesion found is a marked lateral deviation between the ninth and tenth dorsal vertebræ and a consequent downward displacement of the tenth ribs. A disturbance will always be found in the region of the eighth to the eleventh dorsal vertebra, inclusive, or in the corresponding ribs on either side. These lesions undoubtedly derange the vasomotor nerves to the spleen and liver; thus permitting a weakness or lowered resistance of the system, especially of the blood. The blood resisting powers are lessened, probably on account of the spleen being affected, as it is an elaborating gland of the blood; and the liver's action is somewhat dependent upon the action of the spleen; besides, the liver is a secretory and excretory organ.

The principal **osteopathic treatment** given in cases of malarial fever is correction of these subdislocations, and thorough treatment to the liver and spleen directly. Ligon observes that when the case does not respond quickly to treatment it is very liable to be of considerable duration, although in the majority of cases the disease is controlled from the third to seventh day; the

most constant lesions found are from the eighth to tenth dorsal and also the fourth lumbar.

During the **chilly stage** thorough treatment of the vasomotor nerves in the upper cervical, the upper dorsal, the lower dorsal and the lumbar regions is indicated; this treatment is given to equalize the vascular system.

During the **hot stage** the same treatment as in the chilly stage should be given to control the vascular system; besides a thorough treatment of the spleen and liver is necessary. Sponging the body with water will be of some aid in reducing the temperature.

During the **sweat stage** thorough inhibition at the superior cervical ganglion to control the sweat center of the medulla, and treatment at the upper dorsal and first lumbar to control auxiliary sweat centers are indicated.

The bowels should be kept active. When in a comatose form and when internal temperature is high, place the patient in a bath. In chronic cases, change of climate with thorough systematic treatment will usually result in recovery.

Tete[53], of Louisiana, makes the following interesting statement: “A specific osteopathic treatment given within an hour before the expected chill is a specific cure for malaria.” He follows this up by treating on the third, fifth, seventh, fourteenth, and twenty-first days, on account of the tendency of the return of an attack on those days. His observation of the value of treatment just before the attack is borne out by a report by Teall[54] where the case was cured in one treatment, but the lesion was as high as the fourth dorsal. N. Chapman confirms this as being her experience in many cases. The spleen has been observed by Bandel to become engorged and upon emptying there would follow a rise of temperature of one fourth to half a degree. This has also been spoken of by Tucker as the “splenic wave.” Ligon makes the statement that where the osteopathic lesion (the predisposing cause) has been of long standing prior to the attack, and as a consequence hard to correct, it is difficult to shorten the malarial attack.

This would emphasize the point that the essential treatment must be a thoroughly readjustive one, and that stimulatory and inhibitory work can only palliate. This is borne out by several practitioners who have had

considerable experience. Very satisfactory results follow adjustment of the seventh to tenth dorsals.

Quinine has been accepted by medical authorities as a specific for malaria. It is supposed to act directly upon the intracorpuscular hematozoa. That it is not infallible is shown by the numerous cases which come to the osteopath, suffering from both the disease and the quinine. And even drug authorities state that other treatment is also required. It has remained for Dr. Still to demonstrate that excellent results follow osteopathic treatment in malaria. Frequently a single treatment has been sufficient to free and regulate the body fluids and forces so that the parasite was rendered inert, and this treatment was directed chiefly to the fourth and twelfth dorsals. Whereas the osteopath recognizes and appreciates the importance of micro-organisms as exciting and determining factors in many diseases, still he values them as secondary factors only and relies primarily upon removing the predisposing and true etiologic factors, so that nature's forces may not be obstructed and thus predominate. Osteopathic etiology and pathology has shown so conclusively, in a large number of cases, that the existence of micro-organisms is dependent upon devitalized tissue, whether the tissue is a local one or a circulating one, as the blood; and just so soon as the anatomical is adjusted the physiological will function and antitoxic and antimicrobic substances are secreted.

"When the patient has the quartan parasite, as soon as the temperature begins to fall I give him from two to six ounces of red meat juice, extracted from rare beefsteak, sometimes as much as five pounds in the first twenty-four hours following the chill. In almost all cases of quartan malaria the blood is built up sufficiently by the time they reach the second cycle to pass without the paroxysm, or chill. By the time for the third cycle, which is the seventh day, I always have built up the patient's resistance so as to enable him to pass by this cycle without any symptoms of malaria whatever. In cases of double or triple I find the same treatment causes about the same results. I do not give any other diet, except dry toast if they eat the beef instead of taking the juice. If they can take the steak I prefer their taking it, but almost all cases prefer the juice. * * * The treatment for the tertian type of malaria is practically the same as the treatment for the quartan.

"The estivo-autumnal type of malaria differs from the quartan and tertian types; first, in that the paroxysms are, as a rule, much more irregular;

second, they are much longer in duration; third, the chills are more frequently absent; fourth, the fever is often irregular, intermittent, remittent, or continuous in character. This type very often takes the form of blackwater or hemoglobinuric type with hemorrhagic symptoms, with hemorrhage from nose, gums, and bowels. The first thing to do in a case of hemorrhagic malaria is to put an ice bag on the abdomen, which will tend to control the hemorrhage from the kidneys. Give the patient all the red beef juice you can get him to take, provided he has not developed a very sick stomach; if so, give him high saline enemas and in one-half hour give him four ounces red beef juice per rectum. Repeat the feeding per rectum in four hours. As soon as he can retain anything on stomach give him all the juice he can take comfortably. Treat the liver thoroughly—at least three times in the first twenty-four hours. At the end of thirty-six hours the yellow cast will be very much lighter, which is a sure sign that the patient is getting better. Watch the urine closely. The third day there may occur a suppression. If so, give strong stimulation to the renal plexus through the abdomen, and be sure there is a thorough relaxation of the dorsal and lumbar muscles.

"It is an established fact that people in the malarial districts eat very little beef. I find that ninety-nine per cent of the cases of malaria never eat it, or when they on rare occasion do, it has been so overcooked that all the blood-building substances have been destroyed. The beef raw would be better in my opinion; although, the possible chance of getting a tape-worm or animal parasite is so considerable that I would advise that the beef should be heated to 250 degrees."—E. C. ARMSTRONG, Clinical Osteopathy.

Septicemia

This term is applied to any toxic condition caused by the invasion of the blood by pathogenic micro-organisms, with or without any visible site of infection.

Etiologically, the micrococci, streptococci, pneumococci, or staphylococci, as to frequency, in order named, are the cause. The infection is usually introduced by a wound, of any degree of severity. The uterus is a frequent seat following miscarriage, parturition or operation. The virus may be absorbed by the mucous membrane. It may also arise from infection of the deeper tissues. **Pathologically**, the changes are not marked, but consist

in brownish color of the muscles, ecchymotic spots in the pia mater and dark appearance of the blood, which is also less coagulable. Spleen, liver and lymphatics are enlarged with some changes in the other organs.

Symptoms.—The incubation period is from four to six days and the onset is gradual, though often announced by a distinctive chill, followed by a profuse sweat. The most common type is the continuous form of fever, which may, in morning remissions, become subnormal. Pulse is rapid at the beginning, but as cardiac failure comes on, it becomes weaker. In the earlier stages there may be vomiting with diarrhea later. There are punctiform hemorrhages of the skin and possibly other eruptions. Blood examination will settle any doubt as to diagnosis.

Prognosis is good in large percent of cases and depends upon the general health of the patient.

Treatment.—"Incise and drain the infected part; if possible, apply hot boracic acid compresses or keep part suspended in hot boracic acid solution. Osteopathic treatment will aid materially in stimulating and strengthening the patient. Bowels, kidneys and skin must be kept active. Normal salt solution, hypodermically or per rectum is of value. Diet should be liquid, fruit juices, broths, soups until temperature has remained normal twenty-four hours then milk, eggs etc., in gradually increasing amounts until general diet is restored. Amputation of the part may be necessary."—L. E. BROWNE.

Pyemia

A febrile disease arising from an invasion of the blood by pathogenic bacteria, wherein sepsis and multiple abscesses occur from absorption and metastasis.

Etiologically, the cause may be traced to various specific organisms which enter the blood stream and produce thrombophlebitis. From these points and from other bacteria, new foci are established. Occasionally the lymphatics carry the germs. The disease may also start from ulcerative endocarditis or when the appendix is infected.

Pathologically, thrombosis of the vein may take place in any region. Abscesses may form in the lungs, liver, spleen or other internal organs. The

small abscesses may unite and form a large one. The skin presents eruptions and hemorrhagic extravasations, while there may be ulcers of the mucous membrane, also the serous surfaces may be purulently inflamed. The muscles, subcutaneous and osseous tissue occasionally have abscesses. Ulcerative and suppurative heart lesions occur.

Symptoms.—The incubation period is short. There may be slight fever, but commonly a chill is the first symptom, which may reoccur for some time. The fever is either remittent or intermittent and when the temperature is low, sweating is a feature. The pulse becomes rapid and weak, when the disease is severe; breathing becomes difficult. Skin symptoms, such as eruptions and pustules, generally occur. In a word, there is a general intoxication. There is a lessened number of red blood corpuscles and leucocytosis is a characteristic. In grave cases, delirium and coma are present.

Diagnosis.—The history of the case and symptoms will usually render diagnosis easy, although care is necessary to determine from septicemia. Malaria, typhoid and acute tuberculosis must be excluded.

Prognosis.—Much depends on asepsis and surgery but on the whole it is unfavorable.

Treatment.—Surgical interference and treatment as outlined under septicemia is the only hope.

Dengue

(Breakbone Fever)

Definition.—An acute infectious disease; characterized by a double febrile paroxysm, severe pains in the muscles and joints and sometimes a skin eruption.

Etiology.—It is a disease of tropical and subtropical regions. Unhygienic conditions predispose to an attack. During an epidemic a single attack is the rule. The disease spreads from place to place along the lines of travel, attacking both sexes, and all ages. It occurs in epidemics, practically affecting every one. The specific germ has never been isolated as it is

probably ultra-microscopic but there is no doubt but that it is carried by the mosquito *Culex fatigans*.

Symptoms.—The incubation period lasts about four days. The onset is abrupt with a slight chill, headache, and extreme pain in the joints and muscles, of a boring or breaking character. The joints become red, swollen and painful. The fever rises gradually to 103 or 106 degrees F., or over. The pulse is rapid and full and the respirations are much quickened. The face is flushed, the tongue coated, the appetite is lost, and slight nausea occurs. "Black vomit," similar to that of yellow fever, has been observed in this disease. Hemorrhages from various organs may occur and the lymphatic glands are swollen. The urine is scanty and the bowels constipated. Febrile albuminuria and delirium are rare.

At the end of three or four days the temperature falls and there is a period of remission; the patient is free from pain, but profoundly prostrated. During this time the eruption generally appears, but is never constant in character. After a remission of two or three days, the symptoms reappear and a second febrile paroxysm sets in. This is usually milder and shorter than the first, lasting two or three days, when convalescence begins. The duration is, according to medical writers, from seven to ten days, and convalescence slow. Death seldom occurs, so practically no pathological changes have been recorded. By osteopathic treatment, E. B. Ligon has been able to confine the attack to four or five days duration; this is confirmed by the experience of N. Chapman.

Diagnosis.—During an epidemic the disease attacks all classes alike, and the distinct remission renders the diagnosis comparatively easy. An occasional case might be mistaken for acute rheumatism, but the absence of any glandular swelling or eruption, while the pain is more closely limited to the joints, will aid in the diagnosis. Care has to be taken that yellow fever is not mistaken for dengue.

Treatment.—The indications of the treatment are to maintain the patient's strength and to treat the leading symptoms as they arise. The severity of an attack can probably be lessened at the start by strong and thorough treatment of the suboccipital, upper dorsal, lower dorsal and lower lumbar regions, respectively, so as to control the large vascular areas by means of the vasomotor nerves of the cranial region, of the lungs, of the

splanchnic region, and of the lower limbs, thus equalizing the entire vascular system. Elimination should be pushed and the excretory organs stimulated. Ligon has observed that the cervical and lumbar regions are especially tender on the second day and the lower dorsal region on the third day. The most severe symptoms disappeared within a few hours after treatment and the attack was markedly shortened.

The high fever may be treated by the usual methods and by the external application of cold water. The pain is to be controlled, according to the region affected, by a correction of parts impinging upon the nerve tissues and by strong inhibition. The entire spinal region should be kept constantly in a relaxed condition, as far as muscular contractions are concerned. Particularly should the treatment be extensive along the spine during prostration. N. Chapman, in addition to the osteopathic treatment, has the patient drink considerable hot water; also employs the hot bath. The treatment frequently shortened the attack. During the entire attack of the disease, the patient should be kept in bed and a carefully regulated diet administered. Relapses are not infrequent. A suitable change of air may hasten convalescence.

Cerebrospinal Meningitis

Definition.—A specific, infectious disease caused by the diplococcus intracellularis meningitidis, occurring sporadically and in epidemics. It is characterized by inflammation of the membranes of the brain and spinal cord and an irregular course.

Osteopathic Etiology and **Pathology**.—The specific exciting cause of the cerebrospinal meningitis is due to the diplococcus intracellularis meningitidis of Weichselbaum. Lesions are found in the vertebræ corresponding to the cervical and dorsal enlargement of the cord, as well as in corresponding deep muscles; also, as is well known, the muscles of the entire back are severely contracted, especially of the cervical, upper and lower dorsal regions. More commonly it attacks the young, although it may occur at any age. Overexertion, exposure, overcrowded and illy-ventilated buildings, barracks and tenements, and depressing mental influences are predisposing causes. Many times the disease occurs among the poorer

classes. Sometimes the disease prevails in the country rather than in the city.

In cases that prove speedily fatal there may be no characteristic changes; simply marked congestion. Other cases in which death occurs after the disease has been fully developed, there is found every degree of inflammation from slight hyperemia to suppurative changes. There can be no doubt that the osteopathic lesion, as vertebral and rib lesions and deep muscular contractions, affects the circulation of the meninges of the brain and cord and thus favors the invasion of the specific micro-organism. The arteries, veins and sinuses are greatly engorged. The walls of the ventricles soften and the ventricles contain serous exudate. The brain matter may be congested and softened in spots. In the spinal membranes similar changes take place and at times there is extravasation of blood. The changes are more marked on the posterior than the anterior surface of the cord. Abscesses sometimes form. The exudate may follow the lymph sheaths of the cranial nerves, especially the auditory and optic. In long standing cases the membranes become thick and adherent and areas of softening or atrophy of the cortex develop. The thickening and adhesions of the membranes may cause various symptoms for months or even years after recovery from the acute disorder.

The spleen may be normal in size, but when the fever has been intense, it is apt to be slightly enlarged. Bronchitis, pneumonia, endocarditis and pleurisy may occur. The liver may become hyperemic and the kidneys congested.

Symptoms.—The prodromes vary, although the onset is apt to be sudden with a decided chill; headache; vomiting, and pain in the neck and back, which is usually severe, but may be so slight as not to be noticed by the patient. The temperature rises to 101 to 102 degrees F., in most cases. However, it may rise to 105 degrees or 106 degrees and even to 108 degrees in fatal cases, and the pulse is full. Hyperesthesia, photophobia, and dread of noise are apt to be prominent symptoms. The muscles of the neck and back become rigid, and there are pains in the limbs. Orthotonos occurs more frequently than opisthotonos. Convulsions are common in children. There may be paralysis, especially of the muscles of the face and eyes. Delirium usually appears early; it may be mild, but it is often maniacal. The

bowels are usually confined, though there may be diarrhea. There is moderate and constant leucocytosis and jaundice has been met with.

The urine is sometimes albuminous, and sugar has been noted in rare cases. The urine may be increased, but more often it is lessened as in other infectious diseases.

Herpes facialis occurs shortly after the onset in more than half the cases. The contents of the vesicles may be purulent and one or two may coalesce. The petechial eruptions are occasionally numerous and cover the entire skin; they do not disappear upon pressure and the number of spots varies greatly. Other eruptions as sudamina, ecthyma, pemphigus, urticaria, erysipelas, rose colored spots, and gangrene of the skin (rarely) have been met with.

In cases that are **rapidly fatal**, the onset is sudden, usually with violent chills, headache, depression, and in a few hours coma and collapse, which are soon followed by a fatal termination. The temperature may rise slightly, but it is often subnormal. The pulse is feeble; breathing is labored. These cases occur more frequently at the beginning of an epidemic. They occasionally occur sporadically.

The **abortive** form terminates abruptly after the development of one or more pronounced, characteristic symptoms.

The **mild** form can only be recognized during the prevalence of an epidemic. The symptoms are very mild; slight vomiting, little or no fever, headache and slight pain in the back and limbs.

The **intermittent** form is characterized by increase in the fever every day or second day. The strict periodicity seen in malaria is not observed; the fever resembles that of pyemia.

In the **chronic** form the condition may persist for weeks or months.

Complications.—Pneumonia (lobar and lobular) is a frequent complication. Pleurisy, pericarditis, parotitis, arthritis, enteritis, optic neuritis and otitis media may be other complications.

Sequelæ.—Blindness, deafness, keratitis (rarely), persistent headache, chronic hydrocephalus, abscess of the brain, mental feebleness, defective

articulation, aphasia, and paralysis of certain cranial nerves or of the lower extremities have occurred.

Diagnosis.—Typhoid fever begins slowly and is unaccompanied by vomiting, muscular spasms or rigidity, or hyperesthesia. In typhoid the fever is higher and there is a characteristic temperature curve. Widal's test will confirm.

Tubercular meningitis is not epidemic and has no characteristic eruption. It is usually less sudden in its development and is invariably fatal. Retraction of the neck, muscular spasms of the legs and arms are not so marked as in spinal meningitis.

Pneumonia may be complicated with meningitis, especially when the meningitis is confined to the cerebrum. If the case is not seen early, it is almost impossible to say which is the primary affection, as pneumonia may have meningeal complications or cerebrospinal meningitis may be associated with pneumonia. There will be motor spasms and tremors, but the head is rarely retracted, and there is less myalgiac pain than in cerebrospinal meningitis.

Prognosis.—This varies according to the severity of the type. It is a grave disease. Cases have been treated successfully by several osteopaths. The duration is very variable—from two or three days to weeks or even months, but probably in all cases this time can be materially shortened by judicious osteopathic treatment. Convalescence is very slow and relapses are prone to occur.

Treatment.—The osteopathic treatment of cerebrospinal meningitis requires most thorough, but very careful, work along the spinal column, especially the cervical region and the region of the dorsal enlargement of the spinal cord, in relaxing and keeping relaxed the deep muscles on either side of the spine and correcting the derangements of the vertebræ, particularly in the upper cervical spine. Such treatment has a marked effect on the circulation of the spinal cord and brain. Probably, a large amount of the work along the spine, in all cases where muscles are relaxed, has a direct effect upon the circulation of the spinal cord. This treatment constitutes the primary osteopathic work in cerebrospinal fever and should be frequently applied until a cure is obtained. Even in chronic cases where limbs have been greatly affected by pressure upon the nerve centers, due to

a thickened membrane, continued osteopathic treatment along the spine has had a marked effect in absorbing the pathological condition and restoring strength.

The preceding spinal treatment is also a very great safeguard in keeping the various viscera healthy and thus preventing complications. In all constitutional diseases of an acute nature, it is a wise precaution to thoroughly examine the entire length of the spinal column at each visit; and if such precaution is taken many serious complications will never occur that might otherwise have taken place.

The patient should be isolated in a somewhat darkened room, and care taken that the disease is not allowed to spread. Keep the patient upon his sides as much as possible. The diet should be a nutritious one of milk and broths. They should drink freely of water. Cold to the head and spine will be of service in controlling the inflammation; it should be applied with an ice-cap and a spinal ice-bag. Sponging the body should be employed if the temperature is above 102° F. The general bath, as in typhoid fever, may be employed if practicable. Direct treatment to the bowels, kidneys, liver and spleen should be given at each treatment.

Lumbar puncture and the Flexner-Jobling serum are considered of value by those who have had an extensive experience.

Diphtheria

Definition.—An acute, infectious disease, caused by the Klebs-Loeffler bacillus, and characterized by a membranous exudation on the mucous membrane of the fauces, larynx or nose, and by constitutional symptoms. The presence of the Klebs-Loeffler bacillus distinguishes true diphtheria from any other form of membranous inflammation. The term diphtheroid is applied to all such forms as are not due to the Klebs-Loeffler bacillus.

Osteopathic Etiology and **Pathology**.—The exciting cause is the Klebs-Loeffler bacillus. The predisposing cause is obstruction to the circulation of the pharynx and tonsils by subdislocations of upper cervical vertebræ, and even the lower cervical and upper dorsal, and severely contracted deep muscles of the neck. The stasis of blood favors the growth of the bacillus.

Link[55] says: “The cause of nasal, pharyngeal or laryngeal diphtheria is obstruction of the blood and lymph through the neck and the obstruction occurs as a result of lesions in the cervical region, affecting the cervical sympathetics, or lesions in the upper thoracic region whence the vasomotor fibers arise. A derangement of the vertebral articulation of the first rib is usually found. (This affects the stellate ganglion and fibers of the sympathetic chain). These lesions cause a condition of lowered vitality of the mucosa of the nose and throat; the abnormal secretion favoring the rapid multiplication of the Klebs-Loeffler bacillus—the exciting cause of the disease.”

Dr. Still believed that, among other lesions, contracting of tissues involving the scaleni and disturbing the relations of the first rib with the clavicle and vertebra are causative factors. The constitutional symptoms are produced by the toxins generated by the bacillus and absorbed from the diseased spots by the lymphatics and blood-vessels. The bacillus is non-motile and does not usually penetrate the mucosa, but remains very near the site of the local changes although there are instances where it may enter the blood and other tissues. The bacillus is very resistant and can maintain an existence for months outside of the body. There is great variation in the virulence of the Klebs-Loeffler bacillus; it has been found in healthy throats, and sometimes the bacillus may exist in the throat after an attack of diphtheria for months after all the membrane has disappeared. It has also been found in cases of simple catarrhal angina without membrane, and in simple tonsillitis Of the bacteria associated with the bacillus of diphtheria, the streptococcus pyogenes is the most common and probably the most active. The staphylococcus, micrococcus lanceolatus and bacillus coli communis are also found.

The contagion is communicated, as a rule, through the air, by means of fomites from the membranous exudate or discharges from the diphtheritic patients, or during convalescence, from secretions of the nose and throat. Infected milk may cause the disease. Most cases occur in childhood, between the second and seventh year. The disease is most prevalent in the cold autumn and spring months. It is most frequently met with in temperate and cold climates. Defective drainage, catarrhal conditions of the throat, enlarged tonsils, general weakness, and feeble resisting power are

predisposing factors. One attack does not confer immunity from another, but rather predisposes to a second.

The **false membrane** is usually found on the tonsils, the pillars of the fauces and the pharynx, and in fatal cases it may be extensive and involve the uvula, the soft palate and the posterior nares, and even the trachea and bronchi. At first this membrane is yellowish white, but later may become gray; it is more or less adherent and when torn off leaves a raw surface. The diphtheritic poison coming in contact with the throat leads to, first, a necrosis or death of the epithelial cells, especially the more superficial, and the leucocytes. The second change is the hyaline transformation, and simultaneously coagulation; hence the term coagulation-necrosis. The irritation produced by the bacilli causes a migration of leucocytes and these are destroyed and undergo hyaline transformation. This process proceeds from without inward and is usually superficial, and the necrosis may be extensive, involving the deeper tissues, causing ulceration and a gangrenous condition of the parts. The erosion of the tonsils may be so severe as to attack the carotid artery. The lymphatic glands are considerably swollen. The spleen is commonly enlarged. The kidneys show parenchymatous changes. The blood is dark and fluid. Fatty degeneration of the heart is not infrequent. Sometimes fibrinous coagula are found in the heart. Capillary bronchitis, catarrhal pneumonia and areas of collapse are almost constantly found on examination of the lungs in fatal cases. The **urine** is typically febrile with early albumin and often tube casts and renal epithelium. The **blood** shows an excess of red blood cells which may reach 7,500,000. Hemoglobin is slightly reduced. There is considerable anemia during convalescence depending upon severity of toxemia.

Symptoms.—The incubation period varies from one to ten days, usually two or three days. According to the location, diphtheria may be divided into pharyngeal, laryngeal and nasal forms.

In **Pharyngeal Diphtheria**, which is most common, there is first a slight chill or chilliness, followed by fever and sore throat, both of which increase rapidly. The throat is swollen and red and the patient complains of difficult swallowing. The membrane begins on the tonsils in the form of grayish-white patches; it then spreads from the tonsils to the soft palate, sometimes covering the uvula. The cervical glands are swollen and tender. The neck muscles are contracted and somewhat difficult to relax. The temperature

rises to 102 or 104 degrees F. The pulse is rapid and feeble, ranging from 120 to 140. There is loss of appetite. There is more or less prostration depending upon the gravity of the constitutional symptoms. The average duration is from one to two weeks.

Laryngeal Diphtheria (Membranous Croup) may be secondary to extension from the fauces or it may be primary. At first there is slight hoarseness and a harsh, metallic, ringing cough. These symptoms may persist for a day or two, when the child suddenly becomes worse; there is marked dyspnea and the lips and finger tips become livid. The child soon becomes very restless. The temperature may be slightly above normal and the pulse increased in frequency. In favorable cases the dyspnea is not very marked and the child probably will have only one or two paroxysms, when it will fall asleep and wake in the morning feeling very comfortable. The next night, however, the attack may be more pronounced. In extreme cases death may result from suffocation. In some cases the suffocation is slower and results from extension of the membrane downward into the bronchi. Dr. Still found same conditions as in diphtheria, but also the hyoid is involved with the superior laryngeal nerve. The sacral and lumbar nerves are also involved. He always emphasized chilling of gluteal region as a cause for croup and that heat should be applied at the inception of the disease.

Nasal Diphtheria is generally secondary, but it may be a primary affection. In many cases no membrane is found; in others there may be a pseudo-membrane formed in the nose, but there is absence of any systemic disturbance. The Klebs-Loeffler bacillus is sometimes present in these membranes. Nasal diphtheria may be a very grave disease—the constitutional symptoms being great prostration, high fever, marked glandular swelling, irritating and offensive discharges from the nose, and epistaxis. Inflammation occasionally extends through the tear duct to the conjunctiva.

A diphtheritic membrane may grow where the skin has been cut or bruised, but the bacillus cannot live on normal skin. It nourishes on a raw, moist surface and membranes have grown on the lips, tongue, vulva, glans penis, and on ulcerative surfaces and wounds. Diphtheria occurs occasionally in the conjunctiva and the external auditory meatus.

It should be remembered that there are many atypical forms of diphtheria. Bacteriological examination should always be made in suspicious and puzzling cases.

The complications of diphtheria are nephritis, hemorrhages, rashes, capillary bronchitis, pulmonary collapse, catarrhal pneumonia, myocarditis, arthritis, otitis media, and paralysis.

Diagnosis.—The presence of the Klebs-Loeffler bacillus will at once decide the diagnosis of diphtheria.

Prognosis.—The prognosis should always be guarded. The nasal and laryngeal forms are always grave. The causes of death are involvement of the larynx, septic infection, heart failure, bronchopneumonia during convalescence, and rarely, uremia.

Treatment.—Hygienic and prophylactic measures are important. A room should be selected that is ventilated and exposed to the sunlight. All unnecessary articles of furniture should be removed. Great care must be taken against the spread of the disease. Always isolate the patient and disinfect everything that has come in contact with him. The greatest danger lies in the spread of the disease during convalescence and in the ambulatory form, when patients are about and coming in contact with individuals, especially children with catarrhal conditions of the nose and throat. The physician should be careful about disinfecting himself.

In view of the fact that many osteopaths have treated successfully numerous cases of diphtheria and that the osteopathic treatment is peculiarly indicated and effective, the probable requirement of antitoxin (the use of which we do not feel called upon to discuss) would be lessened. Relative to the antitoxin Osier says: “The principle of action depends on the circumstance that the blood serum of an animal rendered immune, when introduced into another animal, protects it from infection with the diphtheria bacilli, and has also an important curative influence upon diphtheria, whether artificially given to animals, or spontaneously acquired by man.”

“The treatment of diphtheria by osteopathic methods is often a pleasure rather than a trial because of the success which rewards us for our efforts. There has been considerable discussion by the members of our profession

regarding the methods to be employed in successfully overcoming this disease, and many have expressed the view that since antitoxic serum is a physiological remedy, which naturally belongs to all schools of healing, it should be employed by the osteopathic physician in cases of diphtheria. I have no objections to the use of the serum therapy by members of the profession who conscientiously feel that they need it in their practice to secure the highest success. However, I feel, on the other hand, that if they were well acquainted with the technique of the methods * * * they would not feel it to their advantage, from the standpoint of success, to use injections in a single case."—R. D. EMERY, Clinical Osteopathy.

The local treatment should be carefully, but vigorously, given. By proper treatment of the throat the extension of the disease may be prevented. The muscles about the throat, especially the deep ones, should be thoroughly relaxed and the cervical vertebra; corrected if displaced. The vasomotor nerves to the blood vessels of the affected region require careful treatment at the superior cervical ganglion, and the cervical lymphatics from the atlas to the first rib should be closely watched. The nerves to control are the vagi, glosso-pharyngeal, spinal accessory, and sympathetic nerves to the pharyngeal plexus, and in cases of nasal diphtheria the fifth nerve has to be carefully treated. An external treatment to the pharynx will have the greatest effect on these nerves. An internal treatment to the nerves of the soft palate will be of considerable service. The parts diseased should be disinfected and kept as clean as possible. Bichloride of mercury (1 : 4000) used as a spray will be found satisfactory, although there are several other disinfectants and germicides that may be used. Pellets of ice in the mouth will be a comfort to the patient. Cold applied externally will be found best for the adult; heat externally is better for the child.

Every possible means should be used to prevent the disease from spreading. One of the chief dangers of diphtheria is the spread of the disease to the larynx, trachea and bronchi. When the disease has extended to these parts it presents all the symptoms of **true croup**. The deep cervical muscles should be thoroughly relaxed to aid in relieving the passive hyperemia and with a view of disorganizing the exudate. Attention should be given to the upper ribs, as interferences with the vasomotor nerves of the mucous membrane of the trachea and bronchial tubes usually occur. Direct treatment over the larynx and local treatment through the mouth upon the

soft palate will be of aid. A thorough relaxation of all the dorsal muscles, even as low as the tenth dorsal, should be given. Inhalations of slaked, freshly burnt lime may be useful in loosening the exudation. In desperate cases tracheotomy or intubation of the larynx should be performed. Willard[56] says, relative to membranous croup: "It matters not whether or not the laryngeal inflammation was immediately caused by a germ; it would not, nor could not, have been produced by such had there not been an unnatural condition of the circulation of and about the larynx."

A constitutional treatment should always be given with a view of preventing the spread of the disease from one organ to another and to prevent complications. The heart's action should be carefully watched throughout the entire course of the disease. Treatment of the spinal cord will guard against paralysis that sometimes follows the venous hyperemia of the vascular linings and substance of the brain and spinal cord. Pay particular attention to the upper dorsal region to prevent possible heart involvement. Post-diphtheritic paralysis seldom if ever occurs in cases that are treated osteopathically. This is a common sequela and is present in from 10 percent to 30 per cent of cases, appearing within three weeks of apparent recovery. Sometimes it is the only result to show diphtheria was present. It seems to follow use of antitoxin rather frequently. Attention to the splanchnics and to the abdomen directly will tend to keep the stomach, liver, kidneys, and intestines in a healthy state. The diet of the patient should consist of liquid food—milk, broths, meat juice, raw eggs and barley water. Let the patient drink freely of water. Treatment of the rectum may be employed with benefit when the pharynx is greatly disturbed.

Various **sequelæ** and **complications** are best relieved or prevented, according to Link, as follows: "First, limiting the production of toxins by a most thorough relaxation of the muscles of the neck, thereby favoring the unobstructed circulation of the blood and lymph; second, by the correction of lesions which affect the vasomotor of the head and neck; third, by spinal treatment affecting the vasomotor to the areas involved; fourth, by increasing the activity of the excretory organs, by treatment in the splanchnic and lumbar areas, that the toxins may be more rapidly eliminated. In cases where laryngeal stenosis is marked and suffocation is imminent, intubation should not be delayed." Post-diphtheritic paralysis

usually yields to osteopathic treatment. Apply treatment according to location.

Dysentery

(Bloody Flux).

Dysentery is an infectious disease wherein the large intestine is inflamed, with ulceration of the mucous membrane; is characterized, clinically, by frequent stools containing blood and mucus; fever and exhaustion. **Osteopathic lesions** of an osseous character and deep muscular contractions of the lumbar region are always present. These involve the vasomotor nerves to blood vessels and lymph channels. Catarrh of the intestinal tract is an important predisposing cause. The disease usually occurs in the summer and autumn, and is more common in hot, malarial regions, although it is found in various climates. Unhygienic conditions are also important predisposing factors. In no disease more than dysentery does specific correction of the osseous lesion effect quick and satisfactory results.

Acute Ileocolitis

(Bacillary Dysentery)

This is the variety most frequently found in temperate climates. It occurs either sporadically or endemically. The Flexner bacillus is frequently found, as well as pus micro-organisms. There are various strains of the bacillus. There is a catarrhal inflammation of part or the whole of the large bowel. Other forms may occur, as ulcerative and membranous.

Osteopathic Etiology and **Pathology**.—Sudden atmospheric changes and simple irritants, such as unripe and indigestible food, are usually the immediate causes. The predisposing cause of acute catarrhal dysentery is always found by the osteopath to be due to spinal derangements in the lumbar region. The lesion is generally a slight lateral deviation of a vertebra. It is generally found at the second or third lumbar; still, the trouble may be found at any point in the lumbar section. The lesion involves vasomotor nerves to the intestinal mucous membrane, thus causing the

inflammation. The drinking of impure water in itself may not be the cause of the disease, but is a favorable medium for the development of the organisms which may excite it. Dyspeptic conditions and constipation seem to predispose to the disease.

The mucous membrane is injected and swollen and often covered with bloody mucus. The follicles of Lieberkuhn are enlarged from retention of their contents, the result of the swelling; the follicles are often ruptured and the mucous membrane sloughs off in patches, forming ulcers. These may extend along the whole colon and frequently into the ileum.

Symptoms.—Diarrhea is the most common initial symptom; the stools being copious and painless. The stools soon become small and frequent, covered with mucus and streaked with blood. These are passed with straining and tenesmus, accompanied by colicky abdominal pains of a griping character. Chills are rare. The tongue is furred and moist: later it becomes dry. Nausea and vomiting may be present, but not as a rule. There is fever and often excessive thirst. Later the stools become green in color, due to the bile which causes a burning sensation in the rectum.

On examination there are found red blood-corpuscles and leucocytes, and large, round and oval epithelioid cells containing fat drops and vacuoles. In mild cases, the course is about eight days; severe cases subside within four weeks, but if the **osteopathic treatment** is careful and specific, the usual duration can generally be reduced one-half.

Prognosis.—The prognosis is generally favorable in the catarrhal form when the disease is treated properly. The previous general health, hygienic conditions, and sanitary surroundings are of great importance. When there is ulceration or membranes the prognosis should be guarded. The condition may become **chronic**.

Treatment.—The bowel should be thoroughly washed out by warm water enema, several times, if necessary, to remove irritating material. Invariably a lesion of the spinal column is found at the third and fourth lumbars or near by. It is generally a subluxation, of a lateral nature, between these vertebræ: rarely is the lesion above or below this point. The treatment should be applied immediately and directly to this region. Time is valuable in these cases and one should go to work at once to correct the irritation. An attempt should be made at each treatment to correct the disorder. This

should not be delayed by wasting time in relaxing muscles and inhibiting, for unusually this gives only temporary relief. When a slight movement has been accomplished between disordered vertebræ, treatment should be stopped and results watched, because the adjustment may have released all obstructions or irritations causing the disease. In many cases, to get an anatomically correct spine is an impossibility, from the fact that the displacements may be of long standing and naturally the subluxated vertebræ have conformed themselves to some extent to their unnatural position. In other words, what has been lost in the position and relation of a vertebra may have been compensated by reducing the effect of the lesion to a minimum. A lesion of this nature at the third lumbar impairs the innervation to the colon and consequently produces a stasis of blood in the mesenteric circulation, followed by inflammation, bloody discharges, cramps, etc. A single treatment is usually quite sufficient in milder cases. Other cases require treatment every few hours or thereabouts, until recovery.

Treatment directly over the abdomen through the mesenteric circulation and glands is an effective treatment in most cases and especially when the attack is severe. It relaxes the tissues about the mesentery, thereby relieving the stasis and freeing the circulation. The greatest care, however should be exercised in giving this treatment.

The constant desire to defecate, that is common to many cases, is a very annoying symptom. Strong, thorough treatment over the sacral region, by inhibition over the sacral foramina and by relaxing the tense muscles of the sacrum, will relieve this condition. In relaxing these muscles, place the whole hand against the muscles and push upward toward the occiput. This treatment inhibits the nerves to the rectum and lessens the **tenesmus**.

Attention should be paid to the liver to keep it active. Washing out the large bowel with tepid water produces a soothing effect, besides having a tendency to allay inflammation. The blandest of liquid foods, as peptonized or boiled milk, broths, beef juice, barley and rice, should be given. The patient should remain in bed until completely cured.

Amebic or Tropical Dysentery

This form prevails in the tropical and subtropical countries for the most part, and is caused by an animal parasite, the *ameba dysenteriae*. This is constantly found in the stools, the tissue of the intestine and also in the pus of the liver abscesses, which are secondary to dysentery. Amebae are sometimes found in the stools of healthy men, having probably entered the system through the drinking water or uncooked food.

Pathologically, the mucous membrane of part or whole of the large intestine is swollen. Round or irregular ulcers which undermine the mucous membrane, especially of cecum, ascending and pelvic colon, are found. In later stages there is infiltration of the connective tissue followed by necrosis. In some cases false membranes and sloughs are formed.

Symptoms.—The onset may be either sudden or gradual, with a very irregular diarrhea, moderate fever, and copious, liquid stools, abounding with the amebae coli. The straining may be less severe and persistent than in catarrhal dysentery and may be absent. Sometimes there is nausea and vomiting.

Abscess of the liver is the most common complication, which may be single or multiple. When single it usually involves the right lobe. Multiple abscesses are small. The more recent abscess walls are necrotic; the older have whitish, smooth, fibrous walls. These abscesses do not contain pure pus, but a fatty and granular debris containing the amebae and a few cellular elements. Sometimes they extend into the lung.

Diagnosis.—This depends upon severity of attack and general condition of the patient. Relapses often occur and the case may become chronic. Cases have been treated osteopathically with success.

Treatment.—In this form of dysentery the treatment is largely the same as in acute ileo-colitis. The spinal lesions affect the innervation to the intestine, thus producing a stasis in the circulation; this condition favoring, and in fact, inviting the retention of the ameba coli in the system at this point.

The diet is the same as in other forms of dysentery. Rectal injections and hot applications to the abdomen are useful. In all cases where strong treatment has been given to the spinal column, a quieting treatment to the nervous system and an inhibitory treatment to the heart will be gratefully

received by the sufferer. Both of these effects can be accomplished at the same time by simple inhibition to the occipital nerves. The stools should be taken care of immediately and disinfected. Ice water enemas given frequently are reported as giving good results. For the tenesmus, inhibit strongly at 3d, and 4th, sacrals.

Chronic Dysentery

This is generally resultant from an acute attack, though the amebic form may be subacute from the onset.

Pathologically, the coats are generally thickened, especially the submucosa and the muscular coats being hypertrophied. Ulcers are usually present, although there are cases in which there are no ulcers. Cicatricial contractions sometimes follow and the calibre of the bowels is reduced, strictures being rare.

Symptoms.—There is a progressive loss of flesh and strength, little or no tenesmus, slight, colicky pain and extreme anemia. The stools contain mucus, at times blood, and the bowels move from two to twelve times a day.

Diagnosis.—The history of the initial symptoms will establish the diagnosis. It is not always possible to distinguish between chronic dysentery and chronic diarrhea. The duration is from a few months to several years, although osteopathic treatment has proven very efficient in many instances.

Treatment.—Rest and a liquid diet are most essential. Foods that are easily assimilable and nourishing, with a minimum amount of residue, are required. Beef juice, beef peptonoids and peptonized milk are the types of food. Change of air, hygienic measures and environment are important.

In cases that become chronic, the spinal column oftentimes exhibits lesions above and below the lumbar region. Undoubtedly they are lesions of secondary importance in comparison to the lumbar lesions, but it is important that they be corrected. The treatment requires thorough, careful work of the disordered spinal column and lower ribs. Occasionally a slight kyphosis is present in the dorso-lumbar region that demands persistent work in order to correct it. An occasional rectal injection is beneficial, especially in cases that have slight ulceration of the sigmoid flexure or rectum causing

colicky pains and a few loose stools in the morning, the patient being fairly comfortable during the rest of the day.

Erysipelas

Definition.—An acute, infectious, specific disease, characterized by a peculiar inflammation of the skin, due to the streptococcus erysipelatis, with a tendency to spread.

Osteopathic Etiology and **Pathology**.—Osteopathically, lesions are found to the vasomotor nerves and lymphatics of the affected area. Dr. Still gives lesions of the "inferior maxilla, the cervical vertebræ, the clavicles or the upper ribs" as specially important factors. These lead to congestion and predispose to infection. It occurs in epidemic form, especially in the late winter and spring. One attack predisposes to a second. Family predisposition exercises a slight influence. Abrasions, lacerated wounds, especially of the scalp, may be the starting point of an attack. Persons having skin diseases and wounds, and women who have been recently delivered are liable to be affected. Chronic Bright's disease, chronic alcoholism, syphilis, debility, phthisis, organic heart disease and unhygienic surroundings are predisposing causes.

The specific virus is the streptococcus erysipelatis, which acts as a local irritant producing the dermatitis. These are found in the lymph vessels and cutaneous connective tissue. The fever and constitutional symptoms are due to toxic agents.

It is an inflammation of the skin, and if uncomplicated, no other structures are involved. Subcutaneous and mucous tissues may be involved, but rarely; if so, there is apt to be suppuration. Visceral complications are of a septic character. Endocarditis, pericarditis, pleuritis-pneumonia, and nephritis are possible complications.

Symptoms.—The incubation period varies from two to seven days. The onset is generally sudden with chill, followed by fever, 104 or 105 degrees F. There may be nausea, headache, and pain in the back and limbs. The local inflammation of the skin follows, usually on cheeks and bridge of nose, or at site of an abraded surface. The area is red, smooth, and edematous. It spreads rapidly, the patch being elevated above the

surrounding tissue and tense. The swelling may be so great as to close the eyes and distort the features. The cervical glands are swollen. The temperature continues high for four or five days and falls by crisis. The eruption begins to subside and a moderate desquamation occurs. If the disease takes a fresh start the fever again rises and continues as long as the disease spreads. There is usually headache and sometimes delirium. The tongue is furred, and bowels constipated and the urine scanty. As a result of intense infiltration the part may become gangrenous. Suppuration frequently occurs in facial erysipelas. The inflammation may extend to the mucous membrane of the throat and mouth.

Diagnosis.—This is not difficult. The fever, the acuteness of the disease, the rapidily spreading eruption, and the constitutional disturbances will serve to distinguish it from all others.

Prognosis.—This is usually favorable; healthy persons rarely die. Convalescence may be slow.

Treatment.—Isolate the patient for the disease is contagious, and a third person may convey the virus. The poison may cling to clothing, furniture, etc. The physician should not take care of confinement cases.

A number of cases of erysipelas have been cured by correcting disorders in the region of the second, third, fourth and fifth dorsals. The lesions are principally subluxations of the ribs and severely contracted muscles. The disorder at the points named interferes with the vasomotor nerves to the face, thus predisposing to an attack of erysipelas by allowing the micro-organism congenial tissue for its devastations. In many other cases derangements have been found higher than the upper dorsal, principally through the middle and upper cervical vertebræ. Lesions in these regions would also interfere with vasomotor fibres, especially through the fifth nerve directly.

The treatments on the whole are to examine for lesions to the innervation of the affected region and remove them, besides giving special attention to the bowels, a nutritious diet, and absolute rest. In cases where there is much restlessness and insomnia, treat the upper cervical region, especially the deep posterior muscles[57]. Locally, use cold water applications; adhesive strips applied near the inflamed area or tincture of iodine, may prevent the disease spreading.

Yellow Fever

Definition.—An acute, infectious disease, characterized by a febrile paroxysm followed by short remission and then relapse, jaundice, toxemia, suppression of the urine, and gastric hemorrhage.

Osteopathic Etiology and **Pathology**.—While a specific germ is the cause of yellow fever, it has not as yet been isolated. Extended tests by United States Army surgeons in Cuba show conclusively that the infection is alone carried by the *stegomyia fasciata*, but "It remains somewhat uncertain whether the mosquito is the sole means of transmission." (Anders). Season is the chief predisposing cause as the outbreak is usually in summer and a frost ends its spread. Immunity is generally conferred by one attack. Tucker[58] noted that all cases examined had liver lesions and that most of the patients were of the malarial or bilious type. Spinal lesions were not marked in some cases, but when present were in the liver and renal areas. Tete[59] believes it to be a virus secreted in the human organism under certain atmospheric and other conditions in certain types, i. e. people subject to hepatic and renal disturbances. He also says the vagus is an important factor.

Pathologically, there is more or less jaundice and hemorrhagic extravasations under the skin. The blood serum is red-tinted, owing to the destruction of the red cells. The liver is pale and presents extensive fatty degeneration, with necrotic masses in and between the cells. The gastro-intestinal mucous membrane is swollen, congested and presents numerous minute hemorrhages. The kidneys show parenchymatous inflammation. The spleen is not enlarged. The heart sometimes shows fatty degeneration. The stomach contains more or less of the "black vomit," which is a mixture of transuded serum and transformed blood pigment.

Symptoms.—The incubation period varies from one to five days. The attack generally begins with a chill, fever, 102 to 105 degrees, headache and pains in the loins and legs. The pulse is accelerated, the face is flushed, the tongue is coated, the throat sore, the bowels constipated and the urine scanty and albuminous. Recent observers state that bile is present in most cases before the albumin is noted. Nausea and vomiting may be present at the onset, but become more severe about the second or third day when the

black vomit appears. The **febrile stage** or stage of invasion, lasts from a few hours to several days and is followed by a decline in the fever when the severity of the other symptoms abates. This is called the **stage of remission** and in favorable cases convalescence sets in or the patient may pass into the second febrile paroxysm. The temperature rises again, jaundice appears rapidly, nausea and vomiting return. The tongue becomes dry and coated. The stools are black and offensive, the urine is albuminous, scanty and may be suppressed; there may also be hematuria. Death may occur from exhaustion or from uremia. Recovery may follow the gravest symptoms, even when there has been black vomit. The duration of the entire attack covers about one week. Relapses sometimes occur.

Price says there is a point in differential diagnosis in yellow fever and it is a symptom not met with in any other febrile affection. It is the progressive fall of the pulse-rate during the congestive stage of the first sixty or seventy hours, i. e., a variation of from five to ten beats less each morning and evening. He adds, "As long as the kidneys are active there is but little to fear."

Diagnosis.—**Remittent fever** has not the deep jaundice, the clear mind, the black vomit, or the albuminuria of yellow fever. The enlarged spleen and the presence of the organism of Laveran in the blood in remittent fever will decide the diagnosis. **Dengue** is sometimes confused with yellow fever.

Prognosis.—This is always a grave disease, and in its severe forms very fatal. Recovery, however, may occur after the severest symptoms have been manifested. Black vomit is not always a fatal sign. Enough cases have been treated osteopathically to state that osteopathy is particularly effective. Improved sanitation is doing much to reduce mortality.

Treatment.—Prophylactic treatment should be carefully carried out. All patients should be quarantined and carefully screened so they cannot be bitten by the mosquito and the disease spread further. People that are not acclimated should keep away from infected districts. All pools, cisterns and other places which can breed mosquitoes should be drained or screened. A systematic warfare should be waged against them. The patient must be put to bed at once and plentifully supplied with fresh air. Everything must be scrupulously clean—body and bed linen. Use a tube for nourishment and a bed-pan for excretions as the patient must not make the slightest exertion.

Spinal lesions may or may not be found. They have been observed in the cervical, eighth dorsal and second lumbar.

The treatment on the whole is symptomatic. The chills and fever of the first stage should be controlled by thorough work at the upper cervical, upper dorsal, lower dorsal and lower lumbar regions. Treatment at these points controls the superficial and deep vascular areas of the body through the vasomotor nerves. The irritable stomach, delirium and severe neuralgic pains of the head, back, epigastrium and limbs are to be treated according to the conditions and severity of the symptoms. The kidneys and bowels should be watched carefully, and at the onset should be freely opened and control of the kidneys never lost. Let the patient drink freely of water, which will aid. Hydrotherapeutic measures, as a cold bath or sponging, may be employed to aid in controlling the fever, the nervous symptoms, and the eliminative power of the excretory organs. Discontinue the use of hydrotherapy when a spontaneous fall of temperature occurs.

At the beginning of the first stage and during the stage of remission are the periods that the osteopath should do very effectual work by paying particular attention to the four large vascular areas of the body, viz.: head, lungs, abdomen and legs. Treat the vasomotor nerves to these regions, thoroughly, as given in the treatment of the first stage. During the third stage everything should be done that is possible to support the system. Ice slowly dissolved in the mouth will be of aid to an irritable stomach. Hemorrhages and the various symptoms are to be treated as they arise.

Good nursing, dieting, ventilation and keeping the skin, kidneys and bowels active are the primary points to consider. During the period of depression, the heart must be closely watched. The diet should be a light, liquid one, of the nature of peptonized milk or light broths. No food is recommended by some at the onset nor until the crisis is passed. Others feed during the stage of remission and give stimulants. During the last stage rectal feeding is suggested if gastric irritability is pronounced.

Tetanus

(LOCK-JAW)

Definition.—An infectious disease, caused by Nicolaier's tetanus bacillus, characterized by persistent, tonic spasms of the muscles with violent exacerbations.

Etiology and **Pathology**.—The exciting cause of tetanus is a specific bacillus which usually gains access to the system through some wound. The site of infection is the only place the germs are found.

The disease is much more prevalent in some localities than in others. It is found in hot countries, as in India and the West Indies, far more commonly than in temperate regions. Exposure to damp cold is one of the recognized causes, also those localities where there are rapid changes from cold. Such regions seem to produce conditions favorable to the existence and growth of the bacilli.

Earth mould, particularly where putrefaction is taking place, as in soil that has been manured, is especially favorable to the existence of the bacillus. It is frequently found in the intestinal tract of the horse, so that the soil about stables is apt to contain the germs. The highly fertilized soil of France and Belgium rendered it a special menace to the wounded of the Great War. Antitetanic serum, according to all reports, was particularly efficacious.

Wounds and abrasions of various kinds, particularly contused and punctured wounds of the hands and feet, favor the excitation of tetanus. When an open wound is present, the term **traumatic tetanus** is given to the disease; **idiopathic tetanus** when no wound is discoverable; **tetanus neonatorum** when it attacks infants—this form is usually due to insanitary conditions, especially the improper care of the umbilical cord; **lock-jaw** or trismus when the jaw alone is affected; **cephalic tetanus** when the throat and face is involved.

Characteristic lesions have not been found in the cord or the brain. The bacilli develop at the site of the wound where the toxin is manufactured. The bacilli do not invade the blood and organs. The toxalbumin is one of the most virulent poisons known.

Congestion occurs in various organs, due to obstruction of the movement of the blood during a spasm. The brain, cord, lungs and muscles are congested. The nerves are often found swollen.

Symptoms.—The period of incubation is from one to twenty days. This is time required for the poison "to be absorbed by the end plates in the muscles and to pass up the motor nerves to the spinal cord." In most cases the incubation is from five to ten days. A chill precedes other symptoms in a few cases. The onset is quite sudden, with stiffness in the neck, jaw and tongue. There are headache, stomach disturbance and languor. Opening the mouth is difficult, but is not painful. Deglutition is difficult. The stiffness increases and extends to the spinal muscles, abdomen and legs which are held in a firm spasm. Thus, the trunk and legs are inflexible.

These symptoms vary in degree of severity, dependent upon the extent of involvement. The jaws may be firmly locked or they may yield to forced extension—"lock-jaw." The muscles of the face may be involved, the angle of the mouth drawn out, and the eyebrows raised—"risus sardonicus." The neck and trunk muscles affected produce opisthotonos. Spasms of the pharynx and esophagus may occur, especially when there are injuries to the fifth nerve.

Associated with these tonic convulsions is intense pain. The distress of the patient is extreme when the chest muscles are affected. All symptoms are increased during the paroxysm. A foot fall, the slamming of a door, a draught of air or any slight sensory impression may excite a paroxysm. The paroxysm may relax and during the interval the patient may walk about. The spasms vary in frequency from a few minutes to one in several hours. During spontaneous or induced sleep the spasm usually ceases. The febrile reaction is generally slight and apparently of nervous origin; in many cases 102 degrees F. In severe cases the temperature may be considerably higher. Perspiration is excessive. The urine is scanty and high colored. The bowels are usually constipated. The mind remains clear throughout. Death is generally caused by exhaustion. **Chronic tetanus** presents similar symptoms, but less marked, and it develops slowly.

Diagnosis.—The history of a wound followed by the characteristic symptoms would rarely occasion an error. **Strychnine poisoning** differs from tetanus in the history, in the more rapid development of the symptoms, no trismus at the beginning, marked involvement of the extremities, and absence of rigidity between the paroxysms. In **tetany** the extremities are chiefly affected by the spasms, the muscles are relaxed during intervals, and trismus is a late or very rare condition. In **hydrophobia** trismus does not

occur and the respiratory spasm is caused by attempts at swallowing. The mental symptoms increase.

Prognosis.—The prognosis is unfavorable. Eighty per cent of traumatic and fifty per cent of the idiopathic cases prove fatal. Cases that are fatal usually die within six days. Cases where there is slight elevation of temperature, and where the spasm is localized to the muscles of the face, neck and jaw, or where muscle stiffness is late in appearing, are more likely to recover.

Treatment.—Free incision and thorough disinfection with hydrogen peroxide and cauterization with pure carbolic acid, of the wound are necessary. The patient should be put in a dark room and there remain as quietly as possible. Avoid all sources of peripheral irritation. Liquid food is to be given, and if the jaws are firmly set, rectal feeding may be employed or food may be passed through the nose with a catheter.

For the spasms, strong inhibition of the nerve centers controlling the affected muscles may be of use. Probably the most effectual treatment for the paroxysms would be strong, thorough treatment of the upper cervical region. Hot baths give relief to the spasms. All the excretory organs should be greatly stimulated, particularly the kidneys, lungs and bowels. Other symptoms are to be treated as they arise. Tetanus antitoxin is highly commended by surgeons who used it during the Great War. As death is at a two to one ratio any method of treatment is justified. A few cases have been treated osteopathically with fair success, following antiseptic measures.

Simple Continued Fever

Definition.—An acute, febrile disease, mild in character, of short duration, not excited by any special organism and depending on a variety of irritating causes.

Osteopathic Etiology.—The most frequent cause of this form of fever is probably gastro-intestinal disturbance. In children it may be due to gastro-intestinal derangement, or to the eating of decomposing food or to exposure to wet and cold. It may be caused by exposure to the sun or great heat, or mental or physical fatigue. It may be the result of exposure to cold sufficient to produce a slight bronchitis, tonsillitis or other affection

producing an unnoticed localized inflammation. It may follow a prolonged exposure to noxious odors or gas. Lesions, osseous or muscular, are always present, corresponding to the tissues and organs disturbed. Muscular lesions, especially, are prominent.

Symptoms.—The onset is usually sudden with a feeling of lassitude, weariness, chilliness, and headache. The temperature rises quickly to 102 or 103 degrees F. or over, and is usually apt to terminate suddenly by crisis on the third or fourth day. The pulse is frequent and the face is flushed. The child is often irritable. Mild delirium may occur. Anorexia is present, and the bowels are constipated. Convalescence is rapid.

Diagnosis.—This depends upon excluding other probable diseases. If the fever cannot be attributed to some of the causes already referred to, there may be a doubt as to its character for the first twenty-four hours, but, if after a careful examination, one finds no other cause and no symptoms develop of any of the recognized diseases, acute continued fever can hardly be mistaken for any other disease.

Prognosis.—Always favorable, recovery without sequelæ being the rule.

Treatment.—It is necessary to find out the irritative cause in order for one to be able to treat intelligently. Rest in bed with treatment of the disturbing factor of the disease, whatever that may be, is the principal treatment to be given. Careful examination of all the organs, with due consideration of the symptoms, will generally leave no doubt as to the cause, and treatment applied accordingly will be sufficient. If there is any gastro-intestinal disorder, thorough treatment of the splanchnics, anterior treatment to the abdomen and thorough evacuation of the bowels are indicated. Use an enema if necessary. Besides the usual fever treatment, sponging the body with tepid water at the time of day when the fever is highest will aid in lessening the temperature and render the patient more comfortable. In cases where nervous symptoms are prominent, care should be taken against any excitement and, if insomnia results, a quieting treatment in the cervical region is usually sufficient. Use plenty of water internally, which is not only necessary for the tissues on account of the fever, but is of great aid in keeping the skin and kidneys active, and thus a great help in the elimination of waste material. A liquid, nutritious diet is best. Milk, broths and soups will be enough. The demands on the digestive

tract are not great when a light diet is administered, besides not exciting the nervous and vascular systems unduly.

Tuberculosis

Definition.—A general or local infectious disease caused by the bacillus tuberculosis of Koch. The bacillus produces specific lesions of the form of nodular bodies called tubercles that undergo caseous necrosis with a tendency to involve neighboring tissue. There may be a diffusion of the infection by way of the lymph and blood vessels to various tissues and organs.

Osteopathic Etiology and Pathology.—Tuberculosis exists in all countries. It generally prevails more extensively in warm than in cold climates, and is of more frequent occurrence in the city than in the country. Altitude, however, exerts more influence than latitude. The disease rarely occurs in mountainous countries, owing to the purity of the atmosphere. The disease is very prevalent in the West Indies and the South Sea Islands. Tuberculosis is frequently met with in Canada among the French Canadians and the English. All races are subject to tuberculosis, but the Indians of this continent, the South Sea Islanders and the colored race are very susceptible to the disease. It is estimated that from seven to ten percent of the present death rate in the United States is due to tuberculosis.

The tubercle bacillus was discovered by Koch in 1881. It is a short, straight or slightly bent, rod. This bacillus has an exceedingly tenacious hold on life and is found in greater or less numbers in all tuberculous lesions.

It can live almost indefinitely outside the body. The bacilli are found in great numbers in the sputum, which dries and flies in the atmosphere in the form of dust. The organism is thus widely spread in regions frequented by phthisical patients. The bacillus gains entrance into the body by way of the respiratory tract in the vast majority of cases. Milk from tuberculous cows will produce the disease, especially in children, causing intestinal and mesenteric tuberculosis. The meat of tuberculous animals is not necessarily infectious, although there is a possibility of infection by this means. Tuberculosis may be transmitted by direct inoculation; this does not often occur in man, but when it does, the disease usually remains local, although

general infection may occur. Persons who follow certain occupations, as butchers, dissectors of dead bodies, and handlers of hides, are more or less subject to local tubercles of the skin. The virus may enter the body through any fissure or excoriation on the skin; thus by washing the clothes or bed linen of phthisical patients, by the bite of a consumptive, or by a cut from a broken sputum glass of a consumptive, one may become infected. It is stated that there may be hereditary transmission. In some cases the virus may be transmitted and the disease may not appear for many years.

Predisposing Causes.—Hereditary predisposition, which renders the person more liable to accidental infection; delicate constitution; scrofulous tendency; previous infectious diseases, as influenza, whooping cough, measles, typhoid fever; diabetes mellitus, etc. In young children meningeal, mesenteric and lymphatic forms of tuberculosis are the most frequent. Pulmonary tuberculosis is usually met with in adults, especially between twenty and thirty years or age. The development of tuberculosis is favored by damp localities; by improper and insufficient food; constant inhalation of impure air; injuries to the chest, with or without laceration of the lungs, and various osteopathic lesions that weaken the tissue through faulty nutrition. Corresponding to the innervation of the organ or tissue diseased will always be found anatomical derangements. “Every case has a defective spine and thorax.” (Hayden[60]).

Bronchial catarrh, tonsillitis, diseases of the stomach and intestines, especially enterocolitis, tubercular pneumonia, pleurisy (rarely), intrathoracic tumors and congenital or acquired contraction of the orifice of the pulmonary artery increase the susceptibility to infection. Lessened vitality of the tissues, whether inherited or acquired, is necessary before the germ can become implanted and proliferate, producing tuberculosis of the tissues and organs. In nearly every instance, when the lungs are involved, lesions are found at the second, third, or fourth ribs. These lesions undoubtedly predispose to the tubercular infection, by lessening the vitality of the lung tissues through interference with the innervation or vascular supply. Possibly a lesion at the second rib or second dorsal vertebra would interfere directly with the vasomotor nerves of the upper thoracic ganglia. The condition of the middle and lower cervical vertebræ should be carefully examined, for lesions at that point would involve the lymphatics of the lungs. The lowered vitality caused by the lesion is the predisposing cause

and the tubercular bacillus is the **exciting cause** which determine the character of the affection.

C. A. Whiting in Clinical Osteopathy says:

"**The spinal outline** characteristic of tuberculosis and of the pretubercular stages presents the following peculiarities: The cervical spine presents various abnormalities, usually lesions involving single vertebræ and associated with irregular muscular tensions. The upper thoracic spine is anterior, the ribs drooping and rather more freely movable than normal; the vertebral articulations are less movable than normal; the tissues in the neighborhood of the upper two or three dorsal spines are abnormally sensitive and the muscles innervated from these segments are contracted irregularly when the disease involves the apices. The lower interscapular region is found sensitive and these muscles are contracted when the lower lobes of the lung are involved, and the location of these sensitive areas may be employed in the localization of the lung area infected.

"In every case recorded in this clinic, lesions involving the area of the origin of the upper and middle splanchnic nerves have been found. The typical tuberculosis spine must include lesions of the lower dorsal area. Probably these lesions are predisposing factors in tuberculosis, partly because of the effects produced upon nutrition thereby, but doubtless the lack of the normal mobility of this part of the spine prevents the normal stimulation of the liver, the spleen, perhaps the pancreas, thus the normal opsonic index is lost, and immunity broken. The treatment of tubercular cases should include careful attention to the splanchnic area, the maintenance of the normal mobility and structural relationship of the entire spinal column, and such stimulating movements to the ninth and tenth thoracic neighborhood as is indicated in each individual case."

Pathology.—In adults the most common site of tubercles is the lungs; in children it is the lymphatic glands, joints and bones. No organ is exempt; the salivary glands and pancreas are the least frequently involved. The military tubercle is the beginning of tubercular deposits. This may develop in any tissue where the tubercle bacillus is found and it is only distinguished by the presence of a tubercle bacillus, as similar conditions are produced by the aspergillus glaucus and actinomyces.

In the development of a tubercle there is proliferation of the fixed tissue cells, particularly those of the connective tissue and the endothelium of the capillaries, due to the irritation of the bacillus, producing the epithelioid cells and in some instances the giant cells, in both of which bacilli may be found. The epithelioid cells vary in shape. The giant cells are formed by enlargements of the epithelioid cells and a repeated division of their nuclei or possibly by fusion of several cells. On account of the inflammation produced by the bacillus, there is migration of leucocytes from the adjacent vessels and lymphoid cells. The leucocytes are largely polynuclear and are rapidly destroyed, but later mononuclear leucocytes appear, which are able to resist the action of the bacilli so that they are not so readily destroyed. A reticulum of connective tissue is formed around the various cells. The tubercles are non-vascular and when once formed undergo caseation and sclerosis.

Caseation is a process of coagulation-necrosis or destructive change, beginning at the central part of the growth, due to the action of the bacilli. The primarily transparent tubercular tissue may become a gray gelatinous body containing bacilli. Frequently the caseation is followed by softening; less frequently, calcification, or it may be surrounded by fibrous tissue.

During the time the cell destruction is going on at the center of the tubercle, hyaline and fibrous changes may render the tissues **sclerotic**. These changes, **caseation**, the destruction of forces, which are dangerous to the patient, or **sclerosis**, which is a healing process, depend upon the power of the body to produce an antitoxin to overcome the effects of the special toxin produced by the bacilli.

There may be a widespread **tuberculous involvement**. This is the result of fusion of the new foci of infection or of miliary tubercles. The lungs are the usual site of infection, varying from a small area, to a lobe or a still greater area.

The irritation of the bacilli is capable of producing **associated inflammatory processes** in its own neighborhood. There may be an overgrowth of interstitial tissue. In other instances, changes to catarrhal or croupous pneumonia may occur. Suppuration is associated with tuberculosis, especially of the lungs, and is due to a mixed infection or the presence of pus organisms. Some authorities claim that the tubercle bacilli

alone are able to produce suppuration; it is, however, more probable that suppuration is due to a mixed infection. The constitutional features in tuberculosis are more dependent upon this secondary infection, especially by the streptococci, than upon the primary infection.

Tuberculosis of the Lymph Glands

(SCROFULA)

Scrofula is a true tuberculosis of the lymphatic glands. The virus is less virulent than that from other sources, which accounts for the slow development and milder course of tuberculosis of the glandular system.

Tuberculous Adenitis may occur at all ages, but is most common in children and young adults. It is rarely congenital. Catarrhal inflammation of the mucous tissues weakens the resisting power of the lymph tissue, thus allowing the bacilli to develop, and is an important predisposing cause. The glands most frequently affected are those of the neck; more rarely there is involvement of all the lymphatic glands of the body. Invariably lesions of the upper and middle cervical vertebræ and upper dorsals and corresponding ribs are found, as well as lesions to the lymphatics at various points along the spinal column and ribs. These lesions affect the innervation to the lymph glands, as well as mucous membranes, and thus predispose to the disease. In all cases anatomical derangements are found in the region of the innervation to the involved gland.

In **general tuberculous adenitis** all the lymph glands of the body are more or less involved, while the other organs and tissues are rarely affected. All the visible glands are found to be swollen, tender and painful. There is more or less protracted fever, with wasting and debility. This is a rare affection.

In **local adenitis** the glands of the neck are most frequently affected and this is especially the case with children. Negroes are more frequently affected than whites. It is seen especially among those living in an unsanitary environment. Measles, whooping cough and an hereditary tendency are predisposing factors. The submaxillary glands are usually the first affected. At first they are swollen to various degrees and are tender; later they suppurate and rupture if one is not able to cure them. There may

be fever. The skin over the glands is usually freely movable; it may, however, be adherent.

The glands above the clavicle, those in the posterior cervical triangle, and the axillary glands may all be affected. In such cases it is likely that the bronchial glands are also involved and may infect the living tissue.

Lesions of the upper and middle cervicals and deep muscles are always found and undoubtedly are the underlying causes. Lesions of the lower cervical, upper dorsal, ribs and clavicle, are of frequent occurrence. Infection may gain entrance by way of the pharynx and tonsils.

The affection often runs a slow course.

The **bronchial** glands may be affected primarily, but usually secondarily to infection of the lungs. The primary form is seen most commonly in children and is apt to be associated with suppuration. Lesions of the upper and middle dorsals and of the cervicals will be found. Catarrh of the bronchial tubes is a predisposing cause. The X-ray is of great value in the diagnosis.

The most noticeable symptoms are those due to pressure or irritation.

Systemic infection may follow rupture into a vessel. Local infection of the lung may occur and the pericardium become infected.

Mesenteric cases occur among children and may be primary or secondary. The primary form is rare. Swallowed sputum is a frequent cause. The trunk and limbs are puny. The child is anemic, and often the abdomen is tympanitic. Diarrhea is marked and there is pain and indigestion. Fever is almost constantly present and of an intermittent type. The disease is most frequently met with among poor children in unhygienic, poorly ventilated houses. There may be an associated tuberculosis of the peritoneum.

Acute Tuberculosis

This shows best the truly infectious nature of tuberculosis. In it miliary tubercles develop in many and various parts of the body. In some cases these growths seem to be uniformly distributed throughout all the viscera. In other instances they are localized in the lungs or in the meninges of the brain. In nearly every instance it is an auto-infection, arising from an old

tuberculous focus, which may be latent and quite unsuspected. General infection, in most instances, arises from the rupture of a nodule into a vein, from tuberculous lymph glands, tuberculosis of the bones, joints, or even the skin.

General Miliary Tuberculosis or Typhoid Form.—This is similar to a general infection of the body and resembles, to a marked degree, the symptoms of typhoid fever. The onset is rarely rapid.

In most cases there is a period of incubation, during which the health fails, the appetite is lost, headache occurs, and the patient soon becomes feverish, with increased debility. The temperature rises and the pulse is rapid and feeble. The tongue is dry. The respirations are increased. Delirium may be present. In rare cases, there may be little or no fever. The temperature ranges from 101 to 103 or even 105 degrees F. It is irregular and marked by evening exacerbations and morning remissions. Occasionally there is an inverse type of temperature in which it rises in the morning and falls in the evening. In some cases the pulmonary symptoms are marked, while in others the meningeal symptoms are more prominent. Tubercle bacilli are rarely found in the sputum.

The spleen is usually enlarged. Constipation is present, as a rule, but there may be diarrhea, and hemorrhage from the bowels may occur. The urine may contain traces of albumin. There may be excessive sweating, and herpes is often present. Choroid tuberculosis is frequently met with. In doubtful cases the blood should be examined for tubercle bacilli, although they are not always present. The duration is from two to four weeks, the disease usually terminating unfavorably.

Diagnosis.—It is often very hard to differentiate between this form of tuberculosis and typhoid fever. In **typhoid fever** epistaxis is a common, early symptom. The temperature curve of the continued type is quite diagnostic. The Widal test should be made. The respirations are moderately hurried and the pulse is often dicrotic. Diarrhea is frequent. Typhoid rash is diagnostic. No tubercles are found on the choroid. No tubercle bacilli are found in the blood. Hemorrhages from the bowels are common.

Pulmonary Form.—When the lungs are chiefly affected the pulmonary symptoms are marked from the onset. It may develop suddenly or there may be a long period during which the general health fails markedly. In children

the disease may follow measles or whooping cough. There is dyspnea, cough and the expectoration is mucopurulent. There is broncho-vesicular breathing with sibilant and subcrepitant rales. The temperature is high, ranging from 103 to 105 degrees F., or higher. Respiration and pulse are rapid.

The disease may last from several weeks to months, or, on the other hand, it may prove fatal within a few days. As the end draws near the signs of suffocation become intensified.

Diagnosis.—The history and general symptoms, together with the dyspnea and cyanosis, will generally decide the diagnosis. The blood should be examined for malarial parasites. The Widal test will differentiate typhoid.

Cerebral or Meningeal (Tuberculous Meningitis).—This form which is sometimes called acute hydrocephalus, occurs quite frequently and is an infection of the pia mater of the brain or cord.

It occurs most frequently in the first two years of life, although it may occur later. It is usually tuberculous in some other region, especially in the bronchial glands. Rarely does the disease involve the meninges primarily.

The meninges at the base of the cerebrum is the principal involvement. There is more or less inflammation, with fibrous purulent exudation. There are tubercles along the blood vessels. The ventricles may be distended.

Symptoms.—The onset is slow, lasting one or more weeks. Headache, constipation, vomiting and chills, followed by a fever, are the initial symptoms. When the onset is sudden, the disease is generally ushered in with a convulsion. The fever rarely rises above 102 or 103 degrees F. The pain is often severe, causing the child to give a sudden cry—the hydrocephalic cry. During sleep the child is restless and there are slight muscular twitchings.

The **irritative symptoms** now abate. The child becomes quiet and is dull and apathetic. Constipation still persists. The abdomen is boat-shaped, and the neck may be retracted. The pupils are dilated. Convulsions and other cerebral symptoms may occur. The temperature ranges from 100 to 103 degrees F. The respiration is irregular and sighing.

Following this, the mental faculties are lost and coma occurs. Convulsions or spasmodic contractions of the muscles of the neck, back and limbs may occur. The pupils are dilated and do not respond to light. The pulse is frequent, irregular and small. The temperature rises to 103 to 105 degrees F., or it may be subnormal. The duration is from two to five weeks; chronic cases may last for a number of months.

Prognosis.—Generally very unfavorable.

Acute Pneumonic Phthisis

The infection of the lungs is rapid and may be primary or secondary. This form is met with most frequently in children and young adults, but may occur at any age.

The **Pneumonic form** is more rare than the bronchopneumonic form and may be very rapid in its course. The attack sets in abruptly with a chill and the temperature rises rapidly. There is pain in the side; cough; dyspnea and mucous and rusty sputum, which may contain tubercle bacilli. There is impairment of resonance, increased fremitus, and bronchial breathing. The whole or part of the lung may show signs of consolidation and dullness, all the symptoms of pneumonia being present. The patient rapidly loses flesh. This attack may come on a person in good health after exposure to cold; but there may have been a debilitated condition, or a predisposition to phthisis. Death may occur in the second or third week or the case may continue from three to four months.

One or both lungs may be involved. The lung is heavy and airless, sinking quickly in water. There is destruction of lung tissue and upon section, cavities are found. The cavities are generally small and are surrounded by tubercles. Older caseous areas of a yellowish white color may be visible. Miliary tubercles are found upon careful examination.

The **bronchopneumonic form** is the most common and occurs most frequently in children. It often follows the infectious diseases, especially measles and whooping cough. The child may be taken ill suddenly with what seems to be an ordinary bronchitis, the temperature rises, the cough is severe, and there may be consolidation with submucous and subcrepitant rales. Rapid respiration and sweating are often marked. The course of the

disease varies. There is rapid loss of flesh, and in many cases the disease develops into chronic phthisis. In other instances death occurs in from three to eight weeks.

The disease may attack the adult whose resistance is impaired. Chills, fever, pain in the chest, hemorrhages, wasting are most noticeable symptoms; these are the various signs of bronchopneumonia. Tubercle bacilli are often found in the sputum. The course is usually from three to eight weeks, while a number pass into a chronic stage.

Areas of caseous tubercles are found, which later suppurate, break down and form cavities. The bronchial lymph nodes are found enlarged, and usually there is acute tuberculous pleurisy.

Diagnosis.—In the **pneumonic form** it may be impossible to make a diagnosis early in the disease. Tuberculosis may be suspected if the patient has been in bad health, has a predisposition to phthisis, or has had any pulmonary disorder. Pneumonia will present the typical symptoms, but if fever continues, tuberculosis will be suspected. Examination of the sputum will probably decide.

In the **bronchopneumonic** form it is very difficult, in the early stages, to distinguish it from simple bronchitis and bronchopneumonia. The irregular fever and rapid loss of flesh are important signs. The sputum will show elastic tissue and tubercle bacilli early in the disease and should be carefully examined.

Chronic Pulmonary Tuberculosis

The chronic form of the disease is more common than the acute. It seems probable that many cases of pulmonary tuberculosis are due to inhalation of the tubercle bacillus, though no doubt, particularly in children the bacillus frequently gains entrance to the system through the intestinal tract from infected milk and food. **Deformities** of the chest, especially where there is constriction and rigidness of the upper part, with more or less immobility of the first, second and third ribs and the junction of the manubrium and gladiolus, associated with weak muscles and a stooped posture are definite predisposing factors. This condition may be congenital or acquired. The local innervation, blood supply and lymphatic drainage is involved, so that

the individual is less resistant and consequently susceptible to infection. The bronchi are thus weakened, favoring the infectious process so that the disease may advance and involve the neighboring tissues, or if infection has gained entrance to the lymph or blood stream elsewhere, the susceptible pulmonary organs may become diseased.

Owing to the above predisposing factors the **primary lesion** of the lungs is often in the bronchus a little below the apex near to the posterior and external borders. A lower lobe may be involved, or several lesions may occur at the same time, involving one or both lungs. Frequently the other lung is infected from the lesion or lesions of the first.

In the acute cases the exudative process involves the lung tissue, becomes caseous and softened, and later necrotic with cavity formation. In the **chronic type** the exudative process is slower, with thickening of the walls of the air vesicles and increase of fibrous tissue. **Cavities**, the result of caseation, are of various size, ragged, often coalesce and open into the bronchus. Fibrous tissue forms about them and frequently arrest the process. In the necrotic involvement blood vessels are often injured causing hemorrhages. Pleurisy, empyema, catarrhal bronchitis, and bronchiectasis are often associated involvements.

In addition to the tubercle bacillus, other micro-organisms, streptococcus and staphylococcus pyogenes, influenza bacillus, and diplococcus pneumoniæ, are often found, and no doubt are important exciting factors.

The **bronchial glands** are swollen, and contain tubercles. They may undergo purulent disintegration. Tuberculosis of the **larynx** is common. In severe cases there may be amyloid changes of **liver**, **kidneys**, spleen, and mucous membrane of the intestines. Tuberculous lesions are found in the intestines, spleen, kidneys, and brain in nearly equal proportions; then come the liver and pericardium.

Symptoms.—The onset of the disease is either abrupt or gradual. Frequently it succeeds influenza, measles, or bronchitis. There is a cough, expectoration, loss of weight, afternoon temperature and probably night sweats. The disease is likely to develop slowly. In other cases gastro-intestinal disorders are the first symptoms, especially with weakness and debility. Again, the disease may follow pleurisy. When the attack is abrupt, pneumonia is simulated. However, the apex of the lung, instead of the

middle or lower lobe, is involved; expectoration is considerable and the fever is not so high and pronounced. Hemoptysis frequently occurs.

The **local symptoms** are important. **Pain** is an early either moderate or severe, symptom, although there are cases where it is absent. When associated with pleurisy, it is severe. The pain is usually situated at the base, anteriorly or laterally, of the scapulæ, but may be between them. **Cough** is present, in the majority of cases, throughout the entire course. It usually grows worse, and is dry and hacking at the beginning but looser and paroxysmal and accompanied by a mucopurulent expectoration later on. The **expectoration**, at first, is slight and there may be more or less blood mixed with it, or even hemorrhage may occur. With the formation of cavities, the expectoration increases and is of a greenish-gray or greenish yellow color. In some instance the sputum is more or less fetid. The expectoration is composed of pus cells, blood, elastic tissue, fat globules and tubercle bacilli. **Hemoptysis** is present in a majority of cases. Early hemorrhages are usually slight, due to rupture of weakened vessels. When there is softening or cavity formation, erosion of vessels may be pronounced and hemorrhage considerable. Dyspnea is a variable symptom, but is characteristic of lung changes.

Fever is a characteristic symptom. It is probably always present at the beginning and the afternoon increase of temperature is common. Where there is softening and formation of cavities, a remittent or intermittent type is present. The pulse is frequent, regular and compressible. **Sweats** may occur at any time, but especially during sleep. They indicate fever activity, and are increased during cavity formation. **Emaciation** is a prominent symptom. This is due to gastro-intestinal disorders and prolonged fever. Loss of weight is gradual, especially if the disease is advancing. Where the lung is considerably diseased, heart disturbances are common.

Other disorders, as of the gastro-intestinal tract, genito-urinary, cutaneous, and nervous systems, are frequent, especially in long standing cases. The **gastro-intestinal disturbances** are gastric catarrh, vomiting, loss of appetite, coated tongue, constipation, and later on, diarrhea. Among **genito-urinary symptoms**, albuminuria is frequent. The kidney involvement may be either of an acute or chronic character. Pyelitis and cystitis are present in some cases, and amyloid degenerations are not uncommon. With the **cutaneous symptoms**, the skin is frequently dry and

scaly, and the hair of the head dry. The hectic flush is common. Upon the chest and back there may be pigmentary stains. The **nervous symptoms** vary according to the involvement. Tuberculous meningitis is rare. The mind usually is clear and even in advanced stages the patient is always hopeful.

Physical Signs.—Inspection reveals that the shape of the chest is often characteristic. A phthisical thorax is flat, especially the thoracic opening with wide intercostal spaces, prominent costal cartilages, and depressed sternum. Sometimes the lower sternum forms a deep concavity (funnel breast). Another type of thorax is long and narrow, with very oblique ribs, and little expansion. In other instances the chest is of apparently normal build. Defective expansion is observed early, especially at the apex of the affected side. The clavicle of the affected side often stands out more prominently.

Palpation shows there is decreased expansion and increased fremitus. Normally, the fremitus is stronger at the right than at the left apex. If the pleura is thickened, the fremitus is decreased, but increased in lung involvement.

On **percussion**, if the diseased areas are minute, the percussion note may not be changed. Always compare the two sides of the chest. Dullness is first noted, as a rule, above, on or below the clavicle. As the disease progresses, the dull sound increases. The size of the cavity, its walls and the amount of secretion modify the note. Large, thin-walled cavities elicit the "cracked-pot" sound. Consolidation, thickened pleura, large amount of material in a cavity and a connecting bronchus impair resonance.

On **auscultation** the breathing is harsh and the expiration is prolonged and high-pitched (bronchial). Early in the disease crackling rales may be heard. After consolidation takes place there is bronchial breathing and crepitant rales. When softening occurs they become moist, louder and sometimes bubbling. These may be heard upon inspiration and expiration. Pleuritic friction sounds, as in case of pleurisy, may be heard at any stage. Vocal resonance is increased.

The **signs** of **cavity** are: **Percussion.**—There is more or less defective resonance or tympany. Over large cavities a "cracked-pot" resonance is obtained. This is best obtained when the patient has his mouth open. There

may be normal resonance if the cavities are covered with a considerable thickness of unaffected air cells.

Auscultation may detect cavernous or amphoric breathing, pectoriloquy and coarse, bubbling rales. Metallic tinkling may be heard over large cavities. Vocal resonance is increased.

Complications.—The larynx and trachea frequently undergo tubercular inflammation, due to invasion from the lung tissue. Pneumonia is of common occurrence. Gangrene, pleurisy and endocarditis are other complications.

Diagnosis.—Bacilli may be found in the sputum before the physical signs are well developed. It may be necessary to examine the sputum several times before the tubercle bacilli are detected. The presence of bacilli will set the diagnosis at rest, provided clinical symptoms are present. Fever, hemoptysis, cough, emaciation and a continuous, local induration are diagnostic. The X-ray should be employed as an aid in diagnosis.

Prognosis.—The prognosis of pulmonary tuberculosis varies greatly in different cases. Undoubtedly a number of cases have been cured; many arrested; even spontaneous cures have occurred. A great deal can be done to prolong life and to make the patient comfortable. The average duration is about three years, although by careful treatment this time is probably being increased.

Fibroid Phthisis

This term is applied to a form in which there is induration, followed by contraction of the affected lung tissue, due to an overgrowth of fibroid tissue. The greater number of cases are primarily tubercular, but have run a fibroid course. Other cases are primarily fibroid, followed by tuberculous infections. It may begin as an ordinary ulcerative phthisis, or it may begin as an inhalation bronchitis. In other instances it may follow a chronic tuberculous bronchial pneumonia or pleurisy.

The **onset** is extremely insidious. There is persistent cough, often paroxysmal in character. Dyspnea is marked, especially on exertion, but little or no fever is present. The expectoration is profuse and mucopurulent. There is slight loss of weight. In the later stages edema is marked. It is a

disease of long duration, lasting from ten to twenty years. The patient is often able to pursue some occupation and may have fair health.

There is marked dullness over the affected side, which is commonly much depressed. There is distinct bronchial breathing at the base, while at the apex there may be cavernous sounds. The heart is frequently displaced and the right ventricle hypertrophied. The bronchi are dilated. The clinical history is identical with that of simple cirrhosis of the lung from which it is often separated with difficulty. Both lungs may become the seat of tuberculous disease. Prolonged suppuration results in amyloid changes in the liver, spleen, kidneys and intestines. X-ray plates are of value in diagnosis.

Tuberculosis of Other Tissues

The **alimentary tract** is frequently the seat of tubercular inflammation. The intestines may be involved primarily or else secondarily from the lungs or peritoneum. The **primary form** is most common in children. There is slight fever, pains of a colicky nature, irregular and persistent diarrhea. The disorder is commonly unrecognized, being mistaken for appendicitis or other intestinal disorders, until emaciation, sweats, the continued fever or lung involvement are manifested.

The stomach, esophagus, pharynx, tonsils, palate, tongue and lips may be the seat of a tubercular lesion.

The **serous membranes** are usually secondarily involved. The peritoneum is generally invaded from contiguous organs, especially the intestines, although the pleurae may be the starting point (and in the female the generative tract is a source). The disease may be either acute or chronic. In the former it starts abruptly with vomiting, pain in the abdomen, fever, and possibly diarrhea. In the chronic form there are fever, pains, emaciation, weakness and the abdomen is distended. The enlarged glands may be felt through the walls. There may be ascites, or the walls of the peritoneum are adherent, or the tubercles may ulcerate.

The endocardium is occasionally the seat of acute or chronic tuberculosis. It is usually secondary. Likewise the pleurae are sometimes involved. The chronic form is more common.

The **genito-urinary system** is subject to tuberculosis. The bladder, ureters and pelvis of the kidney are attacked, and from these the kidney; or possibly the kidney involvement is part of a general tuberculosis. (See pyelitis). The ovaries, Fallopian tubes and uterus are also subject to tubercular invasion. The **diagnosis** depends upon finding the bacilli, the symptoms indicating, oftentimes, an inflammation only. Also the prostate, testicles and seminal vesicles are attacked.

Tuberculosis of the mammary glands is rare. In miliary tuberculosis the liver is commonly affected, often secondary to other tissues, especially the peritoneum, lymphatics and lungs.

The blood-vessels and heart are sometimes involved from nearby organs or from miliary tuberculosis. The brain and cord are also at times invaded. This has been described under meningeal tuberculosis.

Diagnosis and Prognosis of Tuberculosis.—The osteopath should be familiar with the various forms of the disease. An understanding of the pathology and clinical symptoms is essential. The finding of the bacillus, provided there are symptoms of inflammation, is diagnostic. Much depends upon the patient's constitution, hygiene, sanitation, food, fresh air and general management. The osteopathic lesion is decidedly an important factor, but the treatment must be balanced from both the distinctive osteopathic view and that of general management. Then the patient's part is as necessary as the osteopath's. Under proper care and treatment, unless the disease has progressed to a marked degree, there is always a tendency toward recovery, but, to emphasize again, the osteopathic treatment, the environment and general hygiene should be thoroughly understood and appreciated, for at best, the disease is treacherous. Even after an apparent recovery is made, the patient should be under observation; there is always danger of recurrence. Tuberculosis can often be treated successfully, or arrested, provided the disease has not progressed to a late stage; although many times, in the later stages, life can be considerably prolonged by careful treatment.

Treatment of Tuberculosis.—The **prophylactic treatment** of tuberculosis should receive first consideration. The sputum should be thoroughly disinfected and care taken that the patient does not spit about carelessly. A spit-cup should be provided and the sputum collected and

destroyed by burning and the cup sterilized. The patient should be well taken care of and given a separate apartment, so that the danger of conveying the disease to others is reduced to a minimum. He should occupy a single bed. All unnecessary furnishings of the room should be removed and the objects that remain in the room should be frequently aired and disinfected. The general and sanitary environment of the patient should be as favorable as possible to hygienic living. Many times a change of residence is of great benefit. When possible the patient should be out of doors and light exercise taken. The body should be well protected by flannels, the year around.

Keene[61] would carry prophylaxis to careful examination of the pregnant woman to avert a sudden development of tuberculosis after parturition; also of the child, after birth, to remove any predisposing lesions. The mother with a tubercular tendency should, under no circumstance, nurse the child and should be instructed to observe any disposition on the part of the child to acquire malpositions in sitting, standing or walking.

Another important consideration in the prophylactic treatment is the inspection of dairies and slaughter houses. The disease may be transmitted by infected milk. There is less danger of infection through meat; although all animals that present distinct lesions should be confiscated. Sanatoria and other special arrangements for the care of patients should be encouraged.

The **Treatment of the disease** consists primarily in locating the cause of the devitalized condition of the cellular tissue. This is the vital point to be considered and requires a thorough examination of anatomical structures in the region involved. There is a reason why the tissues are in a depraved state and it is our work to examine thoroughly the structures that might become deranged anatomically and cause an obstructed innervation or vascular supply. The disease is not primarily due to the bacilli; the bacilli would not have infected the system had it been in a healthy state. Hence, the object of the treatment in tuberculosis is to favor a building up of normal, well-nourished tissues so that it is impossible for the bacilli to infect the region. Of course, destruction of the bacilli is important, but we cannot expect to do much by the use of a parasiticide, for we are not then influencing or affecting the real cause of the disease. If we can improve the arterial circulation to the diseased tissues, we will be striking at the root of the disease and the healthy blood will be the only parasiticide necessary.

This is where the osteopathic theory of the cause of disease differs from that of other schools of medicine. At the local points of infection there is a decided malnutrition of the tissues, due to a lack of proper blood to the parts, thus favoring the lodging of micro-organisms; by reestablishing normal nutrition nature will repair the tissues if the condition is curable. Hence, it can be seen at once that if the case is curable osteopathic treatment will meet the demands scientifically.

The preceding is the keynote of osteopathic therapeutics; not only in the treatment of tuberculosis, but in all diseases where micro-organisms play an important part. In **tuberculosis of any part of the body**, it is the duty of the osteopath to carefully examine the structures that may become anatomically deranged, from any cause, affecting the nerve, blood and lymphatic supply to the tissues or organs diseased. Correction of anatomically deranged tissues and attention to the hygiene, diet and general health of the patient constitute the treatment.

On the subject of Pulmonary Tuberculosis, W. Banks Meacham says:

"In cases of **pulmonary tuberculosis** it should be remembered that the pathological lesion in the lung is a result of a general systemic interference —an interference so great that the body as a whole loses its stored-up heat in excessive temperature, loses its reserve nutrition, as manifested by early and continuous loss of weight.

"Therefore the causative osteopathic lesion should not be sought alone over the site of the pathological lung lesion but rather in that area where general nutrition is osteopathically affected.

"A few general considerations of **osteopathic mechanics** involved in nutrition should be ever present with the searcher for the cause of pulmonary tuberculosis. For instance we know that ingested fat is acted upon by the pancreatic enzymes; that the invertin of the intestine is an endocrine secretion. In diet we seek to administer an excess of fats to take the place of fat-loss in this disease, often losing sight of the fact that some mechanical maladjustment prevents fat-splitting into a form suitable for tissue assimilation.

"It is common osteopathic knowledge that lesions of the upper dorsal area have a profound influence on general nutrition. Consequently it is to

this area that we must look for the causative osteopathic lesion in this disease. The influence of this area is due to the fact that the nervous mechanism of the secretory glands gets its most direct disturbance in this area where the nerves leave the spinal cord to become distinct innervation to these organs.

"Apart from the nutritive and general circulatory influence of upper dorsal lesions we must consider the germicidal action of the endocrinous secretions in devitalizing the specific bacterial agent in tuberculosis. Undoubtedly these internal secretions have marked effect in agglutinating the bacilli, thus enabling the phagocytes to perform a larger duty.

"The correction of upper dorsal lesions, with due regard for the pathological condition within the thoracic cavity gives a scientific physiological and bacteriological therapeutic action in tuberculosis.

"**Other lesions** may and do demand attention and correction when possible. But we must not lose sight of the fact that our specific action comes from a corrected relation of the upper dorsals. In the cloud of unproved theories and guesses in the literature of pulmonary tuberculosis nothing seems nearer an established truth than that it is a disease contracted in infancy, that it develops, later, in those persons who retain the infantile type of chest—thorax of large antero-posterior diameter in contrast with the lateral diameter.

"In the progress of the disease we do get a costal malformation giving the 'horse-collar' thorax, with an apparent lesion of the osseous walls of the thoracic cavity. But these lesions are the result of nutritive changes brought on by the active infection already present; and are not in any true sense, causative factors in the establishment of pathological areas within the lung.

"The **osteopathic treatment**, then, of this disease is, manifestly, a correction of a plastic posterior upper dorsal lesion. And where the pathological lesion of the lung contraindicates forceful correction, mobility of the area should be sought.

"The **general care** of the case should look to the normal functioning of all organs, with emphasis on ease to the patient. The **diet** should be what the patient can assimilate properly even though it be much less than the amount a normally active person should ingest. **Altitude** has a favorable effect in

selected cases only. It is remarkable that many cases recover in the extremes of the Rockies and the coasts of California and Florida.

"No violent **exercise** should be undertaken on account of the possible embarrassment of an already overworked heart and in consideration of the possibly engorged pulmonary vessels. For these reasons, too, rest in bed is advisable with temperature above 99° F. and pulse above 85."

In **scrofula**, lesions will be found to the lymphatic glands, impairing their innervation and function. The treatment is not to be applied over the glands directly. First, it is necessary to locate the lesions of the bones, ligaments and muscles or such tissues that would cause disturbances to the glands, then readjust the parts. The object of the treatment is to modify the soil conditions on which the bacilli multiply, by correcting the local derangement of the tissues. The entire body is not in such a depraved state that the bacilli will grow and multiply wherever they happen to come in contact with the body; tissues of any organ favor a receptivity for the bacillus only when these local tissues are in a morbid condition. It is then our work to aid nature in relieving obstructed forces that are causing such an effect.

There are **general measures** which influence the tubercular process. The diet of the patient should be nutritious. A diet of milk, buttermilk, egg albumen and meat juice will probably be found best, although many will be able to take ordinary food. The patient should be out of doors as much as possible. Meacham[62] says "Fresh, pure air, wherever found, is essential; elevation is an individual requirement, an even temperature is not necessary and sunshine is important only as it allows the patient to be out of doors. Exercise should not be taken when the patient has a temperature above 99 degrees." The dry, even climate of the Southwest certainly tempts the patient to be out of doors more than one with opposite conditions. Even when the patient is greatly debilitated and weakened, insist upon his taking outdoor exercises or rides. Gymnastic and methodical breathing exercises are essential in widening and strengthening the chest. Bolles[63] believes that the appetite should control the diet and forced feeding be not insisted upon. Fasting, to test the sense of food desires, has points well worth looking into, as gastric disturbances with a loss of strength follow overfeeding. He also recommends deep breathing and physical culture to elevate the ribs and increase thoracic expansion. Outdoor sanatoria are

being established over the country, in many cases by state appropriation as, “the treatment of tuberculosis itself has not been a satisfactory procedure except by climatic changes or the outdoor treatment persistently applied.” (Halbert). The fresh air treatment may be taken at home by sleeping in the open air or by appliances fitted to the window of the room so only the head is exposed to the air. The only factor is to get the air. The skin, as well as the excretory organs, should be kept active. Always make it as comfortable for the patient as possible.

The **fever** is indicative of the activity of the disease, so that treatment to influence the process and to promote elimination is best. Sponging with either cold or tepid water will be helpful. The **cough** is a troublesome symptom. Attention to the underlying irritation is demanded, although one cannot hope to influence, to any great extent, the cough dependent on cavity formation. Catarrhal processes in the respiratory tract can be lessened. Lesions that are acting as a cause of irritation, will frequently be found in subluxated ribs or vertebræ. The seventh and eighth dorsals are frequent sources of cough. The tissues about the pharynx and larynx, and the hyoid bone, disturbing the vagus and other nerves, should be carefully watched, also possible reflex irritation from the abdomen and pelvis. **Night sweats** are due to tubercular processes weakening the system and particularly lessening nervous control. These will subside as the body is strengthened. Sponging will be of service. Disorders of the **stomach** and **intestines**, such as nausea, vomiting and diarrhea, require treatment of the splanchnic area and regulation of diet. Considerable can be done to relieve **tubercular laryngitis** by careful treatment of the larynx and contiguous tissues. **Hemorrhage** is likely to be self-limiting. Attention to the upper dorsal vertebræ and ribs and muscles will tend to equalize the circulation. Rest and use of ice upon the chest, as well as internally, will be beneficial.

McIntyre, in an article on “Fat Food in Consumption,” sums up the treatment for tuberculosis in the following words: “The treatment, then, for consumption should include rich, stimulating diet, proportioned to the digestive power of the patient, containing an excess of fats in most digestible form, of which sweet cream, fresh butter and well-cured bacon are the best examples, and the free use of pure drinking water, coupled with the promotion of blood flow, respiration and elimination of waste by osteopathic means.”

Surgical measures may be necessary where glandular or other tissue has broken down and is a menace to recovery.

Spanish or Epidemic Influenza[64]

By GEORGE M. MCCOLE

The epidemic of influenza which swept over the world and reached the United States in August 1918, starting in at the Atlantic sea-board cities, developed rapidly there and passed westward over the country. It reappeared the following winter.

Epidemiology.—In the United States it was called Spanish influenza, as it was at its worst in Spain at the time it broke out here and was thought to have been brought from that country.

In Europe it was called the Ukrainian influenza and in southern Russia it was said to have emanated from the Orient. No country in the world was exempt. It was at one time thought to be a type of the pneumonic plague and while plague is the severest toxemia known many cases of Spanish influenza were equally as prostrating and fatal as the ordinary type of pneumonic plague. The bacillus pestis was never proved to be the cause of this pandemic of influenza but the clinical analogy was very evident.

A study of European conditions of health and hygiene shows how reasonable it is to believe that some disease would develop and sweep a world lowered in vitality and immunity by the abnormal conditions of war. Every known communicable disease was raging in Europe and Asia where millions of people existed under exceedingly poor hygienic conditions.

The period of incubation of influenza was extremely short, averaging about two days. All ages were attacked, although persons over 60 rarely. Those between 25 and 35 seemed to be the most susceptible but it was, perhaps, because they were in active life and more exposed. There is considerable evidence that the disease was not air-borne but conveyed by contact with active cases. The secretions of the mouth, nose and eyes were considered the active carriers. Masks, made of several layers of gauze fastened over the face, have been worn by many people but experience taught that their use did not avail against infection.

Mortality.—The mortality under drug medication as shown in a statement by Henry S. Bunting was as follows: "New York City 9.8%; Chicago 14.5%; Boston 27%. Osteopathy's influenza salvage represents the difference between these figures and the low score of one fourth of 1%." He gives the following statistics on pneumonia following influenza under drug medication. "Reports from 148 health commissioners show an estimate (called conservative) of 33% of fatalities in epidemic pneumonia under medical care. In some large centers it ran as high as 68% to 73%. As officially compiled to date, the fatalities in epidemic **pneumonia** in our army and navy cantonment hospitals amounted to 34½. Osteopathy's fatalities were only 10% which included all those eleventh-hour appeals to Osteopathy.

"The Chicago and New York departments of health figures, each show total death losses of 18% in all of their epidemic cases. Osteopathy's remarkable salvage of life is best measured from this point of comparison. Its total death rate from both influenza and pneumonia has been actually less than one percent." And this is based on 110,000 cases reported to the American Osteopathic Association.

Pathology.—The pathology of Spanish influenza is practically a study of lung involvement. There we find an exudative pneumonia of a rapidly confluent type, a transudate of blood serum and red cells appearing in the lower lobes of both lungs and rapidly flooding the entire space. Air bubbles were scattered through the serum soaked lungs, giving a frothy appearance to some parts. At times some parts of the lungs showed drops of liquid pus.

Where pneumonia did not develop there was no typical pathology. The toxins left an irritated bronchial tube, intestine or kidney just as in any other severe toxemia.

Bronchial and the old type of lobar pneumonia also appeared as a complication of Spanish influenza, making three types of pneumonia which were to be guarded against.

Symptoms.—The attack is usually ushered in by a chill or prolonged chilly sensations, sometimes lasting for two or three hours; fever 103° to 105° F.; if it does not fall in three days or if it comes up after once falling, pneumonia is to be suspected; pulse, full and bounding with a varying rate; headache usually general in type and in severity from slight discomfort to a

most violent type; intense pain in the back and legs; tenderness the whole length of the spine but especially distressing in the upper dorsal, lower lumbar and sometimes the upper cervical; a dyspnea which is best described as being a constricted feeling of the chest with air hunger; often the bronchial tubes are raw and dry, the patient feeling as if the breathed-in air were hot to the bronchial tubes, an active exudative bronchitis developing; sometimes there is an active bronchitis with distressing cough; nose bleed is a frequent symptom (and is often a sign of threatening pneumonia); most cases sweat more or less, some have drenching sweats; sleeplessness; albuminuria frequent.

When the temperature breaks it practically always falls below normal during the course of that day. A typical case of severe character often presents all of the above symptoms; the lighter cases perhaps only two or three of them, of which the chilly sensations, fever and bounding pulse are the most common encountered.

A severe case is impossible to differentiate from the first symptoms of smallpox. Where a case of this type is encountered, it is always advisable to get history of vaccination or smallpox.

Examination.—The successful treatment of disease calls for attention to little things. Some little thing properly cared for very often gives us our margin over adverse conditions and spells success in the care of our patient.

During the epidemic I found a few cases which ran a temperature much below normal, sometimes as much as three or four degrees, and still with enough symptoms to be easily diagnosed as influenza.

Pulse was taken at the time the thermometer was in the mouth. Pulse was practically always bounding and hard. Its rate varied widely, being influenced by many other conditions. I often, early in the attack and where other symptoms were indefinite, made a diagnosis principally from the pulse.

Respiration was taken while holding the watch and with the finger on the pulse so that patient would not know that breathing was being watched.

Many patients complained of a sensation of weight on the chest and difficult breathing—hardly what one would term true **dyspnea** yet a real air hunger and sensation of constriction in the chest. The breath was often

tainted with the odor of acetone, indicating a high degree of acidosis and giving an important diagnostic point.

The **heart** was then examined, both by auscultation and percussion.

The examination was then extended over the lungs and pleural rub listened for.

Patient was questioned as to having had a chill, general health, occupation, undue exposure, fatigue, what physic if any, had been taken or other drugs used, bowel movements and bloody stools, food taken, sleep the night before, and dreams, headache and backache.

The full examination could not be given at each call and not all of it to each patient, as time would not permit during the height of the epidemic.

Throat was always examined. This is an important point.

The urine was examined in a great many cases and often albumin and sometimes casts were found.

Treatment.—I consider it advisable to give a strong deep treatment if the patient is seen before the attack has gained full headway; after that I give short light treatments.

If the disease has not developed much at the time of the first visit vigorous treatment with adjustment of the deep-lying and tightened-up ligaments over the spinal cord is indicated. Subsequent treatments are given to overcome the invariable and recurring contractions along the spinal cord. The spine is gently sprung and the muscles pulled away from the intervertebral foramina so that arteries, veins and nerves of the spinal cord are free to function.

I might note here that I consider Spanish Influenza does its damage through the attack of its peculiar and virulent toxin and the accompanying acidosis, on the body's reservoir of energy—the spinal cord and related structures, the vegetative glands and nerves.

If the patient is in a serious condition he is often treated in the position in which found, so as not to disturb him. Care is particularly taken to keep a patient who is moist with sweat from taking cold or being exposed. An extra covering is thrown across the neck and shoulders, and pulled down as the bed covers are moved to get to the area to be treated.

The musculature of the upper dorsal and cervical region is given special attention, the region of the first and second cervical and the first to sixth dorsal being special seats of trouble. The region between the spine and scapula on the left side, first to sixth ribs left, and the region of the suprascapular notch on the left side are given specific treatment to free them of contractions. The tissues of the suprascapular notch are in direct connection with the nerve supply of the heart muscle and treatment here is astonishingly effective.

This treatment for the heart is best given with the patient lying on the right side, leaning a little forward, with his left forearm against the chest, hand at neck or chin. Stand then at the patient's head and with the thumbs give all the region on the left side at the base of the neck and around the suprascapular notch thorough muscular adjustment for circulation and removal of contractions which disturb the heart's vitality. Treat first to sixth dorsal region.

I consider this treatment specific for the heart debility of influenza and many other heart conditions, as well. I have found it especially effective in the weakened and nervous states following influenza and in so-called "run down conditions" generally.

Vibration with the tips of the fingers on the anterior chest wall is often used. Tender and contracted tissues are often found along the anterior ends of the ribs which are involved at their spinal ends. These are gently treated. Children are often given vibration, holding their chests with my hands under their arms.

If the patient is stout and not easy to treat I have him sit up in bed and give the upper dorsal thorough percussion with the side of the hand[65]. About 100 strokes at each treatment are usually given. I remember one very fat patient in the eighth month of pregnancy to whom I could give hardly any other treatment. It was especially valuable here and we saved the mother after a hard fight, though the child was still-born.

When nature is meeting the emergency and holding her own in the battle against infection we have a moderate fever—a benign fever. When the body is overworked with other duties and irritations the fever may rise dangerously high. Here it is that the physician must give further aid. Here it is that osteopathic treatment further aids by giving rest to the patient, easing

pain and promoting general circulation (this in itself often quickly reduces fever). Here it is that the attention we give to clothing, diet, ventilation, quietness, good nursing, etc., comes in. The body is relieved of all duties but the one. Its functions are all turned to one end—the destruction of the invading infection. The osteopathic physician adjusts. Nature cures. It is all a matter of adjustment.

For labored breathing, an effective treatment is to have the patient with hands clasped and arms raised above the head, patient being in bed, face up. Stand directly at head of patient. Reach over patient's arms and under the upper dorsal and lift up against the heads of the ribs with your fingers, thus raising the chest, beginning as far down the spine as you can and working up as you treat. Relax the muscles at the same time.

Frequency and Amount of Treatment.—Frequency and extent of treatment depend upon the condition of the patient. In influenza the patient is approached with the idea of a daily visit. If then there is any doubt about his being entirely safe for 24 hours he is seen in 12 hours or as often as the condition indicates. Patients are usually seen more than once a day.

The average time which the patients are confined to the bed is about five days. Some are free from fever in three days; some not for six or seven days. According to conditions they are then kept in bed from one to three days longer.

As to the amount and length of treatment, I agree with James M. Fraser, who says adjustment of the soft tissues should be made and made with as little disturbance to the patient as possible. He says[66]: "The ill effects of too long-drawn-out general treatments, or in short, over-treatment, I consider one of the most important questions for osteopaths because I incline to the belief that in many acute infections more harm may be done by such fatiguing over-treating than if the patient were really not treated at all. A "flu" or pneumonia patient should never be treated over fifteen minutes at the longest in one treatment. It is much better to treat often and not treat so long, as over-treatment may result from a desire to be thorough. If we always would stop and think what we are doing and just what we are trying to prevent we would be more careful when we treat these infectious cases. A patient's resistance may really be lowered, his bowels inhibited, his

heart overstimulated, his muscles fatigued and his nerve force depleted by treating overtime. When the reaction begins, stop."

Congestions and contractions should be removed wherever they are found, be it in the region of the throat, spine, ribs, liver or spleen. I order a daily enema and give positive instructions—after having had one or two almost fatal cases from this cause—to use no physics. Purging killed more people here than any one other thing. If a heavy physic be given two or three times and the patient comes to a crisis, so much vitality has been taken out of the blood that he does not have enough strength to carry him over and he dies.

If the patient comes to pneumonia I find it good and effective to use the "constipation treatment." It is best to let the bowel take care of itself. Nature can do many things, and caring for the bowel in a crisis is one of them, providing the correct diet has been given the patient. If the patient is getting nothing but fruit juices there may be a natural bowel movement and even if he has been getting other food it is better to leave the bowel alone until after the crisis and then give the enema.

A patient with a frank pneumonia following influenza has but little chance of living if his strength is being drained from the blood stream through the bowel every few hours.

I see to it that no draft blows on the patient's bed. In a windy location a cold draft can appear suddenly and do great damage in a short time. The patient should not breathe cold air. Fresh air is all right but it must not be cold air. I order extra covering for the neck, arms, shoulders, back and chest. I like a wool workshirt best but use pneumonia jackets, extra undershirts, sweaters, etc., when the wool shirt is not to be had. In fact continued warmth seems to be an almost necessary condition to the proper handling of influenza. It is because heat, even the heat of the fever itself seems to aid the nervous system in building up antitoxins.

The patient is instructed that if a sweat comes on, either from a hot bath, hot drink or as a result of the disease, to lie and take it, for throwing off the covers is a sure way of taking cold and inviting pneumonia.

If the house is cold or the patient weak or very sick the urinal and bed pan are used. In fact I prefer their use even when those conditions are not

present, as the less the exposure the less chance of pneumonia and the quicker recovery. **Rest** lying in bed is absolutely necessary to a satisfactory course and quick recovery.

For lung congestions and bronchial irritation, in addition to osteopathic treatment along the spinal cord, raising the ribs and chest, and vibration of the chest wall, I sometimes use the old fashioned mustard plaster (made with one teaspoon each of flour and mustard, mixed with olive oil or with water and white of egg), keeping it on about ten to thirty minutes or until a good, red reaction is brought about. The feet must be kept warm with hot water jugs. A hot mustard foot bath is excellent when the feet persist in staying cold.

At first I did not use the hot tub-bath. I am now ordering it if I see the patient early in the attack and where there is no contraindication, such as a dangerous heart condition. I do not use it unless it can be given properly and without undue exposure to the patient. I never give it late in the disease.

A good method is to get the patient into the tub, lay two canes or sticks across the tub, and cover all with a blanket or rug. Place a bath towel for the head to rest on and pull the blanket around the neck. The patient can then take a good hot sweat in comfort. His arms and shoulders, his knees and legs will not be exposed to chill. When he gets up the blanket can be drawn about him if desired. He then goes back to bed for a good rest and sweat. A cold towel is placed on the head and water given to drink.

Every patient should have a good sweat early in the attack. Another good method is to cover with a blanket and place outside fruit jars or jugs filled with hot water, cold towel to the head and several glasses of water or lemonade to drink.

The use of cold compresses on the chest I do not favor. They are used by some osteopathic physicians, but I believe the result is better with other methods. Applied in a hospital where the technique is well in hand they might be successful, but personally I fear them. I am even careful about putting an ice bag on the heart. Cold packs are sometimes used in my practice but only on the head for pain or delirium. Chill must be avoided. Warmth must be conserved, even the fever is benign.

Neither do I favor “rub-on” of camphor, turpentine or onions when they irritate the patient. If the patient has been used to them or has faith in them and wants them I order them. I also order something of the kind where “something must be done”. When a family calls a doctor they “want something done,” and it is best to do something; ever keeping in mind, however, that our patient’s strength must be conserved.

I do favor “rub-ons” in that I think it is well to keep the skin soft with some oil. It helps to keep an even temperature and the skin active. The skin should be wiped dry often, however, to remove the skin secretions which if left on become stale.

I remember being called to see one little girl who could not get her breath, and found she was holding her nose with the bed clothes. She told me that the smell and stickiness of the lard and turpentine and the onions made her so sick and uncomfortable that she felt she could stand it no longer. When she was cleaned up, and clothed in nice clean white cotton she showed a wonderful improvement, and it was real as well as apparent.

As to **baths** in influenza, I instruct the nurse to bathe the patient only as necessary for cleanliness and his comfort. Dabbling around in water is not a safe procedure in a disease where pneumonia is so easily contracted.

I do not use alcohol rubs where the patient is in anything like a serious condition, as alcohol closes the pores and dries out the skin. A rubbing or massage by the nurse is good for a restless, nervous patient, but it had better be done with olive oil or some other good oil. In influenza we do not want the pores closed. We need elimination, and all we can get. A small saving of vitality or a little elimination of toxins may be the margin that saves a patient for us. I do not favor the use of turpentine, for if it is absorbed it irritates an already sick kidney; if it is not absorbed it is useless. Why disturb the patient?

For the bronchial irritation, in addition to osteopathic treatment, and the accessory mustard plasters, inhalation of steam is often used. A pan of boiling water is set by the bed and the patient leans over the edge of the bed with a bed-sheet or paper over the head and steam vessel, breathing the steam as long as it lasts.

For the **throat** most any cleansing gargle can be used but I prefer the use of the common baking soda gargle. I have about one-half teaspoonful of soda placed in a glass and boiling hot water poured over it. As soon as this is cool enough to use I have the patient gargle thoroughly. The idea is to get the mouth, pharynx and tonsillar area clean and free from accumulations. Lemon-water gargle is often gratefully accepted.

If a very sick patient breathes through a dirty and dried-out mouth, all the stage is set for him to draw into the devitalized lung large quantities of infectious material. For this reason if not for the comfort of the patient it is necessary that the mouth be kept clean and also moist.

It is not possible to kill this germ life with any antiseptic. The field must be made and kept clean.

The **nasal passage** also should be looked after, to keep it clean as possible and also to allow the patient to breathe through the nose.

For the nasal passage any good non-irritating oil is effective but I like best 2½ iodine in oil. It is a good lubricant and as far as possible we do get the germicical action of the iodine.

Patients asking me what to do to avoid influenza are advised to keep the mouth clean and closed and to use the oily solution of iodine in the nasal passages.

And when treating the respiratory tract we must keep in mind the fact that all healing comes from the blood side of a membrane. No healing ever comes to a membrane from its exposed surface. Local treatment to a membrane must be a treatment which removes irritation, not one which adds more. Healing must come from within. “The rule of the artery is supreme.”

Diet.—The diet used is liquid, so that the digestive functions will be taxed as little as possible, for they are weak at this time. Fruit and vegetable juices only are used.

The influenza germ propagates largely in the intestine and if the intestine has in it the products of a full diet the bacterial growth soon overpowers the patient. Germ life cannot develop on fruit and vegetable juices.

Another reason for using the liquid and fruit diet is that influenza is a disease running a short course and feeding is not necessary. If it were a disease such as typhoid, running a fever for several weeks, we would then give a more liberal diet, but the patient’s strength will not be lost on a liquid and fruit-juice diet in three or even eight days.

The frequency with which the urine contains albumin in this disease shows us what a heavy load the kidneys are carrying. This makes a salt-free diet advisable and again brings fruit juice to our favorable attention.

To activate the kidneys and thus relieve the headache we give always plenty of water and often hot lemonade. Orange juice and lemonade are used frequently as are blackberry, raspberry, pineapple, loganberry and grape juices. When the acid juices are not well borne we use non-acid juices, such as pear and raspberry juice. A ripe, cooked pear mashed with a fork and mixed with one or two different fruit juices makes a satisfying dish.

Bottled sweet cider is also a most valuable food and a good beverage. We use it in almost every case and find it the most acceptable to the patient of any food offered. I am of the opinion that apple cider has been neglected as an article of diet, both in disease and health, but especially in fevers. It contains considerable iron for the blood, as well as having considerable food value. It has the added virtue of being pleasing to the patient.

In addition to these juices we often use spinach juice. I have the nurse get a can of the best grade spinach and serve the juice hot, as a broth, with a little salt and pepper and perhaps celery salt and a piece of bacon in it to flavor it and to appeal to the patient. Spinach juice contains much iron and iodine in a form readily absorbable by the blood. It also is useful in maintaining the alkalinity of the blood and body fluids, thus counteracting the acidosis of the disease. It renders the urine alkaline and thus relieves the kidneys of the irritation of acidosis and of an acid urine. Where the kidneys are or are likely to be involved the spinach juice must be served without salt.

All the mentioned fruit juices tend to counteract acidosis and produce alkalinity, but are not so effective as the spinach juice. They have the advantage, however, of being used in larger quantities. The spinach juice has considerable food value and has the added value of appealing to the patient's reason, when the iron and iodine content is explained to him. It is especially useful when treating those patients who are wondering if they should not be getting some sort of "tonic."

The juice taken from ground fresh lettuce is also valuable. It contains more iron, iodine and phosphates than the spinach but it is not so easy to prepare. I have used it in the cases of several anemic and quite sick babies and consider it well worth all the expense and effort it took to secure it.

The breaking down of the alkaline reserve of the body and the consequent acidosis, comes early in the disease and is disastrous, and all the attention given to the diet is amply repaid in results. Careful attention to the diet is the only way the acidosis can be overcome.

Raw fruit and vegetable juices also supply that most valuable element, vitamines. For this one thing alone is the raw fruit juice most valuable. I do not believe too much attention can be given to securing a liberal supply of vitamines for the body, especially during an attack of fever.

Some especially interesting points are brought out by contributors to the Journal of the American Osteopathic Association in the March, 1919 number. I wish here to add a discussion of these points. The contributors are physicians and good representatives of our profession and they report uniform and excellent success in handling the recent epidemic.

It seems to be the consensus of opinion that the treatment should be specific and light to avoid fatigue, with the possible exception of the first treatment, which often should be general and vigorous.

All are agreed that the patient should be kept in bed, not even leaving it to go to the bath room. The patient must be protected in every way from fatigue and exposure. The enema was used by all. A number of writers state plainly their opposition to the use of physics and laxatives. A hot tub-bath is recommended by several, but there is opposition to much bathing.

Practically all the writers used the fruit-juice diet. However, a few gave a heavier diet and were successful with their patients, which is one more proof that the osteopathic treatment is the deciding factor in bringing about a cure.

J. R. Thornton wrote after having had about 100 cases. He speaks especially of his cases of pneumonia. They resolved by crisis. There were no deaths. He says: “All cases were, preceding the first treatment, given a generous plain water enema. Orders were left for two enemas per day until told to discontinue, and in most cases the patient got the enema. A few cases, with the highest fever, the stationary fever, were given tap-water enemas, one each hour until the temperature dropped two or three degrees.

“Sponge baths were given to reduce fever in every case. Diet was liquid until the temperature was normal.

“The osteopathic treatment of the usual spinal work, paying special attention to cervical and dorsal areas, and strong inhibition.

“Pneumonia cases were treated three to five times a day and had as much time as they required at each visit. They required action. Heating compresses were used on each case, except the ice bag to the heart when rapid. One case of delirium was treated with ice caps to the head and neck. Normal salt solution per rectum. Murphy drip was given in each case. Diet, liquid consisting of egg-nog, milk, strained soup and broth.”

Mary Alexander Patton: “Treatment should be quick, every motion significant so as not to tire the patient, for exhaustion is always present. Each patient was treated two or three times a day until temperature became normal. The nasal douche was given twice a day followed by K-Y jelly. Hot soap bath followed by soap enema and enteroclysis when fever persisted.”

W. Curtis Brigham ordered “Hot packs the full length of the spine twenty to thirty minutes, three times a day. This will produce profuse sweating and often put the patient to sleep.”

I have used this same treatment, especially in nervous cases, and hold it in high esteem. I have the patient put a bath robe on backwards so that the arms and legs are well protected but the spine easily accessible. The hot packs can then be used and covered over and the patient not exposed.

R. H. Nuckles maintains that lung and ear trouble will not follow influenza where osteopathic treatment has been given to adjust the cervical and upper dorsal circulation.

H. A. Price: “We have kept particularly in mind, first, the nerve, blood and lymphatic supply to the lungs; second, the circulation to the spine (meaning spinal cord); third, the internal secretory functions and to the general excretion.”

Ralph M. Crane says: “A great deal of my work is among the Italians. It was necessary to give quick specific treatment that I might do as much good as possible to the greatest number. I did not treat them as often as I would like to, and because of this fact I learned that osteopathy got control of the ‘flu’ immediately, the first treatment sufficing to start them on the road to recovery; in fact, many of them got no more than one treatment.”

FOOTNOTES:

[51] Hinckle—The Scientific Basis of Osteopathy.

[52] Clinical Osteopathy.

[53] Journal of Osteopathy—Prize Article July, 1906.

[54] A. O. A. Case Reports—Series I.

[55] E. Link, Diphtheria—The Bulletin, 1905.

[56] A. M. Willard, Membranous Croup—Journal of Osteopathy, March, 1904

[57] See Dr. Still—Philosophy and Mechanical Principles of Osteopathy.

[58] Journal of Osteopathy, October 1905.

[59] Journal of Osteopathy, October 1905.

[60] Journal of the American Osteopathic Association, March 1906.

[61] Journal American Osteopathic Association, December 1904.

[62] Journal American Osteopathic Association, May, 1905.

[63] Journal American Osteopathic Association, May, 1905.

[64] Rewritten from article in Osteopathic Physician, June 1919.

[65] This treatment was described by Henry M. Stovel, in The Osteopathic Physician of January 1917.

[66] O. P. June 1919.

ACUTE ERUPTIVE FEVERS, MUMPS AND WHOOPING COUGH

By Edgar S. Comstock

GENERAL CONSIDERATION

In the consideration of these diseases, it is well to bear in mind that lowered resistance is the primary condition that has made the infections possible, and that lowered resistance implies an imbalance of or obstruction to the vital fluids and forces of the body, thereby interfering with the functional activity of the body's normal protective mechanism.

The imbalance of or the obstruction to these vital fluids and forces, which is structural in nature, is produced by many conditions, as fatigue, exposure, sudden changes of heat and cold, emotions, dietetic errors, physical force or violence, etc. These conditions, because of the response of the tissues of the body to environmental changes, produce contractures of the elastic tissues, such as muscle, fascia, etc., which disturbs the structural integrity of the body and thus produces obstructions, irritations or interference with the media of exchange of these vital fluids (blood and lymph) and forces (nervous energy) of the body.

It is evident, then, that the most potent curative factor in the treatment of these diseases, as in all others, is the removal, whenever possible, of the obstructions and interferences that pervert the activity of these protective forces. It is necessary, therefore, to remove the exciting causes (fatigue, dietetic error, etc.) and by such physiological means as may seem necessary to readjust the structures of the body so as to remove the above mentioned obstructions and interferences.

The structural lesions most frequently found in the infectious diseases are of the muscular and fascial type and are very evident to the careful observer. The interosseous lesions are probably often the predisposing factors to the susceptibility of the softer tissues to reaction to environmental

changes, but it has been the experience of the writer that the adjustment of the softer tissues was of greater primary importance in the acute stages of these diseases. The interosseous lesions may be easily adjusted in the very early stages of these diseases, that is before the severe symptoms have appeared, but after the more severe conditions have appeared it has been our experience that the soft tissue work was sufficient unless the interosseous lesions were very easily adjusted.

It is the writer's desire to impress upon the reader the necessity of careful attention to the structural lesions that are always constant in these diseases, using whatever physiological means seem necessary to adjust these lesions and keep them adjusted, and to insist upon carefully restricted diet; continuous, thorough elimination of the waste products of the body; hygienic surroundings and well-regulated environments both mental and physical. Then Nature, which has given the body its own protective mechanism, may have full control of the situation and all of the normal protective chemicals and forces in the body organism are utilized in the battle with the invading infective forces: the glands secrete the chemicals of protection; the antibodies are rapidly developed and thrown into the battle area; metabolism begins to return to normal; elimination becomes increased because of the stimulating action of foreign substances in the body structures; and the work of repair and recuperation begins.

If reliance is placed upon the inherent protective forces of the body, the knowledge of the special type or character of the invading organism is of little importance from the standpoint of the treatment of the disease after it has become established. The value of the knowledge of the specific organisms is in preventive medicine, in seeking out the habitat and breeding ground of the organism and its mode of transmigration. Knowing these, effective measures may be adopted to prevent their propagation and spread. Examples of this are Yellow Fever and Malaria.

Variola

(SMALLPOX)

Definition.—Variola is an acute, specific, highly infectious and contagious, epidemic disease. Its beginning is sudden with a chill, vomiting, severe headache and lumbo-sacral pains. It has a typical fever curve and a

typical eruption on the skin and mucosæ of macules, papules, pustules and crusts successively.

History.—Prevailed in China and India at least 1000 years before the Christian era. Epidemics occurred in the sixth century and during the crusades. Its first clinical description was given in Arabia during the ninth century. It was brought into Mexico about 1520 by the Spaniards and between three and four million people contracted the disease. In 1718 preventive inoculation was introduced into England and in 1796 Jenner discovered vaccination.

Etiology.—The specific agent which is the cause of this disease is unknown, but the virulence of the agents is retained for a long period and is the most virulent found in all diseases. There is no period from the initial fever to the final desquamation that the disease is not contagious, although the stage of suppuration is the most violent. Although the disease is so highly contagious and the entrance of this particular poison into the system produces this disease, still no one has yet been able to discover a germ nor what the nature of the infective agent is. To contract the disease it is not necessary to touch an individual already afflicted, not to even approach the sick room. It may be only necessary to touch a garment that has once been in contact with a smallpox patient, or which has simply hung in his vicinity.

The blood is infectious at a very early stage. As smallpox is contagious without eruption it seems that the secretions and excretions convey the virus. The dried pustules seem to have the greatest infectiousness. Cadavers of smallpox (Variola) victims are very dangerous and relatives of them should be carefully warned. The disease often persists in infected communities for years. The disease is evidently spread by fomites, contact with the pustular contents, and crusts or scales of the desquamating skin. It attacks all classes, ages and conditions of people, which is unlike other erythematous diseases.

A previous attack usually confers immunity. Vaccination is claimed to confer immunity but apparently in not all instances, for there are records of “successfully vaccinated” individuals having severe attacks of the disease.

The susceptibility to smallpox, as to all other infectious diseases, varies in different individuals, in different races, and under the influence of conditions as yet unknown. Some persons are not susceptible to the disease,

nor are they to vaccination, and yet others have been known to have had the disease as much as three times. The Negro and Indian races seem to be more susceptible than the Caucasian. Then again at intervals of a few years, the general susceptibility of the people seems to be increased so that cases of smallpox become far more numerous than usual.

A point of considerable interest is the fact that the child, while in the mother's womb, may experience the disease along with the mother and thereby acquire, before birth, the usual immunity conferred by one attack of the disease. In most cases of smallpox in pregnant women, abortion or miscarriage occurs, yet a sufficient number of instances are on record in which healthy children have been born, exhibiting the characteristic pitting of smallpox, and possessing no susceptibility to vaccination. Again there are other cases in which pregnant women have smallpox and the babes in the wombs have escaped entirely; while the most singular fact is that while the fetus may experience the disease, the mother through whom the exposure was effected, escapes, either because of a previous attack or possibly because of vaccination.

While there seems to be no reason for believing that an attack of smallpox can be, or ever has been, aborted by artificial means, yet there is a prevalent belief that this process occurred during certain epidemics of smallpox, cases having been known in which individuals presented all the symptoms indicating the invasion of smallpox, and yet no eruption occurred, and yet such individuals were thereafter insusceptible to smallpox or vaccination.

The mortality of smallpox varies like the susceptibility of it—with the age of the patient and with some unknown conditions of the atmosphere or soil which favor the occurrence of the epidemics. The average in scattered cases—sporadic—is probably not greater than one in nine or ten. A fatal result occurs more frequently in the second week of the disease than at any other time.

Pathology.—Granular and fatty degeneration occurs in the liver, spleen, kidneys and heart. Infiltration is found in the adrenal glands and testicles. During the papular stage, there is local hyperemia of the papillæ, with interstitial exudation and colliquative necrosis of rete cells, so that a vesicle is formed, peculiar in that it is traversed by delicate bands of epithelial cells.

This, with the fact that coagulation-necrosis occurs mainly in the center, gives it the umbilicated, or depressed appearance. The contents of the vesicle are plasma, fibrin and cell detritus. Leucocytic invasion converts vesicles into pustules. This has a more globular, elevated appearance than the umbilicated vesicle. Pyogenic organisms are found in the pus. When the inflammation injures the corium, scars are apt to result; this occurs when the skin is scratched. The actinic light rays increase the danger.

Diagnosis.—Mistakes in the diagnosis of the first cases of smallpox in an epidemic are almost inevitable. Hemorrhagic scarlatina or measles sometimes cause confusion; in the hemorrhagic scarlatina the mucous membrane hemorrhages are less frequent than in smallpox. The prodromal eruptions plus purpura are very suggestive. The invasion stage lasts about three days.

Smallpox is characterized by sudden onset with violent chill and shivering; agonizing pain in the back and legs; intense headache, mostly frontal; temperature rapidly reaching 102 to 104 degrees F.; full, strong, rapid pulse, going to 100 to 140; uncontrollable vomiting; pharyngitis; red face, bright eyes, coated tongue; anorexia; constipation; sleeplessness; delirium; often copious perspiration and extreme prostration.

An “initial exanthem,” clearing within 24 to 48 hours, appears. It is either hemorrhagic or erythematous. About the third day the true eruption appears, first upon the forehead and in the scalp, then the rest of the face, the backs of the wrists, trunk, arms, and lastly the legs, most abundant upon the parts exposed to the atmosphere. With the appearance of the eruption, all symptoms abate, the temperature falls, and the patient may feel quite comfortable. The eruption consists of coarse, red spots upon the body, like flea-bites, rapidly becoming, within 24 hours, slightly raised red papules, feeling hard and shotty to the touch, and each surrounded by a broad red inflammatory band, the areola. Usually by the sixth day the papules become converted into umbilicated vesicles, at first clear, then turbid. They are hard and indurated to the touch, and on the eighth or ninth day they become pustular. The areola becomes much darker, the temperature rises to 103 to 105 degrees F., and the pulse to 110 to 120. The other symptoms all reappear, with salivation and delirium. Marked edema of the skin renders the skin unrecognizable. The pustules are painful, especially in places where the skin is thickened. The maturation lasts about three days, when the

fever falls by lysis. If fatal, death usually takes place about the tenth day, preceded by feeble and more rapid pulse, marked delirium, subsultus and sometimes diarrhea. About the eleventh day, desiccation begins, the pustules begin to dry, forming tight scabs which are closely adherent. The fever and other symptoms subside but itching becomes annoying. The odor from the pustular stage on is a peculiar greasy one.

After the rupture of large pustules the centers frequently dry and sink in, often in the shape of the Maltese cross. This is most typically seen on the backs of the hands and is pathognomonic. Toward the end of the third week the scabs fall, leaving red glistening pits which disappear or change into deep white striated scars. The hair falls but may grow again. The diagnosis is not certain until the eruption is seen. In the smallpox without eruption the diagnosis must be made from the history of exposure, the presence of an epidemic, fever, lumbar and head pains, delirium, and possibly the initial rash.

Mistakes in diagnosis may be made even by smallpox experts, but attention to the history, somatic findings and the course of the disease, rather than to the eruption, will prevent disastrous results. Always isolate any and all suspected patients.

Varicella Compared with Variola

Vaccination and smallpox never prevent.	Smallpox may closely resemble chicken pox; especially mild cases.
AGE—usually before puberty, may occur in adults.	Usually after puberty (many exceptions.)
Initial stage practically absent.	Initial stage severe, even in mild cases.
TEMPERATURE,—no remission on onset of rash.	Typical remission and secondary fever.
White cells normal or decreased.	Leukocytosis.
Prodromal rash very exceptional.	Prodromal rash quite frequent.
Vesicles in crops.	Vesicles never in crops.
Vesicles rarely shotty.	Vesicles, following macules, are hard and shotty.

Rash Evolution,—	Rash Evolution,—
Very rapid, vesicles on first or second day.	Much slower, vesicles on seventh day.
Eruption is universal, successive crops, most abundant on back, begins on body, less on face, scalp, hands and feet.	Development progresses downward, face first, then wrists, trunk, arms and lastly legs. Less on trunk.
Vesicle is superficial and fluid transparent.	Fluid pearl-colored and NOT transparent. Thicker covering.
Halo (areola) usually absent.	Areola is marked.
Involution is quite rapid.	Involution is slow.

The **Secondary Toxic or Septic Rash** appears during the stage of decrustation, sometimes with a mild fever. It may be either scarlatiniform, morbilliform, or hemorrhagic. The skin immediately surrounding the drying pocks is often exempt leaving an anemic halo. The rash lasts about three days and fades or desquamates. With the development of the skin eruption, an exanthem appears upon the mucous membranes of the body cavities, developing into ulcers. This may develop before the dermal rash and be of diagnostic importance.

Forms or Varieties

I. Variola Vera.	a. Discrete. b. Confluent.
II. Variola Hemorrhagica.	c. Purpura variolosa (black smallpox) d. Variola hemorrhagica pustulosa.
III. Varioloid.	e. Smallpox modified by vaccination or partial immunity.

Discrete Variola Vera.—Incubation symptomless and averages 12 days.

Prodromal stage, from first symptom to eruption. Averages three days. The longer the stage the more severe the infection. Intensity bears little if any relation to prognosis; however, if onset is mild, disease will not be confluent or hemorrhagic.

Invasion begins with severe chill, often repeated. Initial fever rises suddenly to 103° or 104°, and reaches maximum on second or third day. Pulse is rapid and full. Skin is red, hot and dry. There may be sweating in the discrete form and in the favorable cases. The headache appears with the chill and is usually frontal. When severe and accompanied with neckache and vomiting it may suggest meningitis. The backache appears with the chill and lasts about two days. It is a lumbar pain, very like lumbago; it occurs slightly less frequently than the headache and vomiting. This pain is rare in other fevers likely to be confused with smallpox. Vomiting is constant in children and usual in adults. The initial eruptions, which are present in about 10 to 12 per cent, are of considerable diagnostic importance. They are usually limited to the lower abdomen, inner side of the thighs, axillæ, and sometimes on the extensor surfaces of the knees and elbows.

The Eruptive stage consists of the following sub-stages: **macules and papules; vesicles, and pustules**.

The macules and papules occur on the fourth day and progress for about three days. They begin on the forehead, near the hair, with itching and burning and resemble flea-bites. These soon become papules, which are reddish, elevated, circular, hard or shotty and discrete. On second day of this stage they appear on the body, and on the next day on the extensor surfaces of the extremities. If the eruption appears on the second day the confluent type may be anticipated; if on the third day of the disease, the discrete type.

The vesicles which occur on about the seventh day of the disease, contain lymph. Umbilication occurs in the centers of many of the vesicles, and it is suggestive of smallpox.

The suppurative stage begins about the ninth day with clouding of the vesicles and inflammation around them. This continues for three days. The pustules become opaque, then yellow, and a thick pus obliterates the umbilication. The inflammatory “halo” becomes more vivid and edema may follow around these haloes. This edema causes increased tension and deformity, particularly of the face, and produces great tenderness and pain. The pustulation follows in the order of eruption, from the face downward, and are the thickest on the extremities and head. The pustules evacuate

spontaneously, or may dry up without rupture. The skin gives off a peculiar, offensive odor. Bed-sores are now most likely to develop.

The eruptions also may occur in the mucous membranes, particularly in the mouth and nasopharynx. These pass through the successive stages as do those of the skin, but less typically. With the pustulation there is usually a gradually rising **secondary fever**. In the discrete type the secondary fever does not remain high more than twenty-four to thirty-six hours, with morning remissions. A marked leucocytosis occurs with the secondary fever and its extent depends upon the severity of the infection. Delirium, albuminuria, acute exhaustion and heart paralysis are to be guarded against during this stage.

The state of involution, or decrustation, begins about the twelfth day. It follows the order of eruption, and is accompanied with a decrease in edema, redness and pain, but is attended with intolerable itching. Crusts form, the hair falls out and by the end of the second week the temperature returns to normal. If fever persists during this stage it indicates some complications. Scars occur when the true skin is involved and lasts three or four weeks. Complete convalescence follows the disappearance of the last crust.

Confluent Variola Vera.—This is a malignant type and used to be more prevalent than now. The initial stage is violent, and the headache and backache very agonizing. The fever remission is very slight or absent, and attended with hardly any improvement in symptoms. The earlier the exanthem occurs in variola the more likely it will be of the confluent type. The confluent eruptions occur especially upon the face and head, sometimes on the hands and feet. It is largely discrete on the body and extremities. Great edema appears with the fusion of the eruption, with the swelling and erosion of the mucous membrane, the eyes close and the nostrils become obstructed. The fever is high, pulse high and rapid (often irregular), dilirium, albuminuria, persistent nausea and vomiting, great thirst, husky voice, enlarged cervical glands, salivation in adults and diarrhea in children are symptoms present. Death occurs from acute toxemia, usually within a week, but may last a little longer. Recovery from confluent variola is very infrequent.

Purpura Variolosa.—This is “Black Smallpox.” That is, smallpox with primary hemorrhage in the initial stages. It is the worst type and results

almost invariably in death. It is very important because it is so difficult to diagnose. Its incubation period is short (6 to 8 days), invasion very severe, lumbar pains almost unbearable, prostration great, pulse soft, small and rapid and respiration unusually high. The initial pains and vomiting may last until death.

On the first or second day a plum colored eruption appears, with brick-red, purple or inky ecchymoses particularly about the eyes. The condition is desperate. Hemorrhages may occur from any cavity of the body, sometimes accompanied by gangrene of the pharynx. The disease does not usually reach the period of real eruption, because death usually occurs within four or five days. The diagnosis of this condition is by history of exposure to smallpox and the characteristic prodromes.

Variola Hemorrhagica Pustulosa.—This is the type with the **secondary hemorrhage**, or the hemorrhage after the eruption appears, and is more common than primary hemorrhage. It occurs in weakly and alcoholic subjects. The initial stage is severe, and the hemorrhages occur into the vesicles or pustules. There may be epistaxis, hematuria and metrorrhagia. The outcome is almost always fatal, though the hemorrhage at the vesicular stage may be followed by rapid abortion of the rash and recovery.

Varioloid.—This is modified or mitigated smallpox; also known as variola benigna. Persons exposed to smallpox sometimes suffer from varioloid, and persons who have had smallpox may suffer from varioloid at subsequent exposure to smallpox. Vaccination appears to initiate an attack in persons peculiarly susceptible, or as a result of improperly performed vaccination. The lesions remain in the epidermis, the course of the eruption is shorter, the papules vesicate by the fifth day, the process of suppuration is abridged, decrustation occurs rapidly with little or no scarring, and all symptoms are milder. There are many modifications.

Other varieties are (1) Variola sine exanthemate, which has the usual symptoms without the eruption; (2) Variola verrucosa, which has large, solid, conical papules with small vesicles at their apices, which rapidly desicate and form crusts, and finally disappear without scars; (3) Variola cornea (horn pox) which is known by the large mahogany crusts.

Complications and Sequelæ.—Variola is often accompanied by many complications and sequalæ which are an early severe toxemia and a later

secondary infection. During the secondary fever, there may be bronchopneumonia, pleurisy, dysentery, hemorrhages of all kinds, ulcerative eye, ear or laryngeal conditions, purulent arthritis, orchitis, gangrene when the swelling is great and subcutaneous abscesses form, often attacking the penis and scrotum, erysipelas attacking the face, and rarely nephritis.

During convalescence, carbuncles, boils and other subcutaneous abscesses are very common. Disturbances of the peripheral nervous system as neuritis, paralyses especially of the palatal muscles, neuroretinitis, and otitis media are less common. The sequalæ most common are boils, abscesses, deep pitting, otitis media, blindness and permanent baldness.

The **urine** has the usual febrile changes. **White blood** cells reach 10,000 to 20,000 or more. Lymphocytosis occurs during pustulation; polymorphonuclear cells are decreased to 40%, sometimes to 12%; myelocytes and irritation forms are found. During the febrile stage there is a polycythemia followed by an anemia to 3,000,000 or less during the pustular stage. Regeneration is slow, lasting about fourteen days. Normoblasts are rare except in hemorrhagic forms. Exudate taken from the pustules show streptococci, staphylococci, and pseudodiphtheria bacilli.

Treatment.—The imperative demands of treatment are isolation, ventilation, cleanliness and disinfection.

If symptoms are suspicious of smallpox, **notify the proper authorities at once and isolate patient**. When diagnosis is made, cut hair and beard very short.

1. Isolate patient in room free from draperies, rugs, carpets, curtains, pictures, etc.

2. Disinfect all vessels used in room of the patient in carbolic acid solution or in bichloride of mercury solution.

3. Family of patient should be isolated for from sixteen to twenty days.

4. Room should be well ventilated, with windows screened and slightly darkened with red curtains to exclude the ultra-violet rays of light. Temperature should be maintained at 65 degrees. Door-way may be protected by a sheet dampened with a 1:60 carbolic solution.

5. Nurse must be robust, perfectly immune and not afraid. If male nurse, hair must be very short and must have no beard; if female, hair must be short and must wear close fitting cap.

6. Absolute cleanliness is secured by plenty of baths, clean bed and personal linen, and careful nursing. Physician must put on special suit with cap and gloves which are kept in the house, but not in the sickroom.

The first symptoms being the headache, nausea and vomiting and the lumbar pains, the first points of attack in the treatment would be the relief of these pains in the head and back by thorough relaxation of the spinal muscles, paying particular attention to the suboccipital, mid-dorsal and lumbar areas. The headache may be partially relieved by steady pressure between the frontal and occipital regions. No interosseous adjustments requiring painful or difficult technique should be given after the more severe symptoms have appeared. Patient should be visited from one to three times per day, and the reflex contractures of the muscles must be relieved as often as they occur.

Dysentery and diarrhea are controlled by strong inhibitory pressure in the sacral and lumbar regions. Give vasomotor treatment to the superior cervical ganglion. Stimulate the anterior aspect of the solar plexus to stir up its acid function, the blood being alkaline in smallpox.

During all the stages up to the stage of pustulation, the patient responds very readily and successfully to osteopathic treatment. The headache, the backache and the aching joints respond to treatment as readily as, if not more readily than, the headache and backache of influenza do to osteopathic care. The constipation is usually quite readily relieved. It has been the experience of those who have handled smallpox cases, that the tendency to the confluent type is greatly reduced by this treatment and that the response of the patient to osteopathic treatment is very gratifying. Indeed, those of experience have less fear of the outcome of their smallpox cases than do they have of scarlet fever or pneumonia.

After the pustules have formed, each pustule is treated with iodine painted on the pustule with a camel’s hair brush. During the pustular stage it is not necessary to give manipulative treatment, and indeed it is sometimes impractical because of the tenderness of the skin. However, about all that is

needed during this period is good hygienic treatment and good nursing. During convalescence constitutional treatment should be given.

Diet.—During period of vomiting, pellets of ice in the mouth are comforting. During periods of fever give plenty of water with, preferably, lemon juice. As the fever declines begin with barley and oatmeal water with lemon juice; then follow with easily digested and nutritious diet of milk, eggs, broths, beef juice and gruels. Feed every three hours during that period but not large quantities. During convalescence a full, well-regulated, nutritious diet should be ordered.

Hygienic Care.—Keep nose cleansed with glycerine, cold cream or olive oil, which keeps the crusts soft. The mouth and nasopharynx may be cleansed with any mild antiseptic. The eyes are washed with warm boric acid solution. Cold compresses applied over the eyelids assist in reducing the edema. A daily tepid sponge bath is necessary. Bath may be given with bichloride of mercury solution (1:20,000) or creolin (1:500).

Headache.—Deep, steady digital pressure in the suboccipital fossa and at eighth thoracic spine; ice bag to the head; or a mustard plaster at the back of the neck may relieve.

Vomiting.—Thorough relaxation and adjustment of the great splanchnic and cervical areas, with deep, steady digital pressure in the occipital triangles, and at the fourth and fifth dorsal vertebræ on the right side will usually control the condition.

Fever.—Relaxation of the upper dorsal area, relaxation of the cervical area, and deep, steady pressure in the suboccipital region often reduce temperature. Warm sponging in lower grades of fever, bath at 70° F., and cold pack may be needed. If temperature goes very high give a continuous cool colonic irrigation.

Pitting.—Cold wet dressings of lint soaked in any comfortable mildly antiseptic solution, or of ice water and glycerine, are to be used on the hands and face to prevent pitting. Hot water dressings are more comfortable to some patients. It is well to protect the skin from the light, especially from the ultra-violet rays. This, however, must not lead to any lack of ventilation. When crusts are forming keep them moist with vaseline, oil, glycerine, or carbolic acid in lanolin or vaseline.

Odor.—Baths, the daily toilet and the use of dusting powder or 5% iodoform powder, an open bottle of smelling salts or of weak ammonia are good. Plenty of fresh air is best of all.

Cardiac Weakness.—If pulse is feeble and frequent, a general quieting treatment should be given, including relaxation of the cervical area and of the fourth and fifth dorsal segments. An ice bag in flannel directly over the heart is often very useful. Gentle, careful spinal extension is very restful and eases the spinal circulation.

Delirium is usually relieved, or prevented, by spinal extension, the prolonged warm bath or the cold pack, if given when signs of nervousness appear. Morphia or chloroform may be necessary in violent and suicidal cases.

Laryngeal Obstruction.—Usually caused by edema and may require tracheotomy.

Bed-sores.—These and abscesses may occur even under the best of care. Place patient upon a water-bed or in a continued warm bath.

Convalescence is not complete until the skin is entirely free from crusts and is perfectly smooth.

Prognosis.—Prognosis depends upon age of patient; complications; and environment from which patient comes, as well as upon the nursing. In varioloid the prognosis is recovery; in the discrete variety, good; in the confluent type over 50% are fatal; in the malignant types practically all die. In patients under five years old and over forty years old the prognosis is very grave. A filthy environment predisposes to complications. Recurrences seldom occur; second attacks are usually varioloid.

Prophylaxis.—Usual rules of health authorities are: rigid quarantine or isolation, vaccination, disinfection of the skin and all fomites, and final fumigation. Quarantine of a suspected individual is sixteen days after exposure. Isolation continued until every trace of eruption has disappeared. The dead body is very dangerous and a public funeral is not permitted. The clothes used by the patient must be steamed and other articles must be washed with bichloride of mercury and fumigated with formaldehyde vapor. Disinfection of the hands, face, beard and hair of attendants with bichloride solution is imperative.

Vaccination

(Vaccinia; Cow-pox)

Definition.—Vaccinia is an eruptive disease of the cow, communicable only by inoculation and causing, when transmitted to the human being, local reaction in the form of a pock and constitutional disturbances which are followed by a more or less lasting immunity against smallpox. **Vaccination** is the artificial inoculation of vaccine virus for the purpose of producing an immunity against smallpox.

Arm to arm vaccination was formerly very generally practiced but has been practically discontinued because of the possibility of infection from syphilis and other infections. When it is necessary to use the human lymph it should be taken upon the eighth day from a typical unbroken vesicle in a perfectly healthy child at least three months old. The vesicle must be pricked at several points, care being taken not to draw blood. The bovine vaccine lymph is now in general use because it practically eliminates the possibility of syphilis and other infections. Also because it is more easily transported.

It is thought best by many authorities to vaccinate in infancy after the sixth month, at the seventh and eighth year, at puberty, and thereafter at intervals of about seven years, but depending considerably on the prevalence of small pox. The virus is prepared under sterile conditions from carefully selected and tested calves. It is put up under aseptic conditions in hermetically sealed capillary tubes or, in the old style, on ivory points.

There is a great variety of opinions as to the efficacy of vaccination in producing immunity against small pox, this variety of opinion being very prevalent among representatives of the medical schools. Dr. F. P. Millard of Toronto says the lymphatic system is the keynote, and that vaccine virus poisoning spreads through the lymphatics, causing diphtheria and allied throat affections. Dr. A. T. Still said, “We are opposed to vaccination.” He repeatedly emphasized the fact that “Nature furnishes within the body all the remedies necessary to cure disease.” In the recent Canadian epidemic (1919-1920) the medical authorities have met with a most strenuous opposition. The Homeopathic profession, almost to a man, went on record

as opposed to compulsory vaccination. The Illinois Supreme Court has ruled that compulsory vaccination is unconstitutional.

Technic.—The area usually selected is the left arm at a point above the insertion of the deltoid muscle. Some prefer the leg over the junction of the two heads of the gastrocnemius muscle, because it is more easily cared for, and, because of the style of wearing short sleeves among women, it does not expose the scar which results from the vaccination.

The surface must be washed, dried, with a soft towel, and then sterilized with alcohol. With a sterilized needle or lance scratch an area about a quarter of an inch in diameter, being careful not to produce bleeding but merely an oozing of pinkish lymph. A drop of the virus should be deposited upon the abraded surface, rubbed in with the side of the needle and let dry. A thin layer of sterilized gauze should be lightly applied and held by means of adhesive plaster, not encircling the limb. This should be occasionally removed and redressed. The pock should be kept dry and clean, and may be lightly dusted with starch or toilet powder. "Persons exposed to the contagion of small pox should be immediately revaccinated. The immunity conferred diminishes with time." It is the writer's personal opinion that, with the amount of complications that so frequently follow vaccination and with the fact that "it is necessary to revaccinate during an epidemic or after exposure," it were better to defer vaccination, if parties are favorably inclined to the practice, until such time as the presence of small pox in the community make it apparently necessary.

Typical Vaccination.—The period of incubation varies from three to five days. At the end of this time local reaction shows itself in the form of reddish papules at the point of inoculation. In about five days these develop into compound vesicles, which at first have clear and then later opaque contents. About the eighth day the vesicle is fully developed and is round or oval with prominent and well defined edges and a depressed center. An erythematous areola usually appears about the tenth day and the contents are purulent. The surrounding skin is swollen and tender, and a scab now begins to form in the center of the pock and rapidly extends toward its edges. About the end of the second week the areola fades, and the pock is changed into a thick brownish crust which becomes dry and hard, and comes off between the twentieth and twenty-fifth days after vaccination. A dusky red scar is left and this gradually becomes white and pitted. During

the evolution of the pock the glands through which lymphatic drainage takes place become slightly enlarged and tender.

The constitutional reactions are usually moderate fever, restlessness at night, irritability and loss of appetite. These symptoms usually appear about the fourth day and continue about three to five days. At any time during the vaccinia erythema, roseola or urticaria may appear. The constitutional reaction in revaccination is sometimes very severe.

There are many atypical symptoms following vaccination as variation in the number of the pocks, in the size, in the severity of the constitutional symptoms, in the contents of the pock, in the healing and formation of the scar and in the transmission of specific diseases as syphilis, tuberculosis, leprosy, cancer and tetanus.

Complications.—All cases are not benign, as due to impurity of vaccine, carelessness in technic, improper care in dressing, handling of the wound by the patient himself, scratching it with the finger nails, and other accidents of like nature, infections may set in and very serious complications arise. These result in abscesses, erysipelas, tetanus and various eruptions. Otitis media may leave deafness.

The writer knows personally of a young man in the Army during the World War who was vaccinated while in the Army and two abscesses developed which ate entirely through the arm, one abscess passing through the arm just anterior to the humerus and the other just posterior to it. It was many, many months in healing, and nearly caused loss of the arm.

There are many cases of record where vaccination was followed, directly or indirectly, by paralysis, deformities, and chronic constitutional diseases. It is usually claimed these conditions were due to accidents following the vaccination and not due to the vaccination itself. However, it can not be denied that the vaccination was at least the indirect cause of these deplorable conditions.

General Vaccinia.—(Vaccinal eruptive fever; Vaccinola). This consists of a vaccine rash, developing usually from the fourth to the tenth day following vaccination, and appearing in various parts of the body, particularly about the wrists and on the back. The secondary pocks usually develop about the eighth or tenth day after vaccination and are usually more

abundant on the vaccinated limb than on any other part of the body. As the pocks appear in successive groups, all stages of the disease may be seen at one time, and the condition may last for many weeks. Fever may be absent or present, but is usually proportionate to the extent of the eruption and the associated complications.

Treatment.—After vaccination, the patient should be told to return in seven days, when the dressings should be removed, and if the vaccination has been successful, a pearl-like vesicle will be present. If the vesicle has been broken by accident or by rubbing of the gauze, the free portions of the dressing should be cut away and the adherent part left undisturbed. A new gauze should be applied in any case, and in five or six days more, the dressing should be again changed, and this changing continued at intervals until the crust falls, which is usually during the third or fourth week.

If no vesicle forms by the tenth or twelfth day, the vaccination has not been successful. It is suggested by the vaccination advocates that another attempt should be immediately made.

Prognosis.—Uneventful recovery is to be usually expected. Pitting from generalized vaccinia; various constitutional diseases; paralyses and other maiming disabilities sometimes occur. While it is not usually considered dangerous to life, there are nevertheless many cases of record where death has resulted. It is not wholly unattended with danger.

The best of care should always be taken following vaccination to prevent the possibility of complications, though even then they do occur.

Scarlet Fever

(Scarlatina)

Definition.—Scarlet fever is an acute, specific, contagious, infective disease of unknown origin, characterized by very sudden onset, fever, vomiting, sore throat and diffuse exanthem.

History.—It was first recognized in the sixteenth century, but first fully described and differentiated from measles by Sydenham in 1660. It was introduced into America about 1735.

Etiology.—The causative organism or agent is unknown. The virus of scarlet fever produces severe necrosis, but no suppuration. The streptococcus is the most important factor in the production of complications and in their mortality. It is claimed to be the cause of the malignancy of the disease but not of the disease itself. Susceptibility to the disease is by no means universal as only 38% of children and but 5% of adults exposed to the infection acquire the disease. Over 90% of the cases occur under ten years of age, and rarely during the first year of life.

"Scarlet fever is a toxic superficial expression of internal malnutritive conditions of the blood as a tissue. The cause of the toxicity is usually overfeeding, or the feeding beyond the demands of the proximate principles of the body, or the overfeeding under unhygienic conditions.—J. MARTIN LITTLEJOHN.

"It was once held that the virus was disseminated during desquamation, but oral, nasal and otitic discharges probably perpetuate the infection, perhaps months after scaling is complete. In no other disease is the virus so tenacious. It may persist ten years on clothes, furniture, etc."—A. R. EDWARDS.

The light forms are as contagious as the severe ones, and inoculations have occurred from the living subjects as well as from autopsy cuts. In degree of infectiousness smallpox ranks first, measles second and scarlet fever third. The infection may be spread by any third person or by articles coming in contact with the patient, and often the mode is obscure. Sporadic cases apparently frequently appear. The reason for the sporadic cases may easily be explained by the theory of J. Martin Littlejohn, given above. One attack usually confers immunity, but not always. This disease occurs more often in the autumn and winter, and is more prevalent in cities than in the country. (Measles is more prevalent in the country.) Scarlatina sometimes occurs with other infections, such as diphtheria or measles, and more rarely with varicella, pertussis, etc.

Predisposing Factors.—Age, one to ten years; lowered resistance from overfeeding, unhygienic environments, exposure to sudden temperature changes; lesions, both muscular and interosseous which interfere with the distribution of the fluids and vital forces of the body; season of the year (autumn and winter); puerperal women, and wounds.

Pathology.—No specific lesions are found. No trace of the rash shows after death except in the hemorrhagic form. The anatomical changes in cases coming to autopsy are those of simple inflammation, follicular tonsillitis, or diphtheroid angina. Streptococci are abundantly found in the glands and foci of suppuration.

Symptomatology.—Scarlet fever is divided into four stages: (1) Incubation, (2) Invasion, (3) Exanthem, (4) Desquamation.

Incubation Stage.—Has no noticeable symptoms and lasts from two to four days. Some authors claim as high as ten to fourteen days.

Invasion.—The invasion lasts one day. The onset is very sudden beginning with a chill which is followed by a characteristic vomiting, occurring in 75% of the cases, which is more frequent than in any other disease of childhood except pneumonia.

The vomiting is followed by headache and the beginning evidence of sore throat, which usually soon develops into a tonsillitis. The severity of the sore throat is indicative of the severity of the scarlet fever that follows. The temperature suddenly rises to 103° or more, the pulse becomes unduly rapid for the temperature, 120 to 160 per minute, and the respiration is increased. The skin begins to burn, there is dysphagia and intumescence of the cervical glands. The muscles of the back become hypersensitive to touch and to extremes of heat and cold; and particularly sensitive spots are found over the transverse processes of the first to 4th cervical vertebras, the 4th and 5th dorsal and the 11th and 12th dorsal vertebras. At these points will be found intensely contractured tissues which must be kept relaxed.

Exanthem.—The eruption appears at the end of the first day or early the second day, showing first over the clavicles and on the neck, then over the upper trunk, next the lower trunk and limbs. The eruption on the extremities appears particularly over the flexor surfaces of the joints. By the end of the second day the eruption has covered practically the entire body, leaving a white circle about the eyes and mouth. The eruption pales, or disappears on pressure, quickly returning to the scarlet color on the removal of the pressure. Frequently, the skin itches and is very uncomfortable.

A punctiform eruption in the arm-pits, over the groins, or on the roof of the mouth is considered positive proof of scarlet fever.

The eruption at first consists of small red spots which fuse as the skin swells and results in an intense lobster-colored erythema. This lasts four to six days. The tongue, at first, is red at the tip and margins with a greyish-yellow or whitish fur in the center through which is often seen the swollen red papillæ, the "strawberry tongue." The "fur" desquamates on the third or fourth day, leaving a surface intensely red with marked raised, swollen papillæ, the "raspberry or cat tongue," which lasts nearly a week. The breath has a heavy, sweet odor. The pharynx, uvula and tonsils become swollen, and often creamy-white patches cover the mouths of the tonsillar follicles.

Between the second and third day the eruption reaches its height, when it has a vivid scarlet hue unlike any other eruption, and becomes darker each day until it may be a bluish-red, when it gradually fades and desquamation begins. By the seventh or eighth day the rash has disappeared, together with the fever.

Desquamation.—Scaling begins on the face first, from the sixth to the ninth day and lasts several weeks. The skin looks somewhat stained, is a little rough like "goose-flesh" and gradually the upper layer begins to separate, and the scaling begins in large lamellæ or flakes. Casts of the fingers or toes may be shed. The swelling of the glands disappears, and the fever falls by lysis, and convalescence begins, unless complications intervene.

Diagnosis.—In typical cases diagnosis is easy, especially during epidemics or when the eruption is accompanied by other criteria.

1. Sudden onset, with nausea and vomiting, sore throat, quick appearance of fever and rapid development.

2. Punctate spots in the throat, swelling and dysphagia are usually present. The severe sore throat symptoms with the above are always very suspicious.

3. Strawberry tongue is constant.

4. Eruption, typical in character, appearing on second day, first showing on the neck above the clavicles, intense on the body and practically absent around the mouth. Eruption confluent, with no intervening free areas of the skin, followed by desquamation.

5. Lymphadenitis much more pronounced in the inguinal and other glands than in the cervical.

6. Desquamation, tender joints and albuminuria will force the conclusion of scarlet fever, if former symptoms have been indefinite.

In the atypical cases we may have very light attacks with all the symptoms present but very poorly developed; or some symptoms absent as in cases with no temperature, or others with no rash. Some cases are so atypical as to be impossible of diagnosis. The writer has very recently had the experience of one case when there were absolutely no typical symptoms present after being called on the case, but four days after the invasion of the disease in the patient a sister of the child developed typical scarlet fever, and not until the sixth day did any eruption or sore throat appear, and then the eruption was more characteristically measles than scarlet fever. Consultants with the writer agreed with him that the case was one of an atypical, non-eruptive scarlet fever.

Differentiation.—Scarlet fever is not always easily differentiated from other diseases, such as a septic rash, drug rashes, diphtheria, measles and German measles.

A. R. Edwards gives this differentiation between scarlet fever and septic rash.

Scarlet Fever	**Sepsis**.
Bright red erythema, with small red papules.	A very deep purple-red rash, sometimes spreading over the entire body.
The eruption is much the same in both diseases, the same places being exempt.	
Miliaria are rare.	Miliaria are frequent.
Rather typical desquamation.	Desquamation observed less frequently.
CRITERIA: angina, tongue, onset, glands, etc.	Etiology, chills, sweats, fever irregularity, polymorphous exanthems, etc.

Diphtheria.—Often difficult to differentiate. The simple erythema is sometimes observed in diphtheria, but is darker, more on the trunk, and more transitory than in scarlet fever.

Drug Rashes.—These rashes are caused by belladonna, iodoform, quinine, iodide, chloral, copaiba or aspirin. They may be easily differentiated if the cardinal symptoms of scarlet fever are considered instead of the rash alone. At the present time, perhaps the most frequent drug rash that we meet is that produced by aspirin. It is sometimes hard to diagnose because the aspirin has been taken for a sore throat or tonsillitis, which so resemble the early symptoms of scarlet fever.

Measles and German Measles.—The symptoms of the invasion stage of these diseases is sometimes quite similar, and even the rash may be quite similar; the differentiation will be discussed under measles (q.v.).

Types and Forms.—(a) Mild and abortive form (scarlatina sine eruptione). In this the rash may be scarcely perceptible, while the fever, sore throat and strawberry tongue are present. Desquamation may be present and it may be followed with a severe nephritis.

(b) Malignant forms, (1) Atactic variety, violent intoxication, onset of great severity, fever very high (107° to 108°), extreme headache, delirium, and often convulsions. Initial delirium gives place to coma; dyspnea may be urgent; pulse very rapid and feeble; and death occurs before eruption appears. (2) Hemorrhagic variety: there are hemorrhages into the skin, beginning with scattered petechiæ, becoming more extensive and ultimately involving the whole skin. It is characterized by severe fever and brain symptoms at the onset; incomplete exanthem, necrosing angina, marked glandular and splenic swelling; subcutaneous, serous and mucous membrane hemorrhages with ulceration. Death may take place on the second or third day. This is more common in enfeebled children, although it may attack adults in apparently full health.

(c) Anginose form (Scarlatina anginosa.) This form resembles septic diphtheria, with marked toxemia, necrosis and adenitis. The throat symptoms appear early and progress rapidly. Temperature high, cyanosis, diarrhea, rapid weak irregular pulse, and stupor occur. The fauces and tonsils are covered with a thick membranous exudate which may extend to the posterior wall of the pharynx, forward into the mouth, upward into the

nasal chambers, and may occasionally reach the trachea and bronchi. The Eustachian tubes and middle ear are usually involved. The glands of the neck rapidly enlarge and become the seat of brawny induration, and the inflammation extends beyond their limits. Necrosis occurs in the tissues of the throat, fetor is extreme, the constitutional symptoms are great and the child dies of toxemia. If he does not die, extensive abscess formation in the tissues of the neck takes place with sloughing and danger of hemorrhage from the opening of a large artery.

Blood Pressure.—Rises at first, thereafter it follows the pulse and temperature. After the seventh or eighth day it may be below normal. Cases of albuminuria show hyperextension and slowing of heart action. With the subsidence of the kidney irritation the pulse-rate is increased and the blood pressure returns to normal.

Urine.—Shows ordinary febrile character, being scanty and high colored. Slight albuminuria is rather common after the stage of eruption, even a few tube casts may be present without any serious irritation of the kidneys. Urinalysis should be made daily.

Blood.—The red cells are moderately reduced to 3,000,000 or 4,000,000 per c. mm. during convalescence. There may be some poikilocytosis, and normoblasts are occasionally seen. Leucocytosis is early, 15,000 to 30,000 per c. mm., falling with the decline of the fever usually by the fourteenth day, but may persist for weeks after the temperature is normal. The count runs roughly parallel to the temperature. Over 40,000 leucocytes per c. mm. are of bad prognostic omen. Polymorphonuclear cells are increased to 80% or 90%; early returning to normal in favorable cases.

Eosinophilia is present in all but malignant cases. It reaches its maximum two or three days after the rash appears and returns to normal after the leucocytosis has disappeared. The early presence of eosinophilia excludes septic conditions. When these cells are absent in scarlet fever, myelocytes are to be found.

Treatment.—Clinically scarlet fever represents, from the osteopathic viewpoint, (a) a toxic condition due to internal malnutrition and a decrease of the detoxinating function of the thyroid gland; (b) secondarily associated with the sore throat is a type of toxic tonsillitis, but it is due to the toxic elements in the blood; (c) in the lesion field it is associated with extreme

stiffness and muscular tension in the upper cervical area and also in the entire dorsal area, overlapping the upper lumbar. The eruption is a superficial expression of the attempt of the body to eliminate the toxins, and this elimination should be aided by enhancing the activity of all the other eliminative functions. Cases are on record where patients have been exposed to scarlet fever, have gone the usual incubation period and developed the invasion symptoms, and by thorough, oft-repeated osteopathic treatments, with the aid of enemata and copious hot water drinking, have not gone beyond the invasion period and the disease apparently aborted within two or three days. It is therefore well to give thorough, oft-repeated attention to these cases during the very early stages.

(1) In all cases where the first symptoms indicate the possibility of a contagious disease, the patient should be immediately isolated and kept isolated until all danger of contagion is past. In scarlet fever cases get a competent nurse. Keep room light, quiet and thoroughly ventilated with a constant temperature of as nearly 70° as is possible. (It were better to have two rooms if possible, one for day and one for night: have room or rooms on upper floor if in a house). Arrange suitable means for thorough disinfection of all articles used in the sickroom. These are very essential.

(2) Patient should be clothed in usual night wearing apparel. The bed clothing should be warm, but not heavy. The physician should wear an operating gown or a sheet which thoroughly covers his clothing, also a cap. He should carefully wash his face and hands immediately after leaving the sickroom. The quarantine should be maintained for the legally required period, and even after if there continue discharges from the nose, nasopharynx or the ear. Bichloride wrappings should be placed about the body of the dead, and funeral must be private.

(3) Have enema given immediately to cleanse the lower bowel. Follow this with frequent draughts of hot water, or better hot lemonade for the first day. Place hot water bottles at feet. If eruption is slow in coming out, it may be aided by a hot bath, followed by wrapping the patient in warm blankets to prevent chilling.

(4) Thorough osteopathic treatment should be given along the entire spinal area from the atlas to the sacrum, inclusive, to keep the muscles well relaxed, giving special attention to the relationship of the vertebræ and the

tension of the muscles from the occiput to the fourth cervical; the third to the sixth dorsal; and the tenth to the twelfth dorsal areas. Also give special attention to the deep cervical muscles, particularly those at the angle of the inferior maxilla, and at the articulation of the inferior and superior maxillæ. Remember the tendency of the kidneys to complication in scarlet fever, therefore do not neglect the renal splanchnics, for here you not only control the renal functions but also regulate the adrenal functions and their internal secretions. Keep the clavicles properly adjusted and articulate them by bringing them well forward to relieve any irritation that may have started in that area. Careful direct treatment to the abdomen should usually be given at each visit besides the work in the splanchnic area to keep the bowels, kidneys and liver active.

Diet.—Water must be given freely. If fever is very high, pellets of ice held in the mouth will give comfort. During the height of the fever it is preferable to withhold all nourishment, but if in a particular case it seems to be indicated, confine the nourishment to fruit juices, especially oranges. Never force feeding during the fever. For infants cut down their feeding to at least half, making the milk very thin with water or gruel. After defervescence, carefully increase to a light diet using sparingly of nitrogenous foods except milk. After four weeks in the usual case, gradually return to the ordinary diet. This is a good time to make corrections in the ordinary diet if any are needed.

The **bowels** must be kept regulated. An enema is usually indicated after the onset of the disease. During the time that food is permitted it should be of a laxative character. During the fever stage the enema should be given daily to help keep the bowel cleansed and to help reduce the temperature. If bowels are persistently sluggish and the fever is constantly high the abdominal heating compress (so-called “cold compress”) will give much relief.

The **nose and throat** should be constantly looked after. The nose may be cleansed by instillation by means of a medicine dropper, using normal salt solution. If the throat symptoms are mild, a gargle of warm normal salt solution is enough for cleanliness of the membrane. If the throat symptoms are too severe to permit the use of the gargle, or if the patient is too small to be taught the use of the gargle or to wash the throat, irrigation may be employed. The use of raw lemon juice, or of raw pineapple juice, on a

cotton swab is of great value in cleansing the tonsils and throat. The swabbing should be repeated several times per day.

The **teeth** should be carefully and thoroughly cleansed twice per day.

The **skin** must be constantly cared for. During the fever it is well to cover the skin with linen or soft cotton. Daily sponge baths of carbolized water (1:40) of tepid temperature followed by applications of cocoa-butter will give much comfort. Use only good toilet soap and do not use the so-called antiseptic soaps because, authorities claim, there is a chance of renal injury. During the period of desquamation the use of the cocoa-butter will assist in limiting the source of infection by preventing the diffusion of the dry scales which are considered infectious by many physicians. A. R. Edwards says: "During desquamation, oil-rubs were once employed to decrease the dissemination of dry scales, but they decrease the function of the skin, which is of great importance when the kidneys are involved; also, infection is carried by means of throat secretions. Soap and water serve equally well." Some authorities suggest that during the desquamation, after bathing the patient, the skin should be thoroughly rubbed and then the oily application used, using cocoa-butter, unmedicated cold cream, liquid albolene or the like. Olive oil and vaseline are usually irritating. The writer inclines to the opinion that the soap and water bathing is sufficient, except perhaps the use of cocoa-butter over the areas that are desquamating severely.

The **temperature** can usually be controlled by the usual osteopathic methods; steady deep pressure applied in the suboccipital region for a few minutes, followed by relaxing the muscles of the back from the first to the eighth dorsal, by raising and spreading the ribs in the mid-dorsal area, and by light inhibition over the solar plexus. The tepid enema will assist in lowering the temperature. If temperature is high and patient is delirious and has other nervous symptoms the cold pack is useful. The ice cap may be used almost constantly in high fever. If glands are swollen treat by crowding the tissues toward the gland **but never work upon the gland itself**.

If pain is felt in the **ear** immediate attention must be given it. Correct any deviations of the atlas or other upper cervical vertebræ, relax the deep muscles at the angle of the jaw, and relieve any impingements in the lower

cervical and upper dorsal regions. The ear should also be treated with copious boric solution irrigations, as hot as can be borne and at low pressure. The condition of the ear drum membrane must be watched daily and if there is bulging and congestion it is safer to puncture the drum under cocaine than to await spontaneous rupture. Use small amount of boric powder after rupturing.

The **heart** must be examined daily. Vigorous treatment through the thoracic region is indicated, if cardiac symptoms appear, and the patient must be kept quiet and in bed. If heart seems feeble it may be well supported by the cold packs directly over the heart.

Nephritis is most common in the second and third weeks of the illness, but may develop later. In all cases where any symptoms of nephritis appear, light or severe, the patient must be **confined to bed** for at least four weeks, and kept on a milk diet. All irritants must be absolutely avoided. Hot baths should be given twice daily to increase the sweat and the urinary functions, the bath lasting half an hour and the patient kept afterward between blankets. Treat thoroughly, daily, the splanchnic and renal areas, paying particular attention to the tissue conditions in the lower dorsal region.

In the milder cases, the urine contains albumin and a few tube casts, very rarely blood, and edema is slight or transient. Though the patient improves, he remains pale and there is a slight trace of albumin in the urine for months. If recovery does not take place, then chronic nephritis becomes established.

In the more severe cases there may be a puffy appearance of the eyelids, slight edema of the feet, urine diminished in quantity, smoky, containing albumin and tube casts. The kidney symptoms dominate, dropsy persists and there may be effusion into the serous sacs. The condition may become chronic, the patient may succumb to uremia, but in the majority of cases recovery takes place.

The nephritis may be hemorrhagic, in which the urine is suppressed or there may be a very small amount of bloody fluid laden with albumin and casts; constant vomiting and convulsions follow and the patient dies with symptoms of acute uremia.

Other **complications** are arthritis, malignant endocarditis, severe toxic myocarditis and acute phlegmonous inflammation, the last three of which are usually fatal. Chorea is a fairly frequent nervous complication. The mental symptoms are mania and melancholia. Progressive paralysis of the limbs with wasting, may simulate infantile paralysis. The fever may persist after the eruption disappears and the child remain in a septic state (scarlatinal typhoid).

Relapses are rare. Scarlatina may coexist with almost any other acute infection. It lowers the resistance of the body to disease and is often followed by other acute infections or by tuberculosis. Therefore the necessity of care during the entire convalescent stage.

Measles

(RUBEOLA; MORBILLI)

Definition.—Measles is an acute infectious, contagious, erythematous disease, occurring in epidemics, characterized by an initial coryza, bronchial catarrh and an eruption of a general maculopapular type; also by the presence of Koplik's buccal spots.

Etiology.—Predisposing Influences: The chief predisposing factor in measles, as in all other contagious diseases, is a lowered resistance in which some structural or functional change has taken place that reduces the functional activity of the body's inherent protective agencies. These predisposing factors may be classed under three heads, namely; (a) structural, (b) environmental, (c) dietetic. Under the first we find structural disturbances in the upper cervical area affecting the functional control of the nose, throat and head, as well affecting the thyroid and its internal secretions: structural disturbances in the upper and mid-dorsal areas affecting the vasomotor control to the head, neck, and chest, thereby perverting nutrition to all these structures and rendering them more susceptible to the infective organisms; also the dorsal lesions disturb the functional integrity of the lungs and heart, with the result of disturbed respiration and circulation, both of which are vital factors in body resistance: we also find structural lesions in the lower dorsal region, affecting the function of the kidneys and their elimination and the function of the adrenals and their internal secretions. Under the second or

environmental, we have unsanitary and unhygienic conditions, exposure to sudden changes of temperature, wet clothing, fatigue, etc., all of which produce secondary structural lesions and the effects above mentioned. Under the third or dietetic classification, we have the errors of diet so common in children and adults as well; such as too much candies and other sugars, also too much starches, as well as over eating and unbalanced diet.

Measles prevails in all climates and attacks all races, the Negroes appearing to suffer more severely than the whites and to be more subject to complications. Outbreaks are more common in winter and spring, but occur at all seasons. The disease is particularly a children's disease but adults may contract it if not protected by an attack in early life, and with adults the disease frequently manifests the more aggravated forms. It is more common after puberty than scarlet fever.

Exciting Cause.—While the disease is probably produced by a micro-organism, it has not yet been demonstrated. Inoculation experiments upon human beings have shown the presence of the infecting principle in the blood, in the tears, in the secretions of the nasal, pharyngeal and bronchial mucous membranes, and in the contents of vesicles occasionally present. Inoculation with the epithelial scales thrown off at the end of the disease has been unsuccessful. Ordinarily the transmission of the disease takes place through the breath or the nasal and bronchial secretions. The disease may be carried by a third person or by fomites. The infecting principle is intensely active, but not so tenacious nor persistent as scarlet fever. Measles is communicable throughout its entire course from the earliest appearance of the coryza. The individual predisposition toward measles is apparently so general that few, upon exposure, escape it, though we have observed cases where children have been directly exposed and who were immediately thereafter put under osteopathic care and did not develop the disease. Second, or even third, attacks may occur at intervals of some years, but these are unusual. Sporadic cases do occur and are often the starting points for epidemics. Extensive outbreaks occur at intervals of five or six years.

The incubation period is from seven to eighteen days, usually about ten days.

Symptoms.—Prodromes are common, usually consisting of loss of appetite, restless sleep, fretfulness, and often feverishness. There are three

stages, (a) Invasion, (b) Eruption, (c) Desquamation.

(a) Stage of Invasion. The prodromal symptoms are intensified. There is often chilliness but seldom distinct chills. The temperature rises, often reaching 102 to 104 degrees, upon the first and second day. It then falls one degree or more to rise again upon the appearance of the eruption. Nausea, vomiting and headache are often present. The tongue is furred. With these symptoms coryza has developed and is sometimes intense, often simulating severe influenza. Irritation and smarting of the eyelids, lachrymation, photophobia, persistent sneezing, running of the nose, sore throat, discomfort in swallowing, hoarseness, and cough, at first of a croupy character, appear in rapid succession and with varying intensity. These initial catarrhal symptoms are characteristic and occur in the mildest cases in which chilliness, fever and the associated signs of the reaction of the organism to general infection are not observed. The vessels of the conjunctivæ are injected, the eyelids swollen, the nasal mucosa tumid and reddened. The mucous membrane of the mouth and throat is erythematous, while upon the soft palate and the roof of the mouth, and particularly upon the buccal mucous membrane, are to be seen pin head or split pea sized, circumscribed, round or irregularly shaped reddish blotches slightly or scarcely at all raised above the surrounding tissues, usually discrete, but sometimes confluent. This eruption also shows itself in the larynx and is undoubtedly the cause of the croupy cough and other throat symptoms. In a strong light there may be seen upon some of the spots on the mucous membrane of the cheeks and lips minute bright whitish, or bluish-white flecks which are called Koplik's Spots. These spots appear early and soon disappear, and as they are not found in any other disease they are of value in the early diagnosis of measles. The duration of this stage is usually three or four days; rarely it is shorter or it may be as long as a week.

(b) Stage of Eruption. On about the fourth day the temperature again rises, increasing as the rash develops, often to 104 or 105 degrees and reaching its maximum about the sixth day when it usually falls by crisis; followed on the seventh or eighth day by normal temperature. The pulse-rate increases with the fever, often reaching 140 or higher. The eruption usually appears on the fourth day, and shows first about the hair line on the forehead, spreading to the face, chest, trunk and the arms and legs. The eruption is attended by itching and burning, and completely develops in

from twelve to thirty-six hours, the catarrhal symptoms persisting during this time. During this time, in the more severe cases, delirium or stupor may be present, and the patient complains of sore throat and general discomfort, and is restless and wakeful. Usually upon the second or third day of the eruption, great and rapid amelioration of all these symptoms takes place and the fever falls to normal or subnormal. When the eruption is fully developed the individual spots are irregularly circular or oval, and differ greatly in size, averaging about the size of a split pea. The eruption is unevenly set, but usually close together and sometimes confluent, especially on the face, buttocks, hands and feet. Frequently they take on a crescentic arrangement and the spots are circumscribed, the intervening skin being normal or slightly hyperemic.

About the ninth day the rash begins to disappear, on the face first, then the neck and the rest of the body in about the same order as the eruption appeared. The skin takes on a yellowish discoloration and the rash disappears in a bran-like desquamation which lasts several days to a week. In the beginning of the stage of eruption, and in many cases throughout its course, the skin is moist and often bathed in free perspiration. At the height of the eruption the superficial lymphnodes of the neck, and elsewhere, are often slightly swollen and tender.

(c) Stage of Desquamation. The fine branny scales of desquamation are often so fine as to be easily overlooked. This process occupies about a week. The catarrhal symptoms in uncomplicated cases gradually disappear, so that, by the end of the second week from the initial coryza, convalescence is fully established. The cough frequently persists and is of a bronchial nature. Epistaxis is common at the height of the attack. Relapses of measles are extremely rare. Diarrhea is apt to occur at some time during the attack, without any particular significance.

Varieties.—Atypical cases may occur but are not common. They are as follows: (1) Morbilli Papulosi, development of distinct papules, hard to the touch but not extending deeply into the skin. (2) M. Vesicular; a vesicular form. (3) M. Sine Exanthema, cases in which the eruption does not appear, but general symptoms and coryza are present. (4) M. Sine Exanthema, in which the mucous membranes are not involved.

Variations in constitutional symptoms.—(1) M. Afebriles, rare cases in which there is no rise of temperature. (2) M. Hemorrhagica. This is the malignant form and in it the organism is unable to withstand the intensity of the infection and death takes place in the course of two or three days after sustained hyperpyrexia, profound adynamia, or hemorrhages into the skin and mucous membranes. These malignant forms are very rare in private practice, but they occasionally occur in asylums and in the fierce epidemics of camps, and were common in the first outbreaks among the natives of the Fiji Islands, where measles prevailed as a scourge. Death may occur before the rash appears or a few papules may show themselves upon the forehead and wrists. This is also known as **black measles**, and it is characterized by convulsions, delirium and coma, petechiæ, bleeding from the mucous surfaces and profound constitutional depression. The patient is rapidly exhausted, the pulse frequent and thready, the skin pale and cold, and death occurs. (3) Adynamic measles is a serious type in which the symptoms are grave from the onset but without hemorrhages and a typhoid status is early present.

Complications.—In the absence of complications, measles is comparatively a benign disease, but these complications are frequently enough present to place measles among the more serious diseases of childhood. The ordinary complications are due to the extension or intensification of the catarrhal processes peculiar to the disease.

(1) Otitis media is quite common, and may result in perforation of the tympanic membrane and permanent impairment of the hearing; or lead to sinus thrombosis, meningitis, or abscess of the brain. (2) Bronchopneumonia is the most common complication. (3) Purulent conjunctivitis may occur and in neglected cases infiltration and ulceration of the cornea. (4) Catarrhal laryngitis is a frequent complication. (5) Pseudo-membranous type is very uncommon but very dangerous. (6) Edema of the glottis is not common but does occur. (7) Diphtheria is much less common in measles than in scarlet fever. The high death rate of measles is due to the bronchopneumonia complication in which the lesions become extensive, the symptoms become urgent and a large proportion of these cases die. (8) Acute enterocolitis is a frequent and serious complication. (9) Gangrenous stomatitis occurs in young and debilitated children, and in girls

gangrene of the pudenda occur during convalescence with greater frequency than in other infectious diseases.

Sequelæ.—The more common sequelæ are chronic local inflammations, conjunctivitis, otitis, nasal catarrh, laryngitis, and bronchitis. Tuberculosis is a common sequel.

Diagnosis.—During an epidemic, coryza, persistent sneezing and fever are suspicious. The appearance of the eruption on the third or fourth day upon the mucous membrane of the mouth and throat, and Koplik's spots are positive.

Measles is often confused with 1. Rubella or German measles, 2. Variola, 3. Typhus Fever and 4. Scarlet Fever, which see. Occasionally **drug exanthems** are confused with measles. These may be caused by salicylates, antipyrin, quinine, turpentine or copaiba. These rashes are not accompanied by fever or throat symptoms unless they have been given to allay these very conditions.

Treatment.—Measles is so often a serious disease that it should not be attended with carelessness as it so often is, but the best of care and attention given. Parents should be informed of the danger of complications and of the absolute necessity of proper care and attention.

As soon as a susceptible individual is exposed to the measles, he should be immediately isolated, watched and corrections made of any dietetic errors, unsanitary conditions or structural lesions that may exist. He should be protected from sudden atmospheric changes and carefully watched for the first symptoms of the prodromal coryza.

On the appearance of the prodromal, or invasion symptoms the patient should be put to bed in an isolated, well ventilated room of as nearly constant temperature as is possible, from which all hangings, rugs and unnecessary furniture have been removed. The windows must be shaded to protect the eyes from direct or strong light, and any artificial lights in the room must also be well shaded.

The cases can usually be easily handled by careful, well-directed osteopathic treatments. In the manipulative treatment we must pay especial attention to the muscular and other soft tissue conditions in the suboccipital region, over the transverse processes of the upper four or five cervical

vertebræ, under the angle of the lower maxilla and the lateral cervical tissues to remove any obstructions to the circulation and nerve control of the head and throat; see that the muscles in the lower cervical and upper dorsal areas are kept well relaxed, and articulation of these vertebræ, the upper three ribs and the clavicles are kept free; remove all lesions in the mid-dorsal area, whether muscular or otherwise, to prevent involvement of the lungs or heart, and to keep up function of the respiratory and circulatory systems; treat and keep normal the tissues and the articulations at the kidney and adrenal center, 11th and 12th dorsal; raise the ribs and keep them freely movable, this especially for the bronchial cough. Painful manipulations should be avoided and are not necessary. Dr. Still said, “The arms must be raised and the axillary region freed and kept so.” During the acute stage two or three treatments per day are advisable. Do not treat severely or to cause discomfort to the patient. Best results are obtained in the gentle, but thorough, treatments.

In the beginning of the case have the bowels cleansed with an enema, and then careful attention must be constantly given to the bowels and kidneys. The bowels can be kept open by manipulations and diet. The diet should be light and easily digested; during the fever it is best to withhold all food but give plenty of water. Follow fast with fruit juices and then the light diet.

The temperature is usually controlled by treatment, but if it remains high for some time and if the physician cannot reach the patient, the nurse should be directed to give a tepid sponge bath of ten to twenty minutes duration, and repeated at intervals of two or three hours. Also the tepid enema will often reduce the temperature.

For the itching of the skin, a tepid bath with water at 100 degrees given twice daily should be used, the patient dried carefully, and an application of olive oil, cold cream, liquid albolene, or a two per cent menthol salve, rubbed over the entire body will give relief.

The cough is best relieved by thorough treatment of the anterior thoracic regions and the correction of any upper rib or clavicular lesions. Keeping the air of the room moist with vapor is agreeable to the mucous membranes. The dropping of a few drops of eucalyptus oil in the boiling water produces a very soothing vapor.

If the eyes are much involved, they should be bathed every hour or two with a three per cent solution of boric acid, using cotton which is immediately destroyed after use. Dark glasses in a well ventilated room is better than an unaired darkened room.

The nose and mouth should be carefully cleansed at regular intervals and the cloths burned. The throat should be carefully examined daily at first, and at least every other day later, until the case is discharged. The conditions of the lungs must be observed by daily examinations, and the lung and bronchial areas should be daily treated to prevent the possibility of respiratory involvement.

If rash is slow in appearing and the temperature is high, a hot bath (105 to 110 degrees) for three to five minutes will often bring out the rash and relieve the more serious symptoms. During convalescence the patient must be protected against cold. Recovery is hastened by the continuation of treatment during convalescence and treatment given should be indicated by the symptoms present.

Prognosis.—Practically all uncomplicated cases recover. In the hemorrhagic and adynamic types, the majority succumb. One attack usually confers immunity. Sequelæ are frequent under the "old school" treatment, but are infrequent under careful, conscientious osteopathic treatment and careful nursing.

"In and of itself measles is usually not particularly serious, but the after effects are so far-reaching and so serious that students of the history of medicine rank measles third among infectious diseases for causing death. During recovery from measles the patient stands in special danger from pneumonia, and pneumonia following measles is more dangerous than uncomplicated pneumonia. There is a considerable length of time during which he is particularly susceptible to tubercular infection. This is so often insidious, and its evidences are so obscure, that by the time the disease has fully developed, one may have forgotten the mild attack of measles which really paved the way for the serious malady."—C. A. WHITING.

Rubella

(GERMAN MEASLES; RUBEOLA NOTHA; ROTHELN; EPIDEMIC ROSEOLA)

Definition.—A specific acute, contagious, infectious, eruptive disease, characterized by a diffuse maculopapular eruption and swelling of the superficial lymphatic glands. It is attended by a mild fever, suffused eyes, mild cough, slight sore throat but no catarrh, a macular rose-red eruption of the throat accompanied by the swelling of the cervical lymph glands and by a rose-red eruption of irregular size and shape appearing on the first day of the disease.

Rubella, in some ways, resembles scarlet fever and also measles and was at one time considered a hybrid of the two. It is now known to be an independent disease.

Etiology.—The exciting cause, or the infective principle, has not yet been discovered. The disease is probably carried by fomites, is readily transmissible, attacks children especially, and usually occurs in epidemics, though sporadic cases are frequently found. The epidemics usually occur at intervals with several years intervening, during which time there are comparatively few cases. Persons of all ages are susceptible unless having acquired an immunity through an attack of the disease at some former time. Rubella does not confer immunity against any other disease, as scarlet fever or measles, nor do these diseases confer immunity against rubella. One attack of rubella confers immunity against any succeeding attacks.

The incubation period is from five to twenty-one days and is without symptoms.

The predisposing factors are the same as in measles or other infectious or contagious diseases.

Symptoms.—Invasion Period. This stage is usually of very short duration, lasting from a few hours to perhaps two days. The initial symptoms are usually mild, being a sudden chilliness, but not chills; mild fever of about 100 degrees; a slight headache; mild sore throat; swollen cervical and post auricular lymphatic glands; little or no coryza; sometimes slight pains in the back and legs; and the macular rose-red eruption in the throat which is constantly present. Often the initial symptoms are so mild that the presence of a disease is not recognized until the eruption appears, which usually occurs on the first day and rarely not until the fourth day.

Eruption Period.—The rash, which consists of round or oval reddish spots about the size of a split pea, mostly discrete, but sometimes confluent, and surrounded by areas of hyperemic skin, usually shows first upon the face and follows a wavelike progression over the body and limbs. The rash usually begins to fade upon the face before it has appeared upon the last affected areas, and usually remains in one region from a few hours to a half day. It extends over the entire body in from twenty-four to thirty hours. Occasionally the skin is so hyperemic in extensive tracts that the rash more resembles scarlet fever rather than measles. The crescentic arrangement of the papules usually seen in measles can not be made out in rubella. In the course of two or three days the rash disappears with very fine desquamation, leaving a faint pigmentation, which remains for a short time. Slight etching usually accompanies the rash.

Relapses are rare and complications infrequent. There are no special sequelæ, but albuminuria, bronchitis and pneumonia have been noted. Although one attack usually confers immunity, second attacks have been reported, which may have been real second attacks or the first attack may have been an error in diagnosis.

Diagnosis.—Early or sporadic cases may present great difficulty in diagnosis, but when an epidemic is present diagnosis becomes much easier. The **direct** diagnosis of the disease rests upon the very mild nature of the disease, its short initial onset, the character of the eruptions and the early enlargement of the glands with the absence of severe throat symptoms and coryza.

Rubella is frequently mistaken for mild cases of measles or scarlet fever. Unlike measles, it does not have the prominent catarrhal symptoms, the higher fever, the crescentic grouping of the eruption and Koplik's sign. In measles the adenitis is not so severe as in rubella, and especially are the suboccipital and post-auricular glands involved in rubella. Scarlet fever has a very sudden onset with severe symptoms, a very sore throat, the characteristic tongue and the peculiar rash, all of which are decidedly different from rubella. In the latter stages the character of the desquamation is also a distinguishing feature.

Treatment.—Patient should be kept in a properly heated and well ventilated room, being careful that no draughts chill the patient, and should

remain in bed for at least two days. Patient should be isolated. Treatment should be directed to the upper cervical, mid-dorsal and lower dorsal areas to keep normal the function of the internal secreting mechanism, and to normalize and keep normal the respiratory and circulatory systems. Treat carefully to upper lymphatics, working around the enlarged glands and not directly over them. Watch the excretory functions and keep them active by judicious measures. If annoying itching occurs, the hot bath followed by being wrapped in a soft warm blanket will usually relieve. Daily tepid sponging should be given and if hot bath does not relieve itching an application of olive oil or cold cream will often relieve. Diet should be reduced and regulated according to age of patient and severity of the case. Usually the above is all that is indicated, but if more severe symptoms present themselves vary your treatment according to the symptoms present.

Prognosis.—Recovery is the general rule. Relapses sometimes occur, and are usually much more severe than the initial attack. The symptoms are often more severe in adults than in children. Like measles, this disease seems to lower resistance to other infections, and therefore especial care should be taken to protect the patient from exposure to other diseases for some time after recovery from rubella. See that the patient is built up constitutionally after recovery by plenty of fresh air, suitable exercises and good food.

Varicella

(CHICKEN POX)

Definition.—Chicken pox is an acute, specific, contagious, slightly febrile, eruptive disease, usually of childhood, affecting the whole organism through the blood. It is an epidemic disease that spreads rapidly, is highly contagious but not inoculable, and confers immunity.

History.—Varicella was first recognized about 1553 and was distinguished from smallpox by Trousseau.

Etiology.—The agent that causes the disease is not known; the disease usually affects children under ten years of age, but does occasionally attack adults. It bears no relation to variola, except the very slightly similar eruption. It is transferred by direct personal contact, by the air or by a third

person. It is infective from the first symptoms until all the crusts have disappeared. Although the disease usually occurs in epidemics, frequently we see sporadic cases.

As in all other contagious or infectious diseases the predisposing causative factors are those conditions which lower the resistive powers of the body, such as fatigue, improper diet, exposure to sudden temperature changes and imperfect elimination of the body wastes. The structural lesions found as predisposing factors are contractured muscles of the neck and behind the jaw, and muscular and interosseous lesions of the upper cervical, mid-dorsal and dorso-lumbar areas, also of the clavicle and upper ribs.

Symptoms and Diagnosis.—There are three stages to the disease: (1) Incubation, (2) Prodromal, (3) Eruptive.

1. Incubation Period.—This period lasts about fourteen days though it may vary from seven to seventeen days. During this period there is practically no symptomatology except perhaps the last two or three days, when the child shows evidence of a little excitability and irritability. Often on the day before the first noticeable symptoms the child appears even more active than usual.

2. Prodromal Stage.—Prodromal symptoms are not common and usually last but about twenty-four hours. The first noticeable symptom is the irritability of the patient, which is followed by a temperature, usually 99° to 101°, which temperature persists during the course of the disease. There are sometimes thirst, anorexia, constipation, seldom vomiting, and a furred tongue. Some cases have been observed to have the following as prodromal symptoms, but these we believe are usually due to concurrent conditions that exist at the time of the infection: delirium, convulsions, angina, conjunctivitis, dysphagia, bloody vomiting and stools, and an initial erythema, usually scarlatiniform.

3. Eruptive Stage.—The eruption comes within twenty-four hours and is often the first symptom that is noticed. It appears first as hyperemic macules and then rose colored papular spots, somewhat comparable to the typhoid roseola and not hard. These papules rapidly become raised, flattened, ovoid, pin-head to pea-sized vesicles containing a fluid at first watery and then pearly. They disappear on pressure. The vesicles mature

within twenty-four hours, are very superficial, and leave a slight areola about them, which is not inflammatory as in smallpox. The eruption appears first on the chest and then on the neck, face, scalp, and then trunk and limbs in the order named. The eruption is most abundant upon the back, and over the entire body they may number anywhere from eight to many hundred and are usually scattered.

The vesicles are not umbilicated, but some may have slightly depressed centers, are discrete, and appear in successive crops which require from three to six days to complete. Pustulation and hemorrhage into the vesicle rarely occur. On the third or fourth day yellowish-brown crusts form and gradually disappear. Scars may result from scratching or infection. By the fifth day we may find all stages of the eruption because of the appearance of the successive crops. There may be an efflorescence upon the mucous membrane of the oral cavity and of the pharynx causing slight difficulty in deglutition.

The itching may be more or less intense. As scratching may cause pitting it should be guarded against. The fever which is usually slight may persist during the entire eruptive stage, but if it is high and persists as high temperature it suggests complications. Muscular tension of the cervical muscles, especially those in front, and around the angle of the inferior maxilla are usually found, and often the clavicles are bound down, and relation of ribs is disturbed. Ulceration sometimes follows scratching, and even gangrene may appear around the vesicles in debilitated children, especially those who are tubercular or congenitally syphilitic. It is apt to be fatal in these cases. Complications of tubular nephritis, which occurs within two weeks; cardiac hypertrophy; uremia; otitis media; and bronchial affections, are sometimes met with.

Treatment.—Isolate patient so as not to come in contact with other children. The younger children should be put to bed until the crusts have formed; older children may be allowed to be up around the room if their cases are light. Pay particular attention to the muscular lesions of the neck, lower maxilla, mid-dorsal and dorso-lumbar regions, keeping them relaxed by gentle relaxing treatments. A general systemic treatment is soothing and helps to prevent complications.

"Be very careful and very thorough in your neck adjustments. Loosen the atlas and axis and draw forward the inferior maxilla from its pressure upon the vessels and nerves back of its angle. Draw the hyoid bone forward and secure good circulation of blood throughout the entire cervical area."—A. T. STILL.

Give treatment at the 4th and 5th dorsals to stimulate the superficial circulation and thus increase elimination through the eruption as well as the sweat glands. Remember the eruption is the expression of the body's attempt to eliminate the toxins within.

Keep the bowels active by splanchnic and abdominal manipulations and by laxative diet. If bowels are persistently inactive use enemata. Diet should be bland and easily digested. During fever, diet should be liquid or better restricted, giving only water in abundance.

During the eruptive stage do not use tub baths. Daily tepid sponges with either plain water or boric acid solution answers both as an antiseptic wash and bathing. After the daily sponging, and as often as necessary to control itching, anoint with a 10% boric acid ointment or with carbolized vaseline. If scratching can not be controlled, the hands should be tied in muslin bags. As in smallpox the ultra-violet rays seem to irritate the eruptions and to increase the tendency to scarring, therefore the windows and lights should be screened with a dull red material.

Prognosis.—Invariably favorable unless complications set in, which is seldom. Recurrences are very rare.

Prophylaxis.—The child should be kept in quarantine for three weeks or until the skin is entirely clean.

Epidemic Parotitis

(MUMPS; EPIDEMIC PAROTIDITIS)

Definition.—Mumps is an acute, infectious, contagious disease, occurring in limited epidemics, and characterized by inflammation of the salivary glands, particularly the parotid, swelling slight fever and pain over the involved glands. There is special liability to orchitis or to mastitis.

Etiology.—Predisposing Factors: Mumps is peculiarly a disease of childhood and adolescence, not being common in infancy or after the twentieth year. It affects boys nearly twice as often as girls. Mandibular and upper cervical lesions, both of the interosseous and soft tissue types, are undoubtedly potent predisposing factors, as they obstruct and interfere with nerve and circulatory function to the glands affected. Also any condition which lowers the child's resistance to infections makes them more susceptible to this disease than to any other, these conditions being fatigue, exposure to dampness and sudden weather changes, dietetic errors, etc. The cases are more numerous in the spring and autumn seasons. Extensive epidemics are infrequent, but do occur in reformatory institutions and children's homes. It is much more widespread in large cities than in the country or villages.

Exciting Cause; The specific cause has not been demonstrated. The disease is usually transmitted by direct contact, but there are instances where it has been transmitted by a third party or by fomites. There are two views as to the mode of infection; the first being that the active principle travels along the course of the salivary ducts from the mouth to the glands, probably most often through the duct of Stenson to the parotid gland. This is the most generally accepted theory. The second is that the infection is a general one to which certain structures are more susceptible, principally the salivary glands, and the parotid in particular.

Symptoms.—The period of incubation is from fourteen to twenty-one days. Prodromes are usually absent, though in the more severe cases constitutional disturbances, with chilliness, vomiting and mild fever may precede the local inflammation. In the milder cases the local swelling may be the first manifestation of the disease. The temperature is usually moderate but may rise to 103 or 104 degrees in the more severe cases. The left side is more often affected than the right. The disease is characterized by a feeling of tension with soreness just below the ear. Soon a slight swelling may be observed directly under the ear and in the course of forty-eight hours it reaches its maximum size. The parotid gland becomes greatly enlarged and the adjacent tissues of the neck and face become tense and edematous. The skin becomes hard and glossy and usually white in color because of the obstruction to the circulation from pressure. The swelling is between the angle of the jaw and the mastoid process, pushing the ear

upward and its lobule is pushed sharply outward. In the majority of cases the other side becomes affected in two or three days, but sometimes the spread of the disease to the other side is delayed for several days, and occasionally the other side escapes the infection. Frequently the swelling of the other side is so slight that it is only recognized by the closest scrutiny. Infrequently the submaxillary glands become affected without involving the parotid glands, but these cases are rather rare.

The patient is usually unable to open the mouth without considerable pain; acids, and rarely sweets, produce spasms of the jaw muscles; speech and even deglutition are difficult; the salivary secretions are usually increased but quite frequently they are decreased. The breath is foul and the tongue is furred. The mucous membrane of the cheek and pharynx are reddened and there may be a slight angina.

The spine shows subluxations of the upper cervical area, particularly of the atlas and axis, also upper rib lesions and upper dorsal lesions are frequently found. The lesions of the second and third dorsal, and their ribs, are most frequently found when the submaxillary gland is involved.

The symptoms persist from six to fourteen days, when the swelling disappears and the patient regains normal health. Orchitis occurs in about one-third of the cases after puberty. In infancy and childhood it is extremely rare. Usually one testicle is involved, and is characterized by weight, swelling and pain in the scrotum. The testicle may become greatly enlarged when the pain becomes intense. Atrophy may result and if both testicles are affected the loss of reproductive ability may result. In females, usually after puberty, the breasts may become enlarged and tender, pain and tenderness of one or both ovaries, hematoma of the labia, or a vulvovaginal discharge may occur. However these complications are very rare. As a rule the patient is not very sick and relapses are very uncommon. The attack confers immunity which is practically permanent.

Diagnosis.—Under ordinary conditions, especially during an epidemic, the diagnosis of mumps is very easy. The swelling in front of and below the ear, with the displacement of the lobule outward is quite indicative of mumps. The relative rapidity with which the swelling appears, develops and subsides is characteristic of mumps. In acute cervical adenitis the swelling is below the angle of the jaw and does not at any time correspond with the

outline of the parotid gland. In Hodgkin's disease, which is a chronic affection of the lymphatic glands, the salivary glands are not involved.

Treatment.—The patient should be kept away from other children, and should remain in a well lighted, well ventilated room of even temperature, and if the temperature is high or moderately high he should be kept in bed.

The correction of all interosseous lesions is indicated, especially of the upper cervical area, though the second and third dorsal should be given attention because of the influence of these dorsal nerves upon the submaxillary glands. Also correct upper rib lesions that may exist. As mumps is an infective disease the channels of elimination should be watched and stimulated. Build up the body resistance by treatment at the mid-dorsal area to affect circulation and respiration; and lower dorsal area to affect kidney and adrenal function. Watch the bowels and keep this avenue of elimination functioning freely, using enemata if necessary.

The diet should be liquid, of fruit juices, thin gruels, milk and plenty of water. Tepid sponging allays the fever and restlessness. Relaxation of the deep muscles of the neck and shoulders will do much to make the patient comfortable, also the muscles under the angle of the jaw. A very gentle relaxing of the tissues around the gland itself, by crowding them toward the gland, assists in relieving the tension by securing a better venous and lymphatic drainage.

Hot applications to the swollen glands will give a considerable relief; these may consist of hot fomentations, hot salt bag, electric heating pad, hot water bottle, etc. The mouth is kept in good condition by the use of a mild antiseptic mouth wash.

Orchitis should not occur if the boy is kept warm and in bed. If it does occur the best treatment is relaxation of the lower dorsal and upper lumbar spinal muscles, rest in bed, support and protection of the scrotum with cotton wool, cold applications, correction of any bony lesions affecting the pelvic viscera.

If mastitis occurs, rib lesions will be found and should be corrected, as they are probably the predisposing factor to this complication. Treatment would consist of correction of these lesions, if it can be done without irritating the inflamed glands. The manipulation of the surrounding tissues,

with gentle crowding of the normal tissues toward the inflamed glands, without exerting any pressure on the gland itself, is helpful and comforting. Free tissues back to the axillary lymphatics.

Prognosis.—The outcome is usually favorable. In the rare fatal cases, meningitis is the usual cause of death. Under osteopathic care the duration of the swelling, fever and pain is usually greatly lessened.

Quarantine of twenty-four days is necessary.

Whooping Cough

(PERTUSSIS; TUSSIS CONVULSIVA)

Definition.—It is a specific, epidemic, infectious, contagious disease affecting the respiratory organs, characterized by a cyclic course, a severe convulsive cough, paroxysmal, with the characteristic "whoop."

Etiology.—It usually occurs in children, most frequently during the fourth year, and extremely seldom after the twentieth year. It appears to be slightly more frequent among girls, and most cases occur in March and April. Pertussis is highly contagious, being carried by direct contact and by fomites. The Bordet and Gengou bacillus is the specific cause. This is found in the sputum most abundantly during the first week, the most infectious period, and becomes gradually less. One attack usually confers immunity.

The incubation period is from seven to ten days. The patient may be considered non-infectious five weeks after the first whoop.

Lesions of the cervical and upper dorsal vertebræ and of the first, second and third ribs, affecting the vagi, the phrenic, the sympathetic, the recurrent laryngeal or the vasomotor nerves predispose to the disease.

The bacteria were found by Mallory and Horner to be characteristically between the cilia of the trachea and the bronchi. They interfere, mechanically, with the movements of the cilia, preventing the normal removal of secretions.

Symptoms.—The disease is divided into three stages: 1. The catarrhal stage, which lasts one to two weeks; 2, the spasmodic stage, three to six weeks; 3, the declining stage, three weeks.

The Catarrhal Stage: Characterized by headache, photophobia, conjunctivitis, coryza and a cough which becomes drier and harder toward the end of this stage. Often the invasion is insidious and sometimes well marked with a temperature of 100° to 102°. Frequently this stage cannot be differentiated from a "hard cold," except toward the end of the stage when the cough becomes worse instead of better, and the child will seek some support to steady itself during the coughing paroxysm. Also the eyes will water freely during the coughing spell and the child will not be able to "get his breath" between coughs, but will have a number of coughs without inhaling.

One to two weeks.

The Spasmodic Stage: This stage dates from the "first whoop." The fever now usually ceases, unless there are complications. The cough becomes paroxysmal, consisting of a succession of fifteen or more short, rapid expiratory puffs with no intervening inspirations, immediately followed by a deep, loud inspiration, which is the characteristic "whoop," and is due to the partial closure of the glottis. Each paroxysm is composed of three or more such spells, the last one often followed by the expectoration of a small plug of mucus or by vomiting. During the paroxysm the facies presents a swollen, dusky appearance, eyeballs protruding, eyes reddened, and puffy, pinkish lids. The child is well except for the paroxysm, which has an aura, tickling in the larynx, thoracic constriction, a creeping sensation, when the child attempts to brace himself, or runs in terror for support. The "whoop" is a deep, singing or whistling inspiration which is absolutely characteristic. During the cough the child's body is bent forward and he is perfectly helpless, often passing urine and feces involuntarily. Cyanosis often occurs from the strain.

After the attack patient regains control of himself, the respiration is fast, and there is fatigue, sweating and often pain in the abdomen from the strain of coughing. During the severe cough petechiæ of the forehead, ecchymosis of the conjunctivæ, epistaxis, bleeding of the external auditory meatus or from the frenum of the tongue may occur. Ulcer of the frenum of the tongue is quite common. The parosyxms vary from four to a great many per day, averaging about twenty.

Three to six weeks, usually four weeks.

The Terminal or Declining Stage: This stage is longer in proportion in the mild cases. The paroxysms occur at longer intervals, are of shorter duration and of less intensity, the catarrhal symptoms are more marked, the expectoration becomes thinner, fluid, mucopurulent, and looser. The "habit cough" may follow. It is during this stage that complications are most likely to occur, therefore it is the most dangerous.

Complications.—Catarrhal inflammations are common in the initial stage. **Bronchopneumonia** is the most frequent and severe complication. Lobar pneumonia, exudative pleurisy, endocarditis, pericarditis, meningitis and nephritis are infrequent complications. Spasms of the glottis in nervous or scrofulous children is largely nocturnal, and may cause death from asphyxia even in the lightest cases. Hemorrhages may occur in the skin, conjunctivæ, nose, throat, ears or cerebrum. The writer knows of one case where death was sudden from a cerebral hemorrhage in an apparently mild case. Other complications are cardiac dilatation, emphysema, bronchiectasis, pneumothorax, aneurysm hernias, muscular ruptures, and visceral prolapses.

Spasmodic cough from diseased bronchial glands very closely resembles whooping cough. Barthez and Sannee give the following differentiation:

Whooping Cough	**vs**	**Enlarged Glands**
1. Contagious, epidemic.		Isolated, not contagious.
2. Three periods, 2nd parosyxmal.		No distinct periods.
3. Paroxysmal cough with whoop, vomiting, viscid expectoration.		Paroxysms without whoop, expectoration or vomiting.
4. Respiratory sounds normal.		Signs of enlarged glands sometimes present.
5. Respiration normal in interval; apyrexia if simple.		Asthma in some cases, febrile movements, sweats, wasting, etc.
6. Voice natural.		Voice sometimes changed.
7. Acute.		Chronic.

Treatment.—Isolation of patient in well ventilated, sunny room where there is plenty of fresh air day and night is essential. Children exposed to infection should be disinfected and isolated for three weeks, as the disease can not be diagnosed during the catarrhal stage. If case is at all severe, patient should be put to bed.

Cases receiving early treatment are sometimes aborted. Treatment of the whole respiratory tract with correction of vertebral and rib lesions, and relaxation of the contracted muscles should be given. Treatments for the first few days should be at least twice per day. Pay especial attention to the vagi and phrenic nerves. Lesions of the first and second ribs will affect the recurrent laryngeal nerves which will aggravate the cough. The muscles of the shoulder girdle are always very tense and should be kept well relaxed, as should the subscapular muscles. Frequently after treatment the child will have a coughing spasm and raise large quantities of mucus, after which there will be no more spasms for several hours.

Children who play and live out of doors get along best. To support the diaphragm and abdominal muscles from the strain of coughing a muslin bandage tightly pinned about the trunk is very valuable, a pad being placed over the stomach under the bandage. In a very young child instruct the nurse to strongly flex thighs on abdomen during the severe coughing. Inhalations of steam from water with a very few drops of eucalyptus oil in it often relieves the first tickling sensations.

If cyanotic symptoms appear they may be relieved by raising the ribs, especially those over the heart; by relaxing the subscapular muscles; and by supporting the heart by application of cold cloth over the heart. Elevating the abdominal viscera and diaphragm is, also, of distinct benefit.

The diet should be nutritious and easily digested, restricted to liquids during the fever. The child should be warmly clad and protected from drafts. The excretory systems should be kept active by plenty of water drinking and by diet. Treatment should be continued during the terminal stage to prevent the possible complications. Irritants, as beef-tea, stimulants, dry bread, cookies and overfeeding, provoke coughing and vomiting. Food should be given at frequent intervals in concentrated form—gruels, milk with lime water, zwieback in milk, eggs, meat juice, etc. Older patients tolerate more solid food.

Prognosis.—With the complications, this is the most fatal of the acute infections under five years of age. Infants and little children should receive special care. Ordinary uncomplicated cases are favorable for recovery. The prognosis depends upon the age and strength of the patient, the severity and

number of the paroxysms, and the presence or absence of complications. No recurrence is to be expected.

Death is due to spasm of the glottis or to extensive subdural hemorrhage, occurring chiefly in the children of the poor and in delicate infants.

Prophylaxis consists of isolation, disinfection of sputum and final fumigation of the premises. Children should be protected from exposure to infection from whooping cough. It must be realized that it is a very serious disease.

CONSTITUTIONAL DISEASES

Rheumatic Fever

(Inflammatory Rheumatism)

Definition.—An acute, febrile, non-contagious disease; it is infectious, although there is some controversy as to its exact nature; characterized by a multiple arthritis and a tendency to involve the heart.

Osteopathic Etiology and **Pathology**.—The prevailing thought is that the disease is an infection due to a diplococcus. This micro-organism is called by others micrococcus rheumaticus and streptococcus rheumaticus.

"Rheumatic fever occurs most frequently in the temperate zone, among people who live under conditions which are unhealthful and which especially induce focal infection. It is most prevalent in the young and in the more exposed male of all ages. The excess of lymphoid tissue in the pharynx and nose of the young explains the frequency of the incidence of the focal infection and the subsequent rheumatism. The frequent association of the onset of rheumatic fever with lowering of the body temperature by exposure to cold and a wetting is explained by the increased specific virulency of the bacterial cause acquired by a low temperature and the coincident lessened resistance of the patient due to the exposure. The frequent absence of evidence of acute focal infection at the onset of the systemic disease is not an evidence that no focus exists. The latent chronic streptococcus infection of tonsillitis, pyorrhea alveolaris, sinusitis, etc., may suddenly acquire increased virulence and specific pathogenic affinity with varying degrees of focal tissue reaction. This transmutation of type and pathogenicity certainly occurs in the focus of infection. The removal of the tonsils and other sites of focal infection has been followed by complete recovery of prolonged, subacute and chronic types of arthritis and has unquestionably prevented recurrent attacks of rheumatic fever to which the susceptibility is increased by one or more attacks. The occurrence of rheumatic fever after the removal of an apparent focus may be due to secondary systemic latent foci in lymph nodes proximal to joints, in the

neck or elsewhere. The streptococci of these secondary foci may take on new virulence and specific pathogenicity, from the same causes which induced like changes in the pathogenic bacteria of the primary focus.[67]"

Osteopathic lesions play an important role, both in their relationship or bearing upon the tissues of a possible site for a focal infection and upon systemic conditions that derange general bodily tone. This has been definitely confirmed in those cases of rheumatism where correction of the osteopathic lesions, with attention to hygienic measures, have resulted in recovery. This is a feature of osteopathic etiology and therapy that can hardly be over-emphasized, for an intact innervation, circulation and chemism of the organism is basic to both preventive and curative therapy. Rheumatism, like most diseases, is of local origin and if tissues and structures can be kept up to the normal, infectious or the other pathologic processes can rarely become active.

Pathologically, the synovial membrane is hyperemic. The muscles and ligaments are inflamed. The fluid is serous with more or less fibrin and leucocytes. In severe cases slight erosion of the cartilages is found. Acute rheumatism is rarely fatal; when death does occur it is generally due to the complications which arise.

Symptoms.—The onset is usually sudden; although it may be preceded by slight fever, aching in joints, chilliness, and sore throat. It generally involves the larger joints and is almost always multiple; it has a tendency to move from one joint to another. The pain in the joints usually develops rapidly with slight chilliness and a rapid rise in the temperature from 102 to 104 degrees F. The pulse is frequent, often disproportionately to the fever. There are profuse acid sweats, often causing sudamina. There is loss of appetite and thirst is present. The urine is scanty, high colored, very acid, and deposits urates upon standing. The tongue is coated and the bowels are constipated. The joints are reddened, swollen, extremely painful and tender to the touch. Every movement, jarring of the bed, or the pressure of the bed clothes is agony to the patient. The blood is greatly deranged, anemia develops rapidly and there is well marked leucocytosis. The duration varies from a few days to several weeks.

Complications.—The temperature may rise to 106 or 109 degrees F.; this is often associated with delirium, great prostration and a feeble, frequent

pulse. Endocarditis, pericarditis, myocarditis, pneumonia, pleurisy, iritis, chorea, convulsions and meningitis may occur. Coma may develop without preceding delirium or convulsions; this is very serious and may prove fatal. Subcutaneous fibrous nodules attached to tendons and fascia sometimes develop. They vary in size and are most common in children and in young adults, occurring most frequently in the fingers, hands and wrists. They are also sometimes seen about the elbows, knees, scapulæ and spines of the vertebræ. They usually last a few days, sometimes for months, and generally develop during the decline of the fever. Cutaneous affections, such as urticaria, erythema, nodosis, purpura and sweat vesicles sometimes appear.

Diagnosis.—This is seldom very difficult; there are, however, several affections which resemble acute articular rheumatism. In **septic arthritis** its association with some other septic process and the tendency of the inflammation to end in suppuration with more or less destruction of the joints, will determine the diagnosis. Septic arthritis may develop during the course of pyemia, puerperal fever, or acute osteomyelitis. **Gout** is rarely mistaken for acute rheumatism. Gout occurs later in life and usually affects the greater toe; history and mode of onset will usually render the diagnosis easy. In **gonorrheal rheumatism** the history of recent infection, its obstinate character and being generally connected with a single joint from the start are diagnostic. It especially affects the knee. Heart complications are rare. **Rheumatoid arthritis** begins in the small joints; then attacks them all, leaving permanent deformity. There is no fever or sweats and the heart is not affected. Acute arthritis of infants usually attacks the hip or knee. The effusion becomes purulent.

Prognosis.—Recovery is the rule, but the prognosis nevertheless, must be guarded. Relapses and recurrences are common.

Subacute Rheumatism.—In this form both the local and general symptoms are of a milder type and are more prolonged than in the acute form. The temperature seldom rises above 101 degrees F. The inflammation of the joints is not so severe and fewer joints are involved. It may last for weeks or months, and then it may pass into the chronic form. Usually though, when the course is prolonged, the joints return to their normal state.

Treatment.—Place the patient in a room that is well ventilated and maintain a temperature of about 70 degrees F. Avoid draughts of air. The bed should be soft and smooth and blankets should be used. The diet should consist largely of milk, and let the patient drink freely of water. Oatmeal, barley water, egg albumen and meat juices may also be used.

Treatment should be given along the entire spine, especially if the rheumatism changes from one joint to another; otherwise treat the innervation directly to the affected joint. Correct any derangements that may be found along the spinal column and carefully relax the deep back muscles. Particular attention should be given to the bowels and kidneys. Also, treat the liver most thoroughly during each treatment. The liver is many times considerably enlarged and tender in rheumatism and a thorough treatment of it seems to favor a more rapid cure.

Carefully treat the affected tissues. If you cannot treat over the joint, then manipulate the tissues above and below the joint; and usually after a few minutes' manipulation the swelling is somewhat relieved so that direct treatment of the joint can be given. It is best to wrap the inflamed joints in flannel if the pain is severe. Besides treatment of the innervation of the joint, hot applications will be helpful. Some claim that cold compresses are of aid to the inflamed joints.

Complications are to be treated separately. Besides the ordinary fever treatment for the fever, the cold bath is very effectual. After **convalescence** has been established, the patient should be carefully protected for several days from cold and damp. For any stiffness that may persist, manipulation and hot baths will be quite sufficient.

H. M. Still[68] writes "If the fever is not over 103 degrees I do not try to reduce it.... After treatment in a majority of cases, the fever is reduced within twenty-four hours unless complications have set in. These are usually of the heart, so no matter how mild the attack, keep this in mind. If the action is irregular and weak, stimulate it two or three times a day. If it is rapid and high fever, go to the vasomotor centers and reduce fever, then inhibit the heart action and keep the excretions active. If the joints are affected I always move them gently no matter how great the inflammation. As yet I have never had a case of rheumatism in which cardiac lesions or ankylosed joints were a sequela."

If the tonsils are evidently badly diseased and osteopathic treatment does not clear them up do not hesitate to have them removed.

Chronic Articular Rheumatism

Osteopathic Etiology and **Pathology**.—This disorder should be studied in connection with arthritis deformans owing to similar sources of infection and various common factors. It usually develops slowly and follows an acute or subacute attack and is common among the poor, especially those exposed to damp and cold. Heredity, advanced years, although the disease may appear at any age, and constant exposure to cold and wet are predisposing causes. Chronic lesions to the spinal column corresponding to the affected area are found. Too much stress from an osteopathic point of view cannot be placed upon the importance of lesions to both the digestive organs and to the joints especially involved. Then, in addition, particular attention should be given osteopathically or surgically, or both, to sites of focal infection.

Pathologically, the capsules and ligaments of the joints are thickened also, the sheaths of the tendons around the joint, so that in long standing cases the movements are impaired. In severe cases the cartilages may be eroded. Atrophy of the muscles covering the joints sometimes occurs, especially when there is neuritis; thus producing marked deformity. This muscular atrophy is particularly marked when the shoulders or hips are involved. The atrophy is caused partly from disease; in cases where the joint is distended with effusion, the wasting may be due to pressure upon the muscles or blood-vessels.

Symptoms.—Several joints are usually affected; but it may be limited to one joint, particularly the knee, hip or shoulder. Pain and stiffness are the most common symptoms. The pain is increased upon motion, while the stiffness is often lessened by using the limbs. The joints are slightly swollen, but seldom reddened and are usually tender upon pressure. All the symptoms are aggravated on the approach of stormy weather. There is fever but the general health is not greatly impaired. There may be distortion of the joints and ankylosis may occur. Arterial degeneration and chronic endocarditis may develop as complications.

Prognosis.—This should be guarded so far as a complete cure is concerned; although most cases are greatly benefited.

Treatment.—The treatment of chronic articular rheumatism is largely correcting lesions of the spinal column, which affect the diseased tissues as well as the digestive organs, local treatment of the joints, and removal of focal infections. A certain percentage will respond to osteopathic measures alone, though surgery has a definite place in others. The joints and limbs should be thoroughly treated so as to restore a better circulation and relieve the inflamed tissues. Wrapping the affected joint with cold cloths and then covering the cloths with flannel and oiled silk is often helpful. Due attention should be given the general health, such as nourishing food, free elimination and outdoor exercise.

Probably in some cases where the primary infection has been eliminated secondary foci are present and a general treatment will arouse sufficient reaction to cope with the condition.

Arthritis Deformans

(Rheumatoid Arthritis)

Definition.—A chronic affection of the joints, characterized by progressive changes in the cartilages and synovial membranes, and by new osseous formations restricting the motion of the joint and causing deformity.

Osteopathic Etiology and **Pathology**.—It is due to lesions of the spinal column affecting the spinal and sympathetic nerves as well as disturbing the circulation to the cord. Lesions of the spinal column and ribs are found corresponding to the innervation of the diseased joints. The osteopath has been able in every case to demonstrate clinically important osteopathic lesions. In addition the symmetry of joint involvement, muscular atrophy, sweating, etc., point to nervous lesions. Falli found upon autopsy that the anterior horns had undergone atrophic changes. Nervous lesions are probably of a predisposing character while some infection is the exciting cause. A thorough search of the entire body should be made for foci of infection. Malnutrition, traumatism, exposure to cold, and pelvic diseases are important causative factors. In all cases lesions will be found disturbing

the organs of digestion. Females are more frequently affected than males. The disease is frequently seen in women suffering from ovarian and uterine troubles, especially at the menopause. Hereditary influence may be a factor, also auto-intoxication. The disease is most common between the ages of twenty and thirty. Mental worry, anxiety, grief and injury are also predisposing factors.

Pathologically, in one class of cases, the cells of the cartilages and of the synovial membrane proliferate. The cartilages undergo atrophy, or may become soft, degenerate, and are absorbed, leaving the ends of the bone bare. The bones naturally atrophy and become smooth. In another class the edges of the cartilages where the pressure is slight, thicken and form outgrowths which ossify and enlarge the heads of the bones, forming osteophytes which greatly impair the motion; true ankylosis is rare. The synovial membrane becomes thickened, also the capsule and ligaments, thus greatly restricting the movements of the joints. The muscles around the joints atrophy. In the spinal cord atrophic and degenerative lesions are found. In Still's disease there is an enlarged spleen and marked changes in the joint.

Symptoms.—Pain and swelling of the joints and fever and enlargement of the lymphatics near the joint are characteristic. The spleen is congested and later on there is gastro-intestinal disturbance. **Multiple arthritis deformans**, also known as Heberden's nodosites, is characterized by nodules developing at the sides of the distal phalanges. It occurs most frequently in women between the ages of thirty and forty, and gradually increases with age. At first the joints are swollen, tender and painful and then apparently become better. These attacks may appear at different intervals while the nodules at the sides of the joints gradually increase in size. The larger joints are rarely affected. The progressive form may be either acute or chronic. The acute form at the onset may resemble articular rheumatism. It is more common in women between the ages of twenty and thirty, but may occur in children. Pregnancy, recent delivery, lactation, the menopause, and rapid child bearing are common antecedents. There is swelling and tenderness of the joints and slight fever. Several joints are usually involved. The **chronic form** is most common. Symmetrical joints are usually involved. The affected joints slowly enlarge and are painful and red. Usually the hand is first affected; then the wrists, knees, toes, jaws and

spine; in extreme cases every joint is affected. The vertebræ, **spondylitis deformans**, may be attacked. The cervical spine may be alone involved, in which case the head cannot be moved up or down, although rotation usually remains. In some instances the entire spinal column is affected and may become perfectly rigid. In some cases there is hardly if any pain, while in others the pain is agonizing and is almost constant. The joints gradually become deformed, stiff and creak when moved; later they become completely ankylosed. This deformity is due partly to the thickening of the capsule, to the presence of osteophytes, and to the contraction of the muscles. These contractures flex the leg upon the thigh and the thigh upon the abdomen. Muscular atrophy increases the deformity. Numbness, tingling, pigmentation and glossiness of the skin, and local sweating may be present and are of trophic origin.

The **monoarthritic form** affects old persons chiefly, and women more frequently than men. It affects particularly the hips, the knees, the shoulders, and the vertebral articulations. This is often caused by an injury. The muscles waste away and the knee-jerk is usually increased upon the affected side.

Diagnosis.—Care has to be taken in not confusing it with rheumatic fever or gout. Radiographs should be made.

Prognosis.—If treated early there is a fair chance for curing the disease. Advanced cases usually improve under treatment. The osteopathic treatment should be persistent for at least several months.

Treatment.—Osteopathic treatment, if long continued in rheumatoid arthritis, has given satisfactory results, although owing to the extent of the deformity, a cure in advanced cases cannot be expected. An important cause of the disease is probably a trophic or vasomotor disturbance to the tissues of the joint. Osteopathically, there is never any difficulty to locate disorders in the spinal column corresponding to the innervation of the involved joints. The fact that many of the joints are affected symmetrically indicates that the lesion is a spinal one involving the nerve center. During the incipiency marked improvement is the rule.

A thorough attempt should be made in every case to discover the source of infection and remove it, though this does not preclude the essential osteopathic adjustment.

The treatment consists of attempts to correct the spinal derangement and careful manipulation of the diseased joints to restore vitality and motion in them. The preceding simple, but effective treatment, must be continued two or three times per week for months or even years in order to be of particular value. Coupled with the specific treatment should be a careful consideration of the general health. The emunctories should be kept active and the food of the patient be nutritious. The osteopath should require the patient to take considerable physical exercise at regular intervals, warm baths and plenty of fresh air. Massage and friction of the diseased joints will be of aid in absorbing effusions and in restoring the tone of atrophied muscles. Hot compresses are a help. The baths at various hot springs are sometimes of benefit, and change of climate is invigorating.

O. J. Snyder[69] has this to say: "I must be very emphatic, however, to here advise exceptional caution in your manipulative procedure. * * * You cannot attempt to move the joint, for, if you do you will cause excruciating pain and do irreparable harm in that you will cause breaking down of the cartilage and cancellous bone tissue. Your first endeavor should be to reduce inflammation and to mitigate pain. * * * Osteopathically much comfort and reduction of pain can be accomplished by inhibition in the proper spinal areas. A little friction and very gentle extension or traction of the joint can be attempted as soon as the condition of the joint, by the foregoing treatment, has been made possible. At no time should rotation or sidebending, or any other manipulation that produces irritation of tissue be attempted."

In stout adult women a villous arthritis of the knees may develop owing to faulty posture and poor elimination. These conditions are often amenable to treatment.

Muscular Rheumatism

Definition.—A painful disease of the voluntary muscles and of their fascia and the periosteum. It is regarded by many as a neuralgia of these muscles. The pain is greatly increased by motion and pressure.

Osteopathic Etiology and **Pathology**.—Osteopathic experience with cases of muscular rheumatism shows that the nerves, as they pass to and

from the spinal muscles, are affected. The lesion is caused, principally, by subdislocations of the vertebræ, ribs or pelvis, according to the region involved. A gouty or rheumatic diathesis, heredity, exposure to cold and wet and previous attacks are predisposing causes. Men are more often affected, owing to their more frequent exposure. The disease affects persons of all ages. It occurs in acute, subacute and chronic forms.

In cases of frequent recurrence focal infections and intestinal toxins are often important factors. Vertebral and muscular lesions, septic foci, intestinal stasis, exposure to cold and drafts are principal causes.

Pathologically, there is swelling of the muscles of the nature of myositis. In chronic cases there is often atrophy of the muscles, due to interference of the trophic nerves.

Symptoms.—These are generally local and are never accompanied by marked constitutional disturbances. There is seldom fever, and the pulse is only slightly increased in frequency. Pain is the chief symptom; it is increased by motion or pressure. Tenderness is generally present and there may be swelling of the tissues. Rheumatic nodules have been found. The duration is usually three or four days, though it may last longer with frequent recurrences.

Lumbago is a painful affection of the muscles of the lumbar area and their tendinous attachments. The onset is generally sudden. In severe cases it sometimes renders the patient helpless. In **torticollis,** or stiff neck, the muscles of the side and back of the neck are affected. It is usually confined to one side of the head. Any attempt to turn the head causes a sharp pain. In **pleurodynia** the intercostal muscles, and sometimes the pectorals and serratus magnus, are affected. It usually affects but one side, more frequently the left; it is the most painful form of the disease, since the pain is aggravated by breathing. The respiratory movements are consequently restricted on the affected side. The absence of fever and physical signs will distinguish it from pleurisy. In **intercostal neuralgia** the pain follows the distribution of the nerves and there are tender spots along their courses. **Cephalodynia** affects the muscles of the scalp. **Scapulodynia**, **omodynia** and **dorsodynia** affect the muscles of the shoulder and upper dorsal. **Abdominal rheumatism** affects the muscles of the abdomen.

Prognosis.—The prognosis is good. Favorable results are the general rule under careful treatment.

Treatment.—Muscular rheumatism is usually an easy affection to cure. The cause of the disturbance is generally found in the region involved, and is due, in the majority of cases, to some dislocated tissue, usually osseous, that irritates the nerves to the muscles. In addition to correcting the lesions, removal of septic foci, free elimination, lessened diet, stretching of the muscles, application of heat, ironing and rest are beneficial.

In **lumbago** there is invariably found a slight lateral deviation of some vertebræ along the lower dorsal or lumbar region. Occasionally deformity of the vertebræ, asymmetry, or arthritis are factors. The radiograph may be a diagnostic aid. Occasionally, a floating rib or an innominate becomes displaced. Stretching the loins by placing the patient upon his side or back and flexing the thighs on the abdomen is very beneficial. Maintain the tension for three or four minutes. Hot fomentations and rest are helpful.

Torticollis, or stiff neck, is generally due to a lesion of the middle cervical vertebræ. The lesion is usually between the third, fourth and fifth vertebræ, occasionally as low as the second dorsal. A reduction of the subdislocation will often relieve the attack. Stretching of the muscle and application of heat will also be of aid. In some cases of torticollis (chronic) there is a curvature of the cervical spine, and occasionally the muscles are more or less fibrinous. Surgical measures may be instituted. In such instances a cure cannot always be accomplished. The tonsils, nose and teeth should be examined for sources of infection.

A few cases of acute torticollis are caused by some of the deep muscular fibres becoming caught around a process of a vertebra. Severe contraction of the muscles by cold or extensive rotary flexions of the neck, may result in torticollis. Occasionally a case is found due to injury at birth. The cervical vertebræ should be carefully examined. The spinal accessory is the nerve generally involved. Lesions to the spinal accessory occur commonly at the third, fourth and fifth cervicals, or the atlas and axis. The muscles involved in torticollis are the sternocleidomastoid, trapezius, splenius and scaleni. Operations should not be performed until a thorough course of treatment has failed to relieve.

Pleurodynia is often a neuralgia of the pleural nerves. It is usually caused by subdislocations of the ribs exactly over the regions involved. Occasionally, a lesion may exist to the corresponding vertebra, but rarely. The rib is at times completely dislocated. Applications of heat and rest of the part are of aid. Strapping of the region will give considerable relief.

In **cephalodynia** the muscles of the scalp are generally involved by lesions in the upper five cervical vertebræ. In **scapulodynia**, **omodynia** and **dorsodynia** the muscles of the shoulder are usually affected by displacements of the second and third ribs, although the lesion may be found slightly lower in the ribs, or in the corresponding vertebræ. The lower cervical vertebræ may also be at fault. In recurring and chronic cases carefully examine for infectious sources. Dislocations of the shoulder occur frequently; and muscular fibres may slip out of the bicipital groove (rarely). In a few cases muscles may become contracted about the coracoid process, or the acromial end of the clavicle may become dislocated.

Abdominal rheumatism is generally caused by lesions in the lower six dorsal vertebræ, which involve the innervation to the muscles. In some cases lesions of the lower ribs are found, and in a few instances a lesion may be discerned in the upper lumbar vertebræ.

Myalgia of the **upper extremity** is caused by lesions of the cervical or upper dorsal vertebræ or upper ribs. Occasionally some trouble may be found in the shoulder or elbow joints. In the **lower extremity** lesions may be found in the lower dorsal or lumbar vertebræ, or there may be derangements of the pelvic bones. Occasionally disorder is found at the hip and knee joints.

Gout

Definition.—A nutritional disorder in which there is an abnormal accumulation of uric acid and other purin bodies in the blood and tissues; and arthritis, deformity of joints and visceral derangements being the characteristic features.

Osteopathic Etiology and **Pathology**.—Hereditary influences are the predisposing factors of about one-half of the cases of gout. Men are more frequently affected than women. It rarely develops before the age of thirty.

Overeating, sedentary habits, drinking alcohol, especially fermented drinks, and lead poisoning are predisposing factors. Emotional disturbances may excite an attack. Gout is not confined to the rich by any means; but there is also a "poor-man's gout," due to poor food, unhygienic surroundings, and to an excessive use of malt liquors. Uric acid seems to be a causative factor, but whether there is an increased formation or a diminished excretion of the uric acid has not yet been fully decided. The ultimate result is the same in either case; there is an accumulation of uric acid and other purin bodies in the blood, which is responsible for some of the effects of the disease.

Osteopathic experience with cases of gout shows that lesions affecting the nervous system are important factors that control uric acid accumulation or excretion. The nerve centers controlling the affected portions of the body are almost invariably involved, as well as the nerve control to the digestive and excretory organs. A neurosis of these nerve centers probably occurs and is thus a predisposing cause of gout. Considerable can be accomplished in the treatment of gout by careful examination of the spinal column, in the region corresponding to the innervation of the affected area, for vertebral lesions, and correcting them. Usually, slight dislocations of the bones of the foot are found, when that region of the body is involved. The most common subdislocations of the foot are involvements of the astragalus with its articulations and the metatarsals.

Pathological changes are those of the joints principally. There is deposit of uric acid in cartilages, synovial membranes and ligaments. The joint of the great toe is most frequently affected, then the fingers, ankles, knees, hands and wrists. The exudates become hard and are then called tophi. In severe cases the cartilages of the ears, nose, eyelids and larynx are involved. Finally the joints become stiff, deformed and ankylosed, and sometimes there is ulceration.

The kidneys are usually the seat of chronic interstitial inflammation with a deposit of urates. The heart and blood-vessels almost always present changes. Arterial sclerosis is quite a constant lesion; the left ventricle of the heart is hypertrophied. Urate of sodium has been found deposited upon the valves. There is an excess of uric acid in the blood. Chronic bronchitis, emphysema and asthma are among the changes in the respiratory system.

Symptoms.—In **acute gout**, before the attack, the patient may complain of dyspeptic disorder, restlessness and twinges of pain in the small joints. He is apt to have irritability of temper and depression of spirits. The first symptom of the attack is great pain in the metatarso-phalangeal joint of the great toe, which usually comes on suddenly at night with swelling, heat and discoloration of the joint. The temperature rises to 102 and 103 degrees F. Towards morning the symptoms generally abate to recur again the next night. This lasts for several days, the symptoms gradually abating. The urine is scanty, high colored, of high specific gravity and acid in reaction. It deposits urates and often contains a small quantity of albumin. There may be gastro-intestinal symptoms—pain, vomiting, diarrhea, faintness and a rapid, feeble pulse. Pharyngitis is an occasional symptom. The cardiac symptoms are pain, shortness of breath and irregular action of the heart. These attacks may appear with varying severity. In some cases there may be severe cerebral symptoms.

Chronic gout follows repeated attacks of the acute form. The articular symptoms continue for a longer time and the condition extends to other joints. The chalk deposits slowly increase until the joint becomes swollen and deformed. The morbid changes already described are characteristic. The urine is increased in quantity, is of low specific gravity and may contain albumin and hyalin and granular casts. Involvement of the heart and blood-vessels gradually occurs.

Irregular gout or **lithemia** is seen in persons who have been gouty or have a hereditary predisposition. It includes a set of symptoms that are not alone distinctive, but when taken with this gouty tendency, all forms of irregular gout can be recognized. There are various gastro-intestinal disturbances; cutaneous eruptions; heart and blood vessel changes; pains in the various muscles and joints; nervous symptoms, as headache, neuralgia and neuritis; urinary symptoms, and pulmonary and ocular disorders.

Diagnosis.—Only the irregular form of gout should be difficult to diagnose. Differentiation is to be made from arthritis deformans and acute and chronic rheumatism.

Treatment.—The hygienic treatment of gout is very essential. The patient should live a quiet life, avoiding mental and physical strains. Plenty of fresh air, exercise and regular hours should be insisted upon. Alcoholic

drinking should be avoided and the food taken in moderate quantities. Keeping the skin active by the use of cold baths, if the patient is strong, and warm baths should he be weak, is a helpful measure. The dress of the patient should be warm and suitable for the climate.

A regulated diet of nutritious food, taken at regular hours, is necessary. Each patient should receive separate instructions as to diet. The food given may be small amounts of beef, mutton and chicken, with fresh vegetables; with the exception of strawberries, tomatoes and bananas, fruits may be used; fats, milk and stale bread are also suitable. The patient should avoid tea, coffee, pastry, hot breads, highly seasoned dishes, and such articles. The free use of water is beneficial.

The **osteopathic treatment** consists of careful correction of the lesions of the spinal column in order to free the nerve force to the affected region. The spinal treatment in gout is the most essential treatment and is effective. A most thorough examination should be made of the tissues about the diseased area; in the foot the astragalus oftentimes is subdislocated from its articulations, causing obstructions to the local vessels and nerves. The metatarsal bones should receive due attention, as occasionally one of the bones corresponding to the affected tissues is dislocated, usually downward. All the joints between the diseased tissues and the spinal nerve centers should be carefully manipulated so as to favor a better circulation. During a severe attack of gout, besides careful treatment of the blood supply to the diseased region, wrapping the joint in cotton wool and applying warmth and moisture to the joint may be helpful.

The kidneys, liver and bowels are to be kept active. A light treatment to the kidneys and liver each time is very helpful in aiding the organs to eliminate the waste material, and especially in controlling any inflammation that may exist in the kidney. The essential treatment in gout is to relieve the disorder of the nerve centers, to increase the activities of the emunctories and to regulate the hygiene of the patient.

Diabetes Mellitus

Definition.—A nutritional disorder in which there is an abnormal amount of sugar in the blood, characterized by an excessive urinary discharge, in

which grape sugar is constantly present, and by a progressive loss of flesh and strength.

Osteopathic Etiology and **Pathology**.—Almost invariably there will be found a posterior dorso-lumbar curvature wherein the spinal column tissues are much contractured. This condition probably involves the sympathetics (vasomotor and trophic) to the pancreas, liver and intestines. Important lesions may also be found as high as the occiput. Tenderness and congestion over the abdomen, especially the liver, are frequent. It affects men more frequently than women and is a disease of adult life, ranging between the ages of thirty and sixty, though cases have occurred in the very young. It is more serious in the young, the very young seldom recovering. Hereditary influences are believed to be a predisposing cause. It affects the better classes principally and especially those of a neurotic temperament. The Hebrew race is specially predisposed. The colored race is seldom affected.

Obesity, certain chronic diseases (malaria, gout, syphilis), occupations taxing the mind, and pregnancy are predisposing influences. Injury or disease of the spinal cord or brain frequently cause diabetes, especially any irritation of Bernard's diabetic center in the medulla. Derangements of the endocrine system are important. Injuries to the spine, chiefly in the dorso-lumbar and sacral regions, and to the abdomen, and diseases of the pancreas or liver are, as has been stated, oftentimes causes. Lesions to the spine may disturb the glycogenic function of the liver, the glycolytic ferment of the pancreas, or produce an alimentary glycosuria. Extirpation of the pancreas is immediately followed by diabetes, but if a fragment of the pancreas is left it is not always followed by diabetes. The normal amount of sugar in the blood is 1-1000 while in diabetes the amount of sugar is 3 to 4-1000 up to 7 or 8-1000. The healthy kidney will not excrete sugar when it is at the normal ratio. Concerning the presence of acetone-bodies von Noorden[70] says: "The excretion of acetone-bodies may serve, like glycosuria, as a measure of the intensity of the diabetic disease ... it will be at once understood that in no other disease do the acetone-bodies occupy so important a position as in diabetes." Irritation of the centers of the vasomotor nerves to the liver or direct stimulus to the liver cells is followed by glycosuria. Interference with the pneumogastric nerve also influences diabetes.

Pathologically, the liver is enlarged, firmer and darker in color than normal. Often there is fatty degeneration of the organ. The pancreas is diseased in about one-half of the cases of diabetes, especially the islands of Langerhans. The lesions found are granular atrophy, occlusion of the pancreatic duct, atrophy from pressure, fat necrosis, and sometimes it is small, soft and anemic. The kidney changes are those of catarrhal nephritis. In the fatty degeneration hyalin changes take place. The heart is hypertrophied in a few cases. Arterial sclerosis is frequently met with. In the lungs bronchitis, pneumonia and tuberculosis occasionally develop. In the stomach and intestines catarrh is common. The blood presents an increase of sugar. In the nervous system are found many lesions, especially congestion, extravasation and sclerosis of the brain; disturbances of the posterior part of the cord, and congestion and sclerosis of the sympathetic ganglia. The bony lesions, however, (almost invariably a posterior lower dorsal and lumbar) must involve the sympathetics, via the splanchnics, to the extent of profound metabolic disturbance, for in no other way can the results of osteopathy be explained. The importance of specific treatment at this point cannot be over estimated.

Symptoms.—The **onset** is gradual; thirst and frequent micturition being the first symptoms noticed. After an injury or a sudden, severe nervous shock, diabetes may set in abruptly. As the disease progresses there will be marked thirst, polyuria, an abnormal appetite, wasting and debility. The tongue is dry, red and coated. There is constipation and the skin is dry and harsh. Temperature is often subnormal; pulse frequent with increased tension.

In some cases the **urine** is not increased in quantity; usually however, the amount varies from four to five pints to several quarts in twenty-four hours. It is pale in color, of high specific gravity and acid reaction. Sugar is present in variable quantities from one or two per cent to five or ten per cent. Sugar in the urine must be constant in order that the affection is a true diabetic one. Albumin is often present; urea is increased and uric acid may be slightly increased. Acetone-bodies are often found and usually indicate a more serious condition.

Diabetic Coma is the most important and gravest complication. There is either a sudden or gradual loss of consciousness. This may occur after some form of exhausting exercise. There may be previous headache or a feeling

of intoxication. It may be preceded by nausea, vomiting, colicky pains or some local affections, such as pharyngitis or pulmonary complications. Peripheral neuritis, neuralgia, numbness, are possible symptoms. Impairment of hearing, cataracts, strabismus, diabetic retinitis and atrophy of the optic nerve may occur. The sexual function is lost early in the disease. Eczema, with burning and itching of the labia and vicinity, (and in men a balanitis), furuncles, boils and carbuncles are common. Gangrene and edema are not uncommon. Acute pneumonia, bronchitis and tuberculosis are possible complications. **Progressive loss of flesh** is a serious indication.

Diagnosis.—The diagnosis is easy, as there is no other disease with which it can be confounded. Careful urinalysis should always be made. Examination for acetone, diacetic acid and oxybutyric acid is valuable.

Prognosis.—Many cases have been cured by osteopathic measures while nearly all treated have been benefited. If the patient is put upon a diet free from carbohydrates, in mild cases the sugar will disappear, while in severe cases it will still be present. Mild cases usually yield readily to treatment. In cases over forty years of age the outlook is quite favorable, but in cases under forty, and especially the young, the prognosis is not so favorable. In cases under puberty the results are apt to be fatal. Stout persons bear diabetes better than lean. All cases are liable to complications, which render the prognosis more serious. It is a disease of long **duration**, although death has occurred in a few weeks.

Treatment.—In nearly all cases of diabetes mellitus examined there have been found posterior conditions of the lower dorsal and lumbar regions. The posterior curve has always been fairly well marked and generally is a symmetrical curve. By that is meant a spinal curve that is not irregular and the relation of the various vertebræ, one to the other, is not seriously deranged. Correction of this condition of the spinal column has almost invariably given satisfactory results and in the majority of cases the condition of the patient has improved remarkably, and many entirely cured. To get the best results the patient should be laid on his side on the operating table and the knees drawn up so that the thighs are flexed upon the abdomen. The osteopath standing in front of the patient throws his weight against the flexed thighs and reaching over upon the spinal column springs the entire weakened portion of the spine toward its normal position,

stretching the spinal column to separate each vertebra from its neighbor so that the deranged nerves, as they pass through the intervertebral foramina, may be released. Meeker[71] reports a case with a marked kyphosis which was treated two years before enough motion could be had between the vertebræ to produce any results, but after that they were favorable. Direct treatment to the abdominal organs to correct liver congestion and stimulate the pancreas and increase activity of the intestines is essential.

The nerves affected by the posterior pathological curve of the spine, mentioned above, and by separate lesions that may exist within the pathological curvature, are probably the vasomotor nerves to the portal system, pancreas and the intestines. The vasomotor nerves to the portal system branches are given off principally from the fifth to the ninth dorsal vertebræ, although fibres may escape from the cord as low as the first lumbar vertebra. The nerves to the intestines are given off principally from about the ninth dorsal to the lower lumbar vertebræ. Possibly there are nerve fibres direct to the hepatic cell protoplasm.

How lesions in the dorso-lumbar region cause diabetes mellitus is an important question and is hard to answer. An unnatural acceleration of the portal circulation may cause an increased quantity of sugar to pass to the liver, resulting in part of the sugar not being changed into glycogen and thus passing into the circulation; or a paralysis of the vasomotor nerves to the liver causes congestion and slowness of the blood stream. Thus a disturbed circulation of the liver may cause accumulation of sugar in the liver, so that the blood ferment has time to act upon the glycogen and transform it into sugar; or there may be a saccharinity of chyle or blood in the portal vein, due to an impeded conversion of sugar in the intestines into lactic acid; or there may be an accelerated absorption of sugar due to an abnormal state of the intestines; or the nervous control to the pancreatic functions may be disturbed. Hence, one or many pathological changes may occur and influence a case of diabetes, due to a disordered dorso-lumbar region.

The center for the hepatic vasomotor nerves, “diabetic center,” is in the floor of the fourth ventricle at the level of the origin of the vagi nerves. A lesion of the “diabetic center” or an obstruction to the pneumogastric anywhere along its course may cause diabetic symptoms; hence, there may be lesions of the cervical region that would affect reflexly the diabetic center, or lesions of the pneumogastric may occur, particularly at the atlas

or axis, and cause diabetic symptoms, or, at least, these may influence the course of a case of diabetes mellitus. Or the upper cervical lesions may disturb the pituitary gland which is of importance in carbohydrate metabolism.

There are nerves from the superior and inferior cervical ganglia of the sympathetic that have considerable influence upon the liver. These nerves do not pass down the cord to the splanchnics, but pass in the sympathetic to the celiac and hepatic plexuses and then to the liver. Stimulation of these nerves causes the hepatic vessels at the periphery of the liver lobules to become contracted. Possibly in a very few cases, a stagnation of blood in other vascular regions of the body may cause the blood ferment to accumulate in the blood to such an extent that diabetic symptoms occur.

Dietetic treatment is essential, but is not so necessary as some medical authors would have us believe. A regulated diet should be insisted upon in all cases, but one should not go to extremes in dieting. A complete elimination of the carbohydrates is no longer considered the best treatment, as it withdraws too important an element from the diet, producing weakness without any corresponding return for good. A patient's appetite is often inordinate and it will be necessary to regulate the quantity and character of foods. Proctor[72] mentions a case which recovered when carbohydrates were restored, as the patient was too starved to build up. Under osteopathic treatment much more liberty can be allowed in selection of foods. Von Noorden[73] reported a number of cases in which excretions of sugar continued upon the strict anti-diabetic diet, but which were sugar free when they received a large amount of oatmeal along with some vegetable proteid or white of egg and butter, other carbohydrates being excluded. It is suggested by the editor of the Series that the oatmeal may be used alternately with diabetic diet, and relieve the monotony greatly. It can also be used as a test of the patient's digestive and sugar destroying powers. The following food may be included in the dietary:

Animal Foods.—Meats of every variety, except livers; game, poultry, fish and eggs.

Vegetables.—Cabbage, cauliflower, celery, lettuce, green string beans, the green ends of asparagus, tomatoes, spinach, mushrooms, cucumbers, watercress, young onions, or any other green vegetable.

Bread and Cakes.—Made of gluten flour, bran flour or almond flour; griddle cakes, biscuits, porridges, etc., may be made of these flours.

Beverages.—Skimmed milk, buttermilk, coffee and tea without sugar, and carbonated water.

Relishes.—Pickles, cream cheese and nuts of all kinds except chestnuts.

Fruits.—Oranges, lemons, cranberries, cherries, strawberries, all in moderate quantities.

Other foods may be used, but each case requires a thorough study in order to determine what is best to do.

Various foods should be tested out and controlled by urinalysis. The point is to increase metabolism so that the body can store up considerable carbohydrates without the appearance of sugar in the urine.

In severe cases Allen's fasting treatment to be followed by a low diet should be instituted. However, it should be remembered that the correction of dorsal and upper cervical lesions is invaluable.

Mental excitement and worry should be avoided as much as possible. Frequent bathing and regulated exercise will be of considerable value. The diabetic patient should have a well ventilated room and plenty of rest and sleep; flannels are to be worn next to the skin the year around.

Various symptoms and **complications** are liable to arise, which the competent osteopath is prepared to meet by following general rules.

Keep the bowels open. And frequently examine for acetone and diacetic acid. If there are any symptoms of **coma** fast the patient, and neutralize the acid intoxication with bicarbonate of soda until the urine is alkaline.

Diabetes Insipidus

(POLYURIA).

Definition.—A constitutional disorder in which there is a continued excessive secretion of urine, free from albumin and sugar. There is constant thirst.

Osteopathic Etiology and **Pathology**.—This disease is more frequent in males than in females. It occurs most commonly between the ages of twenty and thirty. It is due to chronic disturbances of the nerves. The lesions usually found upon osteopathic examination are lateral derangements of the vertebræ in the renal splanchnic region, (ninth to twelfth dorsal inclusive) or a slight kyphosis in the same locality. Such lesions probably affect the central nervous system in the region of the sympathetic nerves to the kidneys, by a paralysis of the muscular coat of the renal vessels. The disease may be associated with other conditions, as injuries and diseases of the nervous system elsewhere; exposure to cold; prolonged debility and fatigue; cerebral diseases, as meningitis, paralysis of the sixth nerve, tumor of the brain, and blows on the head; injuries of the cervical region; sunstroke; cerebrospinal fever; malaria; syphilis; pregnancy; hysteria; hereditary influences, and drinking too freely of cold water. There are many diseases and conditions which may be associated with diabetes insipidus; and which act as irritants, directly or reflexly, upon the center in the medulla oblongata (which is just above the diabetic center), or upon the sympathetic ganglia in the abdominal region. Thus, there is a vasomotor neurosis, due either to central or reflex lesions.

Second in importance to lesions of the renal splanchnics are lesions of the upper cervical region. Irritations in the cervical region may act upon the center in the medulla or the lesions may affect some of the sympathetic fibres as they pass from the brain to the renal sympathetics. The pituitary gland may be disturbed. Probably axis and atlas lesions are factors.

Lesions of the nerve centers and of the sympathetic ganglia have been found upon post-mortem examination, but they are not constant. Nervous lesions have been found in the region of the base of the brain. The kidneys are sometimes congested and enlarged. The tubules may be dilated.

Symptoms.—Great thirst and an enormous secretion of urine of a pale, watery and slightly acid nature are the characteristic symptoms. The skin is usually dry and harsh, the bowels are constipated, and the appetite may be voracious. The health on the whole is quite perfect, although if the affection is not arrested, considerable loss of flesh and strength may result. There is a tendency for the disease to become chronic.

The nervous lesion causing polyuria may be the outcome of a debilitated condition of long standing or the symptoms may occur suddenly. Preceding the large flow of urine such symptoms as nervousness, irritability, headache, sleeplessness, failure of memory, and inability to concentrate the mind commonly occur. Other symptoms may be present in addition, as debility, diarrhea, epigastric and lumbar pains, and impaired sexual function.

Diagnosis.—The diagnosis is not difficult. Thirst, polyuria and the absence of albumin and sugar characterize the disease. In **diabetes mellitus**, finding of grape sugar in the urine would at once exclude polyuria. In **paroxysmal diuresis**, the increased amount of urine is not permanent. In **interstitial nephritis**, there is albumin, casts, etc.

Prognosis.—Depends upon the cause. The disease yields to treatment much quicker than diabetes mellitus and is without doubt much less serious. The disease, in a large majority of cases, can be cured. Under osteopathic treatment most cases will yield good results or be cured in from a few weeks to six months.

Treatment.—The treatment of the disease causing diabetes insipidus is of first consequence, but frequently such a disease is undiscoverable. There is often a tendency toward neurasthenia; consequently, habits, environment, etc., should be carefully attended to. Examine for sexual, rectal and other reflex irritations.

Correcting lesions of the renal splanchnics is important; in fact, in a fair number of cases treatment of this locality will entirely cure the disease. A very effective treatment, in addition to the ordinary methods of treatment, is to have the patient lie flat upon the back while the osteopath reaches around the patient on either side, placing the fingers firmly upon the transverse processes of the lower dorsal vertebræ and springing the spine forward by lifting upward on the patient, enough even to raise the patient from the surface he is lying on. This treatment is especially effective in lessening the increased amount of urine. Attention should be given to the false ribs on either side and to the condition of the spine below and above the renal splanchnics. The cervical vertebræ should be examined carefully for disorders, and if any are found they should be removed at once, if possible.

Hygienic treatment is of as much importance as in diabetes mellitus. The clothing should be warm, warm baths taken, and general friction and care of the skin utilized so that the circulation may be somewhat diverted from the kidneys. Restriction of water is not always necessary, except in cases where excessive drinking has become a habit, as the thirst is caused by the diuresis and not the diuresis by the large ingestion of water. Regulate the diet and see that the bowels are acting normally.

Rickets

Rachitis

Definition.—A constitutional disease of children, characterized by impaired nutrition and changes in the growing bones, causing deformities. The physical growth is disturbed and the bone deformity is due to an over growth of cartilages and delayed calcification.

Etiology and **Pathology**.—Rickets may occur in the new-born, but it rarely begins before the child is six months old. It is a disease of the first and second years of life. Heredity is probably not a factor but certain races, especially the Negro and Italian, have a tendency to be rickety. The disease is much more common in the large cities than in rural districts; also it is more common in Europe than America. The disease is most frequently met with among the ill-fed and badly housed poor of the large cities, though it is not rare to find it among the well-to-do. Lesions to the digestive organs predispose. Breast-fed children seldom have the disorder. Improper or insufficient food (a diet too low in fats and proteins) bad air, want of sunlight, prolonged lactation, exposure to cold and dampness are predisposing factors.

Pathologically, the most marked changes are seen in the long bones and the ribs. The cartilage between the epiphysis and shaft is thickened and is soft and irregular in outline. Underneath the periosteum the tissue is spongy. Microscopic examination shows an increase of proliferation of the cartilage cells with scanty calcification. The bones are soft and there is a diminution in the calcareous salts. In a word ossification is delayed and the bones are not perfectly developed. In the cranium the frontal and parietal eminences are prominent, while the top of the head and the occiput are flattened, giving the head a square appearance. The fontanelles remain open until the

second or third year of life. The ribs become affected very early. At the point where the ribs join the costal cartilages, bulging occurs, forming the so-called “rachitic rosary.” The normal shape of the chest walls is markedly changed. Just outside the junction of the ribs with the cartilages, the ribs fall in, producing a shallow depression, while the sternum and cartilages are pushed forward. The bones of the leg may be distorted. The normal curves of the spine are occasionally disturbed. The liver and spleen are often increased in size.

Symptoms.—The **onset** is slow. In many cases digestive disturbances, with their usual effect upon the nutrition, precede the appearance of the characteristic lesions. The child is irritable and restless, and there is usually slight fever and profuse sweats. The child is often languid, pale and feeble. The lymph gland are enlarged. The tissues are soft and flabby and skeletal changes begin to make their appearance. Among the first are changes in the ribs and head, already described under pathology. Changes sometimes occur in the bones of the face, particularly the maxillæ. Dentition is delayed. The spinal column is frequently curved antero-posteriorly or laterally. The long bones are curved and their extremities become thickened. The pelvis is distorted and twisted and in women this may seriously complicate labor. “Chicken breast” and “bow legs” are common, as well as muscular weakness, and the child walks late. The abdomen is large and prominent, due to flatulency and to the enlargement of the liver and spleen.

Diagnosis and **Prognosis**.—By observing the symptoms, diagnosis is not difficult. Prognosis should be guarded, owing to danger from other diseases; still, on the whole, prognosis is fairly favorable.

Treatment.—Rickets being a disease of malnutrition due to weakness of the digestive organs, improper food, or to influences of disease, the treatment must be principally following hygienic rules and good dieting. The child under six months, if not nursed satisfactorily by the mother, should be given diluted cow’s milk. Salts may be obtained from barley gruel and whole wheat. Diluting the milk with barley water is highly recommended. Fresh meat juice and cream are invaluable. If curds are found in the stools, the digestion is not perfect and is usually due to overfeeding the child. The child should be out doors as much as possible. Fresh air is a necessity. The worst air outside is better than the best air of the house as far as purity is concerned. Protect the child carefully with

warm clothes, and when sitting or walking the child should be supported. Baths will be found beneficial.

In the older child, beef juice, light meats, yolks of eggs, green vegetables and fruits may be given. Lessen the amount of carbohydrates. Careful osteopathic treatment of the various affected tissues of the child will aid a great deal in correcting deformities. Attention to the lesions found will also aid in increasing the nutrition to the involved tissues as well as correcting digestive disturbances. This, also, is of distinct benefit in improving the assimilation of lime salts. Possibly treatment of the "nutritional" centers, (fourth dorsal and fourth lumbar) would be effectual. Carefully guard against complications of the nervous and respiratory systems. After ossification the deformities may be corrected by the orthopedic surgeon, though in the young child considerable can be accomplished by repeated attempts at straightening by bending and molding the long bones. All those conditions which predispose to rickets should receive attention; chief among these is the care of the nutrition of the mother during pregnancy. Nursing should be regulated, and possibly future pregnancies discouraged.

Obesity

Definition.—Obesity is essentially a nutritional disease and is an inconvenient accumulation of adipose tissue in the body, sometimes impairing the bodily function. With some individuals obesity is a normal condition. In others it means impaired health, especially poor elimination.

Etiology and **Pathology**.—Heredity, overeating, sedentary habits, hot, moist climates are predisposing causes. Exciting causes are especially the eating of fat-making food, excessive use of alcohol and insufficient exercise. Obesity may follow the menopause or an infectious disease. Osteopathic lesions are frequently found in the upper and middle dorsal region. These probably are causes of a disturbed metabolism. An excessive diet of starches and sugars will indirectly act as a fat producer. In young people the possibility of hypopituitarism should be considered. Lesions of the upper cervical, in these cases, are frequent.

Pathologically, adipose tissue is deposited throughout most of the tissues. Usually the abdomen is encumbered with a large amount. Passive congestion probably favors the deposition of fat, for in cases of pendulous

abdomen, simply drawing the abdomen in and up and the patient, through voluntary effort, keeping it up, will frequently cause absorption of the fat in a few days or weeks. The fat is distributed underneath the skin, throughout the viscera and about the heart. The tissues may suffer from fatty infiltration, especially the heart, arteries and veins; also the liver, kidneys and stomach. There is an increase of specific gravity of the blood. Edema occurs from passive congestion, due to weak heart.

Symptoms.—The round, fat face, double chin, hanging cheeks, large waist, the thick, prominent, sometimes pendulous abdomen, and the bulky extremities form characteristic features. At first obesity presents no harmful symptoms. Usually the first troublesome symptom is increased frequency in the breathing, due to a weak and overworked heart, and to the fact that the motion of the lungs is hampered by the heavy chest walls, and also by the interference with the descent of the diaphragm on account of the enlarged liver. Dyspnea, passive congestion, anemia, poor digestion, uterine disorders, and mental inactivity are common. There is cardiac hypertrophy; later the heart is overlaid with fat. The pulse is usually frequent, but may be irregular and slow.

Treatment.—Obesity being a nutritional disease it seems but reasonable that alterations of the anatomical structures will produce a change in the proper balance of nutrition. Along osteopathic lines, derangement of tissues affecting the nerves to the digestive and lymphatic systems will produce obesity. In the majority of cases examined have been found disturbances at the sixth and seventh cervical, fourth and fifth dorsal and from the tenth dorsal to the second lumbar. Lesions at these points could readily interfere with the thoracic duct and the receptaculum chyli, as well as with the processes of digestion, assimilation and elimination. It is claimed that stimulation of the splanchnic nerves causes dilatation of the receptaculum chyli. Direct treatment to the abdomen and to areas of fatty deposit will aid very materially in absorption.

The **dietetic treatment** is essential, the principle being to furnish less food to oxidize. Restrict fats, sugar and starches and limit the amount of water. Alcohol should be prohibited. Another important point in the treatment is exercise, which must be carried out in a systematic way. Rules can be laid down only in individual cases and should be governed by the osteopath in charge. The principal effect of general mechanical treatment is

to promote oxidation. Massage and baths are beneficial. The patient can do much for the abdomen by keeping it in and up, and walking erect.

Scurvy

Definition.—A constitutional disease, characterized by extreme general weakness, anemia, spongy condition of the gums, disintegration of tissue and a tendency to hemorrhages.

Etiology and **Pathology**.—In comparison with former times scurvy is now a rare disease. Lack of fresh vegetables or their substitutes, overcrowding, dampness, bad hygienic surroundings, and prolonged fatigue under depressing influences are the predisposing causes. Arctic explorers have shown that fresh bear's meat and bear's blood are a preventative.

There are extravasations of blood into the skin, muscles and mucous membranes. Hemorrhages may occur in the internal organs, especially the kidneys and liver, and in the serous membranes. The gums are swollen and spongy. The teeth decay. The spleen is soft and enlarged. Parenchymatous degeneration of the heart, liver and kidney is frequent. Ulcers occasionally occur in the skin and bowels. The blood is thin but there is no leucocytosis.

Symptoms.—The disease is usually slow in development. The general manifestations of anemia with debility are among the first symptoms. The gums are swollen, soft and spongy, they bleed easily and in severe cases there is ulceration. Petechial spots appear upon the body. Subcutaneous ecchymosis occurs, first on the legs, then on the arms and trunk. The eyes and face are swollen; the patient appears as if he had been bruised. Hemorrhages from the mucous membrane frequently occur. The temperature is usually normal. The pulse is small, feeble and frequent; sometimes irregular and slow. The appetite is impaired and constipation is present at first, as a rule, although this may be followed by scorbutic dysentery.

Diagnosis.—The disease is readily recognized when several cases occur together. It is somewhat hard to recognize in isolated cases, and to be able to distinguish it from certain forms of **purpura**. The etiology, the gingival changes and the hemorrhages usually decide the diagnosis.

Prognosis.—Scurvy being a disease due to malnutrition, it is necessary to remedy such condition by attention and correction of the faults producing it. Hygienic surroundings and a wholesome diet will do more in curing the disease than anything else. An outdoor life and good ventilation with anti-scorbutics, as fruit juices, especially lemons and oranges, fresh vegetables, (onions, potatoes, etc.) and fresh milk, are necessary.

It is held by Garrod that scurvy is caused by an absence of potash, for a deficiency of potassium salts is found in the blood. The anti-scorbutics named above contain potash. A careful treatment along the splanchnics would help to improve the appetite and digestion. Treat the gums and ulcers according to surgical indications.

Infantile Scurvy

SCORBUTUS

This form usually follows the prolonged use of condensed milk, sterilized milk or proprietary foods for children. The disease occurs during the first two years of life, but it is most common from the seventh to the fourteenth month.

It develops rapidly. Joint pains, anemia and irritability are early symptoms. The child is pale, has a muddy complexion and may show signs of rickets. The gums may be soft and spongy. There is tenderness and pain on motion. There may be hemorrhages under the skin. The lower limbs are drawn up and motionless. The bones become thickened from sub-periosteal hemorrhage, and there is apt to be softening between the shaft and epiphysis. The back and legs become very weak. The lesions are usually symmetrical. The temperature is variable.

Treatment.—The treatment of scurvy in children consists in, first, omitting all proprietary foods and substituting fresh cow's milk, meat juice, strained gruel and a moderate quantity of fresh orange or lemon juice. Under this treatment, cases that have not progressed too far will promptly recover.

Northrop says: "It is a significant fact that the country which furnishes most of the literature on scorbutus in children is the same which is posted from end to end with advertisements of proprietary foods."

Purpura

Purpura is a symptom rather than a disease. It is characterized by extravasation of blood into the skin and bleeding from the mucous membranes, irrespective of direct injury. These extravasations do not disappear upon pressure and vary greatly in size. They may be small, (petechiæ) or large (ecchymoses). They are bright red and gradually become darker. Clotting of normal blood requires three to five minutes, purpuric blood, ten to fifteen minutes.

It is a symptom of **infectious diseases**, as in pyemia, septicemia, mycotic endocarditis, typhus fever, smallpox, etc. **Toxic**, as produced by venomous snake bites and by **certain medicines**, as copaiba, mercury, quinine, iodides and others in overdoses. **Cachectic purpura** may be observed in cancer, tuberculosis, Bright's disease, scurvy, etc. In **senile purpura** the spots are generally confined to the extremities. In certain **nervous diseases**, bleeding spots appear on the skin, as in tabes, myelitis and severe neuralgia. **Mechanical purpura** is seen in venous stasis; this is rare.

Purpura simplex affects only the skin. It occasionally follows attacks of infectious diseases. The spots are found upon the legs, more rarely upon the trunk and arms. Articular pains may or may not occur. Fever is seldom present. Loss of appetite, diarrhea and slight anemia may be manifested. The duration is one to four weeks.

Purpura rheumatica is a much more serious affection, characterized by multiple arthritis of rheumatism. Seldom seen under five years, and lasts about two weeks. The joints are swollen and painful and the temperature rises to 101 and 103 degrees F. The amount of edema varies greatly and occasionally it is quite excessive. In addition to the purpura there is usually urticaria. **Henoch's purpura** is seen most frequently in children and is characterized by severe gastro-intestinal disturbances as pain, vomiting and diarrhea, hemorrhages from the mucous membranes and acute enlargement of the spleen, in addition to the symptoms already named under the foregoing form. There is some danger of hemorrhage into the kidneys.

The disorder of **purpura hemorrhagica** is usually associated with rheumatism, malaria and other infectious diseases. This is the most serious form of purpura. It is most commonly met with in delicate girls during early

life; but it may occur at any age and in the most robust of either sex. Fever, weakness, vomiting and diarrhea are the early symptoms. After a couple of days of languor and weakness, purpuric spots appear upon the skin; and bleeding occurs from the mucous membranes and may cause profound anemia. Hemorrhages into the internal organs occur. Favorable cases recover in ten days or two weeks. Others may end fatally. Care should be taken not to confuse the disease with scurvy.

Treatment.—In the treatment of purpura the disease from which it develops should receive due attention. Occasionally there is danger of overlooking the primary disease and treating some symptoms of the disease, although it is true that sometimes an important symptom is nearly all that is manifested. Outside of treating the conditions under which purpura arises, general measures should be considered, as a nutritious diet, rest, fresh air, and general treatment of the patient so that normal circulation and strength may be restored. The treatment of the purpura locally should be such as to restore normal circulation of the part by removing any obstruction or irritation of the blood supply that may be found, by careful manipulation of the tissues. As stated the management of the disease under which it arises should be embraced in the treatment. In cases of hemorrhage from various organs see article under hemorrhage. Some cutaneous hemorrhages are best relieved by local manipulation.

Hemophilia

(Bleeder's Disease).

Hemophilia is a hereditary condition manifested by a tendency to uncontrollable hemorrhage with or without injury. The usual mode of transmission is through the female line, rather than by the male. The mother does not necessarily have to be a bleeder, but the daughter of one, in order to transmit the disease to her offspring. Atavism through the female alone is almost the rule. Not all the children of a bleeding family are afflicted; the male children are more subject to the condition than the female children. The tendency usually appears within the first two years of life. The families of bleeders are often large and are commonly healthy looking and have fine soft skins. It is claimed blondes are most likely to be afflicted.

Pathologically, an unusual thinness of the blood-vessels with a fatty degeneration of the intima has been noted. In many cases there is deficient coagulability of the blood and a lessened number of leucocytes. Hemorrhages have been found in and about the capsules of the joints, and in a few instances inflammation of the synovial surfaces. The arteries are situated superficially, but that does not explain anything. The real nature of the disease has not been determined. Emotional excitement is a factor, consequently vasomotor disturbances may be important. The frailty of the blood-vessels and the peculiar constitution of the blood preventing thrombotic formation are the two facts of importance that have been recognized.

Symptoms.—Hemorrhages occur from the most trifling injuries. Blowing the nose may cause severe epistaxis; the extraction of a tooth is a frequent cause of hemorrhage; the prick of a pin, a slight cut, a scratch, or a blow may result in profuse bleeding. The bleeding may occur spontaneously from the mucous membrane of the mouth, nose, lungs, intestines, etc.; or it may occur directly from the fingers, toes, back of the hands, and lobes of the ears. The hemorrhages may last several hours. As soon as checked the patients rapidly resume natural appearance providing the bleeding is not often repeated, thereby causing a permanent anemia. There may be attacks of arthritis with fever, as with acquired hemorrhagic tendency, closely resembling rheumatism.

Diagnosis.—Hereditary tendency and persistent hemorrhage from slight injury.

Prognosis.—In a few cases the tendency to bleed gradually diminishes until at last it entirely ceases. The younger the subject the more is it liable to prove fatal. In the majority of cases death occurs between the first and eighth years. After maturity the chances of an attack are much lessened.

Treatment.—Members of the bleeder's family, particularly the boys, should be guarded against traumatic influences, and operations of all kinds should be avoided. Outdoor exercise, fresh air, bathing and plain nourishing food, in fact, the hygienic surroundings, and all food should be carefully watched so that the threatened subject may become strengthened and hardened. Marriage should be discouraged, especially with the daughters, as it is through them the tendency is propagated. Possibly, coupled with the

foregoing prophylactic treatment, a stimulation of the glands of elaboration of the blood will be of service to build up the physical constitution of the patient. During attacks absolute rest and the required symptomatic treatment should be given. For resultant anemia the usual treatment is to be employed.

In severe cases direct transfusion should be considered.

FOOTNOTES:

[67] Billings, Focal Infection.

[68] Massachusetts Journal of Osteopathy, Jan. 1906.

[69] Journal of the American Osteopathic Association, November 1919.

[70] Diabetes, p. 90.

[71] Journal of the American Osteopathic Association, Oct., 1904.

[72] Journal of the American Osteopathic Association, Oct., 1904.

[73] Practical Medical Series, 1905.

DISEASES OF THE DIGESTIVE SYSTEM

Diseases of the Mouth

Stomatitis

Definition.—Inflammation of the mouth.

Etiology.—Chemical, mechanical, thermal or parasitic irritations; secondary to disorders of the gastro-intestinal tract, scarlet fever, measles and variola; cachexia, due to such diseases as cancer and phthisis; dentition; artificial feeding; hot weather and poor hygienic surroundings are the most common causes. Lesions to the innervation and vascular supply of the mouth are found, principally, in the upper cervical vertebræ, occasionally in the upper dorsal vertebræ and corresponding ribs.

Varieties.—Catarrhal, aphthous, ulcerative, parasitic, gangrenous.

Catarrhal Stomatitis

Etiology.—Most common in infants and children. Hot and irritating substances; secondary to diseases of the stomach, to measles, scarlet fever and variola; difficult dentition; alcoholic or tobacco excesses.

Hazzard says in all cases of stomatitis “there is generally lesion to the bony or other tissues in the cervical region (sometimes also in the upper dorsal), which deranges vasomotor control of the tissues of the mouth and tongue, obstructs venous return, weakens the tissues and lays them liable to the effects of some particular irritant, local or in the system, but there is, generally, lesion affecting the gastro-intestinal tract which is the real underlying cause of the trouble.”

Symptoms.—Diffuse, red swelling of the mucous membrane, heat and pain in the mouth, increased flow of saliva, fetor of breath, restlessness and languor. In children there is a disinclination to nurse and a slight fever may

be present. The sense of taste is blunted and there is commonly a bitter taste in the mouth. The neck glands are enlarged.

Treatment.—Removal of the exciting cause is the most important point in the treatment. Good hygienic conditions must be enforced. The mouth should be kept clean. Wipe it out at frequent intervals with a soft piece of absorbent cotton and cold water. A borax solution is frequently used. Attention should be paid to the diet and secretions. Light but thorough treatment of the upper cervical region is to be given, with careful attention to the tissues about and below the angles of the jaw, so that the innervation, blood and lymphatic supply may be equalized.

Aphthous Stomatitis

(Canker)

This disease is characterized by little, painful, grayish-white spots upon the superficial layer of the mucous membrane. They consist, primarily, of an exudate of fibrin and wandered-out leucocytes. It is principally a disease of childhood. Among the common causes are difficult dentition, disorders of digestion and uncleanliness of the mouth, such as neglect to cleanse the child's mouth after nursing. It may be a symptom of measles or of local diseases.

Probably the innervation to the region of the little grayish-white spots or canker is obstructed at some points by a disordered tissue. The lesion may be mechanical or it may arise from a disordered digestion. If one is able to locate such a lesion and remove it, a cure will be hastened. The seat of the infection is the internal surface of the cheeks, gums, roof of the mouth, tongue and lips.

Symptoms.—There is redness of the mucous membrane of the mouth, followed by the appearance of the vesicles with a red areola. Pain in the mouth and an increased flow of saliva occur. Mastication, deglutition, and even speaking, may be painful. This condition is followed by sleeplessness, feverishness, diarrhea and fetor of the breath.

Treatment.—Removal of the cause, as in other varieties of stomatitis, is paramount. Give attention to the food. The milk should be sterilized. The disordered digestion should be corrected at once. All secretions must

receive prompt attention. The child should be nursed at regular intervals. Locally, keep the parts clean and carefully treat the innervation.

Ulcerative Stomatitis

This is a disease of children, although it may not be limited to them, as it occasionally occurs in epidemics and affects all ages. It occurs chiefly in the families of the poor and in places where the hygienic surroundings are bad, the food poor and personal cleanliness lacking. It may begin as an aphthous stomatitis. Often sufferers from severe, acute diseases are subjects of attack.

Symptoms.—The gums of the lower jaw are chiefly affected. They are at first congested, swollen and bleed readily. Pain is increased by mastication and deglutition, the mouth is hot, the breath fetid, the saliva dribbles and the digestion and bowels are disordered. The ulcers may appear at various points upon the cheeks, lips and tongue; the deposit is yellowish-gray.

In the more severe cases the gums are spongy and the teeth are loosened. In proportion to the constitutional disturbances, fever and enlargement and tenderness of the submaxillary glands occur. Even necrosis of the bone may follow.

Parasitic Stomatitis

(THRUSH)

The exciting cause is a fungus known as Laccharomyces albicans. It is claimed that a catarrhal stomatitis is the soil upon which the fungus develops. Parasitic stomatitis is chiefly a disease of nursing children and is promoted by unhygienic conditions. It is seldom seen after ten years of age, occurring in adults only in the last stages of consumption, cancer, and severe chronic diseases.

Symptoms.—Upon inspection there are seen numerous milk-white elevations. These appear first about the angles of the mouth, soon extending to all parts of the mouth, and in a few cases, even to the pharynx and to the esophagus. When removed bleeding points are left. The general symptoms of stomatitis are present—pain upon mastication and swallowing; fetid, hot

breath; increased saliva; increased temperature; restlessness; swollen lips and disordered digestion occur.

Diagnosis.—The microscope will remove all doubt as to the nature of the affection. In aphthous stomatitis the ulcers are preceded by the formation of vesicles.

Prognosis.—Is favorable in the majority of cases.

Treatment.—Hygienic measures, absolute cleanliness, correction of the disorders of the gastro-intestinal tract and local treatment as in other forms of stomatitis, is the required treatment. A boric acid solution will be found beneficial.

SPINAL LESIONS AND THEIR RELATION TO DISEASES OF THE GASTRO-INTESTINAL TRACT

Acute Gastritis, Chronic Gastritis, Gastric Neurosis, Gastric and Duodenal Ulcer.

By Charles J. Muttart

The instant relief that Osteopathy can give in acute indigestion is one of its outstanding achievements. It impresses the patient and his friends with a deep conviction of the superiority of osteopathic therapy. The results in these cases are not, in any sense, a matter of chance. They follow logically from the osteopathic viewpoint, teaching, reasoning, and practice. In dealing with the manifestations of disease, such as heredity, onset, course, duration, subjective and objective symptoms, etc., and in the effort to differentiate cause from effect, and to reconstruct a mental picture of the sequence of cause, effect and sequelæ, the osteopath has the advantage of binocular vision in that he recognizes two distinct pathologies cooperating to produce the symptom complex, syndrome or disease which he is called upon to treat. One pathology is to be found in one or more of the vertebral and rib articulations and the immediately adjacent or corresponding segments of the spinal cord. The other is in some one or more of the organs or tissues connected with the pathological segment or segments of the cord.

The function of the joint is MOTION.—Unrestricted normal range of motion is essential for the normal function of all parts of the articulation as well as for the nutrition of the nerve mechanisms immediately adjacent. When a spinal articulation ceases to perform its function all of its parts are more or less impaired, muscles atrophy, ligaments lose their tone, and circulation to and from the spinal segment is interfered with because action is a large factor in promoting the flow of blood and lymph and maintaining normal stimulus.

As a result of this spinal pathology, internal organs and tissues, supplied by nerves arising in the segment that is in lesion, will be variously disturbed in their function.

Dr. Carl P. McConnell says: “My observation of lesioned animals so far as the digestive organs are concerned is that the lesion affects the reflexes of and through spinal and sympathetic ganglia so that the vasomotors are involved with a consequent hyperemia of the submucous coat. This means involvement of the endothelial layer of the blood-vessels, diapedesis, derangement of the secretory function and disturbance of the motor mechanism, all of which lead to functional upset and disturbance.”

The dominant part played by the osteopathic lesion as a causative factor in acute and chronic diseases of the alimentary canal becomes increasingly evident as clinical observation and laboratory research permit a more thorough appreciation of the anatomy and physiology of the parts involved. The abnormal stands out more clearly from the normal. Finally, the task of restoring normality is becoming a clear-cut problem to which the correction of the osteopathic lesions furnishes an almost complete solution.

The normal alimentary canal transports food, macerating it, mixing it, and treating it with various chemicals and enzymes on the way, breaking it down physically and chemically, and absorbing from it such end-products as are needed to maintain metabolism. The abnormal alimentary tract may be at fault in any of these functions. This delinquency is generally traceable to a mechanical origin. Correction of the mechanical deviation is followed by restoration of normal function except in cases where extensive tissue changes have occurred.

Thorough mastication is essential to good digestion. Any dental defects or deficiencies should be corrected. **The temporo-mandibular articulation** should be examined, and full free motion restored if lacking. The muscles on the affected side are softer than on the sound side. Tonic spasm rigidly closes the mouth. It may be due to tetanus, caries of the lower teeth, cutting of the lower wisdom tooth, or other irritations to the sensory branches of the inferior maxillary nerve. There is enough space back of the wisdom teeth to pass a catheter to administer food.

The tongue assists in mastication and deglutition and is the seat of most of the nerves of taste. The hypoglossal nerve, which supplies it, leaves the

skull through the anterior condyloid foramen and may be impinged there or lower in its course. **Lesions of the occiput and upper cervical vertebræ** and obstructions to the lymphatic drainage at the angle of the jaw may cause pressure on this nerve and cause disturbances in the movements of the tongue, atrophy, swelling, etc. Swelling may be due also to endocrine disturbance, constitutional diseases, anemia, glossitis, local irritants, injuries, etc. Pressure may be made on the hypoglossal nerve behind the angle of the jaw.

The special sense of taste plays an important role in normal digestion. The lingual nerve supplies the anterior two-thirds of the tongue with taste. The sense of taste may be lost, impaired, perverted or otherwise abnormal.

The sense of smell plays an important part in our appreciation of flavors, and when it is impaired by colds, adenoids, or other affections of the nose or pharynx, the sense of taste is measurably impaired. **Normalization of nose and pharynx** restores the sense of taste in such cases. Impairment or loss may also be due to lesions of the chorda tympani, or glosso-pharyngeal nerves. Lesions of the mandible, hyoid, occiput or upper cervical nerves, parotid disease or obstructed lymphatic drainage behind the angle of the jaw may cause pressure directly or indirectly on the glosso-pharyngeal and chorda tympani nerves. Perversion of taste occur in pregnancy, hysteria, epilepsy and insanity.

Foul taste, fetororis in the mouth is frequent in pneumonia, typhoid fever, peritonitis, septicemia and other severe fevers; also after ingestion of pungent foods or strong drugs; in constitutional diseases; as a result of inattention to oral hygiene, excessive smoking, mouth breathing at night, furred tongue, etc. It clears up on removing the cause.

Furred tongue occurs in gastritis, fevers, and a variety of other conditions. The fur is composed of broken down epithelium which would normally be removed by friction with solid food. When none is taken, the fur accumulates. When blood or hematin becomes mixed with the broken down epithelium, the fur is brown. Ordinarily it is white. **A clean red tongue** is frequently found in hyperacidity. It is probably due to vasodilatation due to hyperactivity of the autonomics or inhibition of sympathetics. The sympathetic supply is from the **superior cervical ganglion**. It may be affected by lesions of the occiput, atlas, axis and third

cervical vertebra, of the hyoid, by anterior cervical muscular contractures, by obstruction to venous and lymphatic drainage and blood supply. Correction of the lesions named and normalization of the other structures involved will usually restore the tongue to normal condition.

The salivary glands have a two-fold innervation. The thin, full, watery, salty secretion is produced by activity of the cranial autonomic fibers; the sparse, viscous secretion containing the organic elements, ptyalin, etc., is produced by the sympathetics. **The sympathetic nerve supply** is from the middle and superior cervical ganglia and can be disturbed by lesions affecting them as mentioned above. The secretion of ptyalin may be disturbed by any lesion from the fifth dorsal up.

It must not be forgotten that a **posterior occiput** draws the superior cervical ganglion back against the axis and third cervical with just as much pressure as is exerted by an anterior atlas or third cervical. This pressure or stretching tends to inhibit it, preventing vaso-constriction and permitting vasodilatation of the internal carotid artery and its branches and congestion of the parts supplied, mid-brain, cerebrum, etc.

If, for any reason, the venous drainage from the lateral sinus into the internal jugular vein, or the ebb and flow of the cerebrospinal fluid between brain and cord, is reduced or hampered, an extra burden is thrown on the cerebral veins and sinuses, and the intra-cranial pressure is raised at each heart-beat, ultimately producing pressure on the meninges and causing violent headache over the fifth and tenth cranial nerves which supply the meninges with sensation. These nerves are intimately connected with the digestive system. Any increase of intra-cranial pressure causes increased irritability and hyperactivity of the cranial nerves, many of which are concerned with various functions of the digestive system. Moreover, the nuclei of these nerves lie on the floor of the fourth ventricle which is supplied mainly by the vertebral arteries and the basilar artery. Lesions of the cervical vertebræ affecting the plexus on the vertebral artery or filaments to it from the upper parts of the cervical gangliated sympathetic cord, may impair the blood flow through the vertebral arteries and cause similar increased irritability of the nerve cells in the medulla, mid-brain and cerebellum. Such disturbance is reflected in awkward movement, hyperesthesia, and symptoms due to increased irritability of the autonomic nerves such as slow pulse and respiration, watering of the mouth,

hypersecretion and hypermotility of the gastro-intestinal tract, rapid digestion and poor assimilation, vasodilatation, impoverished blood, and so through a vicious cycle back to still greater impairment of nutrition to the nerve cells within the cranium. Until the lesions are corrected, the condition becomes progressively worse till exhaustion occurs.

Ordinary medical hygiene can do little or nothing. The palliative remedies employed simply mask the symptoms, or actually accelerate the destructive process. Lesions that irritate the cervical sympathetics would cause vaso-constriction and give rise to opposite symptoms, namely, cerebral ischemia, decreased flow of saliva, atony of stomach, lack of digestive juices, sluggish intestinal peristalsis, rapid pulse and respiration, etc. Correction of the lesions and restoration of normal blood supply and drainage to the brain and removal of any lesions tending to inhibit the sympathetics from the fifth dorsal up, will usually in a short time restore the activity of the salivary glands to normal. The otic and sphenopalatine ganglia can be disturbed by abnormal conditions within the pharynx. These must be corrected when found.

Deglutition, or swallowing, is a very rapid, highly complex movement. It takes not more than a second for the food to cross the pharynx. The soft palate and larynx are raised to close off the air-way, making the food-way practically continuous for the second needed to complete the transfer of the food across the air-way. The tongue is pressed against the roof of the mouth and the mylohyoid contracts vigorously and shoots the bolus of food across the pharynx. Bolting the food leads to serious digestive disturbances, not the least of which is the loss of the normal reflex which prevents swallowing unprepared food. When lost, this reflex can be restored by thorough mastication for three or four months.

The voluntary part of swallowing is performed by the motor portion of the fifth cranial and the hypoglossus. The involuntary part involves afferent impulses over the superior laryngeal and efferent impulses over the inferior laryngeal. The levator palati which raises the soft palate is probably supplied by the spinal accessory nerve through the pharyngeal plexus. This nerve can be affected by lesions of the occiput, atlas, mandible and hyoid, and by any obstruction to lymphatic drainage which increases pressure behind the angle of the jaw. In paralysis of the levator palati, as **after diphtheria** or other peripheral neuritis, fluids regurgitate through the nose

during the act of swallowing. The raising and closing of the larynx is accomplished by the superior and recurrent laryngeal nerves by way of the pharyngeal plexus. Pain in swallowing is generally due to some inflammation or infection of the tonsil or pharynx. This does not occur when everything is normal from the fifth dorsal up.

The second and third stages of swallowing occur in the **esophagus**. The esophagus receives esophageal branches from the vagus, carrying autonomic fibers which contract its longitudinal muscles and dilate its arteries. It also receives sympathetic impulses from the plexus on the arteries which supply it. These sympathetic impulses convey vaso-constriction and constriction of the circular muscles of the esophagus. Any lesion from seventh cervical to ninth dorsal might affect the esophagus; probably fifth dorsal is the most nearly specific, as the heartburn which results from regurgitation into the esophagus is usually localized there.

Lesions of the upper six dorsal vertebræ interfere with digestion and nutrition in another vital way by reducing the activity of the lungs and consequent **intake of oxygen** into the system. If there is not sufficient oxygen to oxidize the proteins to amino-acids there will be harmful products left for the tissues to neutralize. Lesions of the third, fourth and fifth cervical affecting the **phrenic** may have a like effect. Sub-oxidation must be noted when present and treated by removing lesions affecting respiration, by deep breathing exercises, and by diet rich in the needed mineral salts, and properly balanced. An improperly balanced diet changes the structure of the tissues and amounts in effect to an osteopathic lesion which causes disturbed function. It must be searched for, found if present, accounted for, corrected and kept corrected to obtain maximum therapeutic results.

The stomach, intestines and rectum are intimately related with the other abdominal viscera.

It will therefore be readily seen that any disturbance of the liver, gall-bladder, pancreas, spleen, duodenum, pleura or peritoneum will disturb the function of the stomach, and that any disturbance of any organ will disturb the function of the intestine. In fact, clinically, it would seem that the majority of cases can be accounted for by the lesions found, the stomach or intestinal disturbances which are regarded as reflex from some other organ,

being in reality caused by the same lesion as disturbed the organ which first manifested disturbance.

Going more deeply into the nature of the mechanism whereby symptoms of gastro-intestinal disturbance are produced, we find that the alimentary tract has an ingenious conveyer mechanism with a number of sphincters. These are operated by intrinsic sympathetic or myenteric nerves, called plexuses of Meissner and Auerbach. In conveying food, impulses are passed from one portion of the tract to the next over these myenteric arcs. Normally the peristaltic movement is always forward because the point of highest irritability is at the proximal end. There is an exception to this rule in the ascending colon, where antiperistalsis occurs normally. When the irritability of a distal point of the alimentary tract becomes greater than the more proximal points, an antiperistaltic wave is set up causing vomiting. The myenteric activities are regulated by the autonomic impulses over the vagus, and by the sympathetic impulses over the splanchnic nerves. The autonomics contract the longitudinal muscles, dilating and shortening the tube. They also stimulate secretion of digestive juices and fluids and mucus and dilate the blood-vessels. The sympathetics contract the circular fibers and sphincters, narrowing and lengthening the tube, retarding the food, inhibiting the secretions and constricting the blood-vessels. The myenteric reflexes can continue after the vagi and splanchnics are cut. The vagi simply stimulate them and the splanchnics inhibit them. The pathways are from the coeliac plexus where the vagi and splanchnics meet with various other plexuses on the arteries and following the courses of the arterial supply to the minutest parts of each organ. Each cell is surrounded by nerve fibers. Visceral-afferent fibers over both vagi and splanchnics convey impulses to the cord segments and medulla which modify the systemic blood supply, drawing blood from the head and surface by constricting their arteries during digestion and filling the abdominal arteries. If opposite impulses should be received drawing blood away from the abdominal arteries, digestion would be interfered with. Any lesion or other condition causing hyperirritability or overstimulation of the vagus will result in overstimulation of the myenteric nerves, with vasodilatation, hypersecretion, contraction of the longitudinal coat, widening and shortening of the digestive tube, sluggish peristalsis but rapid movement of food through the sphincters, incomplete digestion and undernourishment. Inhibition of the splanchnic nerves will produce a like result. The opposite

condition would come about as a result of inhibition of the impulses over the vagus to the myenteric nerves, or of overstimulation of the splanchnic nerves.

Inhibition of the splanchnic nerves may be secured by extreme flexion of the spinal column. This raises the cord in the spinal canal, lengthens it, stretches or draws on the nerve roots and vessels, squeezes the fluid out of the cord, and inhibits the splanchnics in two ways, first by a partial anemia or ischemia of the cord, and secondly by direct traction of the visceral afferent fibers in the posterior and anterior roots.

Conversely, stimulation of the splanchnic nerves may be secured by complete extension of the spinal column. This lowers the cord in the spinal canal, shortens it, releases the strain on the nerve roots and vessels, flushes the cord with blood, and tones up the sympathetic impulses in two ways, first by increasing their relative and absolute nutrition, through richer supply of richer blood, and secondly by releasing the nerve roots from strain, permitting free entry of afferent impulses over the posterior roots, and free exit of visceral-efferent impulses over the anterior roots.

Any lesion, inasmuch as it limits or alters the normal motion in a joint, produces an exaggeration or diminution of the normal spinal curves, and more or less lateral curvature. The altered equilibrium thus produced affects the viscera in three ways: 1. Mechanically, by pressure, gravity, altered position of ribs, vertebræ, diaphragm, etc.; 2. Reflexly, influence on nerves to and from affected segment; 3. Directly, by interference with nutrition of nerve cells by hyperemia or ischemia.

There is always a functional kyphosis in visceroptosis or splanchnoptosis. The nerves in the cord are inhibited. The skeletal muscles are hypotonic, allowing the functional kyphosis to occur, and the viscero-motor nerves are inhibited, allowing the abdominal viscera to become hypotonic and sag out of place within the abdominal cavity. The ribs are held up by the cervical fascia, and the abdominal muscles are held up by the ribs. The hypotonic condition extends to intercostals and abdominal muscles, with the result that the abdominal muscles are unable to play their part in maintaining the viscera in their proper places. The contraction or tonus of the abdominal muscles, the external and internal oblique, transversalis, rectus abdominis, diaphragm and levator ani, maintain the

viscera firmly in position. It is only when the muscles of the abdominal wall have lost their tone that any strain or weight is thrown on the peritoneal and vascular supports. The inhibition of the restraining sympathetic impulses via the splanchnic nerves, allows hypersecretion and hypermotility of the alimentary tubes and further complicates the clinical picture by a colicky diarrhea or spastic constipation.

There are eight sphincters of circular unstriped muscle in the alimentary tract. Inhibition of sympathetic supply or increased autonomic supply causes sphincter insufficiency, overstimulation by sympathetic impulses or an insufficient supply of balancing autonomic impulses causes sphincter spasm, stasis, vomiting, fermentation, putrefaction, auto-intoxication. At each of these sphincters food is held back and controlled till the proper time has elapsed and the proper chemical environment is prepared for it in the next portion of the tract. Normal function of these sphincters is absolutely essential to normal metabolism and nutrition. The upper esophageal sphincter controls the entrance to the esophagus; the cardia controls the entrance to the stomach, the pylorus controls the entrance to the duodenum, the X-Ray shows a duodenal sphincter that controls the entrance of food into the jejunum. Here the food enters the long tract of the jejunum and ileum which measures twenty-five feet when the longitudinal muscles are relaxed and the circular muscles tonic, and which a short time later may measure only fifteen feet when the longitudinal muscles are contracted and the circular are relaxed. This section ends at the ileo-cecal valve, which controls the entrance of food into the cecum. There is the mid-colic sphincter about the junction of the proximal third with the distal two-thirds of the transverse colon, and the recto-colic sphincter which controls the passage from the sigmoid to the rectum. The rectum ends in the internal sphincter ani. There is some evidence of a ninth sphincter, the mid-gastric at the point where the peristaltic waves of the stomach begin. Absorption takes place mostly from the ileum and jejunum and it is worthy of note that four of these sphincters hold the food up on its way into this part of the tract, and four of them hold it back on its way out. Any lesion may affect one or other of these sphincters. It is believed that antiperistalsis from the mid-colic sphincter to the cecum during digestion is normal permitting more complete absorption of nourishment. Yet here, after absorption is complete, and at all times elsewhere in the alimentary tract, peristalsis is normally forward

because the point of highest irritability is at the upper esophageal sphincter and the irritability decreases as the tract is further from the esophagus.

When the splanchnics are inhibited and the vagus autonomic impulses are normal or increased, the intestinal sphincters from the pylorus down may all be incompetent, so that food passes along too rapidly to be properly digested and absorbed. This results in undernourishment.

Any lesion anywhere in the body will affect **peristalsis**. It begins at the lower third of the stomach where it joins the pyloric portion and goes forward to the internal sphincter ani, being modified in its course by local conditions. Compensation may be established. Many cases of diarrhea and constipation are thus to be accounted for. **Diarrhea** is a symptom due to vasodilatation, hypersecretion and relaxation of the circular muscles especially at the sphincters. When these three factors are cleared up by correction of the lesions and hyperextension of the spine, the diarrhea stops unless some other factor is at work to irritate the myenteric nerves or to excite the autonomics or inhibit the splanchnics. Lesions from the sixth dorsal down are usually accompanied at first by some diarrhea, which afterwards becomes constipation, through loss of tone in the longitudinal muscles especially in the distal part of the colon. In these cases, correction of lesions, and extreme flexion of the lower dorsal and lumbar spine will give relief while the body is returning to normal.

When gastric digestion begins, simultaneous action is set up in the ileum. When disease of the cecum, appendix or ascending colon is present, there is contraction of the ileo-cecal valve causing stasis of the lower ileum and disturbed or retarded action of stomach and duodenum. These reactions are brought about by impulses to and from the myenteric plexus. The sympathetic and autonomic nerves affect the motor system of the alimentary tract not directly but through the myenteric or Auerbach's plexus.

The **external sphincter ani** muscle is supplied by the pudendal nerve from the third and fourth sacral segments. It is in a state of tonic contraction, and having no opposing muscles keeps the anal orifice closed. The autonomic supply to the longitudinal muscles in the descending colon and rectum is from the second and fourth sacral. Inhibition here will, therefore relax the longitudinal muscles and external sphincter and permit

free peristalsis in the descending colon and rectum. Pelvic disturbances may affect these nerves, or pressure due to visceroptosis, etc. The circular muscles of this section are supplied from the lumbar cord. They may be affected in any lumbar lesion, with the end result of spastic constipation by reason of a shortened markedly distended descending colon, sigmoid and rectum, and little peristalsis because of inhibition of the circular fibers, and contraction of the external sphincter ani.

The fundus of the stomach, lying in the left dome of the diaphragm, always contains a cushion of air which supports the left dome of the diaphragm, as the convexity of the liver supports the right. Normally the air is regulated and causes no symptoms. A lesion, usually of the mid-dorsal or lower dorsal segments may inhibit the circular fibers and permit distension, which becomes enormous when the pylorus is obstructed. The shortness of breath, palpitation of the heart, etc., accompanying this distension are probably due to pressure on the heart and lungs from which the stomach is separated only by the diaphragm.

Eighth, ninth and tenth dorsal lesions play a large part in peptic ulcers by permitting hyperemia, hypersecretion, and lowered vitality of the mucosa, and pyloric incompetence or spasm, because the pylorus, pyloric end of the stomach and first part of the duodenum get their chief sympathetic supply from the ninth and tenth dorsal segments of the cord. The tenth vertebra is more freely movable than the higher dorsal joints and is therefore more frequently in lesion, which helps to account for the greater frequency of duodenal ulcer.

The main sympathetic supply to the appendix seems to be derived from the eleventh dorsal segment. The appendix has the same motor and secretory mechanism as the rest of the alimentary tract but is richly supplied with lymphoid follicles. One of the twigs from the eleventh dorsal nerve pierces the rectus muscle to supply the skin at McBurney’s point, thus explaining the great frequency of pain and cutaneous hyperalgesia at this situation in appendicitis. Lower dorsal and upper lumbar lesions are unquestionably causes of many cases of appendicitis and other obscure diseases traceable to appendicitis. Correction of these lesions has restored the appendix and related structures to normality in hundreds of cases.

Sensory reflexes are shown in hyperalgesia and pain or tenderness in the abdominal skin and muscles and the parietal layer of the peritoneum from the ensiform cartilage to the pubes in an area extending about two inches on each side of the mid-line, corresponding to the distribution of the twigs of the lower six thoracic nerves which supply sensation to this region. **Esophageal** disturbance at the cardia causes pain in the region supplied with sensation by the fifth and sixth dorsal, near the ensiform. **Gastric derangement** causes pain midway between the ensiform and umbilicus, which radiates to the left, in the area supplied by the eighth dorsal. **Hepatic disturbance** causes pain on the right of the median line, radiating to the right in the sensory distribution of the ninth dorsal. **Intestinal pain** is located in the sensory distribution of the tenth dorsal nerve in an oval area around the umbilicus. Pain due to **duodenal ulcer** is sharply localized at a point about an inch or two above and to the right of the umbilicus where twigs of the tenth dorsal nerve come to the surface. This point corresponds closely to the normal position of the underlying duodenum, though the duodenum may be displaced, and the sensitive spot remain at the same point. The pain from **fundal gastric ulcer** or **carcinoma** is usually localized sharply about an inch or two to the right of the median line midway between the ensiform and umbilicus, at the spot where the twigs from the eighth dorsal nerve pierce the rectus and come to the surface. In the disease of the **pylorus**, reflex pain is lower; of the **cardiac end**, higher. The reflex pain at McBurney's point in **appendicitis** has been referred to, but it must be borne in mind that pain from disturbance in the **colon** also shows in the sensory distribution of the eleventh dorsal nerves midway between the umbilicus and pubes. Pain may also be referred to areas supplied in the back by the corresponding segments. These reflex pains can usually be stopped by inhibiting along the spine corresponding to the sensory area affected. This reduces the impulses entering the posterior roots and lowers the irritability of the segment.

The **motor reflexes** from gastro-intestinal disturbances result in muscular contractures of spinal, abdominal and other muscles supplied by motor nerves arising in the anterior horn of the segment which innervates the part of the viscus that is affected. Stomach, liver, gall-bladder, pyloric and duodenal disturbances cause increased tone, contraction, contracture and rigidity of the rectus muscles above the umbilicus, for instance, and the other viscera contract it in lower portions. More important are the extreme

contractures of the musculature of the back which is supplied by the segments which supply the affected part of the viscus. These contractures produce some distortion and loss of motion in spinal joints and thereby produce the same effects as primary lesions, causing widespread disturbance which persists until the spinal musculature is normalized. In **colic**, the lumbar segments being involved, there is marked contraction of the ilio-psoas which causes the characteristic drawing up of the thighs on the abdomen, while the extreme contraction of the rectus abdominis draws the thorax down.

Most persistent vomiting may arise reflexly from other organs as in so-called biliousness, jaundice, pregnancy, brain affections, appendicitis, onset of acute infectious diseases, alcoholism, sea-sickness, colic, hernia, intestinal obstruction, migraine, shock, and anesthesia. Irritation of any sensory branch of the vagus or of nerves which connect with it in the medulla, or reflexly from consciousness via the cerebral cortex, as in the case of nauseating sights, smells, tastes, as well as irritation from any viscera innervated from the sixth dorsal down, may overstimulate the corresponding efferent nerves going to parts of the alimentary tract supplied by that segment, increase its irritability and start antiperistalsis. Similarly disturbances in almost any viscus may reflexly disturb the normal balance between sympathetic and vagal autonomic stimuli resulting in hypersalivation, hyperchlorhydria, pylorospasm, distension, gastric atony, gastrosulcorrhea, enterocolitis, spastic constipation, achylia, or colicky diarrhea. In these cases, the derangement of the viscus reflexly disturbs the alimentary tract through central nerve connections. Correction of the primary trouble is followed by removal of the reflex symptoms. In this connection it is important to note that the visceral reflex symptoms may arise from irritation of the alimentary tract by improper diet, poor cooking, or wrong combinations. Carbohydrates digest quicker than proteins, and these more rapidly than fats. Food is handled by the fundus in the order in which it was swallowed. If the fats are swallowed first, the starches may be held up for five or six hours, subjected to the acid stomach secretions and allowed to ferment causing distension, which reflexly produces a variety of symptoms.

Mental exertion, strong emotions, heavy physical exertion, interfere with the function of the alimentary tract and set up disturbances in the balance of

sympathetic and vagal autonomic impulses, through the nervous reflexes via the cortex, and through the demand for blood, which impoverishes the abdominal circulation at a time when it needs all the blood it can get. The ischemia produced in this way has about the same effect as ischemia produced by a spinal lesion. Conversely, disturbances of the alimentary tract produce profound changes in character and personality, by reflexes to the cerebral cortex causing dullness of perception, in all the senses, poor memory, sluggish thought, erratic judgment, irritable disposition, fear, worry, lack of ambition, indecision, lack of energy, vacillation, and finally a psychosis in which manic depressive symptoms are balanced by paranoiac symptoms.

The alimentary tract is so intimately bound up with the whole stream of vital activity, whether vegetative, sensorimotor, or psychic, that any disturbance of body or mind is likely to affect it in some part, and conversely any disturbance of the alimentary tract is bound to affect all the rest of the body and the mind. A satisfactory classification of its diseases is therefore difficult to make, but the one here adopted is probably the best for the purpose. The early stages of gastro-intestinal diseases are often so similar that it is nearly impossible to differentiate them with certainty; the classification is therefore based on the clinical picture and pathology of advanced stages. Fortunately, with the exception of cancer, diseases treated in the early stages usually clear up when the lesions are corrected, and the necessary attention given to the other causative factors present.

Acute Gastritis

Acute dyspepsia is one of the frequent disorders of the stomach. It may occur as an early symptom of an infectious disease, but very often it is due to some non-specific irritation. The usual exciting causes are errors of diet, over-indulgence in improperly cooked and highly seasoned food, or food that has been spoiled, such as meat, fish and milk, or over or under ripe fruit. Food that is either too hot or too cold may develop an attack. Alcohol is a common cause in those not accustomed to its use. Overuse of tobacco may bring on an attack. Many acute “bilious” attacks are brought about by some mental shock or excitement at the time of taking food, for it has been

shown by the researches of Pawlow that both gastric motion and secretion are altered by mental irritation during digestion.

Unquestionably osteopathic lesions of the splanchnics and vagi are important predisposing factors. These lesions produce a lowered resistance of the tissues, which will frequently explain why certain exciting factors that will initiate an attack in one individual will not do so in another. A healthy mucosa will not be so readily irritated by either indigestible or partly decomposed food.

Osteopathic experimental work reveals that the vertebral and rib lesions readily affect both the spinal nerves and the sympathetic ganglia, which is followed by vasomotor and trophic disorder to the mucous and submucous coats of the stomach, as shown by eccymosis and hemorrhage of the submucosa and beginning parenchymatous degeneration of the free ends of the glands of the mucosa. Upon the other hand irritation of the muscles from dietetic errors always causes more or less contraction of the muscles in the upper and middle dorsal, which, in turn, may produce through imbalance of tension and fibrositic changes, constant interosseous lesions and thus be the cause of the catarrh becoming chronic. This vicious cycle phenomenon should not be overlooked. Viscero-motor, viscerosensory and viscerotrophic reflexes may be factors in the pathogenesis of the osteopathic lesion.

Pathologically, the mucous membrane is more or less covered with mucus. Upon removal of the mucus the membrane is found red and swollen, and the epithelial cells of the glands are granular. This is especially noted in the pyloric area. There are minute extravasations of blood and hemorrhages of the mucous coat, and infiltration of the submucous layer.

Symptoms.—Acute gastritis occurs at all ages, so particularly in children care has to be taken that the attack is not the beginning of some infectious disease. A careful inquiry into the history, and examination of the vomitus will usually make the diagnosis clear. The sudden onset of nausea, vomiting, pain in the epigastric region referred to the back and head, vertigo in some cases, if the infections can be ruled out should leave no doubt as to the nature of the disorder.

Other symptoms are weakness, and chilliness which later if the attack is severe, is followed by fever. The tongue is coated, the lips dry, and there

may be herpes. Belching of gas, constipation in some and diarrhea in others, and dark colored urine are noticeable. There is tenderness on palpation over both the stomach and splanchnic areas. Examination of the stomach contents show deficient hydrochloric acid, the presence of organic acids, bile and undigested food, and considerable mucus.

Diagnosis.—In young children acute gastric indigestion is common, though a casual gastritis is rare. In the former prostration, vomiting, and undigested, greenish stools are noted. In some cases there is no fever, while in others it may range from 102 to 105 degrees. In all cases care should be taken, as has been stated, that the attack is not the beginning of some infectious disease. Appendicitis, acute bowel constriction, pregnancy, uremia, meningitis, gall-stone colic, and gastric crises of tabes dorsalis should be differentiated. Most attacks of acute dyspepsia are over in twenty-four hours. The prognosis depends upon eliminating the cause. The X-ray may be of value in protracted cases.

Treatment.—If the case is seen early, emptying the stomach by induced vomiting or the stomach tube is the first indication. If several hours have elapsed and much of the stomach contents have passed into the intestine, emptying the colon with an enema will commonly give quick relief. Withhold all food for from twelve to twenty-four hours, or longer if necessary. In some cases the sipping of hot water will be beneficial, while in others pellets of ice in the mouth will give some relief.

Whether or not there existed previous spinal lesions there will always be found muscular tension and spinal rigidness during an attack of acute gastritis. These should be corrected for immediate relief, but what is of greater importance, if these acute lesions are not corrected the patient's recuperative forces are interfered with and recovery is delayed. Then, also, these lesions tend to chronicity and predispose to future attacks. Treatment should be given daily, or oftener if special indications arise. Though the most common area that demands attention is from the fourth to tenth dorsals, still the vagi nerves, especially the right, should not be neglected. Lesions of the upper three cervicals are the most frequent disturbances of the vagi.

Vomiting is a common and distressing symptom. Pathologically, it is due to an antiperistaltic contraction of the stomach and a spasmodic contraction

of the diaphragm and the abdominal muscles. It is caused, usually, by irritation of the vagus in the stomach, or in the pharynx by irritation along the spine (particularly in the cervical and upper dorsal regions), or to the sympathetic nerves or to various parts of the body, or by direct influence of the brain. Relief can usually be given by inhibition of the vagus in the occipital region or by inhibition at the fourth or fifth dorsal vertebra on the right side. In a few instances, placing the patient in the knee-chest position and gently raising the abdominal organs gives relief. If this does not suffice the stomach and colon should be emptied, providing the vomiting is protracted. A frequently effective measure for nausea and vomiting that can be carried out by the attendant, is the application of hot fomentations to the dorsal spine.

Flatulency may be very distressing. The spinal treatment may be sufficient to control this condition, or careful direct pressure for a few minutes over the pit of the stomach. Adjustment of the lower ribs, especially of the left side, may be effective. Occasionally the gas can be passed into the intestines by careful inhibitory treatment in the region of the eighth and ninth dorsals. The inhibitory treatment causes relaxation of the pyloric orifice; also, inhibition of the left vagus relaxes the pylorus. Inhibition at the sixth and seventh dorsals relaxes the cardiac orifice, thus favoring the passing of the gas from the stomach out through the esophagus.

In all cases subject to gastritis the dorsal spine should receive considerable attention in order that recovery may be complete. The habits of the patient should be thoroughly regulated and overfatigue guarded against. And, also of special importance in recurring attacks, is the fact that a number of cases present some derangement of the biliary tract, or duodenum, or the appendix region.

Diet.—After twenty-four or forty-eight hours, if the attack has been severe, albumin water may be given in small quantities; also whey, milk, bouillon, and chicken or lamb broth. If there is no return of gastric distress, add junket, custard, cornstarch pudding, gelatine, dropped eggs, scraped beef, and white meat of chicken; vegetables purees made with cream or meat stock are usually well borne at this time. Foods containing much cellulose, fats and sweets should be withheld until all symptoms have subsided.

Chronic Gastritis

It is unnecessary here to repeat the causes of acute gastritis, any one of which continued over a long period of time will cause chronic catarrh of the stomach, as it is sometimes called.

Spinal and rib lesions anywhere from the occiput to the coccyx, but more particularly from the fourth to the tenth dorsal, will predispose to chronic gastritis, the particular type and degree of local pathology depending upon the exciting factor.

A commonly found *en bloc* lesion is a flattening of the normal convexity in this region, with more or less immobilization, shown by attempting to reestablish the normal convexity through flexion.

In addition there may be single spinal or rib lesion in the same area, or cervical lesions affecting the pneumogastric, which is the secretory nerve to the stomach. (See chapter on the "Lesion and Its Applied Anatomy.")

Pathology.—Chronic gastritis probably never develops as such without going through several preliminary stages beginning with alimentary hypersecretion, or hypersecretion occurring only during the active period of digestion. These are the cases usually classified as hyperchlorhydria. At this time no actual pathology can be demonstrated in the glandularis.

If the condition is not treated intelligently at this time the next step will be periodic attacks of what is known as "hypersecretion periodica chronica" followed by "hypersecretion continua chronica." The stomach contains abnormal amounts of gastric juice even after a night's rest. At this stage there is a transition from the functional to the organic condition. All stages are characterized by an abundant secretion of mucus.

If allowed to go on there will finally result a destruction of the secreting cells known as Atrophic Gastritis or Achylia Gastrica in which the stomach presents a smooth functionless appearance.

Secondary Chronic Gastritis.—Portal obstruction from any cause predisposes to chronic gastritis. The most common of these is failing compensation in heart lesions, which through back pressure causes portal stasis; the same thing may follow obstruction in the liver itself. Chronic gastritis is also a late accompaniment of the nephritic trinity, kidneys, heart

and arteries. It may also be associated with diabetes, gout, anemia and other constitutional disorders.

Tuberculosis is commonly ushered in by symptoms of chronic gastritis. We should be constantly on the alert to avoid the mistake so commonly made of treating the stomach as an entity and overlooking the real trouble in some other part of the anatomy.

It is probably safe to say that there are only two primary diseases of the stomach, ulcer and cancer. All others are suspiciously associated with diseased processes elsewhere, and when the spinal lesion is given its full significance even these will be found to be directly traceable to anatomical perversions somewhere within the mechanism of local nutrition.

Symptoms.—These are governed by the stage of progress in which the patient is seen. During the stage of hypersecretion of acid gastric juice there will be vague feelings of distress, fullness and burning in the stomach, and "heartburn" during digestion. When the stomach is empty all symptoms will subside. Later there will be periods of a few days or weeks when there will be more or less continuous distress with some vomiting of highly acid gastric juice containing mucus.

When the condition has progressed to the stage of continuous hypersecretion there will be continuous symptoms as above, but with nausea, vomiting becoming more frequent especially late at night or in the morning, always accompanied by sticky mucus.

Appetite is variable, there is often a disagreeable taste in the mouth (the "dark brown" taste of the chronic alcoholic). Heart palpitation and vertigo and other vagus symptoms are common.

Diagnosis.—On physical examination the stomach is found distended, and in some cases displaced (gastroptosis). There will be diffused tenderness on pressure over the whole organ which should help to distinguish it from gastric ulcer or cancer in which the tenderness is quite localized.

Chronic gastritis cannot be **positively** diagnosed without making a gastric analysis. Many cases are wrongly diagnosed through neglect of this very important procedure.

The cases in which gastric analysis should be made are so well stated by Lockwood that we will take the liberty of quoting them in their entirety.

"(1) Gastric analysis should always be made in every case of dyspepsia, no matter whether these symptoms be apparently gastric or intestinal, unless passage of the tube is contraindicated.

"(2) Gastric analysis should be made in every case of chronic diarrhea that is not due to evident disease of the colon or rectum.

"(3) Gastric analysis should always be made in all cases of intestinal toxemia, or recurring headache of toxic origin, and in patients who complain of the symptom complex which is spoken of by the laity as 'biliousness'.

"(4) Gastric analysis should be made in all cases of anemia and general physical wretchedness without known cause and which are rebellious to treatment."

The finding of excessive gastric mucus intimately mixed with food remnants is the chief differential point in the diagnosis of chronic gastritis.

Differential Diagnosis.—A complete statement of differential diagnosis by Kemp cannot be well improved upon.

"CHRONIC GASTRITIS.—No severe pain, no circumscribed spot, painful to pressure; no hematemesis; no cachexia; no marked emaciation, except in severe cases of long duration; free hydrochloric diminished or absent; gastric mucus present; slow course.

"ULCER OF THE STOMACH.—Hyperchlohydria present, but not invariably so; severe pain in the epigastrium with intervals free from pain when stomach is empty; local tenderness which is circumscribed; dorsal pain; hematemesis, or occult blood in the stool or gastric contents; microscopic pus; no mucus; patient has appearance of suffering; no true cachexia.

"CANCER OF THE STOMACH.—Age usually over forty-five; rapid course; free hydrochloric acid usually markedly diminished or absent; lactic acid present; pain generally continuous, but not so acute as in ulcer; Boas-Oppler bacillus; cachexia; tumor on physical examination; small amount of visible or occult blood; hematemesis much less than ulcer; foul odor to vomitus at times present.

"ACHYLIA GASTRICA.—Slow course; scarcely any gastric juice; acidity very low or entirely absent; absence of pepsin and rennin; usually no mucus or lactic acid.

"These differential considerations apply to typic cases, and the observer must be on the qui vive for various gradations and modifications of these clinical pictures."

Prognosis.—The outcome of chronic gastritis depends upon our ability to locate and remove every factor in the etiology, the willingness of the patient to cooperate and the patience and resourcefulness of the physician. At best the progress is slow and one must expect temporary setbacks usually due to failure of the patient to carry out instructions.

Treatment.—The most successful treatment is prophylactic, but until the public has been educated up to this form of economy we must begin with conditions as we find them.

First get the patient's confidence by making an intelligent examination, a scientific diagnosis, and a reliable prognosis based upon your findings. All lesions, bony, ligamentous, muscular and psychic must be intelligently and carefully removed.

Specific lesions which would directly or reflexly interfere with the nerve and blood to the stomach must be corrected.

The rigidness commonly found in the vertebræ and ribs of the splanchnic area must be overcome first by specific adjustment, and the normal flexibility maintained by teaching the patient proper exercises for the purpose. This should include deep breathing with the spine flexed to the limit, and the ribs fixed, by the patient reaching around as far as possible and grasping the ribs as described by Dr. Harry Forbes. This will tend to overcome the flat dorsal so characteristic in all gastro-intestinal conditions.

Direct manipulation over the stomach has no particular value and may be even harmful.

Inasmuch as nausea and vomiting and excessive gas formation are only the result of hypersecretion we cannot expect to give more than temporary relief except by methods which remove causes. Much comfort may be given by inhibition in the splanchnic area. In severe cases it may be necessary at times to wash out the fermenting, irritating mass by gastric

lavage. Outdoor life, frequent vacations and change of occupation are often of decided benefit.

Diet.—Indiscretions of diet must be avoided and this cannot be too positively impressed upon the patient. It is always best to make a list of foods to be taken for breakfast, lunch and dinner and insist that no other foods be taken without further instruction.

Just what these foods shall be depends upon the gastric secretions as shown by gastric analysis. They should always be nutritious and given in quantities sufficient to maintain nutrition.

The stomach should have rest and yet is expected to do its part in the process of digestion. All foods must be given in a finely divided form and well masticated to spare the stomach the mechanical effort of grinding.

In hyperacid gastritis all foods of an irritating nature must be positively prohibited. The classical breakfast of grapefruit, oatmeal, ham and eggs and coffee will not do. Starchy foods must be reduced owing to their tendency to ferment in the presence of highly acid juice and the delay in the stomach due to the high acidity.

In subacid gastritis advantage must be taken of the fact that carbohydrates digest well and proteins do not.

Diet for Hyperacid Gastritis.—Before breakfast: Wash the stomach with warm water and an ounce of Phillips Milk of Magnesia, allowing the water to remain in the stomach 20 minutes or a half hour, lying down and turning from side to side on the face in order that the water and magnesia may be brought in contact with all parts of the stomach.

For breakfast: Prunes, allowed to simmer for four hours, without boiling, and put through a colander, to remove the skins. Soft cereals, such as farina, cream of wheat, or wheatlet, thoroughly cooked, and served with middle heavy cream, no sugar. Two eggs, soft boiled, or poached. Zweiback, thoroughly masticated, with a liberal quantity of butter. Cocoa (Phillips).

Luncheon: Puree of peas, beans or lentils, made with cream. Asparagus, green peas, boiled rice, spinach chopped very fine, creamed carrots, boiled onions, baked potato, well done. Chicken, boiled lamb or beef, ground; oysters in any form but fried; fresh fish. Desserts: Choice of junket, cornstarch, custard, rice pudding, floating island, gelatine or tapioca.

Evening meal: Same as luncheon except substituting eggs for meat.

Cup of hot water before luncheon and dinner.

If patient requires quick building up give milk between meals and at bed-time.

Gastric Neuroses

Gastric neuroses include **motor**, **sensory** and **secretory** derangements. Though the sensory disturbance is often the most marked, still motor and secretory symptoms are usually present. In other words there is commonly a complex of the different forms.

Where gastric neuroses can be positively diagnosed, by a process of elimination, there is no more plausible explanation than that of the spinal lesion. The success of osteopathic physicians in treating so-called “stomach trouble” proves conclusively the superiority of the osteopathic method. A note of warning should be sounded, however, for as diagnostic methods have become more exact it is found that many cases which were formerly diagnosed as neuroses prove to be referred from some organic change, such as infected gall bladder, appendix, tube or ovary, tonsil, tooth or sinus. It has been proven that many cases of sensory and secretory disturbances have entirely cleared up when these causes have been removed. Though infection may play an important role, still in some instances, especially gall bladder, duodenum and appendix, the gastric neurosis may be simply due to a nervous reflex.

Gastroptosis, atony, and in many cases splanchnoptosis, has been found to be the underlying cause of many hitherto unaccountable gastro-intestinal symptoms.

Gastric crisis of locomotor ataxia if not properly diagnosed by the finding of the other well known symptoms may give us much trouble and discouragement.

Ulcer and cancer have quite characteristic symptoms, yet it is well known that they are often treated as neuroses in the early stages, much to the detriment of the patient, especially if the case proves to be cancer.

In the **sensory** disturbances, which are probably the most common, hyperesthesia and **neuralgia** are the special features. In the former a feeling of weight, fullness and burning are complained of, which are frequently manifestations of a neurotic temperament. In fact, hysteria and neurasthenia are very often basic conditions. The same is true in gastrodynia, where the pain starts in the pit of the stomach and extends around the lower chest and ribs. There may be other neurotic symptoms such as excessive hunger and a constant desire for food. Menstrual irregularities, the menopause, worry, constipation, and anemia are important factors. Special care should be taken that there is no organic disorder of the gastro-intestinal tract or of the nervous system.

The **motor** neuroses comprise a variety of derangements. Excitation of the motor functions of the stomach, as a direct result of irritated nerves or of reflex stimuli, are not uncommon. Owing to this the food may not remain in the stomach long enough or the stomach activity may be too pronounced. There may be also more or less rapid vomiting of the food, without any particular strain. Other motor neuroses may be spasms of either the cardiac or pyloric sphincters, and in a few instances there may be atony of the stomach walls. Although these conditions may be of a neurotic character, still great care should be taken that some organic disease is not basic.

The **secretory** derangements consist of hyperacidity, supersecretion, and lessened amount of acid secretion or achylia gastrica. Many of these cases are associated with hysteria and neurasthenia, though in achylia gastrica, cancer may be the cause. Hyperacidity may be associated with ulcer. Pelvic diseases, nervous reflexes from the gastro-intestinal tract, constipation, and anemia are to be considered as possible etiological factors.

Diagnosis.—These cases require the most painstaking inquiry into the history, the most complete physical examination, and all findings carefully checked up by laboratory tests.

Inquiry will often show that all symptoms subside when on a vacation with a change of scene and climate.

Lockwood gives the following rules for arriving at a diagnosis of “nervous indigestion.”

“(1) A diagnosis of nervous indigestion should not be made in the presence of more than 30 c. c. of fluid in the fasting stomach, the fluid giving a strong reaction for hydrochloric acid. Hypersecretion is generally an expression of pyloric stenosis, organic or spasmodic, and this is due to an organic cause.

“(2) A diagnosis of nervous indigestion should not be made in the presence of persistent hyperacidity accompanied by epigastric pain. Nervous hyperchlorhydria may occur, but is not accompanied by either pyrosis or pain. The association of either of these latter symptoms should suggest an organic origin for the complaint.

“(3) Achylia gastrica may be of nervous origin, but this is not probable when serious motor error is in evidence. Achylia with food-stagnation is strongly suggestive of cancer of the stomach.

“(4) Achylia gastrica, accompanied by pain or vomiting, indicates an underlying organic cause.

“(5) The diagnosis of nervous indigestion should not be made when recognizable food remains are repeatedly found in the fasting stomach. Under the influence of fear, nervous shock, or vicissitudes of temperament the motor functions may be temporarily interfered with, but this would not be the case permanently.

“(6) The diagnosis of nervous indigestion should not be made when epigastric distress or pain occurs regularly at a definite time after eating. The very fact of this disturbance coming on at a definite time argues against a neurosis.

“(7) The diagnosis of nervous indigestion should not be made when one symptom alone persists, without other evidences of nervous instability. The presence of one definite symptom in itself presupposes an organic cause.

“(8) The physician should be on the qui vive for drug addictions, for these habitues can sometimes present a syndrome of symptoms that will puzzle the most experienced.

“(9) The diagnosis of nervous indigestion should not be made in persons over forty or forty-five, in whom indigestion is a new symptom. Such patients are usually developing a serious systemic or malignant disorder.

"(10) Finally, digestive nervous neuroses and organic disease may be concomitant, and the presence of either need not exclude the other."

Treatment.—First get the patient's confidence by making a most complete examination. This desirable beginning is usually hastened by the osteopathic physician, when after a few treatments symptoms are greatly relieved. Correct all lesions wherever found, particularly those anatomically connected with the stomach. When the symptoms are sensory relief can always be given by inhibition over the splanchnic area. Occasionally the ensiform process and the lower costal cartilages are lesioned.

Diet.—When hyperchlorhydria is the chief symptom foods must be selected which bind acidity or those which lessen its secretion, such as milk, eggs, cream cheese, fats such as butter, cream, olive oil, boiled or broiled fresh fish, **boiled** beef or lamb run through a grinder, oysters in any form but fried, white meat of chicken, vegetable puree made with cream or milk (no meat stock), gelatine, custard, junket or **sponge cake**.

Many neurotic patients are under-nourished through fear of food. They must be positively assured that if the food is well chosen and carefully masticated there need be no fear of discomfort. Care should be taken that the patient is not constipated.

Some cases can only be reached by a "rest cure" of four to six weeks, which together with the treatment outlined above will prove most satisfactory.

In all cases guard against worry and overfatigue. Build up the general health as rapidly as possible. Outdoor life, sufficient sleep, frequent vacations, and change of scene are specially beneficial.

Gastric and Duodenal Ulcer

Statistics show that peptic ulcer is far more prevalent than is supposed by the casual observer. "In the combined statistics of 59,450 autopsies of various series evidence of healed or unhealed ulcer were observed in 4.4 per cent." (Bassler.)

The reason for this is that peptic ulcer may present very definite symptoms which are readily interpreted or they may be so atypical as to

make definite diagnosis impossible. Like all gastro-intestinal diseases, many of the symptoms are easily confused with so-called indigestion or "stomach trouble."

Etiology.—One characteristic of gastric and duodenal ulcer is that it only occurs where the mucous membrane is subject to the influence of hydrochloric acid and pepsin; lower end of esophagus, stomach and first part of duodenum.

Similar ulcers are often found in the sigmoid and rectum where the feces often become acid due to bacterial action, or on account of slow movement, hydrochloric acid and pepsin which may have escaped neutralization in the duodenum may attack the mucosa.

For the part played by spinal and rib lesions on the glandular layer of the stomach, the reader is referred to a previous discussion of the lesion.

Probable secondary causes of gastric ulcer are: (1) Embolism of an artery (gastric arteries are terminal). These emboli are supposed to be caused by toxic and infectious agencies which enter the circulation, as sometimes occurs in pyemia and large burns of the skin.

(2) While hydrochloric acid associated with pepsin seems to be an important factor, it is doubtful whether it can attack the mucosa without there being a previous abrasion or other injury. It is said that a normal secretion of mucus is nature's protection against self digestion.

The swallowing of substances of a coarse or irritating nature or those chemically corrosive or at extremely high temperature may so injure the mucous membrane as to permit an attack by HCl and pepsin.

Certain occupations seem to predispose to gastric ulcer, such as cobblers, or others who in their work press various objects against the stomach.

Sharp blows over the stomach have been followed by acute ulcer. A frequently associated condition is gastroptosis, which seems to be explained on the basis of narrowing of the blood vessels and their more ready occlusion. Probably sagging of the duodenum is an important predisposing factor.

Anemia and chlorosis should not be overlooked as predisposing causes. And tuberculosis and syphilis are possible associated disorders.

Of all the theories advanced, the lowering of vitality, due to lesions of the splanchnics and vagus nerves remains the most logical.

Symptoms.—The most characteristic symptom is pain, which in a typical case comes on at a regular time after taking food. It may be a half hour, an hour or two hours, and in the case of duodenal ulcer may be as late as four hours. The distance beyond the cardia at which the ulcer is located seems to govern the time; also the time at which the secretion of hydrochloric acid reaches its height, which varies in different individuals.

The pain is due to free acidity (that which is not combined with the food) irritating the raw surface of the ulcer. Pain is often increased or lessened by posture. If turning on the left side gives relief the ulcer is probably at the pylorus; if worse when standing than reclining the ulcer is probably on the greater curvature.

The pain is usually localized by the patient, and pressure at the given spot increases the pain. In many cases there is referred pain in the region of the 9th, 10th and 11th ribs on the left side.

At the height of pain vomiting may occur, due probably to pylorospasm resulting from high acidity. Vomiting always gives relief. The taking of protein food or alkali will usually relieve the pain of ulcer, (hunger pain). Ulcer patients are usually well nourished owing to the habit of relieving themselves by eating, or they may be thin due to their fear of food.

In acute ulcer frank blood may show in the vomit, and may be the first indication of trouble, whereas in the chronic type it may be occult, or occult blood may be found in the feces. The hemorrhage of ulcer, unlike that of cancer, is not constant.

Diagnosis.—Diagnosis of duodenal ulcer, as distinguished from gastric, is made by finding the tender spot to the right and below the pylorus, the pain coming on three or four hours after taking food, and the finding of blood in the feces (tarry stool) and not in the stomach contents. Repeated examinations may be necessary owing to the fact that hemorrhage is not constant.

The large percentage of stomach ulcers are near the pylorus, and of the duodenal ulcers the ascending portion is the area almost invariably involved.

Ulcer is differentiated from functional disorders by a history of real pain as distinguished from the vague disturbances of sensation often called pain by neurotic patients. Also its regular appearance in relation to food. The pain of "gastralgia" has no regular habit and is not influenced by food.

Referred pain from cholecystitis, chronic appendicitis, etc. has no relation to food and is not relieved by food or alkalies.

Ulcer is to be distinguished from cancer by the age of the patient (in cancer usually over 40) with a previously good gastric history, except in cases where cancer has been grafted on to a chronic ulcer. In these cases a careful inquiry will bring out a characteristic ulcer history up to a certain time, when all symptoms change; pain becomes constant; is not relieved by food or alkali; vomit becomes dark in color and has a characteristic odor, appetite fails, and signs of cachexia set in.

Gastric ulcer should be suspected in all cases of persistent gastric symptoms which are not readily relieved by treatment and regulation of diet, and in which there is found high acidity and continuous hypersecretion not accompanied by mucus.

The X-ray and gastric analysis should never be neglected in suspected cases, keeping in mind the possible injury from the tube in case of recent hemorrhage.

Treatment.—Osteopathic treatment of gastric ulcer will be almost uniformly successful if we will analyze all of the factors entering into the problem.

It is obvious that in order to heal the ulcer we must remove all factors which interfere in any way with nutrition. Then give the stomach as near absolute rest as possible while at the same time building up the nutrition by a generous but well chosen diet.

When acute hemorrhage has recently occurred, complete rest in bed with a trained nurse in attendance is the first indication. Complete rest of the stomach, all nourishment being given by nutrient enema. An ice bag is to be placed over the stomach, and removed every three or four hours to allow surface circulation to react. Warm applications should not be used while there is any marked bleeding.

During this period no effort on the part of the patient should be permitted, and no manipulative treatment which would tend to increase blood pressure should be given.

After all evidence of hemorrhage has ceased for ten days, or at once in case of chronic ulcer, we may carefully correct all spinal or rib lesions in the splanchnic area especially the 6th dorsal, or cervical lesions affecting the pneumogastric. Pain and pylorospasm may be relieved by steady pressure at the 4th and 5th dorsal on the right side.

After spinal lesions have been corrected without unduly irritating the stomach, careful relaxing treatment should be given with the patient on the back, keeping in mind that all exertion will tend to irritate the ulcer.

If special care is observed, frequently definite relief may be given by placing patient in knee-chest position and gently raising the lower portion of duodenum where it lies alongside of ascending 3rd and colon, 4th lumbar.

During this period a hot water bag or a thermal pad should be kept over the stomach night and day.

In certain cases of perforation in a few obstinate conditions, and in a few where mechanical obstruction is marked, surgery may be indicated.

The following diet will be found best during the first week:

7 A. M. A half glass of cooked milk, with the leathery substance which rises on the top removed, and the yolk of one egg stirred into it and sweetened, if desired; taken luke warm or cool, but never ice cold. This amount to be increased on the second day to three-fourths of a glass, and on the third to a full glass, which is to be continued for a week. If the milk produces diarrhea, add two tablespoonfuls of lime water to each portion.

9 A. M. A saucerful of gelatine (Knox's or Crystal Rock) with 2 tablespoonfuls of cream and a teaspoonful of sugar.

12 M. A half to full glass of milk prepared as above.

3 P. M. A saucerful of gelatine, with cream (medium) and sugar as at 9 A. M.

6 P. M. A half to whole glass of milk, as before, with one egg stirred in and sweetened. The egg yolks at 7 A. M. and 6 P. M. are to be increased until six are taken daily at the end of the week.

8 P. M. A half to a full glass of milk.

The whites of the eggs are to be stirred up in the water in the proportion of a white to a glass of water, 4 teaspoonfuls of sugar to be added to every glass, this to be taken by the patient only when thirsty. If the bowels do not move, no laxative can be taken, but an injection of warm water or a little soap may be employed. If much discomfort is produced by the food, a hot compress must be laid over the stomach or above the navel.

During the second week the diet should remain much the same except for the addition of one or two pieces of Zweiback three times a day.

During the third week, if pain and blood in the feces are lessening, we may add soft, well cooked cereal like cream of wheat, cocoa, puree of split pea made with cream.

Fifth week add minced chicken, coddled egg, **boiled** beef or lamb put through a meat grinder, soft vegetables such as chopped spinach, squash and mashed or baked potatoes with liberal quantities of butter.

During and after the sixth week we may add all vegetables which can be served in puree form, fresh fish, oysters, apple sauce, inside of a baked apple, prune whip, custard junket, corn starch pudding.

At this time also if all goes well the patient may sit up in bed and gradually move about, being careful to avoid all sudden movements which would put a strain on the epigastric region.

If necessary we may also increase our manipulative treatment at this time.

The patient must be warned against the use of any article of diet which will be chemically or mechanically irritating to the stomach, for a period of months, and an examination of feces should be made from time to time to make sure of no return of hemorrhage.

Dilatation of the Stomach

A dilated stomach is a stretched stomach having increased capacity, due to nervo-muscular atony or to pyloric obstruction. Every stomach which is not retracted when empty is a dilated stomach. A dilated stomach may occur either as an acute or as a chronic condition, but it is to be distinguished from temporary distention and a normally large stomach.

Osteopathic Etiology and **Pathology**.—The nervo-muscular atony causing dilatation may be due to obstructive lesions in the stomach splanchnics, or to a general debility of the spine in the dorsal region (usually a kyphosis), or to continued overeating and improper food causing a stasis and fermentation. It may also be due to overdrinking and various diseases, as phthisis, liver and lung diseases, anemia, chlorosis, acute fevers and kidney diseases, causing more or less of a general nervo-muscular atony. Dilatation may result from a mechanical obstruction, or narrowing of the pylorus or the duodenum, by a cicatricial contraction of an ulcer; by hypertrophic thickening due to various diseases, by adhesions and tumors. Occasionally the pyloric obstruction is congenital. A floating kidney may fall upon the horizontal portion of the duodenum and thus mechanically obstruct the passage of food from the stomach, which consequently dilates. Tight lacing might prevent the liver, when congested, from passing in front of the kidney, thus luxating the kidney. Dilatation of the stomach occurs at all ages, although most frequently in middle aged persons.

Pathologically, the muscular coat is thinner and paler than normal, with more or less atrophy of the glandular tissues and an increase in capacity of the stomach. When obstruction exists at the pylorus, hypertrophy of the muscular coat may occur.

Symptoms.—The symptoms are those of the disease causing the dilatation plus those of persistent chronic catarrh. The patient complains of a sense of fullness in the epigastric region and there is flatulency, eructations and vomiting. The cavity of the stomach being much enlarged, great quantities which are usually considerably decomposed are vomited each day or two. There is often lessened acidity of the vomited mass, though in some cases it is increased. Passage of the food from the stomach to the intestine is delayed and the bowels are constipated, the fecal matter being dry and hard. The urine may be scanty and the skin dry. Anemia, debility and emaciation are always present to a greater or less extent, and on account of the absorption of poisonous matter drowsiness may occur.

Physical Signs.—Inspection.—In some cases the outline of the distended stomach can be plainly seen. There is prominence of the epigastric region, the tumefaction being at the pyloric end of the stomach. **Palpation.**—The resistance upon manipulation of a dilated stomach is like that of an air cushion. If the patient is made to drink a half tumbler of water, bimanual palpation will cause a splashing sound to be heard along the circumference of the stomach at its lowest point; and by moving the water about by changing the position of the patient, the outline of the stomach can be made. If the sound is not heard at the first manipulation, it must not be concluded that the stomach is normal for the stomach may be so dilated and flabby that it falls behind the abdominal wall like an apron. **Percussion.**—The note is tympanitic over the greater part of the stomach until the lower curvature is reached when the sound is dull (due to the liquid contents of the stomach), followed by a tympanic sound again when the intestines are reached. When percussion is made the patient should always be in a standing position if possible.

When there is **pyloric obstruction** a tumor usually presents itself, and vomiting is more severe and peristalsis more active than when the dilatation is due to atony of the walls of the stomach from an obstructed innervation.

Diagnosis.—This is usually easy if due care is taken in making the examination. Goetz has shown by the use of his spinegraphometer that in cases of visceral prolapse the spine is commonly posterior in the dorso-lumbar region. The X-ray is of value in determining the size and function of the organ.

Prognosis.—In a case of nervo-muscular atony the prognosis is favorable. If due to a malignant disease recovery is usually impossible. In hypertrophy of the pylorus or the duodenum, recovery is probable by means of surgical interference.

Treatment.—When the dilatation is due to atony of the muscular walls of the stomach from obstructed innervation at the spinal column, treatment is usually successful. Attention should be given to the condition of the spinal column in the splanchnic region (fourth dorsal to twelfth dorsal), the spine being usually posterior. A thorough and persistent course of treatment must be given, not only to restore the normal activity of the nerves to the muscular coat and glands of the stomach, but to build up and restore

strength in the weakened spinal column. Lesions in the spinal column, even higher than the fourth dorsal, may affect the innervation of the stomach. There are cases where lesions have been found at the fifth, sixth and seventh cervicals that interfere considerably with the action of the stomach, causing nausea, flatulency, eructations, and even vomiting. Such an affection may be through the fibers of the splanchnic nerves or through fibers of the vagi nerves.

The vagi nerves have an important bearing upon gastric dilatation as paralysis of the gastric branches of the vagi arrests the peristalsis of the stomach and thus tends to favor retention of food within its cavity. The stomach in such cases becomes enlarged, mainly by the weight of the food and the presence of gases due to decomposition of the retained food. Thus lesions may be found higher than the lower cervicals and cause obstruction and paralysis of the fibers of the vagi to the stomach.

Direct stimulation over the stomach in the form of thorough manipulation of the stomach walls causes contraction of the muscular fibers of the stomach, mainly the circular fibers. This treatment, with additional treatment of the splanchnic and the vagi nerves, will tend to build up the weakened plexuses of the stomach. Much time can be saved by putting the patient to bed and treating him every day for several weeks. When the stomach is dilated or dilated and prolapsed, to any extent, it usually requires three to five months treatment at least; this time can be shortened one-half by keeping the patient in bed, treating the spine three times a week, and the abdomen every day. Light food at frequent intervals, upper thoracic breathing, and frequent drawing up and in of the abdomen should be required. The patient may also manipulate his own abdomen twice a day to advantage; teach him to manipulate, draw and pull it upward. There is no danger of too frequent treatment as long as there is no bruising of the parts; this, however, does not apply to the spine. It is not an uncommon thing to correct a dilated stomach or a dilated and prolapsed stomach that is an inch and a half or two inches below the umbilicus. Care must be taken in all cases that other viscera are not prolapsed. It is a common experience to find enteroptosis, which can usually be readily functionally corrected, with the stomach ptosis. But where the kidney, or possibly both, is much prolapsed only fair results can be secured until the kidney is replaced and kept there,

and if necessary by surgical means. Also, note whether the liver is enlarged. (See special article on Prolapsed Organs).

When the disease is due to cancer and various growths of the pylorus or the duodenum, nothing can be done but palliate. Such cases require surgical attention. In all cases it is necessary that care and preoccupation of the patient should be removed. Baths, changes of air, a carefully regulated diet and caution in the use of liquids will be of great aid to the general health of the patient, and thus the weakened nervous system will be indirectly but greatly benefited. Too great care cannot be taken of the patient, as there is created in the organism a special aptitude for the tissues to become inflamed and thus weaknesses at various parts of the body may occur. Phthisis, typhoid fever and various diseases are apt to follow dilatation of the stomach, as the nutritive and resistive process of the body are impaired.

The meals should be taken regularly and with great care, the patient not eating too quickly nor too much. Solids should be used but little; the artificially digested foods, such as peptonized milk and beef peptonoids, probably being the best. Beef juice and scraped beef are excellent foods, as they are easily digested. Fatty and starchy foods should be avoided.

Washing out the stomach is useful, but it should not be indiscriminately employed. Lavage will not be necessary in all cases of mechanical obstruction. It relieves the distention, by removing the weight and the fermenting and decomposing material.

In **acute dilatation**, which may be due to prolonged diseases, general anesthesia, injuries of the spine, and to narrowing of the duodenum, vomiting, pain and collapse occur. Empty the stomach, and place patient in knee-chest position. Reach beneath the duodenum and raise this part of bowel. Start well down, as low as third or fourth lumbar. If this does not give quick relief stand patient on his head.

Gastroptosis and Enteroptosis[74]

(Glenard's Disease)

Definition.—A displacement of the stomach and intestines.

Osteopathic Etiology and **Pathology**.—A weakened, debilitated spine is the common cause. A slight posterior curvature is a frequent occurrence. A debilitated spine impairs the innervation to the abdominal viscera and to the muscles of the abdomen. Many cases are of congenital origin due to lack of complete development and weakness of the supporting tissues. Other causes are muscular strain, repeated pregnancies, tight lacing and malnutrition. A downward displacement of the floating ribs, and a consequent prolapse of, and atony of the diaphragm, is an important cause.

Prolapses of the stomach and intestines are of frequent occurrence in both sexes, and very common in women. It is a condition oftentimes overlooked, and when recognized, little has been done in the way of a cure. It is the cause of much disturbance, not only to the stomach and intestines, but to the various abdominal viscera and to the pelvic organs, and it is the cause of a large percentage of prolapses of the uterus, (excluding lacerations from childbirth) for not only is the great suspensory ligament of the uterus (the peritoneum) prolapsed as a consequence, but all of the abdominal viscera and the parietes of the abdomen are also prolapsed and crowded down into the pelvis. The small or large intestine or the stomach may be prolapsed singly. This is frequently the case with the transverse portion of the colon, which may be elongated and tortuous and prolapsed nearly to the symphysis pubis. Prolapse of the liver, spleen and kidneys may occur singly or with a general displacement of all the organs.

Symptoms.—The abdominal walls are weak, oftentimes flabby. The viscera of the abdomen do not have normal resistance upon manipulation. The spinal column presents lesions. There is dyspepsia, flatulency, constipation, abdominal pains and various neurasthenic symptoms.

Diagnosis.—Is readily made by the lack of tone to the abdominal walls and viscera and the general debility of the patient. Inflation of the stomach with air will determine between gastroptosis and dilatation. The X-ray is of special value in determining position, function, spasms, kinks, etc. of the digestive tube. There are innumerable gradations and phases of this condition.

Treatment.—To remove the cause is of primary importance. This is to be followed by treatment of the spinal column, correcting its various derangements and improving the innervation to the atonied viscera and

abdominal parietes. Direct treatment over the abdomen helps to give tone to both the viscera and abdominal muscles. In many cases the treatment will have to be a prolonged one in order that the tissues may regain their normal condition. Usually a treatment from two months to a year, or possibly more, is required. Exercises and manipulations that tone the tissues, correct the posture, and raise the chest, diaphragm, abdominal and pelvic viscera, and release spasms, kinks, and adhesions, are indicated. The diet of the patient should be nutritious, and sufficient in emaciated cases to increase his weight if possible. A supporting bandage will often give some relief. A few cases will require surgery.

Particular attention should be given to the colon, duodenum and diaphragm.

Relative to the treatment of gastroptosis and enteroptosis, W. E. Harris writes as follows: “I first set to work trying to correct the spinal irregularities; coupled with this I give deep and careful manipulation of the gastric and intestinal walls—treating my patient two or more times per week for a period of one to three years. A lesser period is not long enough to bring the desired result in such cases. I also instruct the patient to knead his own bowels, which I prescribe as a necessary proceeding, and to be performed twice daily on retiring and before rising. Of equal importance with the osteopathic treatment, come local, specific abdominal exercises. These are to be of the resistive type, and must also be taken for the general musculature. I have my patient retract the abdominal walls and voluntarily draw the abdominal contents towards the diaphragm, in regular series. These exercises must be faithfully performed and continued after the treatment has ceased in order to be of real value. I do not find our treatment, without the hearty cooperation of the patient in doing his exercises conscientiously, to be sufficient in itself. Have the patient avoid overloading the digestive tract. Use concentrated foods, in small quantities, i. e., only sufficient to sustain strength, twice daily and without taking fluids at meal times. Of course water, in small quantities and at frequent intervals, may be taken between meals. To summarize—First, corrective treatment. Second, resistive exercises. Third, attention to diet.” (See Dilatation of the Stomach.)

DISEASES OF THE INTESTINES[75]

Acute Diarrhea

Definition.—A diffuse inflammation involving the entire intestinal tract to a greater or less degree. Usually the seat of disease is found in the small intestine and the upper part of the large bowel.

Osteopathic Etiology and **Pathology**.—Acute diarrhea may be caused by overeating, drinking impure water, unripe fruits, and poisons produced in decomposed and fermented milk and other articles of food. This sometimes takes place in perfectly harmless substances in an inexplicable manner. Milk and ice cream may produce intestinal catarrh. Dr. Still often referred to the harm resulting from iced drinks. Changes in the weather, tending to weaken the system, often cause diarrhea; hot weather favors this, although a chilling of the system by a sudden fall in the temperature may produce the disorder. Dr. Still was of the opinion that sitting on the cold ground (a common habit of children) is a frequent source of intestinal derangements. Changes in the quantity and quality of the secretions also induce the disorder; thus the bile, if in too great a quantity, increases the peristalsis to such a degree that diarrhea is produced; if diminished, it favors the fermentation and decomposition of the food. Pancreatic diseases may be a cause of diarrhea. Infectious diseases, through their specific poisons, such as cholera, dysentery and typhoid fever; inflammation, extending into the bowels from adjacent parts; inflammation caused by peritonitis and intestinal obstructions, as invagination and hernia; hyperemia, secondary to diseases of the liver, heart and lungs; cachectic states met with in Addison's disease; the last stages of Bright's disease; cancer and marked anemia are all among the causes of diarrhea.

As in constipation, diarrhea is oftentimes simply a symptom of various disorders; still, it may be the only symptom manifested. Lesions are found in various regions of the body, but chiefly in the lower dorsal and lumbar vertebræ and the lower ribs at either side. Also lesions may be found to the vagi, thus increasing the peristalsis or affecting the blood supply of the intestines. The lesions to the splanchnics may involve the motor, vasomotor or secretory fibers to the intestines. Oftentimes the innervation to the liver is disturbed, affecting the secretion of the bile. The left side of the spinal column is involved more often that the right side, by vertebral, rib and muscular lesions.

Nervous Diarrhea frequently follows fright and other causes of nervous excitement, and is often found in hysterical women. There is simply an increase in the peristalsis and secretion of the bowel, due to a vasomotor paresis of the intestinal vessels, producing an outflow of the serum.

The intestinal condition is one of hyperemia. The secretory glands are frequently inflamed. In decided cases the mucous membrane may be red and injected, but more often it is pale and covered with a layer of mucus. Sometimes the solitary follicles are considerably enlarged. These enlargements may become filled with pus, forming abscesses which rupture, leaving an ulcer. Peyer's patches may also be involved.

Symptoms.—The diarrhea is the important, and often the only, symptom of enteritis; the stools are frequent, varying from two or three to fifteen or more a day; they are thin and watery, varying in color according to the amount of bile they contain. They are usually of a yellowish or greenish color. They contain undigested food, mucus, columnar epithelium and mucous cells, micro-organisms and triple phosphate. The reaction of the discharge is either acid or neutral. There are colicky pains in the abdomen, rumbling noises or borborygmi, intense thirst, dry and coated tongue, with loss of appetite, and, rarely, a fever. When fever is pronounced care should be taken that some infectious disease is not the cause. **Chronic catarrhal diarrhea** may follow the acute form. If the stools contain much undigested food the inflammation is in the upper bowel; if thin, watery and containing mucus, the lower bowel is involved. In prolonged cases the general health is affected. Definite tender areas along the spine and deep muscular contractions are invariably important etiologic and diagnostic clues.

Diagnosis.—This is ordinarily made easy by giving attention to the above symptoms. In distinguishing as to whether the large or small intestines are involved the following is important: In catarrh of the **small intestines**, diarrhea is not so well marked; there is much undigested food, but very little mucus; and there is usually pain of a colicky nature in the middle or inferior part of the abdomen. When the **large intestine** is involved there may be no pain; when present, it is intense and usually in the upper and lateral parts of the abdomen; there are borborygmi and thin, soupy stools, mixed with much mucus. If the lower portion of the bowel is involved there may be marked tenesmus, with marked contraction of the muscles over the sacral foramina.

Duodenitis is often associated with acute gastritis. Placing the patient in the knee-chest position one may be able to palpate the duodenum. If the inflammation involves the bile duct, there is jaundice; in these cases the urine may be bile-stained.

Prognosis.—Commonly favorable if early and prompt treatment is employed; though it should be remembered that some infections, or constitutional disease, or intestinal ulcer may be an underlying cause.

Treatment.—Many cases of acute diarrhea will recover by restricting the diet, with rest. Where improper food and water are the causes, an entire change of diet should be considered. Withdrawal of all food and the substitution of boiled milk will be of great aid. The bowels should never be confined if there is reason to suspect that all irritating matters have not been removed; and when fermentation and irritation exist in the lower bowel, an enema will often be beneficial. The spinal column should be examined, especially on the left side, from the fifth dorsal down to the coccyx. The vertebræ may become displaced and cause diarrhea, by derangement of the vasomotor nerves.

Either an increased blood supply through the intestines, or an affection of the motor nerves will produce an increased peristalsis. An active condition of Meissner's plexuses may be produced sympathetically, resulting in increased secretion of intestinal juice and thus in diarrhea. The ribs may become displaced and be a source of irritation to the nerves of the intestines. The muscles of the spine are apt to become contracted by colds, injuries, strains, etc., and stimulate or inhibit the action of certain centers in the cord and produce disordered intestines. Conversely the muscles of the back may be thrown into a contracted condition by irritating substances in the bowels acting as a stimulus to the centers in the cord, and thus reflexly to the muscles. Trouble may arise in the colon and rectum by lumbar lesions, the slipping of an innominate, a dislocated coccyx, or contracted muscles over the sacrum. In a word, thorough inhibition, relaxing contracted muscles and correcting abnormal vertebræ and ribs are the osteopathic essentials of treatment for diarrhea. Inhibition of the lower dorsal and lumbar is very effective; it dilates the mesenteric vessels by way of vasomotor fibers, and thus controls secretions and lessens peristalsis. This has been clearly proven in the osteopathic experimental work of Burns and Pearce.

Hot fomentations over the dorsal and lumbar spine will frequently, through the nervous reciprocal relationship, be of decided value.

Direct treatment over the mesenteric circulation, i. e., through the abdomen anteriorly, will be helpful in some cases. It relaxes tissues, removes irritations and frees the circulation generally about the mesenteric vessels and intestines. When giving this treatment one should be certain of the underlying pathology. The liver should be kept active. Treatment of the vagus nerves is important, as they help to control the blood supply and the motor nerve force through the intestines. Daily hot baths and increased activity of the skin and kidneys are beneficial.

Chronic Diarrhea, and Mucous Colitis

Definition.—A chronic inflammation of the mucous membrane of more or less of the large intestines. There may be ulceration.

Osteopathic Etiology and **Pathology**.—Chronic diarrhea may be the result of repeated attacks of the acute form or may be caused by cancer, tuberculosis, Bright's disease, typhus fever, disease of the liver, organic disease of the heart and lungs, obstructions to portal circulation or impactions of any nature that occasion passive congestion. Frequently cases of long standing are due to chronic lesions of the lower ribs or lower dorsal or lumbar vertebræ. The lesions of the lower ribs usually consist of downward displacement of the ribs, affecting the innervation to the intestines directly, or possibly dragging the diaphragm downward to such an extent as to interfere with the blood and lymph vessels as they pass through it, thus causing congestion of the intestines by obstruction to the lumen of the vessels.

In many cases the **pathological changes** are simply those of the acute form. In more pronounced cases the mucous membrane becomes a brownish red, livid gray or slate color; this discoloration being due to hyperemia and blood extravasation. The mucous coat is also swollen and thickened. Atrophy of the mucous membrane, and in some cases of all the coats, with destruction of the glands, may be a result of the chronic form. Ulcerative changes occur chiefly in the lower part of the ileum and colon;

these may be follicular or there may be large ulcers and considerable areas of ulceration.

Symptoms.—Constipation and diarrhea frequently alternate; the stools are thin, mixed with a large amount of slimy mucus; the small intestine is most frequently involved, and the patient complains of pain in the umbilical region; there is distention of the bowels with gas; the health gradually declines; there is great pallor, and the patient becomes emaciated, gloomy and irritable.

Mucous Colitis is a chronic form of colitis, characterized by paroxysms of severe pain and the discharge of large masses of mucus, forming gray translucent casts, which are not fibrinous but mucoid in character. This disease occurs usually in women of nervous type, but is occasionally seen in men and children. When there is no underlying organic disease, it is probably largely a secretion neurosis. Mental emotions and worry, sometimes errors in diet, or dyspepsia bring on the attack. Overfatigue is often an exciting factor. The nutrition is generally well maintained, but in other cases there may be a gradual emaciation and ultimate death. This is undoubtedly one of the most persistent and troublesome diseases that one will meet; still the osteopath can do much for these cases and not infrequently bring about a cure. But the treatment must be consistent and persistent.

Mucous colitis is not hard to diagnose, although many cases are treated for simple indigestion. It is needless to say that a correct diagnosis is paramount. In these cases there is almost invariably some visceral prolapse, which undoubtedly is the underlying cause, by favoring venous congestion of the bowels. The liver is usually congested; this alone may cause the venous stagnation, but more often it is simply due to the common cause. Back of the visceral prolapse and congestion will almost invariably be found a posterior dorso-lumbar curvature; still there may be a scoliosis or single lesions only, and a downward displacement and constriction of the floating ribs.

The **treatment** requires most persistent and careful work for at least three months, and probably six to nine months. Correction of the spine and floating ribs should be of first consideration; then intelligent treatment over the abdomen, by raising and toning the bowels, not only the bowels as a

whole, but especially in the ileo-cecal, hepatic flexure, transverse colon, splenic flexure, sigmoid flexure, and rectal regions. The direct treatment should be cautiously given when there are indications of ulceration.

Have the patient help himself by manipulating his bowels night and morning, drawing the abdomen up and in, and by thoracic breathing. Prescribe plenty of drinking water and reduce starchy and saccharine food to a minimum. Again emphasis is placed upon the necessity of persistent treatment, two and three times per week, for several months. The mucus is hard to remove. It is tenacious and frequently causes colicky pains.

To the student Von Noorden's[76] monograph on this subject is especially instructive. He notes that almost without exception the patients suffer for some weeks or months prior to the development of colica mucosa from obstinate constipation. For acute attacks, among other things, he advises rest in bed, hot applications, and high water injections. He believes in massage of the large intestine (particularly of the sigmoid flexure), in cases of atonic constipation and also in spastic constipation, provided the patient has a diet that leaves a large residue. "A coarse, laxative diet of Graham bread, leguminous plants, including the husks, vegetables containing much cellulose; fruit with small seeds and thick skins, like currants, gooseberries, grapes; besides, large quantities of fat, particularly butter and bacon."

Diagnosis.—Diagnosis is always easy. The presence of blood, pus, or fragments of tissue in the stool point to ulceration. Ulcers in the rectum, and as high as the sigmoid flexure, will be recognized by examination with the speculum.

Prognosis.—Osteopathy has undoubtedly changed the prognosis of other treatment. Many cases can be cured and most other cases greatly benefited. The deep seated ulcerations may cause circumscribed peritonitis, or even abscess, and the prognosis becomes grave as these complications arise.

Treatment.—As diarrhea may be caused by lesions anywhere from the sixth dorsal to the coccyx, a most thorough examination is necessary. On the one hand, diarrhea may be due to a marked lateral or posterior spinal curvature, which is plainly seen upon inspection, but on the other hand, it may be due to a slight twist or deviation from normal of a vertebra which would require considerable osteopathic ability to exactly locate. Diarrhea may result from subluxation in the lower costal region, one or more of the

three lower ribs on either side being involved. Record of one case, in particular, of chronic diarrhea is of interest as it was due to a rib dislocation. It was the case of a man fifty years of age, who had suffered from chronic diarrhea, several stools a day, for over thirty years. He was completely cured in one treatment by correcting the dislocation of the vertebral end of the tenth rib on the left side. This case is cited to impress upon the student the necessity of precise diagnosis and treatment. Rarely will diseases be cured by a single treatment, but when such happens it exemplifies the potency of the osteopathic lesion. Treatment on the left side is usually more effective in diarrhea than treatment on the right side. When diarrhea is a symptom of some constitutional disturbance, correction of dorsal, lumbar and rib lesions, with thorough inhibition, careful dieting and rest, will commonly suffice provided the primary disease is intelligently looked after.

Chronic lesions of the vagi nerves may exist and produce chronic diarrhea in the same manner as in acute diarrhea. Rest and a liquid diet, preferably boiled milk and albumin water, will be a helpful treatment; the diet requirement is to have a minimum amount of waste, so that the residue will cause the least possible irritation. Beef peptonoids with the milk will be a nutritious addition to the diet, and change of air and surroundings may be an aid to a more speedy cure. The skin and kidneys should be kept in a healthy condition and, if necessary, the bowels thoroughly emptied by injections.

Diarrhea of Children

Three forms of diarrhea are recognized in children: Acute dyspeptic diarrhea, cholera infantum, acute enterocolitis.

Acute Dyspeptic Diarrhea

This disease is most frequently due to errors in diet; the mother’s milk may be altered in quantity or quality from taking improper food; the child may be over-nursed, or the foods given in place of the mother’s milk are at fault. Too often a filthy bottle is the cause. The predisposing causes are dentition and extreme heat; and these, combined with constitutional weakness, bad hygiene and a weak spine, diminish the resisting power of

the infant. Hence, in artificially fed children of the poorer classes, this disease is very prevalent.

Pathologically, there is catarrhal swelling of the mucosa of both the small and large intestines. The amount of mucus is increased, and there is more or less involvement of all the lymphoid tissue. The submucous membrane is often infiltrated. If there is much inflammation ulcers may occur.

Symptoms.—The child may seem to be in its usual health, with slight restlessness at night and an increased number of stools. This restlessness may be due to nausea and colicky pain. The stools are copious and offensive, containing undigested food and curds. In children over two years old these attacks may follow the eating of unripe food or drinking tainted milk. In other cases the onset may be sudden with vomiting, purging, and griping pains. The fever may rise rapidly to 103 or 104 degrees or more, sometimes followed by convulsions. The stools become more numerous—there may be twenty in the twenty-four hours—gray or green in color, and sometimes containing much mucus, rarely blood.

Diagnosis.—The sudden onset and the character of the stools, which never have a watery, serous character, distinguish this from cholera infantum. And the small amount of mucus which the stools contain distinguishes them from those of ileo-colitis. This form often precedes the onset of specific fevers.

Prognosis.—Among the better classes this is generally favorable, but among the weak, half-starved children of the poor it is often unfavorable, especially in hot weather.

Treatment.—The child should be clad warmly, kept absolutely clean and given a change of diet and air if possible, with frequent baths. Sterilized milk should be given at regular intervals; or if the diarrhea continues, beef juice and egg albumin instead. The bowels should be thoroughly cleansed by injections. The spine should be thoroughly treated through the lower dorsal and lumbar regions, and if the abdomen is not sensitive, a light treatment to the bowels directly will aid recovery. Frequently it will be found that the muscles of the neck and upper dorsals are considerably contracted, especially where the child has fever and is very restless.

For **acute intestinal indigestion** Ruhrah gives the following dietetic treatment: "Withhold all food for the first twenty-four hours, except a little albumin water. This is best given in small doses at not too great intervals. Plain boiled water may be used instead. Very weak tea to which a little red wine has been added may be given if the child is weak. On the second day the albumin or barley water may be given with the addition of weak strained broth, and on the third day malted milk may be added to the list. After four or five days cow's milk diluted and boiled or peptonized may be tried. It is best mixed with a farinaceous gruel or with malted milk to start with. It may be given every other feeding for a day or two if it agrees, and the former feeding gradually resumed.

"In nursing infants withhold the breast twenty-four hours and feed as above. After that the breast may be given once for a few minutes and the feeding pieced out with albumin- or barley water. If it agrees the breast may be given for three or four feedings, every other feeding followed by albumin- or barley water. On the following day the breast may be given at each feeding. The time of nursing should be increased gradually until the child is back on its old schedule."

Cholera Infantum

Definition.—An acute, catarrhal inflammation of the mucous membrane of the stomach and intestines, with some disturbance of the sympathetic ganglia. This is a disease of childhood during the first dentition.

Etiology and **Pathology**.—Probably due to the poisonous products of decomposing and fermenting foods acting upon the system. The predisposing causes are hot weather, dentition, bad hygiene, the previous presence of some slight dyspeptic derangement, dyspeptic diarrhea, and enterocolitis.

The **pathological** changes are similar to the morbid anatomy of catarrhal gastritis and enteritis. The serous discharges and rapid collapse are due to the intense irritation of the sympathetic system. The kidneys and liver may become involved, and bronchopneumonia is a possible complication.

Symptoms.—The disease is of sudden onset, setting in with severe vomiting, which is increased by giving food or drink. The stools are copious

and frequent, at first containing some offensive fecal matter, and later becoming watery, and odorless. There is decided fever, reaching as high as 105 degrees. The pulse is rapid and feeble, ranging from 130 to 160. Prostration, pinched features, hollow eyes, depressed fontanelles and loss of weight are characteristic symptoms. The tongue is coated at first, but soon becomes dry and red, and thirst is intense. Even at this time a reaction may set in, but more commonly death results with symptoms of collapse and high temperature. In other cases there are restlessness, convulsions and coma. As there is no cerebral lesion, this condition is probably due to toxic agents absorbed from the intestines.

Diagnosis.—This is not difficult, as the toxic symptoms, the severe vomiting, the profuse watery discharge, rapid emaciation and prostration, and the hyperpyrexia are significant.

Prognosis.—Grave, even with the most favorable surroundings, although in numerous instances osteopaths have successfully treated this disorder. Much depends upon the promptness of treatment.

Treatment.—A change of air, complete rest, removal of all foods for a short time, and absolute cleanliness are of great importance. Thorough treatment should be given along the entire spine, particularly to the splanchnics of the stomach and the intestines, and to the vagi nerves in the cervical region. Frequent bathing with cool water, or better still, wrapping the child in cold, wet sheets, will reduce the hyperpyrexia.

Thorough cleansing of the stomach and intestines with warm water occasionally gives excellent results. In **collapse** the use of a hot bath is indicated, followed by wrapping the child warmly in blankets and placing him in a horizontal position. The food of the child should consist of peptonized milk, raw beef juice, diluted egg albumin, barley water and chicken broth. Nourishment should be given gradually, and **only** after the intense symptoms have subsided.

Acute Enterocolitis

In enterocolitis the ileum and colon are chiefly affected, especially the lymphatic glands or lymph follicles.

Osteopathic Etiology and **Pathology**.—Warm weather, the artificial feeding of children, dentition and bad hygiene are predisposing causes. The disease usually occurs between the ages of six and eighteen months, but it is not infrequent in the third or fourth year. This disease is not confined to the warm weather, but may set in at any season of the year. Previous light attacks of diarrhea are often a predisposing factor. Lesions in the spine occur from the eleventh dorsal to the fourth lumbar.

The mucous membrane is congested and swollen, and the solitary follicles and Peyer's patches are swollen and often ulcerated. The changes may end here or the ulcers enlarge and extend into the muscular coat with the separation of a slough. There may be infiltration and thicking into the submucous and muscular coats, followed by induration of the tissue, producing abnormal rigidity.

Symptoms.—The disease may be a sequel of dyspeptic diarrhea or cholera infantum. The temperature increases and the stools change in character, being at first yellow, and later green. They contain traces of blood and mucus. Vomiting may be present, but is not a constant symptom. The abdomen is distended and tender along the course of the colon. The disease may abate here, recovery from the condition being slow; or the symptoms may increase in severity with persistent, small, painful stools, mainly of blood and mucus, tenesmus, and with scanty urine. The child grows pale and emaciated, and assumes a senile appearance. These cases last five or six weeks, death being preceded by coma and convulsions; though a few recover. Relapses are not uncommon and should be guarded against. **Ulcerative and membranous** forms may occur. Pneumonia and nephritis are possible complications.

Diagnosis.—**Enterocolitis** is distinguished from dyspeptic diarrhea by the greater severity, more fever, greater prostration, the stools containing more mucus and even blood, and by the greater pain and suffering. **Cholera infantum** may be recognized by the abrupt onset, very high fever, constant vomiting, and early collapse. If typhoid fever seems a possibility, the Widal test should be used.

Prognosis.—Grave; recovery follows prompt treatment with favorable surroundings.

Treatment.—Attention should be given to the condition of the spine from the eleventh dorsal to the fifth lumbar. An inhibitory relaxing treatment over the sacral foramina will lessen the tenesmus. When the ileum and colon are involved, disorder is usually present at the third and fourth lumbar vertebræ, although the lesion may be higher. Relaxation of all muscles in this region and correction of the vertebral lesions are essential.

Irrigation of the bowels once a day with a pint of cold water is very beneficial and even pieces of ice may be introduced into the rectum. Fresh, pure air, rest and cleanliness, with a restricted diet and daily warm baths are important. In a word, hygienic and dietetic treatment similar to that for acute diarrhea should be employed.

In all forms of diarrheal diseases in children much depends upon previous **osteopathic** attention, **diet**, **hygiene**, and **environment**.

Cholera Morbus

Definition.—An acute, gastro-intestinal catarrh of sudden onset, characterized by violent abdominal pains, incessant vomiting and purging.

Etiology and **Pathology**.—This disease greatly resembles Asiatic cholera; so much so that one seems justified in suspecting that cholera morbus, like true cholera, is due to a specific organism. No single bacillus has yet been designated as the specific germ, although one has been recognized resembling very much the common bacillus of true cholera. Until this has been fully decided, cholera morbus must be regarded as severe inflammation of the mucous membrane of the stomach and intestines, due to some poison generated from the improper food, which seems to be the cause of the disease, such as indigestible fruits, cabbage and cucumbers. It is most prevalent in hot weather, but is also caused by exposure to cold and damp. The condition of the mucous lining of the intestines is the same as in acute diarrhea. In fatal cases of cholera morbus there is the same shrunken, ashy appearance of the skin that characterizes cholera.

Symptoms.—The onset is sudden, with intense cramps in the epigastrium and frequently in the lower limbs; nausea; vomiting, and purging of bilious material, which later becomes almost like water, and in

severe cases the discharge becomes serous, finally resembling the rice water discharges of true cholera. There are also intense thirst, moderate fever, rapid emaciation and loss of strength; the surface becomes cold and covered with clammy sweat; the pulse is frequent and feeble. The patient becomes restless and anxious.

Diagnosis.—Asiatic Cholera.—There is no way of distinguishing between Asiatic cholera and cholera morbus, except by examination of the discharges for the bacillus. Similar attacks are produced in poisoning by arsenic, corrosive sublimate and certain fungi, and are only discriminated from it by clinical history and cause.

Prognosis.—In the majority of cases the prognosis is favorable, death rarely occurring. The duration is from twenty-four to forty-eight hours.

Treatment.—A strong inhibitory treatment to the gastro-intestinal nerves is at once demanded. This relaxes the muscles of stomach and intestines, dilates the blood-vessels and lessens peristalsis. The treatment should be kept up until relief is given. In some cases, gentle treatment over the stomach and intestines quiets the distress. Inhibition at the occiput gives relief, especially to the nausea and vomiting. Hot applications should be applied to dorsal and lumbar spine.

The vomiting is relieved principally at the fourth and fifth dorsal vertebræ on the right side near the angle of the ribs. Cold carbonated water and pieces of ice swallowed are useful. The diet must be regulated, the further after treatment being symptomatic. Clear the bowel by warm enema if any irritating matter is still present.

Inasmuch as food passes through the small intestine in 4 to 6 hours, and requires 20 hours to pass through the colon, the colon should be emptied by high irrigation in all acute intestinal disorders.

Intestinal Colic

This is a painful spasmodic contraction of the muscular layer of the intestines.

Osteopathic Etiology.—Lesions of the splanchnics derange the intestinal nervous mechanism, with a consequent upsetting of circulatory equalization

and chemical function of the intestines. Thus irritations and obstructions of the reflex arc predispose to lowered resistance, congestions, and disturbed chemism. Indigestible food, flatulency and impaction of feces oftentimes produce intestinal colic. Exposure to cold and emotional upsets may be factors. Foreign bodies, intestinal worms, abnormal amounts of bile discharged into the intestines, and reflex causes from diseases, as from the ovaries, uterus, liver, kidneys, etc., will produce the disorder; also lead poisoning, syphilis, rheumatism, locomotor ataxia, chronic malaria and hysteria.

Kerley says: "Children who take too much milk, too strong milk, or who take milk too frequently are the usual subjects of colic. Probably the most frequent cause of colic is indigestion of the proteid of the milk; either the proteid is in excess or the child has poor proteid capacity. Not a few cases of colic are due secondarily to defective bowel action."

Symptoms.—Severe paroxysms of pain, centering around the navel and diffused throughout the entire abdomen. The pain is of a piercing, cutting and twisting nature, relieved upon pressure. The abdomen is distended and the patient restless and continually changing his position. The attacks alternate with periods of complete quietude. In severe attacks the features may be pinched and the surface cold, with feeble pulse, vomiting and tense abdominal walls, all indicating incipient collapse. The duration of the attack is from a few minutes to several hours, eased at intervals and usually ending by a discharge of flatus.

Differential Diagnosis.—In **lead colic** the history, the slate-colored skin, blue line on the gums, sweetish metallic taste, constipation, slow pulse, retracted abdominal walls, and lead in the urine will designate this disease. **Biliary colic** presents pain in the hepatic region, radiating to the back and right shoulder; also jaundice, calculi in the stools and bile in the urine. Tenderness over the gall bladder is important. **Nephritic colic** is accompanied by pain radiating down one or both ureters to the inner side of the thigh, with retraction of testicle of side affected, or the labia, and blood, mucus, pus or calculi in the urine. In **uterine colic** there is dysmenorrhea and pain in the pelvis. In **ovarian colic** there is extreme pain upon pressure over the ovaries, and hysteria. **Abdominal aneurism** presents tumor, pulsation, bruit. In **inflammatory** and **ulcerative** disorders of the abdomen there is tenderness upon pressure, and fever. The pain of acute appendicitis

is at first general, centering in the right iliac fossa in about 24 hours. The X-ray may be of definite aid in renal and biliary conditions and various disorders, such as intestinal adhesions, angulations, etc.

Treatment.—Relief of pain is the first indication and is best accomplished by strong inhibition in the splanchnic region, which relaxes the spasm of the intestinal muscles, by normalizing the reflex arc. If disorders of the spinal column are located, it is of primary importance that they be corrected. In cases of irritation of the intestinal mucous membrane, a contraction of muscles of the spine will be found according to the area of the intestines involved, e. g., irritation of the mucous coat of the jejunum causes contraction of the muscles at the tenth and eleventh dorsals. It is a viscero-motor, viscerosensory or viscerotrophic reflex sign. On the other hand, a lesion at the tenth and eleventh dorsals may produce colic or other disorders of the jejunum. The portion of the bowel affected, therefore, can be often told by noticing the places of muscular contraction along the spinal column. Generally the jejunum and ileum are the portions of the bowel affected in intestinal colic. The pain can frequently be controlled if in the jejunum, at the tenth and eleventh dorsals; if in the ileum, at the twelfth dorsal; if in the ileo-cecal region, including the vermiform appendix, at first to third lumbar; if in the colon, at the third to the fifth lumbar; and if in the rectum, over the sacral and coccygeal nerves. Occasionally the duodenum and jejunum are reached by nerves as high as the fifth dorsal (usually vasomotor nerves, not sensory), and the other portions of the bowel lower, according to their respective positions. The relief is given by way of the splanchnics and sympathetics to the mucous (sensory) coat of the intestines, although inhibition relaxes intestinal muscles (motor nerves) and dilates blood-vessels (vasomotor nerves). Though precisely localized inhibition is of decided value, still if normal alignment, through adjustment, can be secured results are usually quicker and more satisfactory.

Anterior treatment to the abdomen helps to relieve the contracted fascia of the mesentery, with a consequent freeing of the circulation. It aids peristalsis of the intestines and expulsion of the irritating material. This probably produces considerable effect by way of the axone reflex. Direct treatment to the abdomen for the peristalsis relieves also constipation, impactions and the enteralgia, the latter principally by firm pressure. Peristalsis is also increased by stimulation of the vagi and inhibition of the

splanchnics. The latter treatment, of course, is not given to relieve pain directly, but to facilitate the removal of irritating substances if such are the source of trouble. If this does not produce a movement of the bowels promptly, a warm enema will assist greatly. The cecum and sigmoid should not be overlooked.

Flatulency can be relieved by direct pressure upon the solar plexus, which apparently removes obstructions to the abdominal nervous system (particularly the nerves of the digestive glands, as fermentation and flatulency are due to a disproportionate secretion of digestive juices) and thus the gaseous formations are absorbed. Additional treatment to the lower dorsal vertebræ and lower ribs to relieve nerve lesions and increasing both thoracic and abdominal circulation may be indicated.

As stated in the etiology of intestinal colic, the splanchnic nerves contain not only sensitive fibers, but motor and vasomotor fibers as well. The same is true of the vagi nerves; they exert upon the intestines not alone a motor influence, but also a blood control; consequently, our work in a certain region can be for more than one purpose. Hot applications to the abdomen may be of benefit. And hot fomentations to the spine for 20 or 30 minutes (affecting reciprocal innervation) is often of great benefit. The diet should always be regulated for a few days at least.

Constipation[77]

Constipation is an unnatural retention of feces from any cause. The following causes are frequently met with: A deficiency of the bile or other secretions that aid peristalsis; many acute and chronic diseases which lessen the secretions and impair peristalsis, such as anemia, hysteria, chronic affections of the liver, stomach and intestines and acute fevers; certain drugs and strong purgatives; strictures; concentrated food; sedentary habits, overfatigue and neglect of the calls of nature. Atony of the colon may be caused by chronic disease of the mucosa and by general disease causing debility. There may be weakness of the abdominal muscles, due to obesity and the distention of frequent pregnancies, or obstructions, such as displaced uterus, pregnancy, prolapsed cecum, sigmoid or rectum, and displaced coccyx. Constipation is really a symptom, in most cases, of some disease; many times it is about the only symptom observed. One has to take

into consideration the many causes that would produce constipation when the treatment of a case is undertaken. A disordered structure may be found in almost any region of a body, which would bear directly or indirectly in the causation of constipation.

Irregular habits often bring on the most obstinate cases of constipation in later life. There may also be local causes, such as disturbances of the normal secretions, impairment of intestinal walls, due to inflammation, and mechanical obstructions caused by tumors, intussusception, twists, etc. Constipation in infants is usually caused by errors in diet, but may be congenital.

In all obstinate cases the X-ray should be employed in diagnosis.

In the majority of cases lesions will be found in the vertebræ of the lower dorsal and lumbar regions, or in the lower ribs of either side. The lesions may affect the vascular supply and innervation of the intestines directly, or the lesion may cause the constipation by affecting some other digestive organ first. Lesions to the vagi affecting the peristalsis of the intestines are common.

The usual **symptoms** are frequent stools, debility, lassitude, headache, loss of appetite, anemia, furred tongue and fetid breath. Serious symptoms may result in long continued cases, such as piles, ulceration of the colon, perforation, enteritis and occlusion. The fecal mass may become channeled and diarrhea may occur from the irritation. In long standing cases of constipation, if the patient suddenly develops diarrhea the rectum should be well examined to see if there are impacted feces present. Neuralgia of the sacral nerves may also be caused by impacted feces in the sigmoid flexure.

Treatment.—Naturally, owing to the numerous etiological factors, each case is a special study and the treatment is necessarily varied. Many cases will present slight impaction of the bowels, a sluggish liver, spinal lesions and so on, which simply require a specific treatment and all the symptoms will be removed. On the other hand, constipation may be due to prolonged ill health and thus require a careful, systematic treatment, not only of the bowels, but of the entire system. Of primary importance in these cases is regulation of the diet, plenty of exercise, sufficient sleep, and regularity in going to stool at a fixed hour each day. The effect of attention to the latter

point, in some instances, will be sufficient to perform a cure. Too much cannot be said in regard to the beneficial effect of systematic habits.

Lesions may be found in the spinal column producing constipation from about the fifth dorsal to the coccyx, although principally the lower three dorsal and upper two lumbar vertebræ are at fault. Constipation may be caused by defects at any point in the intestines, and consequently the sections of the spinal column sending nerves through the intervertebral foramina to the several sections of the bowels should be examined. At any point from the fifth dorsal to the coccyx, certain vasomotor, motor and secretory nerves of the intestines may be affected by various lesions. The vasomotor nerves keep up the vascular tone of the bowels, the motor nerves the peristaltic action and the secretory nerves attend to the intestinal juices. In constipation, disorders of the spinal column are generally found on the right side. There is no good reason offered as to why this is so.[78] In those cases where the liver is impaired, the answer might be because most of the nerves to the liver are on the right side, but the right side is just as often affected when the lesions are in the lumbar region and the nerve supply to the hepatic region intact. Dr. Still considered the fifth dorsal of importance.

The **vagi nerves** have important bearing upon the motor apparatus of the intestines. Lesions in the upper cervical, involving intestinal fibers of the vagi, occur occasionally. Stimulation of these fibers increases the peristalsis of the intestines. Mechanical stimulation of the mid and lower dorsal region, as shown by osteopathic experiments, increases peristaltic action and vaso-constriction in the stomach and intestines.

The value of **direct treatment** over the intestines from the duodenum to the rectum in most cases of constipation cannot be overestimated. It aids peristaltic action, removes impactions, stretches adhesions, strengthens weakened muscles of the intestines and abdomen, and in general gives tone to all of the abdominal organs. The treatment should not be given in a hap-hazard manner, but each effort should be for a definite purpose. Care should be taken not to bruise the intestines or other organs, as by gouging or severe punching; the flat surface and the palms of the hands should be used. This means that the part of the bowel involved should be treated intelligently, the osteopath reaching underneath the section and the patient drawing the bowels up and in. Obstructions and impactions of the gut, especially at the

ileo-cecal and sigmoid regions, should be carefully corrected. At all angles of the gut, impactions and prolapses may occur.

J. H. Sullivan[79] makes the following observation concerning severe, deep abdominal treatment: “I have noted that this often resulted in the reverse of good effects. In constipation, naturally then, I am chary about treating abdominally, confining my work principally to the biliary regions, the ileo-cecal and left iliac regions and have attained good results when a promiscuous working of the abdomen had not so resulted.” This emphasizes the point that specific treatment is as much indicated for the abdomen as it is for the spine.

Frequently there will be found a spastic condition of the pelvic colon, often associated with congestion and adhesions. This probably sets up a reversed peristalsis. Treatment by inhibitory relaxation, with patient in knee-chest position, and adjustment of lumbar and innominate lesions, is indicated.

Direct treatment to the liver and biliary ducts is necessary in many cases, as the bile secretion is often defective; thus a slowness or inactivity of the liver and bile ducts might cause costiveness.

Some cases result from anesthesia of the rectum, due to pressure of the fecal matter collecting in the rectum. Simple dilatation of the rectal sphincters and a stimulating treatment through the sacral nerves will bring about a healthy activity of these parts. Occasionally the coccyx becomes displaced and produces paresis of the rectal nerves; or a displaced uterus or a tumor may produce the same result.

The use of **proper food** is essential. Coarse food leaves a great amount of residue, and on the other hand, dainty food leaves but little residue, both causing costiveness. As a rule increase the amount of fruit and vegetables. The patient should drink considerable water, and the time is of importance. Have a glass of cool, not iced, water taken on arising and if breakfast is delayed sufficiently, another in half an hour. Most people do not drink enough water. Unless contraindicated eight or ten glasses daily should be insisted upon. An enema[80] occasionally is indicated and is a great aid when used, particularly in cases of paralysis of the intestines and in impactions. Correct breathing and out door life are beneficial.

Treatment of the Constipation of Infants.—Repeated small enemata at a fixed hour each day will often be satisfactory but be certain that the tissue is not irritated. Two ounces of tepid water at a time should be injected. Careful spinal treatment and massage to the abdomen will be useful, as will slight dilation of the anus, which is usually done with the little finger, but in obstinate cases a soap stick may be used. When there has been continued straining at the stool, the sigmoid and rectum will often be found prolapsed, causing a mechanical obstruction. With the finger well lubricated this can be corrected and often is all that is needed. These directions, with care in the foods, are usually sufficient in any case not congenital. In chronic constipation Ruhrah outlines dietetic treatment as follows: "In infants see that they get sufficient fat and protein; well cooked and sweetened oatmeal gruel is useful. Orange juice, baked apple, or prune juice taken on an empty stomach is of service. Olive oil, the malted foods, or malt extracts are useful. In older children fresh fruits, vegetables, and oatmeal porridge are of value. Graham bread, dates, figs, and prunes may be used."

Intestinal Obstruction

(ILEUS)

This is due to a sudden or gradual closure of the intestinal canal at any point. Closure of the gut may be caused by strangulation, intussusception, twists and knots, abnormal contents, strictures, tumors, kinks, spastic states, adhesions, etc.

Strangulation.—This is the most frequent cause of acute obstruction of the bowels. There may be stricture of the bowels due to inflammatory processes producing bands or adhesions, or due to the adhesion of a bowel to an abdominal wound; a vitelline remnant, as a blood vessel, may remain and act as a strangulating cord, or in Meckel's diverticulum one end may be attached to a mesentery or abdominal wall and thus form a ring through which the gut may pass and become strangulated.

Strangulation may take place through the foramen of Winslow or the foramen ovale, or between the pedicle of a tumor and the abdominal wall.

Peritoneal pouches, mesenteric and omental slits, adherent appendix or Fallopian tubes and diaphragmatic hernia may be other causes. An internal

strangulation (hernia) may take place in the crural or inguinal canal, in the umbilicus, in the sacro-sciatic notch or in the opening through which the infra-pubic vessels pass. In strangulation there is a constriction of a portion of the bowel causing an arrest of the circulation of blood at that point, and more or less stoppage of fecal matter of the intestine.

In ninety per cent of cases the strangulated part is in the lower abdomen and sixty-seven per cent occur in the right iliac fossa, according to Fitz.

Intussusception or Invagination.—Intussusception is a slipping of a part of the intestine into another part immediately below it, as the slipping of a part of a finger of a glove or a coat sleeve into another part. The portion involved may be anywhere from half an inch to a foot or more in length. This produces compression and inflammation of the intestine, and obstruction to the intestinal contents. It occurs principally in children and is more common in males.

Spasms of the intestinal muscles and perverted peristalsis are probably the most common causes. One part of the bowel may be dilated and an adjacent portion contracted, thus allowing an invagination. Diarrhea, habitual constipation and intestinal polypi are important exciting causes. Invaginations oftentimes occur just before death, probably due to irregular peristalsis.

Following engorgement and inflammation of the invaginated portion, a tumor is usually present, and lymph is exuded which may cause the layers of gut to adhere, so that the invaginated portion is firmly held. Necrosis and sloughing are then likely to take place.

Intussusception varies according to location and is named according to the part of the bowel involved. There are commonly recognized (1) Ileo-colic, when the ileo-cecal valve enters the colon. (2) Enteric, of the small intestines. (3) Colic, of the large intestine. (4) Colico-rectal, of the colon and rectum. (5) Rectal, of the rectum.

Twists and **Knots**.—These occur more frequently in males, usually between the ages of thirty and forty. In nearly all cases the twist is axial, accompanied by relaxed and lengthened mesentery. One portion of the bowel may be twisted about another, or a loop of bowel twisted upon its long axis. A bowel being impacted or overdistended by feces and gas, is

quite likely to roll on its axis or knot and become dislocated, its weight and inactivity thus producing compression and obstruction of the bowels. The volvulus commonly occurs in the large intestine, at the sigmoid flexure and in the ileo-cecal and cecal regions. It occasionally occurs in the small intestine.

Abnormal Contents.—Obstructions may be caused by gall-stones, enteroliths, lumbricoid worms, certain medicines (such as magnesia and bismuth), fruit stones, coins, needles, pins, buttons, etc., and fecal matter. Foreign bodies usually lodge in the ileo-cecal region and in the small intestine, while fecal impactions occur in the large intestine, more frequently in the lower part. Females are more subject to it than males.

Its causes are many and are similar to those of constipation. Spinal lesions are very frequent, probably causing paresis or paralysis of a segment of the bowel; or all the forces that maintain a normal activity of the intestines may become impaired. Hemmeter[81] says it is "more frequently the result of defective innervation of the intestine."

Impactions are frequently met with and are easily overlooked under any diagnosis which does not include thorough palpation of the abdominal viscera. The impaction may be so large as to produce dilation of the bowel. The obstructive mass becomes very hard and dry and perhaps channeled, allowing some material to pass until, finally a large piece of fecal matter will obstruct the passage completely. In **diagnosis** it must not be confused with neoplasms, tumors, etc. Impactions may occur at any point of the colon and the weight so drags the bowel out of position as to be misleading. The principal points are the ileo-cecal region, sigmoid flexure, and rectum. Tenderness is usually present, as may be diarrhea which must not be taken as evidence that the bowel is clear. Impaction gives rise to many reflex symptoms and is often the real cause of many mistaken conditions.

Too much cannot be said on the importance of a thorough examination of colon and its connections, which should be routine of every examination as the large bowel is impacted much more often than suspected and may be the seat of many reflex and direct disturbances. The heart may be affected by weight upon the vessels, gastric disturbances and signs of auto-intoxication from absorption may appear.

Dilatation of the sigmoid flexure, especially when it is congenitally long, may even be so great as to crowd up and interfere with the liver and diaphragm; in these cases the coats of the intestines are usually hypertrophied.

Strictures and Tumors.—These usually occur in adults, more frequently in women and generally involve the large intestine and lower part of the abdomen, most of them occurring in the left iliac fossa. They frequently result in chronic obstruction. Occasionally, a stricture may be spastic, due to vertebral lesions, that is severe enough to cause complete blockage of intestinal contents. These are usually of the pelvic colon. There are cases where the opposite condition, paralysis of a section, generally of the small intestine, occurs. This may be due to injuries to the bowel, or to damage of the blood supply, or to derangement of the innervation.

Scar tissue, following ulceration of the bowel; tumors of various kinds; and congenital defects, are possible sources of intestinal obstruction.

Symptoms.—Acute Obstruction.—There is constipation, nausea, vomiting, and pain. The pain is of a colicky nature and may come on abruptly. After the contents of the stomach have been vomited, the material becomes colored with bile, and finally stercoraceous vomiting occurs. Observing the contents vomited (gastric, bile-stained, and fecal) will greatly aid in the diagnosis. The contents of the bowel, below the obstruction, may be emptied or complete constipation may remain. All the symptoms, as a rule, rapidly grow more pronounced. The pain is more severe; tenderness occurs over the abdomen in limited areas; there is slight tympany; the eyes are sunken; the skin is cold and clammy; the pulse is quickened and feeble; there is rapid increase of leucocytes; the urine highly colored; the tongue is dry and there is incessant thirst; tenesmus and tumor may be marked, and fever occasionally occurs. The above condition may continue from three days to a week, when collapse and death may occur, if relief is not obtained.

Chronic Obstruction.—In fecal impactions constipation of long standing is commonly observed. In some cases the fecal mass has become channeled, allowing the bowels to remain open; the patient possibly not knowing that there is any trouble. In fact, diarrhea may be present, due to irritation above the impaction. Finally, however, obstruction occurs; the breath is offensive, the appetite is poor, the abdomen swells, and there is

fullness and weight within the abdomen, accompanied by pain and vomiting. Upon examination before complete closure, the fecal impactions can easily be felt through the abdomen externally. The tumor is a yielding mass. It has been mistaken for an enlarged liver or gall-bladder, a kidney, or a tumor of the stomach or duodenum. Other symptoms may be present as hiccough, jaundice, tenesmus, tumultuous peristalsis, local peristalsis, local peritonitis and collapse. In stricture caused by cicatrices that may have been formed years before, complete obstruction takes place. Transient attacks often occur. Usually the general health is greatly impaired long before complete occlusion.

Diagnosis.—A diagnosis can usually be made by careful, thorough examination through the abdominal wall, in connection with the symptoms, and the physical signs. The region of intestinal trouble is manifested by contracted muscles at certain points along the spinal column, corresponding with the particular portion of the bowel involved, as indicated under intestinal colic. Examining the patient in the knee-chest position will often give a better opportunity to locate and outline the obstruction. Rectal and vaginal examinations should not be neglected. Intestinal obstruction may be confounded with tumors, hernia, intestinal colic, enteritis, peritonitis, hepatic colic and renal colic. **Peritonitis** may be differentiated by the history, the early fever, diffused tenderness and absence of fecal vomiting. When **invagination** occurs, besides the symptoms of obstruction, the age, tenesmus, bloody discharges and the sausage-shaped tumor in the line of the colon, will be diagnostic. In **stricture**, the history, gradual onset, and ribbon-like and bloody stools will distinguish that disorder. In **tumors** the gradual onset, age, bloody discharges, and cachexia will be important symptoms. X-ray diagnosis may be of value in certain cases.

Treatment.—Treatment of the bowels directly is required, and each case must depend for its relief upon the ingenuity of the osteopath. Rules to be followed cannot be given, as cases vary in manner of involvement and in location, consequently the correction of the disorder depends as much upon the ability of the osteopath as does the determination of the diagnosis. Taxis is the method commonly used in relieving intestinal obstructions, though other methods may be employed.

In **invagination**, raising the buttocks and lowering the chest, with thorough injection of oil or tepid soapsuds, or an inflation of the colon with

air, may give relief. In addition to thorough but cautious manipulation of the bowels as in **impaction**, irrigation of the lower bowel with warm water, soapsuds, or glycerine and water, will usually be of material aid. In **strangulation**, high injections of warm water, and assuming the knee-elbow or lateral position, may straighten out the acute obstruction. **Twists** and **knots** are best relieved by direct treatment, although injections may be of aid. **Kinks** of the pelvic colon, ileum, and duodenum are best treated with the patient in the knee-chest position. **Tumors** and **strictures** will require, sooner or later, surgical interference in most cases, but to treat as in impaction will be effective for a short time at least. If there is no indication of immediate **relief within three days, surgical interference should be instituted**. Besides the ordinary treatment for the nausea and vomiting, washing out the stomach will help allay such disorder, quiet the peristalsis and relieve the abdominal distention and pressure above the seat of obstruction. Strong thorough treatment of the spinal nerves to the stomach and intestines will be of great help in lessening pain, establishing normal peristaltic action and in suppressing inflammation. The vagi also should be treated for perverted peristalsis. Hot fomentations will be of service. The nutrition of the patient is best retained by rectal injections of food.

Spastic states, particularly of the pelvic colon, frequently cause constipation of various degrees of chronicity. Reaching beneath the spastic area and inhibiting and raising (knee-chest position) the parts will often give marked relief.

Adhesions can often be stretched sufficiently to restore normal function of the bowels.

Treatment of **impactions** and **abnormal contents** requires an additional word. The first step is to free the colon of the fecal mass. The enema is of great assistance in this, for cases of long standing present a hard, dry mass, often adherent, and the mucous membrane is sensitive from inflammation. Much abdominal treatment must not be given until the mass is softened by water. When in the sigmoid or rectum it may, if not dislodged by repeated enemata, have to be removed by a colon spoon, perhaps under anesthesia. Impaction of the small intestine is rare and out of reach of the enema, although if taken as hot as can be borne, it will exert considerable influence high up. In these tendencies and in constipation, when the bowel must be kept open before treatment has produced much effect, there should be an

effort made to break up any cathartic habit which may be formed. The enema is a most valuable aid, but it must be given correctly. The patient should be instructed that a fountain syringe is preferable, and that it must never be taken standing. This merely fills and distends the rectum, or lower sigmoid at the best, and is passed without any or with very little effect. Lying on the right side is a very good position, as is also on the back with hips elevated, but the knee and chest is best in most cases. The water should be a little above body temperature and can be saponified or used clear. The effect will be about the same. The tube should be perfectly smooth and well lubricated and introduction must be made with care so as not to bruise or irritate. The water, having been allowed to run to expel the air, may be now started and will separate the mucous folds and allow easy penetration. The rubber tube should be held between the thumb and finger, so the flow can be stopped as soon as it meets an obstruction. When this is passed the flow can begin again and continue until the required amount (from one to two quarts for an adult), has been taken, or until the feeling of distention becomes too great. By following this method, much of the distress and colicky pains which sometimes accompany an enema, may be avoided. Water should be held for some minutes, to allow softening of the fecal mass. In many impactions it is important to get the water into the ascending colon. For that purpose nothing is better than a Coles sigmoid irrigator. This is shaped somewhat like the letter S and is about a foot long from tip to tip. Its introduction is not difficult, but care must be used. Place the patient on the right side and stand in front, having the bag suspended near. Introduce the tube and with slow, gentle pressure let it follow the course of the bowel. When the splenic flexure is reached, it will stop, but by letting a little water flow, the bowel will distend and it will pass. When in the full length, the end will be near the median line and in the transverse colon. Now let the water flow slowly, stopping frequently, and with one hand gently lift and work the abdomen. This will both soften the contents and aid the water in reaching the farthest point. It is not well to give more than a quart the first time, as there is apt to be some prostration. The tube also has the mechanical effect of raising and replacing the sigmoid, descending colon and splenic flexure. When there is lack of tone to the bowel or when very little stimulus is needed, a half pint of cold water taken in the morning, will often act quickly. Appliances which force the water into the bowel when the

patient is sitting, are not recommended, as they tend to stretch the muscular coat by pressure from lifting a column of water.

Hernia.—There are several methods of replacing a hernia. The first endeavor, in every instance, must be to reduce it, whether it be strangulated, incarcerated or simply protruded. One of the easiest and commonest methods is to place the patient on his back, the buttocks elevated, the legs flexed upon the thighs, the thighs flexed upon the abdomen, and the limb on the affected side slightly rotated inward, so that the columns of the ring about the hernia may be relaxed. After the hernia is protruded a little more, so that its contents may be emptied readily, a gentle pressure with the thumb and finger is made upon the upper part of the tumor, when the rest will follow. A gurgling noise is heard upon reduction. Cases that cannot be reduced and are causing acute obstruction of the intestines, should be treated surgically. Incomplete hernia, which does not show externally, may be present and cause severe reflex symptoms. Considerable attention has been given to this by some investigators. The patient is placed in the Trendelenburg position and the bowel lifted out of the fossa. If any signs of hernia are present a well fitting truss will often cause it to heal. Exercises, in a few instances, will be beneficial.

Appendicitis

Appendicitis is an inflammation of the appendix vermiformis. In a few cases the cecum and surrounding tissues are involved (typhlitis, perityphlitis). The vasomotor nerve supply comes from the lower three dorsals and upper two lumbars. The sensory nerves make their exit from the three lower dorsals. Appendicitis is nearly always predisposed by injury to the innervation of the vermiform appendix and immediate region, vertebral derangements or subdislocations from the tenth dorsal to the third lumbar. The vermiform appendix is a peculiarly constructed organ, and its function has not been determined with positiveness. It undoubtedly has a function and possibly a very useful one. Sir William Macewen[82] does not share in the general belief that the appendix is without function, but protests against its indiscriminate removal, believing it has a powerful influence over the function of the colon. “Yet thousands have been operated and show no ill effect.” This is in keeping with the ideas of Dr. Still, who always

maintained that the appendix is of importance to the human economy. Although the organ has been found in various localities of the abdomen, this fact and others do not necessarily indicate that it is a functionless relic. It is richly supplied with lymphatic and blood-vessels and has a peristaltic action peculiar to itself. When the organ is in perfect condition, foreign material probably would not find a lodging point in it, on account of its peristalsis. Dr. Still[83] suggests that the appendix has a sphincter, also the power to contract, dilate or shorten, should any foreign substance enter, and he worked with this idea in view with uniform success. The truth of this theory has been proved by Abrams[84] who has demonstrated by the aid of the fluoroscope that peristalsis of the appendix can be stimulated by percussion at the 10th dorsal and it made to empty and fill itself. Abrams makes use of this fact in the treatment of catarrhal appendicitis. Appendicitis may also be caused by fecal impactions and foreign bodies in the bowel contiguous to the appendix. In these cases there is usually an impaired innervation from the spine, due to vertebral and lower rib lesions, resulting in a weakened muscular coat and catarrhal congestion of the mucosa. In a word, prolapse of the bowel at this point is a predisposing common cause. In various instances abrasions of the coats of the tube occur, or the innervation or vascular supply is impaired, and pathogenic bacteria, as bacilli coli communis, streptococci pyogenes, staphylococci pyogenes aureus, typhoid bacilli, tubercle bacilli and others, find a favorable lodging point and determine the nature of the disease. Injuries to the spinal column and displacements of the vertebræ in the lower dorsal and lumbar regions, straining and lifting, tight lacing, torsion of the appendix, traumatism, impaction of feces, concretions and foreign bodies, acute indigestion, indigestible food, overeating, exposure to wet and cold, and infectious diseases (as typhoid fever, tuberculosis and influenza), are all in the list of causes of appendicitis.

Pathologically, in most cases the inflammation is catarrhal. This includes many of the mild attacks. The mucosa is inflamed similarly to catarrhal processes elsewhere, although the inflammation may rapidly spread to the deeper structures unless immediately cared for. The inflammation may be so severe that the lumen becomes closed. This is termed **obliterating appendicitis**. When this occurs the attack may cease and danger from subsequent attacks are at an end, but inflammation may go on to purulent

involvement and even to **ulceration**, **gangrene** and **perforation** or **peritonitis**. An **abscess** may be within or without the appendix. **Adhesions** are likely to form about the mass.

Symptoms.—A sudden, violent pain in the abdomen, usually localized in the right iliac region, although at first this pain may be general. The point of greatest tenderness is detected over McBurney's point—a point at the intersection of a line between the umbilicus and the anterior iliac spine, with a second drawn along the outer edge of the right rectus muscle. The patient usually lies on the back with the right leg drawn up. The severity of pain is not indicative of the seriousness. If the pain ceases suddenly, it is commonly a serious indication. There is usually fever at the onset, the temperature being from 100 to 102 or even 104 degrees F., and very rarely preceded by a chill. In favorable cases the temperature gradually falls, reaching normal in from five to seven days. If recovery has not begun by this time an abscess is probably forming. If **suppuration** takes place the temperature continues with but slight fall, although in some cases there is a rise, or it may become almost normal. Pain in the right iliac fossa, without fever, rarely points to an acute attack of appendicitis. Vomiting and nausea are more or less frequent, and more commonly present in the event of perforation or rupture of an abscess. In favorable cases vomiting rarely lasts beyond the second day. In the majority of cases constipation is present from the beginning of the attack, due to paralysis of the bowels. There may be diarrhea, particularly in children.

"**Urine** is febrile in character with large quantities of indican. The **blood** shows leucocytosis. A leucocyte count of 20,000 is high and indicates an acute appendicitis, with pus, gangrene or peritonitis."

On **inspection** of the abdomen at the onset of the attack, the sides look alike, but on **palpation** there is rigidity of the rectus abdominis muscle and the other muscles overlying the seat of inflammation. The whole abdomen may be slightly distended. In the majority of cases there is a progressive development of a hard swelling or tumor in the right iliac fossa. These tumors vary in size, but are usually oval and the size of a hen's egg, and generally situated a little above Poupart's ligament. **Fluctuation** of the tumor is indicative of suppuration. There is often great irritability of the bladder and frequent micturition. A sudden fall in the temperature often indicates that a perforation has taken place, or that a small abscess has

ruptured into the intestines. In favorable cases the temperature falls at the end of the third or fourth day, the pain lessens, the tongue becomes clearer and the bowels are moved. If the tumor persists, the patient is very liable to have a **recurrence** of the condition.

Rapid growth of the tumor and aggravation of the several symptoms point to suppuration, especially **extreme tenderness** over the point of inflammation. If the appendicitis goes on to suppuration, there is danger of rupture into the peritoneum. In a few cases the abscess may rupture into the bowel, in which case the patient recovers. Other terminations are lumbar abscess, hepatic abscess and perinephritic abscess. Death may be caused by septicemia or pylephlebitis. These events may be delayed a variable length of time, depending upon the extent and strength of the adhesions that form about the abscess. “The gravity of the appendix disease lies in the fact that from the very outset the peritoneum may be infected; the initial symptoms of pain, with nausea and vomiting, fever, and local tenderness, present in all cases, may indicate a widespread infection of this membrane.” (Osler). He also says local signs are not so trustworthy as the general symptoms.

There is liability to **relapse in appendicitis**. The attacks may recur for years at different intervals. In some cases these intervals are very short. In some cases perfect recovery may take place after repeated attacks.

Diagnosis.—In many cases the diagnosis is easy, but other cases require careful study and close observation. Sudden pain becoming localized, tenderness and rigidity in the right iliac region are three symptoms that together almost positively indicate appendicitis. The leucocyte count is of particular value. A **pseudo-appendicitis**, with all symptoms of true appendicitis in the initial stage, may be caused by the downward dislocation of the twelfth rib on the right side, and occasionally the eleventh rib on the same side. The rib lies obliquely downward toward the crest of the ilium. In a few cases the obliquity of the lower rib is so great as to very nearly touch the ilium. The dislocated rib may produce severe irritation, pain, tenderness, rigidity, and even inflammation, of the abdominal muscles. The patient nearly always complains of the pain being deeply seated, thus possibly confusing one. In **typhoid** there is a gradual development of the fever, characteristic temperature curve, enlargement of the spleen, epistaxis and diarrhea. The Widal test should be made. The absence of fever and intermittent pain in the abdomen, with complete constipation, fecal

vomiting, general distention of the abdomen, bloody stools and marked tenesmus would determine **intestinal obstruction**. In **tubal disease** a gradual onset, a more dull and constant pain, the history, and pelvic examination will usually differentiate this disorder from appendicitis. Kelly[85] gives these points in differential diagnosis, between acute salpingitis and appendicitis: "In the former it will usually be found that there has been a yellowish vaginal discharge for some period before the attack. The local pain and tenderness, usually located deeper in the pelvis, is most intense on palpation in the region of Poupart's ligament. On vaginal examination exquisite tenderness is felt on either side of the uterus." In **biliary colic** the pain is higher along the biliary ducts and gall-bladder, extending even as high as the shoulder, and jaundice is generally present. In **renal colic** the pain extends along the ureters down to the inner side of thigh and testicle, and back into lumbar region. There is absence of fever and rigidity. The pain in **perinephritic abscess** is downward into groin, as in nephritic colic, and there is tenderness of the lumbar region. Exploratory incision may be necessary.

Prognosis.—Naturally, the prognosis depends upon the character of the appendicitis, but on the whole the prognosis is favorable. A large proportion of cases recover. Surgical operations are many times deferred until too late; undoubtedly on account of the uncertainty of the condition. Still, on the other hand, many serious cases recover under the proper treatment when an operation seemed almost absolutely necessary; all going to prove the fact that very much depends upon diagnosis of the true condition. The statement that there is "no medical treatment for appendicitis," seems rather broad in view of the report of the medical inspector[86] of the French Army in Algeria. Out of 668 patients suffering from appendicitis, 188 were operated upon and 23 died, while 408 were treated medically and only three died. He concluded that a meat diet tended to increase the number of cases. "It is exceedingly common and the prognosis is, on the whole favorable. Tafft, of Copenhagen, found adhesions in the neighborhood of the appendix in 35 percent, of all bodies subjected to post-mortem examinations[87].

Treatment.—Confine the patient in bed at once. Cases have undoubtedly been lost by not enforcing this point. Attempts should be made to correct the disordered condition of the dorsal and lumbar regions. Thorough and careful treatment should be given at this point, and in most instances the

pain can be relieved by correction of the disordered vertebræ. If the case is seen at the beginning of the attack, careful manipulation that especially lifts the cecum and surrounding structures and local application of ice are indicated. However, great care should be exercised here, for some of the most severe cases show no induration. Temperature, pulse, and blood picture are invaluable as guides. When the case is advanced, extreme care should be used in manipulating over the swollen and inflamed region. Hot applications will be helpful in such instances.

When due to fecal impaction and foreign bodies, thorough, direct, elevating treatment over the involved region, and high rectal injections are indicated. This applies to the onset, for if the disease has progressed to the point where pus may be present, the **bowel** must be **absolutely** at **rest**. Do not give or allow to be given purgatives at any stage of the disease. When **sure** that **there is no pus**, direct, careful work over the cecum and appendix is allowed and is of value. It should be a lifting of the colon and relaxing of nearby tissues, to promote the circulation. Treatment of the spine is necessary in all cases, to relieve pain, to correct the nerve and vascular supply, and to increase peristalsis so as to remove irritating bodies from the vermiform appendix. “Colitis follows appendectomy more frequently than any other abdominal operation. The explanation for this is that the appendicitis is seldom localized in the appendix but is complicated by colitis, or rather the colitis is complicated by the appendicitis. In such cases, removal of the appendix aggravates rather than alleviates. A conclusion to be drawn is, to carefully palpate the colon in all appendicitis cases and reserve diagnosis, prognosis and advising of an operation until it can be definitely determined as to the location, extent and degree of the disease. The formation of pus is an indication requiring immediate evacuation.

“If good surgical advantages are available and the case begins with considerable virulence and a surgeon can be had within the first twenty four hours, it is in all probability best to operate; but if the case begins slowly or no good hospital advantages are available, or if the case is not seen until some forty-eight hours have elapsed after the onset, in all probability it is strictly an osteopathic case and should not be touched by surgery. Some advocate in all instances to wait until pus is formed before operative procedure is resorted to. This is a rather dangerous attitude to take, for I have seen hundreds of cases operated and have operated upon a great many

myself and I have never seen a case die unless it was a pus case."—S. L. TAYLOR.[88]

The case should be most carefully watched, and a surgeon should be promptly called for consultation if the occasion demands it in the least; and if thought advisable, operation should be resorted to before too late. Do not assume too much responsibility in these cases. The patient should be nourished on a restricted diet of milk and animal broths. Asa Willard[89] strongly recommends no food by mouth, as it is bound to set up peristalsis and cause increased irritation. He sustains the strength by rectal feeding. This view is held by other authorities, even to withholding water when the inflammation is at its height. Tasker confirms the advisability of restricted feeding and advises resting the bowel even to the point of discontinuance of food. The course of the attack is usually so short that there is no danger of starvation and little loss of strength results. This point is a highly important one in cases of any degree of severity.

In **chronic cases** of a fibrotic character, no pus, carefully lifting the parts and loosening adhesions in addition to spinal adjustment will often restore normal circulation. These conditions aside from the local disorder frequently cause hyperchloridia and other digestive disturbances.

Diseases of the Liver and Bile Duct

Primary diseases of the liver will invariably present osteopathic lesions from the fourth or fifth dorsals to the eleventh or twelfth. The ribs on the right side are commonly involved. These lesions probably disturb the liver by way of the vasomotor fibers. Displacements of the duodenum, of the hepatic flexure and transverse section of the colon and displacements of the right kidney are frequent sources of liver disorders. Care should be taken in differentiating primary from secondary diseases, for naturally the relative importance of the various factors in treatment will vary. In many secondary diseases there will be found predisposing osteopathic lesions, and these secondary disorders and degenerations can at least be palliated and occasionally the degeneration retarded or stopped by persistent osteopathic treatment, diet, and hygienic measures.

Hyperemia of the Liver

This is an abnormal fullness of the blood-vessels of the liver, followed by an enlargement of that organ. It is active when there is abnormal pressure in the portal veins (afferent vessels); passive when there is excessive pressure in the sublobular veins (efferent vessels).

Osteopathic Etiology and **Pathology.—Active hyperemia** is usually due to indiscretions in diet. After each meal a physiological hyperemia of the liver occurs, which is greatly increased by habitually overeating and overdrinking. This condition may lead to functional disturbance and possibly to organic change. Traumatism and lesions of the vertebræ and ribs, irritating vasomotor nerves, are important. Habitual constipation, malaria, heat, and arrested menstrual epoch, and infectious fevers are also causes of the active form. Enteroptosis is not a rare cause.

Passive hyperemia is due to obstructions of the efferent circulation. Valvular heart disease is the most common cause. Lung diseases, as emphysema or cirrhosis; obstruction to the vena cava or interference with the flow of blood through the liver; and diseases of the pleura, are among the causes.

Most cases of congestion of the liver present lesions to the vasomotor nerves of the liver, fifth to ninth dorsal. Especially are the ribs over the liver apt to become displaced and affect the organ.

Pathologically, the liver is enlarged and engorged with blood. The appearance of the organ depends upon the duration of the hyperemia. In passive hyperemia the central portion of the lobule and the area of the hepatic vein are deeply colored. The periphery and the area of the portal vein are pale. This alternation of the dark and light color gives rise to the nutmeg liver, which is so noticeable upon section. In cases of long standing, atrophy of the liver cells and overgrowth of connective tissue result.

Symptoms.—Active Hyperemia.—Dull aching and a sense of fullness in the right hypochondrium, aching of the limbs, coated tongue, nausea, vomiting, constipation, highly colored urine, and slight jaundice.

In **passive hyperemia** the symptoms are the same, but less marked. The onset is gradual and the liver may attain considerable size. In severe cases following tricuspid regurgitation the liver may pulsate. In severe cases dropsy takes place.

Diagnosis.—Active hyperemia is occasionally confounded with catarrhal jaundice. Usually congestion of the liver is easily diagnosed.

Prognosis.—In active hyperemia the prognosis is good, unless repeated attacks lead to atrophic degeneration. In passive hyperemia the prognosis depends entirely upon the cause.

Treatment.—Active hyperemia.—The treatment consists of measures which tend to diminish the congestion, principally a thorough, direct manipulation over the liver by raising and spreading the ribs. Careful and thorough treatment to the dorsal splanchnics of the liver is also indicated. The substitution of a scanty for a heavy diet is essential. The foods given should be such as are easily digested, as milk and broths; fats and sugars are to be avoided.

In **passive hyperemia** the treatment consists of correcting the disorder causing it. Often heart diseases are the cause. A thorough depletion of the bowels will aid largely in relieving ascites that may follow passive congestion (See ascites).

In liver congestions it is well to pay attention to the intestinal condition in order that the circulatory mechanism here may be thoroughly coordinated with the hepatic.

Simple Catarrhal Jaundice

Definition.—Jaundice due to inflammation of the terminal portion of the common duct, not the result of impacted gall-stone. The disease probably starts as a catarrhal inflammation of the stomach and upper portion of the small intestine. The bile is retained and absorbed.

Osteopathic Etiology and **Pathology**.—A frequent predisposing cause is the subdislocation of the tenth rib on the right side, thus interfering with the innervation to the bile ducts, and causing congestion of the mucous membrane of the common duct; although lesions above and below this point may occur. Extension of gastro-duodenitis into the common duct is a common source of the inflammation. Sagging of the duodenum will disturb the bile-duct through its being a portion of the duodeno-hepatic ligament. Duodenal catarrh usually follows errors in diet, exposure, malaria, Bright's disease, portal obstruction and chronic heart disease. Infectious fevers, as

pneumonia and typhoid fever, and emotional disturbances are among the causes. Catarrhal jaundice may occur in epidemic form.

Pathologically, the duodenal end of the duct is most commonly involved. The mucous membrane is swollen and the orifice fills with mucus. The inflammation may involve the common and cystic ducts and even the hepatic. The liver is enlarged and the gall-bladder distended.

Symptoms.—The only symptom present may be simply the jaundice. There is always tenderness upon pressure over the ducts. The patient many times complains of a stabbing pain when pressure is exerted over the duodenal opening. Usually the course of the bile duct can readily be felt upon deep pressure, owing to the tumefaction. Accompanying this condition may be general malaise, loss of appetite, nausea, vomiting, constipation or irregular action of the bowels, pains in the back and limbs and a slight fever.

Diagnosis.—Where jaundice is present without pain, it generally indicates catarrhal jaundice. The absence of emaciation or of evidences of cancer or cirrhosis usually makes the diagnosis easy. Good general nutrition and a negative physical examination favor simple jaundice as to the diagnosis.

Prognosis.—The prognosis of catarrhal jaundice is favorable, unless accompanied with infectious diseases or hypertrophic cirrhosis. When diseases are associated with jaundice the danger is usually from the disease. The duration of the disease is generally given as from two to eight weeks, but osteopathic treatment generally lessens that time at least one-half.

Treatment.—The treatment is directed toward relieving the inflammation of the bile ducts and increasing the flow of the bile into the intestines. Great relief to the patient will be experienced from thorough treatment over the bile ducts, especially at the duodenal end. Press slowly but firmly over the region of the ducts, then execute a downward motion with firm pressure over the course. This performance should be repeated several times, until the tenderness in this region is almost or entirely relieved. The idea of this treatment is, **first**, to slowly but firmly bear down upon the abdominal muscles over the congested tissues, so as to relax the tissues and get as close to the ducts as possible, and **second**, with the downward movements to reduce the congestion of the ducts and at the same

time to remove any mucus or other material from the orifice, thus allowing a freer flow of bile. It will be recalled that the normal flow of bile is under very low pressure. Care should be taken not to gouge or dig into the tissues with the ends of the fingers, but to use the flat surface of the fingers. Any gouging or severe treatment will not allow one to accomplish his purpose, owing to the stimulus or irritation it would give the abdominal muscles and thus cause them to contract; and furthermore, it would more or less bruise the parts. An inhibitory treatment should be given along the spine on the side affected to help relax the abdominal muscles before this treatment is administered. In all circulatory disturbances of the bile-duct and other hepatic tissues lift the duodenum at about the second lumbar where it lies beside the ascending colon. This tends to release portal vein, hepatic artery and bile-duct, the duodeno-hepatic ligament.

Direct treatment is given to the liver by more or less kneading or working the organ and also by raising and spreading the ribs. This treatment is to stimulate the activity of the liver. Reaching under the cartilages of the eighth and ninth ribs on the right side and bearing inward and downward will empty the gall-bladder and thus be of aid in relieving the tension in the biliary passages. It is probably a stimulus to these cutaneous fibers that causes a relaxation of the sphincter muscles of the gall-bladder and thus allows it to empty. Stimulation of the tenth nerve contracts the gall-bladder. Then it should also be noted that work over the duodenal end of the bile-duct relaxes the orifice while through reciprocal relationship the fibers of the gall-bladder contract. When all of the muscles of the hepatic region have been carefully relaxed and softened, a thorough examination can then be made of the vertebræ and ribs that might embarrass the innervation or vascular supply of the liver. Lesions of the vertebræ and ribs affecting the liver may occur from the sixth to the eleventh dorsal. Lesions to the vagus and phrenic nerves may occasionally involve the organ.

Irrigation of the large bowel with cold water may be employed. The cold excites peristalsis of the gall-bladder and ducts. Drinking freely of water will be helpful. A non-stimulating diet should be given. The stomach may not be in a condition to bear solid food; and furthermore, food on entering the duodenum will increase the local inflammation of the common bile duct. Give diluted milk, buttermilk, light meat-broths, clam-broth, egg

albumin and pressed beef juice. After the pain, vomiting and fever subside, the diet can be gradually increased.

Cholecystitis

Cholecystitis is an inflammation of the gall-bladder caused by infection. Stagnation of bile due to obstruction (especially gall-stones) of the bile ducts, or a slowing of the bile flow owing to deranged innervation from osteopathic lesions or sagging bowel, are predisposing factors. Fibrotic changes in the appendix are fairly common sources that derange the nervous reflexes of the biliary function. The disorder may be associated with specific fevers.

Exciting factors are the colon bacilli, streptococci, staphylococci, typhoid bacilli, and pneumococci.

Symptoms.—The gall-bladder feels hard and full. There is inflammation and thickening of the mucous membrane, with considerable increase of mucus. Owing to the infection there may be ulceration and suppuration, with possible perforation and peritonitis. When the inflammation extends outside of the bladder there are usually adhesions.

The onset is commonly sudden, with pain and tenderness in the right hypochondrium. Great care should be taken in deciding the location of the inflammation, for the pain and tenderness may be over the stomach, or along the duodenum or ascending colon as low as the cecum. Nausea, fever, constipation, and possibly jaundice, are other symptoms.

Treatment.—Exercise special care in treating these cases. Although in many instances the inflammation will rapidly subside, still owing to suppuration there is danger of aggravating the condition. It is better, in doubtful cases, to confine the treatment to spinal work, and to influence drainage by placing the patient in knee-chest position and carefully raise cecum, ascending colon and duodenum. Rest, restricted diet, plenty of water, and hot fomentations will be beneficial. In severe cases surgical interference is indicated.

Jaundice

(Icterus)

Jaundice is a symptom and not a disease. It consists of the discoloration of the skin and other tissues by material derived from the bile. The discoloration may vary from a mere paleness to a yellow or brown olive hue.

Toxic jaundice occurs in acute yellow atrophy, pernicious anemia, pyemia, specific fevers, and the action of poisons.

Obstruction by foreign bodies as gall-stones and parasites are important causes. Inflammation and swelling of the biliary ducts and duodenum are common causes as well as stricture of the duct by tumors and various growths, either internal or external, to the biliary ducts. In some instances pressure from without by the pancreas, stomach, kidneys, enlarged glands, fecal matter, a pregnant uterus, etc., has been the cause. Irritations and obstructions of the splanchnic nerves, due to lesions in the lower dorsal vertebræ and the ribs from the sixth to the eleventh, will often markedly affect the liver. Also lesions at these points may predispose to inflammation and tumefaction of the bile ducts.

Symptoms.—Besides the discoloration of the skin, there is itching of the skin, on account of bile pigment deposits; even eruptions may occur. The mucous membranes are often colored and a constant symptom is the bright yellow discoloration of the sclerotic coat of the eye. The secretions are colored. It may be first noticed in the urine. The perspiration is colored, rarely the saliva and tears. There is frequent sweating.

As very little bile passes into the intestine, the feces are pale and gray, and sticky. The bowels are generally constipated, but diarrhea may occur, owing to decomposition resulting from absence of the normal ingredients. Other symptoms may be associated with the gastro-intestinal derangements, as nausea, fetid breath and loss of appetite. A slow pulse may occur, due probably to some stimulating effect on the inhibitory action of the vagus nerve. Lesions are often found at the atlas and axis, affecting the vagus. Pain back of the right scapula is a symptom of liver trouble; it has been suggested that it is due to a stimulus passing up the vagus to the spinal accessory, and thence to the trapezius muscle.

Various cerebral symptoms may be present, as great depression, irritability, headache and vertigo. In severe cases there may be delirium and coma.

In **hemolytic** and **toxic jaundice** the destruction of blood is due to some toxic agent. The feces are not clay colored and the urine is less stained with bile. The general symptoms may be very severe depending upon the underlying cause.

Diagnosis.—To mistake for jaundice the dirty yellowish discoloration of the skin commonly termed sallowness is an error often made. This condition indicates malaria, uterine disease or general ill health. Very likely it is an anemia and is readily diagnosed from the jaundice as the secretions and conjunctiva are not stained. Addison's disease somewhat resembles jaundice, but the feces are normal, the urine and sclerotic coat are not colored, but exposed portions of the body and flexures of the joints are deeply stained.

Prognosis.—Depends entirely on the cause producing it. Ordinary cases run from two to six weeks, while others may not recover for several months. Jaundice from impaction of the bile ducts may be manifest for only a few days. Toxic form may terminate fatally, owing to the disease causing it. The extent of resorption of bile and destruction of red blood cells in the liver varies to a considerable degree.

Treatment.—The treatment for the different forms resulting secondarily will be found under the diseases causing them. A simple icterus, caused by disturbance through the innervation of the liver and bile ducts directly, can be relieved readily by thorough treatment of the liver and bile ducts as described under catarrhal jaundice. Carefully raise the intestines if they are prolapsed, especially the colon and duodenum.

Cirrhosis of the Liver

This is a chronic disease of the liver, characterized by hyperplasia of the connective tissue with destruction of the liver cells, resulting in the organ becoming hard and usually small.

Etiology.—The disease usually occurs in the male sex and in middle life. When occurring in children, it is commonly of the syphilitic form, though it

may be due to other infections. The abuse of spirituous liquors is a common cause. It follows chronic diseases, such as syphilis, long continued malarial intoxication, gout and tuberculosis. Passive congestion, due to chronic heart and lung disease, causes some cases. A few cases are caused by inflammation of the bile ducts, due to infection and obstructing calculi; others to a stimulating diet, while some cases are inexplicable.

Pathologically, the **first stage** is hyperplasia of the connective tissue and consequent enlargement of the organ. As this increases the connective tissue destroys immense numbers of the hepatic cells, owing to the pressure. Often the enlargement is accompanied by tenderness. In the **later stage** the overgrowth of imperfectly developed tissue seems to contract the hepatic cells that still remain, causing atrophy and degeneration of most of them, and thus reducing the size of the organ, which is followed by sclerosis. The portal and hepatic circulations are greatly obstructed. An occasional form is termed **hypertrophic sclerosis** in which sclerosis is found while the organ continues enlarged.

There are two common and well defined varieties, atrophic cirrhosis and hypertrophic cirrhosis; other forms (rare) are met with.

Atrophic cirrhosis is the common form, and is usually due to alcoholic excess. The surface of the liver is rough and uneven in addition to its hardness and reduction in size. It may also be greatly deformed and covered with granulations (“hob-nails”). The normal weight is four or five pounds, but it may be so reduced as to weigh no more than one pound or a pound and one-half. Sometimes there is **fatty infiltration**, which enlarges the liver to such an extent that the contraction is not noticed. There is an overgrowth of the connective tissue, which contracts and constricts the branches of the portal vein, causes atrophy and degeneration of the hepatic cells, and even sometimes obliterates the bile ducts. The new connective tissue is well supplied with blood-vessels from the hepatic artery, thus aiding greatly in the growth.

In the **hypertrophic form**, as well as in the atrophic cirrhosis, there is an overgrowth of connective tissue, but in the hypertrophic form the new form of tissue exhibits no disposition to contract. The enlargement of the organ is largely due to hyperemia. As the tissue does not contract there is no pressure on the portal vein and atrophy is prevented. There is early jaundice

(which is a characteristic symptom) owing to obstruction of the biliary channels. The surface is smooth and its color is greenish yellow.

Symptoms.—Atrophic Form.—There may be practically no symptoms. As there is obstruction of the portal circulation, there may be congestion of the stomach and intestines, resulting in chronic gastric or intestinal catarrh having the following symptoms—anorexia, distress after eating, distention, constipation and coated tongue. Owing to the anastomotic communication between the portal and caval circulations, as the portal circulation becomes more obstructed, the superficial abdominal veins become greatly distended. Hemorrhoids occur, owing to the communication of the superior hemorrhoidal, which is a branch of the portal vein through the inferior middle hemorrhoids, with the hypogastric vein and the vena cava; hence hemorrhoids are a characteristic symptom. There is enlargement of the spleen and hemorrhage from the stomach or bowels. Edema of the legs and ascites are due to engorgement of the portal system. Ascites is much more common than edema of the legs. There may be slight jaundice, although this is a rare symptom in atrophic cirrhosis. There is always decided emaciation. On examination there is a diminished area of hepatic dullness, while the splenic dullness is enlarged. It is often impossible to outline these organs, as the abdominal distention prevents it. The urine is scanty, high colored and often loaded with urates, but seldom bile-stained.

In the **hypertrophic form** slight jaundice appears at the onset, which gradually deepens until it is intense and persistent. Occasionally there is fever. The disease as a rule is decidedly chronic, though acute symptoms may develop at any period. The urine is often bile-stained, but of normal quantity. On examination the liver is large, smooth and round and can be felt below the ribs. The spleen is greatly enlarged.

Diagnosis.—In **atropic cirrhosis**.—With ascites without dropsy elsewhere, history of alcoholism, hemorrhage from stomach or bowels and reduction in size of liver, the diagnosis is absolute.

Hypertrophic cirrhosis.—In **cancer** of the liver the patient is advanced in years, has no splenic enlargement, and more commonly ascites is present; while in hypertrophic cirrhosis there is chronic biliary obstruction, the liver is only moderately enlarged and hard, marked jaundice, with causes leading

to or evidence of hepatic obstruction. This form of cirrhosis is also to be differentiated from **amyloid liver** and **echinococcus cyst**.

Prognosis.—Unfavorable, although in some cases the disease can be arrested during the early stage, provided the habits are regulated and treatment is continuous and persistent. Death usually occurs from one to two years after appearance of dropsy. Ascites is difficult to contend with.

Treatment.—If the disease is recognized at the beginning and persistent treatment given to the liver, the chances are that atrophy of the cells and connective tissue formation will not take place. But ordinarily cases of cirrhosis are incurable. The most that can be done is to reestablish a compensatory circulation in the liver. Otherwise it would be no more unreasonable to say that one could cure a chronic valvular lesion of the heart. The patient should live a quiet outdoor life. Alcoholic drinking should be stopped. The diet should be light and nutritious, preferably a milk diet. The bowels should be kept open, the skin active and the kidneys closely watched.

Fatty Liver

In fatty infiltration there is no loss of function. The fat infiltrates the cell, crowding aside the protoplasm. This is largely a normal process, though fatty degeneration may be associated.

In fatty degeneration the cell loses its structure and is changed into fatty tissue. Chronic intoxication from infectious diseases, such as phthisis puerperal fever, typhoid fever, pneumonia and syphilis are the principal causes. Alcoholism and phosphorous poisoning are other causes.

Amyloid Liver

There is infiltration into the tissues of the liver, of the so-called amyloid substance. The infiltration begins in the blood-vessels, the hepatic artery first, then the central zone or periphery, and finally all structures of the liver. This disorder should be viewed as a disturbance of metabolism.

Etiology and **Pathology**.—This condition is usually found in cases of prolonged suppuration, especially associated with tubercular disease of the

bones as in hip-disease, syphilis, rickets, malaria, cancer and leukemia. It is believed by some to be the result of microbic invasion, especially the tubercle bacillus and staphylococcus. Lesions are frequently found from the fifth to the tenth dorsal vertebræ, which probably act as predisposing factors.

The liver is considerably enlarged and rounded. It is pale or waxy in appearance and is doughy in consistency. On section it is anemic and whitish, partly due to infiltration into the walls of the blood-vessels narrowing the lumen. The amyloid changes may be circumscribed and in some cases fatty infiltration is present.

Symptoms.—There are no characteristic symptoms except the enlargement of the liver, although the complexion may be waxy and there may be some gastro-intestinal disturbances. Pain is absent, although occasionally there is a dragging sensation, due to the weight of the organ. Jaundice is not present, but the stools may become light colored, owing to a diminished secretion of bile. The urine may be increased in amount and contain some albumin if amyloid occur in the kidneys. Emaciation and anemia are present and ascites seldom occurs. Amyloid changes involve the spleen, kidneys, intestines and other organs.

Diagnosis.—The organ being large, hard and smooth, with absence of jaundice and ascites, the presence of albuminuria and an enlarged spleen and with the history of the case, mistakes are not likely to be made.

Prognosis.—Depends upon the cause. The progress may be rapid or slow.

Treatment.—Careful attention to the primary disturbing factor and direct treatment to the liver will, in some instances, reduce the size of the organ. Nitrogenous food and hygienic measures should be instituted. The vasomotor nerves of the portal system (fifth to last dorsal) should be treated thoroughly.

Gall-Stones

Gall-stones are concretions that originate in the gall-bladder and occasionally in the hepatic ducts. “The primary formation of gall-stones is itself largely dependent upon **stagnation** of bile, such as may arise in the

gall-bladder if an intermittent or incomplete closure of the cystic duct be brought about by such things as tight lacing, pregnancy, or even unequal sagging of the abdominal viscera."—MacCallum. The stone is largely composed of cholesterin, and may form without any inflammation of the gall-bladder, owing probably to the stagnation affecting the bile salts so that the cholesterin is precipitated instead of being held in solution.

More often there is inflammation of the wall of the gall-bladder due to micro-organisms. This causes an exudate from which is derived the calcium. The calcium with bilirubin is deposited in layers on the stone which give it the various colors of yellow, brown or green.

A rare type is one formed in the hepatic ducts, which is soft, green, and composed of calcium bilirubin concretions.

The stones "contain a great deal of organic material derived from desquamated epithelial cells and coagulated albuminous matter, as well as pigment." The colon bacilli, staphylococci, streptococci, typhoid bacilli, and pneumococci are the bacteria most frequently found. A **cholecystitis** may be a predisposing factor or it may be secondary to the concretion.

Osteopathic Etiology and **Pathology**.—This is a disease of middle life and is more frequently found in women. Sedentary habits and constipation combined with overeating, are other important factors. It is found in stout subjects who are particularly fond of starchy and saccharine food. Catarrhal jaundice is a predisposing factor. Depressing mental influences may predispose. The thicker the bile the more likely it is to deposit. Dr. Still's theory is that lesions of the ribs on the left side from the sixth to the tenth dorsal are factors in the formation of the stones as they interfere with pancreatic secretions. No matter how it comes about, the fact is that in all cases of gall-stones the osteopath finds lesions to the eighth, ninth and tenth ribs on the left side, as well as lesions from the fifth or sixth to the tenth dorsal, deranging innervation to the liver and bile ducts. It is possible that lesions over the spleen probably interfere with the activities of the spleen and thus in some manner this organ does not properly elaborate the blood before it passes to the liver. Sagging of the duodenum may, through tension on the duodeno-hepatic ligament, interfere with the flow of bile. This would cause derangement of the nervous reciprocal relationship between opening

at duodenal orifice and gall-bladder. In carcinoma of the liver and stomach, gall-stones are said to be frequent.

The stone itself is a brownish object, nearly spherical, faceted and in some instances polygonal in shape, varying in size from a pea to a hen's egg.

The stones are found anywhere in the biliary tract from the duodenal orifice to the ramification of the bile vessels. Usually there is more or less of an accumulation in the gall-bladder. At any point the stone may produce ulceration and suppuration. Perforation may occur into the peritoneal cavity or adjacent organs.

Symptoms.—Gall-stones may be in the gall-bladder for years without giving rise to any symptoms. Their presence is made known only by their expulsion from the gall-bladder. If they lodge in the duct in transit from the gall-bladder to the duodenum **biliary colic** is produced, which is the characteristic symptom of an impacted gall-stone. Small stones may pass into the intestine without producing symptoms. The pain is very sudden, piercing and excruciating in the region of the gall-bladder, when a stone attempts to pass. The pain radiates through the abdomen, right chest and shoulder, and the patient writhes in agony and occasionally faints. Downing[90] emphasizes the point that when a patient comes in with a history of repeated attacks of biliary colic and no stone found in the stools one should at once suspect that one of considerable size obstructs the common duct.

There is always tenderness in the biliary region with more or less contraction of the abdominal muscles. Nausea, vomiting and sweating are usually present, followed by a weak pulse, cool skin and pale and anxious face. Fever is soon present and a chill is common. The paroxysms continue as long as the stone remains lodged, which may be from an hour to several days. There are remissions of pain, entire relief being given as soon as the stone reaches the duodenum. Jaundice usually follows a prolonged attack. The liver is sometimes enlarged. The spleen is enlarged. Should the stone become impacted, ulcerative perforation, with consequent peritonitis and shock, follows.

Diagnosis.—The diagnosis is conclusive when the gall-stones are found in the stools or when they can be felt in the gall-bladder. All the above

symptoms are characteristic. If a patient complains of severe pain radiating from the hepatic region, and nausea and vomiting are present, subsiding suddenly with a slight jaundice, the disease should hardly be mistaken.

Tenderness over the gall-bladder frequently indicates infection or gall-stones or both. Radiographic examination may be of aid.

Nephritic colic should never be confounded with hepatic colic as in the former the pains start in the lumbar region and radiate downward into the groin, the testicle and the inside of the thigh. In **appendicitis**, jaundice and bile-stained urine are not found. A **pseudo-biliary colic** is occasionally found in nervous individuals especially when the eleventh and twelfth ribs (or ribs as high as the seventh) on the right side are displaced downward.

Prognosis.—Is usually favorable. Ulceration, perforation, and suppuration may prove fatal, although much depends upon surgical interference.

Treatment.—During the attack of **biliary colic**, the osteopath should usually be able to readily locate the position of the gall-stone in its transit from the gall-bladder. He should usually proceed at once to aid the stone in its downward passage by careful manipulation over the duct. Still this treatment should be given with great caution, for if there is suppuration or ulceration, perforation and resultant peritonitis may occur.

Usually one will not have much difficulty in dislodging the stone and relieving the sufferer in a few minutes. The recumbent position, with the thighs flexed on the abdomen, is the position assumed for treatment, and if the muscles in the hepatic region are very tense and rigid, interfering with locating the gall-stone, an inhibitory treatment to the posterior spinal nerves supplying the contracted muscles will aid one materially. An inhibitory treatment of the nerves of the biliary tract (the ninth and tenth dorsals), may be a helpful measure in dilating the duct. Also, hot application over the affected area and to the dorso-lumbar region will aid.

During remissions two or three treatments per week should be given to correct the lesions at the eighth, ninth, tenth and eleventh segments. Give particular attention to any enteroptosis that may be found. Average cases should not require more than two or three months' treatment. Hildreth, who has had many cases, is much opposed to operation as his experience has

been that where there is not complete obstruction the correction of lesions will prevent further formation of stones. While he finds the trouble ranges from the third to the eighth dorsal, still, as a rule, it is between the fifth and sixth that best results are obtained. Probably if the treatment is a rightly directed one the stones already formed may be disintegrated. Willard[91] reports 393 cases.

Permanently impacted gall-stones require surgical treatment. Prophylactic treatment, as a regulated diet, daily exercise and a discontinuance of excesses, should be strongly urged. The patient should not be allowed any fatty or saccharine food. Water freely taken will be of aid.

Diseases of the Spleen

Diseases of the spleen are usually secondary to other disorders. The following osteopathic treatment under Splenitis will, in addition to the probably primary disturbance, be applicable to active and passive splenic hyperemia and amyloid degeneration of the spleen. Surgical and other measures are to be employed when indicated.

Owing to the role that the spleen plays in infections, the osteopath pays considerable attention to stimulating the organ through its spinal innervation in these cases.

Splenitis

In acute **splenitis** there is generally a blocking up of the smaller splenic arteries by fibrous coagula (hemorrhagic infarct), which have formed in the left ventricle of the heart in consequence of endocarditis. Malarial infections, septicemia, typhus and acute exanthematous fevers may cause coagula formation in the splenic veins. Injuries to the vertebræ or ribs on the left side over the spleen (ninth to eleventh ribs inclusive) are occasionally the predisposing cause of primary inflammation of the spleen. Following the formation of abscesses the entire organ may suppurate; it may produce pyemia, or it may burst and the pus be discharged into the peritoneal sac, causing peritonitis, or into the pleura, stomach or colon.

Chronic splenitis is induced by passive congestion, leukocythemia and splenic anemia.

Symptoms.—Tenderness and enlargement of the spleen are the principal symptoms. The organ may be twice its normal size, but in a few cases the tumefaction is so insignificant that it can hardly be found on percussion. Dull pain generally exists if the enveloping membrane or adjacent organs are involved, the pain being increased upon percussion and deep inspiration. In a few cases the pain radiates to the left shoulder and if the peritoneal covering is involved, a sharp pain will be present. Fever and rigor follow if suppuration has taken place, and peritonitis follows in case of rupture or perforation. Marked hypertrophy and chronic inflammation may cause cough, nausea, vomiting and dyspnea.

Treatment.—In the treatment of both the disease producing splenitis, and of primary splenitis, a thorough treatment of the spine, eighth to the eleventh dorsal, is necessary. The nerves (vasomotor) to the spleen are from the left splanchnics, consequently treatment of the left side is more effectual. Particular attention should be given the ribs over the spleen—the ninth, tenth and eleventh—as disorders of these ribs are a common cause of splenic disturbances. Careful and fairly firm treatment is always indicated, care being taken not to add irritation to an already inflamed organ, and especially beware that force is not used where there is danger of rupture. Stimulation of the tenth nerve contracts the spleen. In cases of suppurative splenitis the direct treatment should not be given.

Stimulating treatment over the spleen, as over the liver and kidneys, gives tone to the strong elastic capsule surrounding it, so that direct manipulation over these organs, coupled with the power of the strong elastic capsule and highly elastic tissue of the inner organ, will greatly aid in lessening the engorgement and hyperemia. In a few cases where the spleen is involved, lesions are found in the upper cervical which affect the right pneumogastric nerve and thus impair the normal activity of the gland.

FOOTNOTES:

[74] See special article, Prolapsed Organs, Part I.

[75] The student will receive many helpful suggestions by reading Macleod, Physiology and Biochemistry in Modern Medicine; Cannon, The Mechanical Factors of Digestion; Carlson, The Control of Hunger in Health and Disease; Gaskell, The Involuntary Nervous System; Pottenger, Symptoms of Nervous Disease.

[76] Von Noorden, Colitis, 1904.

[77] See Philosophy and Mechanical Principles of Osteopathy, p. 190.

[78] There are several possible suggestions. (1) Developmental (See Mayo, Relation of the Development of the Gastro-intestinal Tract to Abdominal Surgery. Jour. A. M. A. Feb. 7, 1920). (2) Owing to the appendix, cecum, ascending colon, duodenum, and biliary tract being frequently disordered. (3) Imbalance of muscular tension, owing to the muscles of the right side being often the better developed. Muscular lesions and lymphatic involvement of the cervical region seem to occur oftener on the right side than on the left.

[79] Journal of Osteopathy, May, 1900.

[80] For points on enema, see treatment under Intestinal Obstruction.

[81] Diseases of the Intestines, Vol. I, p. 240.

[82] The Lancet, (London,) Oct., 1904.

[83] Philosophy of Osteopathy, p. 226.

[84] Medical Record.

[85] The Vermiform Appendix and Its Diseases, p. 711.

[86] Dr. Chauvel, 1902.

[87] Rose and Carless.

[88] Clinical Osteopathy.

[89] Journal of the American Osteopathic Association, Dec, 1902.

[90] Journal of American Osteopathic Association, March, 1905.

[91] Journal of American Osteopathic Association, March, 1905.

DISEASES OF THE RESPIRATORY SYSTEM

DISEASES OF THE LARYNX[92]

Acute Catarrhal Laryngitis

Definition.—An acute, catarrhal inflammation of the mucous membrane of the larynx. This may be ushered in as an independent disease or it may be associated with inflammation of the upper respiratory passages.

Osteopathic Etiology and **Pathology.**—One of the principal causes of acute catarrhal laryngitis is exposure to cold and dampness, which contracts the muscles of the neck region, especially about the larynx. Lesions in the upper and middle cervical vertebræ are important predisposing causes. Occasionally the first rib becomes luxated, causing a greater or less congestion of the laryngeal mucous membrane by contracting the lower antero-lateral muscles of the neck, and affecting lymphatic drainage. Improper placing of tone, as well as too constant use of the voice in speaking and singing, are common causes. Inhalation of irritating gases or dust, and mechanical injuries to the larynx are occasional causes. The disease may be associated with certain infectious diseases, as measles, diphtheria, influenza and whooping cough.

Pathologically, the mucous membrane is intensely reddened and inflamed; this inflammation involves both the true and false vocal cords and may extend into the trachea and about the epiglottis. The membrane is covered slightly with mucous secretion. In rare instances edema of the glottis may occur. The muscular contraction about the larynx impedes blood and lymphatic drainage and thus induces congestion. The contraction may be so severe as to slightly prolapse the organ. The vertebral lesions impinge upon or affect vasomotor fibers and thus bring about congestion.

Symptoms.—There is hoarseness and cough with a sensation of tickling in the larynx; these are the most constant symptoms. The cough is dry and the voice altered. At first the voice is husky, but some attempts at speaking

are attended with more or less pain and finally the voice may be entirely lost. Deglutition is painful. At first the expectoration is scanty, but later it becomes mucopurulent. There is rarely much fever. When there is considerable edema, dyspnea and asphyxia are prominent features.

Prognosis.—Simple catarrhal laryngitis never terminates fatally. When there is dyspnea or asphyxia indicating edema of the larynx, the prognosis is grave. The attack usually lasts from one week to ten days, but this can be materially shortened by careful osteopathic treatment. In severe infections it may be two or three weeks before the larynx returns to its former condition.

Treatment.—In a few cases confinement of the patient to his room, and possibly the bed, will be necessary; especially should the larynx have rest from phonation, and the taking of food of an irritating character should be avoided. Smoking is to be prohibited. The room should be at an even temperature, from 70 to 75 degrees F., and the atmosphere saturated with moisture by the generation of steam.

The tissues in the cervical region about the cervical sympathetic and vagi nerves should be carefully adjusted. The deep posterior muscles of the cervical spine are to be relaxed and direct treatment given over and about the larynx. Relaxing tissues and raising the larynx will be very effectual in relieving the **huskiness** of the voice and in controlling the congestion and inflammation of the laryngeal mucosa. Besides the treatment of the vagi nerves at the atlas and their course down the lateral and anterior portion of the neck, the superior laryngeal may be treated at the upper portion of the great cornu of the hyoid bone and the inferior laryngeal at the inner side of the cleido muscle near its sternal attachment. Adjust the tissues along the course of the external carotid and subclavian arteries, chiefly the first rib for the latter. Give careful treatment to the internal jugular and innominate veins. Correct any tissues that may impinge upon the lymphatics of the mucous and submucous coats of the larynx where they are drained into the deep cervical glands. Release any immobility of the upper chest, relax the pectoral, auxiliary and upper dorsal muscles, and adjust the first four or five dorsal vertebræ.

Prompt action of the skin, freedom of the bowels, placing the feet in a hot bath and continued local hot packs, or even an ice-bag in severe cases, will be of special value at the onset; but due attention should be given these

throughout the entire course. The fever is easily aborted by the cervical treatment and proper attention to the bowels and sweat glands.

Chronic Catarrhal Laryngitis

Definition.—A chronic, catarrhal inflammation of the mucous membrane of the larynx.

Osteopathic Etiology and **Pathology**.—The causes of chronic laryngitis may be numerous, but lesions of the cervical vertebræ are the most common. The contractured cervical muscles, especially the deep vertebral ones, are usually the result of corresponding osseous deviations.

Other causes given under the acute form, as overuse and abuse of the voice, inhalation of irritating substances, excessive use of tobacco and alcoholic drinks, tumors, etc., are important etiological factors. Thus irritations inducing acute attacks, if repeated, will result in chronic catarrh.

The **pathological** changes as revealed by the laryngoscope are swelling of the mucous membrane, occasional superficial erosions, and rarely ulceration.

Symptoms.—The voice is usually hoarse and rough, being due to a thickening of the vocal organs. In severe cases the voice may be lost. There is fatigue and pain after slight use of the voice, a sense of tickling in the larynx which produces a desire to cough, and expectorations of viscid mucus and mucopus.

Prognosis.—The prognosis is sometimes unfavorable, although many cases are cured.

Treatment.—The patient must learn to take care of himself properly. He should avoid overheated rooms and the use of tobacco and alcohol, and the throat should not be protected too much. It is a good plan to bathe the neck every morning and night with cold water. He should avoid loud speaking; the sound should be expelled by the abdominal muscles and diaphragm and not by the muscles of the throat. Examine the upper air passages carefully for any obstructions and infections that might exist which are a source of irritation to the larynx.

Special attention should be given to the atlas, axis and third cervical. Lesions lower down the spine may be found, for other laryngeal nerve fibers, other than those from the superior cervical ganglion, may be at fault. Palpate the **hyoid** to see if it is tilted by contracted muscles, as will often be the case.

Aphonia is commonly caused by a dislocated atlas. The aphonia may also be caused by swelling of the vocal cords and tissues about them and by serous effusions of the laryngeal muscles. The larynx may be prolapsed slightly and if raised quickly relieved. Difficult breathing and hoarseness are occasionally very troublesome symptoms. The former is due to an inability of the glottis to dilate, on account of swelling of the mucous membrane of the diseased parts and from drying of the secretions on them, thus increasing the obstruction (this is sometimes termed pseudocroup) but expiration is easy, the stridor is from the inspiration; the latter is due to a collection of mucus on the vocal cords or the cords may become relaxed, swollen or roughened.

Another annoying symptom sometimes presented is pain on deglutition, which is due to swelling of the mucous membrane of the upper laryngeal passages and the epiglottis. In all of these annoying symptoms, persistent, thorough, direct treatment of the larynx is of value. On the whole, careful, continued treatment of the cervical innervation and vascular supply of the larynx, as in the acute form, is indicated.

In all laryngeal disorders, if condition permits, hyperextend the neck while the patient is lying supine and thoroughly relax the soft tissues about the organ and then carefully raise it.

Laryngismus Stridulus

(Spasm of the Glottis)

Definition.—A spasm of the muscles of the larynx that are supplied by the inferior or recurrent laryngeal nerves. This is commonly not excited by an inflammatory condition, but it is usually a purely nervous condition.

Osteopathic Etiology and **Pathology**.—Spasm of the glottis is usually found in children with **enlarged tonsils and adenoids**. It has been observed that rickets and syphilis are probably frequent underlying causes. The

spasm is occasionally associated with tetany. The nervous factor is the immediate and important consideration. Cervical lesions, both vertebral and muscular, are invariably found. Then nasopharyngeal and tracheal disorders and reflex digestive disturbance are exciting causes. An elongated uvula or a deranged hyoid bone will occasionally be exciting factors. Subluxation of the upper two or three ribs and of the clavicle may also be exciting factors.

The affection is usually found in children under five years of age. All cases are not of a distinct nervous type, for slight acute catarrhal laryngitis may be present.

Symptoms.—There is a sudden onset and the spasm may occur on waking from sleep, but it may come on either in the night or day. The disease starts with a sudden arrest of breathing, the child struggles for breath; there are tonic muscular spasms and the face becomes congested in a few seconds. This is followed by sudden relaxation of the spasm and the air is drawn through the glottis with a shrill, crowing sound. Several spasms may occur in a day or they may be weeks apart. Death rarely occurs.

Diagnosis.—The absence of fever, cough and hoarseness and its distinctly intermittent nature will differentiate it from croup. Should there be any question of diagnosis a bacteriological examination is advisable.

Prognosis.—The prognosis is almost always favorable. In very young children death from suffocation may occur, but rarely.

Treatment.—The treatment should be applied either centrally or peripherally, depending altogether upon the location of the irritation. If the irritation is of central origin, that is, through the innervation from the brain and spine, a correction of the superior and inferior laryngeal nerves is necessary; if the stridor is due to peripherial irritations, a correction of the end-plates (muscles) over and about the larynx is required in order that the spasms be relieved.

Thorough treatment should be applied to the upper part of the chest and diaphragm, chiefly the phrenic nerves at the third, fourth and fifth cervicals and over the eighth, ninth and tenth ribs anteriorly, in order that the spasms may be prevented from extending to the intercostal muscles and the diaphragm.

Placing the patient in a hot bath will be of service in some cases when the spasms are severe. Alternating hot and cold packs about the throat are of service. The air of the room should always be kept moist. Care should be taken that the trouble is not due to gastro-intestinal disorders or to dentition. Keep the child upon a fluid diet of milk, meat broths and egg albumin.

In the more severe cases the well known osteopathic method of relaxing and inhibiting the soft palate and contiguous tissues will stop the spasm.

Spasmodic Laryngitis

(False Croup)

Definition.—A catarrhal inflammation of the mucous membrane of the larynx with spasm of the glottis.

Osteopathic Etiology and **Pathology**.—This affection is practically the same as laryngismus stridulus associated with catarrhal inflammation of the mucous membrane. It is a disease of young children. Derangements of the innervation and blood supply to the laryngeal mucous membrane and muscles of the larynx are found in the same locality as noted under acute catarrhal laryngitis and laryngismus stridulus. There is acute catarrh causing a croupy cough, and difficult breathing due to spasm of the glottis.

Symptoms.—These attacks generally occur during the night, the child being suddenly awakened by severe paroxysms of suffocating and a dry, hard cough, associated with evidences of dyspnea. In half an hour or an hour or two the coughing ceases, perspiration follows and the child falls asleep. If proper treatment is not given, these attacks may occur for several successive nights, the child appearing almost or quite well during the day.

Diagnosis.—The symptoms are so characteristic that the diagnosis is easy. In all instances the prognosis is favorable.

Treatment.—The catarrhal inflammation of the mucous membrane of the larynx should be treated in the same manner as simple inflammation of the laryngeal mucosa, i. e., thorough treatment of the cervical spine and direct treatment over the larynx.

During the paroxysm, if the patient cannot be relieved very shortly by the cervical treatment, he should be placed in a hot bath of a temperature from

98 to 110 degrees F. This will, in the majority of cases, relieve the attack. In addition a hot compress may be placed about the throat. Producing emesis by irritating the fauces with the finger is necessary in a number of cases in order that the secretions in the laryngeal region may be ejected, thus relieving suffocation and labored breathing. Also, an overloaded stomach which is causing an irritation, should be emptied at once by vomiting. The bowels should be kept well open in all cases. Occasionally the epiglottis becomes wedged in the chink of the glottis. Such a condition requires an introduction of a finger into the fauces to release the disorder.

Care should be taken, especially following an attack, that the child is not exposed to cold or rapid changes of temperature, so as to avoid repetition of the spasms.

Coughing.—Coughing, not only in spasmodic laryngitis, but also in various diseases where coughing is a prominent symptom, is a most irritating and annoying feature. The osteopath is many times called upon to relieve the cough, whether it is due to slight irritation of a nerve fiber alone or is a symptom of a serious chronic disease. The coughing center is located in the medulla oblongata; the afferent nerves are sensory branches of the vagus; the efferent nerve fibers are found in the nerves of expiration and in those that close the glottis. Consequently, coughing may be caused by stimuli to various sensory nerves, various cutaneous areas (chiefly the upper part of the body), mucous membrane of the respiratory and digestive tracts, the mammae, liver, spleen, ovaries, uterus, kidneys, etc. Perhaps the most common cause of cough is contraction of some of the muscles of the neck, irritating sensory fibers. Contraction of the omo-hyoid muscle may produce an irritating cough by causing traction on the hyoid bone. In a few cases the larynx may prolapse to some extent and thus be a source of irritation. Lesions of the spinal cord between the seventh and eighth dorsal, also at various points above in the dorsal vertebræ and in the ribs (especially at the second and third ribs), are very apt to produce a cough. Impaction of the sigmoid flexure is oftentimes accompanied by coughing. Enlargement of the heart may cause pressure upon the respiratory tract directly and cause a deep, dull cough. Foreign bodies in the external meatus of the ear are occasionally a source of irritation which is accompanied by coughing. Thus there are innumerable sources of stimuli that may produce coughing. In all cases it is necessary to make a careful diagnosis as to whether it is an

irritation to some fiber that can be corrected at once or whether it is a symptom of a disease that can only be relieved by the cure of the disease. In local congestions the cold pack will often be of service.

Tuberculous Laryngitis

Definition.—An inflammation of the laryngeal tissues of tuberculous origin.

Osteopathic Etiology and **Pathology**.—Tuberculosis of the larynx is commonly secondary to pulmonary tuberculosis. In a few cases the laryngeal invasion may be of primary origin. In either instance there will be found a disturbed innervation or altered blood supply of the larynx that predisposes to the multiplication and growth of the bacilli. The osteopathic lesions are similar to those found in other involvements of the larynx.

Pathologically, the mucous membrane is inflamed and swollen, and exhibits scattered tubercles, which are usually about the blood-vessels. The tubercles cluster, caseate and leave shallow, irregular ulcers. There is thickening of the mucosa about the ulcer, and the ulcer is generally covered by a grayish exudate. They may erode the true vocal cords, often destroying them completely. The ulcers slowly involve the tissues in all directions, causing perichondritis with necrosis of the cartilages. The mucous membrane of the pharynx, esophagus, fauces, and tonsils may be involved, and the epiglottis may be completely destroyed.

This disorder, strictly, should be discussed under pulmonary tuberculosis for, as heretofore stated, it is generally a secondary affection; the larynx being invaded by the tubercular bacilli in the sputum arising from the bronchial tubes and lungs. The bacilli in inspired air may primarily invade the laryngeal mucosa. However, in either case the circulation of the mucosa is not normal and osteopathic correction of the same is effective.

Symptoms.—Huskiness of the voice, followed by hoarseness, and in advanced stages aphonia, are prominent symptoms. A hacking cough is usually present and the patient complains of pain in the throat, particularly on coughing, swallowing or speaking. The loss of voice, painful speaking or whispering are quite characteristic. When the ulceration of the tissues of the

larynx has progressed to a later stage, dysphagia, suffocation and distressing paroxysms of cough occur.

Diagnosis.—Is not difficult, as pulmonary phthisis is usually associated with it. Examination of the sputum for the specific bacilli will be conclusive.

Prognosis.—The prognosis is not of the best at any time. On the whole, it is unfavorable.

Treatment.—In this disease osteopathic treatment has been quite effectual. Cases of primary origin are more successfully treated than when of secondary cause, although one will be surprised many times at the results obtained when the disorder is not primary. The treatment must necessarily be both constitutional and local. Care of the general health as to hygiene and diet is absolutely necessary. The food must be nutritious and non-irritating. Scraped beef, raw oysters, raw eggs, soups and gruel are required. In cases where difficulty of deglutition occurs, it may be largely overcome if the patient hangs his head over the side of the bed and sucks through a tube liquid nourishment placed in a dish upon the floor.

The local treatment required is careful, persistent work over the larynx and adjacent tissues. The treatment is given to increase the blood supply to the diseased tissues so that healing may take place, and that the bacteria may be deprived of the conditions favorable to their activity. Treatment along the cervical spine and upper dorsal will aid in correcting the vasomotor disorders that exist. Local application of hot water will assist in relieving the pain. When pulmonary phthisis exists, attention and correction of it is important; in fact, is of primary consideration in laryngeal affection.

Syphilitic Laryngitis

Etiology.—This disease is of frequent occurrence, due to inherited syphilis, or to the secondary or tertiary stages of the acquired form.

Symptoms.—There is a hoarseness of the voice, a hacking cough, difficulty in swallowing and the various symptoms of catarrhal laryngitis. The secondary form may present superficial, whitish ulcers on the cords or ventricular bands, while in a tertiary stage the lesions are extensive and serious. Deep ulcers with raised edges are present, gummata develop on the

submucous coat of the epiglottis and there may be necrosis and exfoliation of the cartilages. Deformity is produced by the cicatrices following the healing of the ulcers and sclerosis of the gummata. Edema of the larynx may suddenly prove fatal.

Diagnosis.—The history of the case, the presence of other symptoms of the disease, the deep, symmetrical ulcers, the absence of tuberculosis elsewhere and the absence of marked pain, will usually make a diagnosis easy.

Prognosis.—Is somewhat favorable, more so at least than the tubercular form of laryngitis. There is great danger of deformity and permanent impairment of the voice.

Treatment.—The treatment should be both constitutional and local. Active measures must be taken to rid the system of the virus of syphilis, and thorough, direct treatment should be applied to the larynx and to its innervation. If the cicatricial stenosis has progressed so far that there is little hope from manipulative treatment, tracheotomy or gradual dilatation should be performed. The ulcerated portion is always to be kept clean.

Edematous Laryngitis

Definition.—An acute inflammation of the mucous membrane of the larynx with infiltration of serous fluid into the submucous tissue.

Etiology.—This is a very serious affection. It may occur in connection with acute laryngitis, though rarely, and occasionally with chronic diseases of the larynx, as tuberculosis and syphilis. It may be a complication of some acute infectious disease like diphtheria, scarlet fever, or erysipelas of the face. It sometimes occurs suddenly in the course of Bright's disease. Lesions as in acute laryngitis are predisposing factors.

Pathologically, there is marked swelling of the epiglottis. The swelling can very easily be felt with the fingers. The mucous membrane is tense and changed in color. There is infiltration of a serous or sero-purulent fluid into the loose connective tissue of the larynx. The arytenoepiglottic folds are greatly involved, and they may be swollen to such a degree that they almost meet.

Symptoms.—Extreme dyspnea and stridulous respiration. Hoarseness of the voice and later aphonia. There is a feeling of intense oppression or suffocation. Evidence of dyspnea, anxious face, blue lips, protruding eyes and retraction of the base of the chest occur. The sternocleidomastoid muscle is very prominent.

Diagnosis.—This is not difficult. The history of the case, laryngoscopic examination, and the swollen epiglottis which can be easily felt with the fingers make diagnosis easy.

Prognosis.—Generally unfavorable. At any time it is extremely grave, but with prompt and vigorous treatment recovery is possible.

The duration varies from a few hours to several days.

Treatment.—One must attend strictly and carefully to the laryngeal innervation, as in acute catarrhal laryngitis. Obstruction to the superior or inferior thyroid, facial, internal jugular or innominata will cause tumefaction and edema of the larynx and adjacent tissues. Also, enlargement of the lymphatics about the larynx and salivary glands may produce edema of the laryngeal region; consequently, particular care should be taken of the various tissues about these vessels and of the innervation from the cervical spine, so the veins are not obstructed or the lymphatic channels disordered, so that infiltration of the tissues may be further prevented.

The most prominent symptom is laryngeal dyspnea and this depends altogether upon the swelling of the soft parts. If the swelling is great and the disorder cannot be removed, suffocation will follow. In such cases, besides giving direct treatment over the larynx, introducing a finger into the mouth, and reaching clear back under the roof of the soft palate, with a firm, downward, outward and sweeping movement on either side, relax the soft tissues. The persistent use of small pellets of ice, held far back in the mouth, will be found very beneficial; also, application of the ice-bag, provided the edema is of inflammatory origin.

If one is not able to control the rapid infiltration of the larynx and glottis when such cases arise, tracheotomy or intubation should be performed at once. When edematous laryngitis is due to diseases of the heart, lungs and

kidneys, treatment of the primary disease should be given in addition to the local treatment.

FOOTNOTES:

[92] For diseases of the nose see Deason, Part 1, Page 257.

DISEASES OF THE BRONCHI

Acute Bronchitis

Definition.—A catarrhal inflammation of part or whole of the mucous membrane of the larynx, trachea and bronchial tubes, or it may extend into the capillary tubes. This is bilateral, affecting more or less the bronchial tree in both lungs.

Osteopathic Etiology and **Pathology**.—The most common cause of acute bronchitis is "catching cold." It is more prevalent in the winter, and it often succeeds an ordinary cold in the head, coryza or laryngitis, the inflammation extending downward from the upper air passages. A case of acute bronchitis always presents a contracted condition of the muscles on either side of the spine in the upper dorsal region. The contracted muscles may extend as far down as the middle dorsal or as high as the entire cervical. Occasionally, the ribs posteriorly are drawn downward by the extreme contraction of the muscles, and the upper anterior part of the chest may be somewhat constricted and limited in its movements by the tensed muscles. Thus, in a few cases the ribs and upper dorsal vertebræ are actually subdislocated by the extreme contraction of the muscles. The principal points affected are the second, third, fourth and fifth dorsal regions. In a few instances cervical lesions disturbing the vagus and resulting in motor weakness of the tubes, will be noted. The osteopathic control of the bronchial vasomotor nerves is in this region (dorsal).

The disease is also associated with measles and it is usually a symptom of influenza. One attack predisposes to another. It affects either sex and especially children and the old, in whom it most frequently involves the smaller bronchi. In adult life it involves the larger bronchi. Micro-organisms, particularly the pneumococcus, influenza bacillus, and micrococcus catarrhalis, act as exciting causes.

Pathologically, the mucous membrane of the portion of the trachea and bronchi that are implicated become reddened, congested and more or less covered with a tough mucus mingled with epithelial cells. The hyperemia is

most marked about the mucous glands. Some of the smaller bronchial tubes are dilated. In severe cases there is desquamation of the ciliated epithelium, swelling and edema of the submucosa, and infiltration of the tissues with leucocytes. The affection involves chiefly the vasomotor nerves. In cases on the verge of chronicity, look well to the diet; especially lessen in amount the starchy and saccharine foods.

Symptoms.—The onset of acute bronchitis is accompanied by the symptoms of a common "cold." In the beginning the cough is hard and dry without expectoration; but later it is looser, the secretion becoming mucopurulent and abundant and finally purulent. The scanty sputum is at first glairy and mucoid, while later it becomes more abundant and mucopurulent and contains pus cells and desquamated epithelium. When the bronchial inflammation becomes fully established, there is a feeling of tightness and rawness beneath the sternum and a sensation of oppression in the chest, due to swelling of the mucous membrane and the presence of secretions which cause stenosis of the bronchial lumina. There is a slight fever, rarely exceeding 101 degrees F. The disease lasts from four or five days to three weeks. There is either a complete recovery or chronic bronchitis is developed.

Physical Signs.—There may be no physical signs in slight attacks of acute bronchitis of the larger tubes. In severer cases the physical signs are well marked. **Inspection** may recognize increased frequency of breathing, and when the smaller tubes are involved there is dyspnea. **Palpation.**—The bronchial fremitus may often be felt, providing there is sufficient narrowing of the breathing tubes. **Percussion.**—Sounds are normal as long as the bronchitis is uncomplicated. **Auscultation.**—In the early stage piping, sibilant rales may be heard on both sides. These rales are inconstant and appear and disappear with coughing. There may be harshness of breathing added to these. When resolution sets in, the rales change and become mucous and bubbling in quality. Vocal resonance in bronchitis is normal, unless complications occur.

Diagnosis.—This is generally easy. The absence of dullness and blowing breathing and the bronchial character of the cough and expectoration are usually sufficient to distinguish it from pneumonia and pleurisy. If the physical signs are noticed carefully, the diagnosis is rendered easy and positive in all cases.

Prognosis.—In the very young and the very old, the prognosis is unfavorable, but in a previously healthy adult the most that can happen to a case of acute bronchitis is to become chronic. Recovery is the rule; even in the aged and feeble death is rare. If osteopathic treatment can be instituted from the inception, the disease will probably be aborted. The treatment almost invariably lessens the severity and duration of an attack. For capillary bronchitis see Bronchopneumonia.

Treatment.—Complete rest in a warm bed, and a hot foot bath would cure a large majority of cases in a day or two if the patient would only submit to such treatment. Most of them wish to be around and out doors and very likely attending to their usual work, so that a cure in some cases is hard to perform. They are very liable to take more "cold" and in a few cases it will take great effort to prevent the bronchitis from becoming chronic. One thorough treatment per day will usually be sufficient.

The hyperemic condition of the bronchial tubes is due to a vasomotor disturbance, generally caused by a severe contraction of the muscles of the back in the region of the first to fourth dorsal; although the vasomotor nerves to the mucous membrane of the bronchial tubes may be affected anywhere from the first to the seventh dorsal inclusive. Contraction of the muscles over the anterior part of the chest corresponding to these regions and caused by the same influences (chiefly atmospherical changes) is of quite common occurrence. In the majority of cases the contraction of the chest and back muscles is so severe that the ribs are partly displaced by the tension and thus is added a complication to the disorder, and from this complication chronic bronchitis is liable to occur. The ribs or even vertebræ to the corresponding region oftentimes remain partly dislocated and are a source of continued and permanent irritation to the innervation of the bronchial tubes. So it is always necessary in treating any form of bronchitis to see at each treatment that the ribs and vertebræ from the first dorsal to the seventh dorsal, inclusive, are anatomically correct.

As has been stated, the disordered muscles or ribs may be affected anteriorly as well as posteriorly; consequently, the treatment applied is a thorough relaxation of the chest and back muscles and the correction of the ribs and vertebræ in order that the vasomotor disturbance of the bronchial mucosa may be corrected and the inflammation relieved. An excellent method to release the immobilized anterior upper chest is to place patient

flat upon his back with pillow beneath upper dorsal. This hyperextends spine, enlarges spinal foramina, and tends to elevate ribs. Then by use of arms as levers, moderate inspiration, and employment of one hand over anterior end of ribs they may be easily released and raised. This treatment effects circulation, innervation, lymph tissue, and rib bone marrow.

In addition to the dorsal spinal nerves, and the sympathetic, the vagi are to be considered in the treatment of bronchitis, as all of these nerves, sympathetic, spinal, and vagi, go to make up the anterior and posterior pulmonary plexuses from which the bronchial mucosa receives its innervation. The veins particularly involved in passive hyperemia of the bronchial tubes are the superior intercostal and azygos major; so raise and spread the ribs to give greater freedom to these blood-vessels.

"The blood flow may be diverted from the bronchi to the abdomen by a slow, deep, inhibitive treatment over it, including pressure over the solar and hypogastric plexuses." (Hazzard).

The excretory organs and the diet of the patient should be attended to. Especially in children, the diet had best be a fluid one, as milk, egg albumin, meat broths and meat juice. For those who are subject to the disease an outdoor life is best.

Chronic Bronchitis

Definition.—A chronic inflammation of the mucous membrane of the large and middle sized bronchial tubes.

Osteopathic Etiology and **Pathology**.—Chronic bronchitis may be either primary or secondary. The primary form is the result of exposure to wet and cold or to the daily inhalation of irritating vapors or dust. This form is rare, the affection being almost always a secondary one, and is most commonly met with in chronic lung affections, heart disease, gout or renal disease. It may be caused by any disease which favors congestion of the air tubes by obstruction of the circulation; especially mitral diseases and Bright's disease. It is also caused by chronic alcoholism and may be the result of repeated attacks of the acute form. Chronic vertebral and rib lesions are found from the first to the seventh dorsal, inclusive. Elderly people are often subject to the disorder.

Pathologically, the lesions of chronic bronchitis present great variation, as to both their nature and extent. In some cases the mucous membrane is atrophied, so that some of the elastic fibers are noticeable. The epithelial layer is in great part missing. The muscular coat and mucous glands are atrophied.

In certain cases the mucous membrane of the bronchi is thickened, and there may be ulceration. In long standing bronchitis, there is frequently dilation of the tubes (bronchiectasis) and emphysema.

Symptoms.—Pain is rarely present; there is merely a feeling of constriction beneath the sternum. The cough varies with the weather and season and there is often an absence of the cough during the summer. It is apt to be worse at night than in the morning, and is frequently paroxysmal. There is rarely any fever. As a rule, there is free expectoration of mucopurulent or distinctly purulent matter. Sometimes it is abundant, seromucous in character, and again there are severe cases of dry cough in which there is almost no expectoration. Unless associated with other diseases, the general health suffers but little, if at all. The appetite, as a rule, is good and the body weight is well maintained.

Physical Signs.—Inspection.—There is considerable immobility of the chest and if emphysema is present there is distension. **Percussion** is clear, and hyperresonant in emphysema. **Auscultation.**—The expiration is prolonged and forcible. This is associated with sonorous and sibilant rales and moist rales of all sizes.

Special Varieties.—Bronchorrhea, dry catarrh, putrid bronchitis or fetid bronchitis.

Bronchorrhea.—In this form there may be an excessive bronchial secretion. This may be liquid and watery, but more frequently it is purulent, thin and containing greenish masses; or again it may be thick. Dilation of the tubes and fetid bronchitis may be developed.

Fetid Bronchitis.—Fetid expectoration is associated with gangrene of the lungs, abscesses, bronchiectasis, decomposition of matter within phthisical cavities, or empyema with perforation of the lungs; or it may occur independently. There is considerable expectoration that is thin and offensive. When **putrefactive changes** take place during the course of

chronic bronchitis, as a rule, the following symptoms immediately appear: fever, which may be septic; increase of cough; pain in the side, and sometimes a chill. There is increased prostration. The symptoms may abate followed by the usual course of bronchitis.

Dry Catarrh.—The cough is distressing and paroxysmal. It is usually associated with emphysema and is a very troublesome form.

Diagnosis.—This is not usually difficult. Phthisis—the absence of fever, of hemorrhage, of tubercle bacillus and the signs of localized consolidation (usually at one or other apex) will serve to distinguish between the two.

Prognosis.—Recovery is not always accomplished. The diseases being generally a secondary affection, the prognosis must depend upon the primary condition. The danger from development of emphysema, bronchiectasis and dilatation of the right ventricle must be thought of. Frequently cures will be obtained, even in old persons. Care must be taken that there are no serious organic lesions. Deep treatment to readjust the upper and middle dorsals is most essential.

Treatment.—In the first place there must be a careful regulation of the hygiene of the patient. The diet should be a nutritious one, care being taken to give food that is easily digested. A liberal diet can easily be selected from the various meats, vegetables, cereals, fruits, soups, broths, eggs and milk. The clothing should be carefully selected. Flannel should be worn next the skin the year around, care being taken that the sufferer is not too warmly clad. Due attention should be given to bathing, exercising, etc. The patient should be out in the open air a great deal, but be careful that it is not too stormy. The air of the room should be kept at an even temperature and not subject to abrupt changes. Two or three treatments per week will be required, and when the condition is considerably aggravated, do not hesitate to treat oftener, but be careful not to unduly irritate the lesions.

Lesions will be found to the ribs and vertebræ from the first to the seventh dorsal inclusive. Many cases present lesions in the vertebræ from the second to fourth, usually of a lateral nature. Other lesions of frequent occurrence are displacements of both vertebræ and ribs. Correcting these deviations relieves the chronic inflammation of the tubes. Also in those cases where dilatation of the bronchial tubes occurs, the obstruction to the motor fibers is to be removed by the correction of the vertebræ and by

removing obstruction to fibers of the pneumogastric; the fibers of the latter supplying the transverse muscles of the bronchial tubes.

It generally requires a considerable course of treatment for the cure of chronic bronchitis, and one of the hardest things to contend with in the treatment is the likelihood of the patient "catching cold." When a fresh cold gets thoroughly started, it is almost impossible to prevent the disease from extending down the bronchial tubes, as the innervation is less rich in the smaller tubes.

Hazzard says: "The obese should be taught the habit of deep respiration, as should all persons subject to the attacks of the disease. This measure, together with the daily cold sponge or shower bath, is a great aid in overcoming the chronic tendency."

Those cases that are due to cardiac or nephritic diseases require the treatment of the primary disease in addition to a light bronchial treatment.

A lesion between the gladiolus and manubrium of the sternum may be found, but it is of rare occurrence in these cases. The upper portion of the sternum may be held very rigidly and slightly underneath the middle portion of the sternum; or at the point of articulation of the two portions a distinct ridge may be found, caused by the articular ends being pushed anteriorly. Probably such lesions affect the innervation to the bronchial tubes and lung tissues. Associated with this condition the upper chest is considerably immobilized, affecting the lymph and rib bone marrow function. Examine the first ribs and clavicles carefully. Changes of climate are often beneficial.

Fibrinous Bronchitis

Definition.—A rare, acute or chronic inflammatory disease of the bronchi, in which a fibrinous mould of the bronchus and its branches is formed. These are expelled in paroxysms of cough and dyspnea. The casts block the bronchial tubes. When these moulds are large or medium sized, they are generally hollow, while those of the smaller bronchi are solid.

Etiology and **Pathology**.—The causes are unknown. Young men, between the twentieth and fortieth years, are the usual subjects; but the disease may occur at any period of life. Lesions occur as in other forms of

bronchitis. The attack occurs most frequently in the spring months. In some cases there seems to be some hereditary influence. Chronic pulmonary diseases, like phthisis, emphysema and pleurisy, are occasionally predisposing causes. It is sometimes associated with skin diseases, such as herpes, impetigo and pemphigus.

The **pathology** is not known. The masses that are expelled are usually round and mixed with blood and mucus. The casts are more dense, but the membrane is identical with that of croupous exudates. This affection, however, is limited to certain bronchial tubes and recurs at stated or irregular intervals, sometimes for a period of several years. There is loss of epithelium in the affected bronchi and the submucous tissue is often swollen and infiltrated with serum.

Symptoms.—Acute cases are rare. The attacks may set in with rigor, high fever, pain in the side, soreness, severe paroxysms of cough and sometimes a slight hemoptysis. The symptoms are those of an ordinary acute bronchitis, but of severer character; aggravated cough and dyspnea and fatal termination are not uncommon. Death occasionally results from suffocation. There may be but one attack without any recurrence, but in the chronic form the paroxysms recur at irregular intervals, though they are less severe than in the acute form.

The disease may last for ten or even twenty years, the attacks recurring weekly, or a period of a year or more may intervene. The onset is marked by bronchial symptoms with or without fever. The cough soon becomes distressing and paroxysmal in character. The sputum may be blood-stained and occasionally there is profuse hemorrhage. The expectoration is in the form of ball-like masses which, when unraveled are found to be moulds of the bronchi. They may be hollow and laminated or quite solid. When examined under the microscope they are seen to consist of a fibrillated membrane in which are imbedded leucocytes, mucus, corpuscles, fat drops and epithelial cells. Leyden’s crystals and Curschmann’s spirals are occasionally found.

Physical signs are usually those of bronchitis. The weakened or suppressed breath sounds in the affected territory may occasionally be determined. There is sometimes a diminished expansion or even retraction of the chest wall over the affected area. There is no dullness on percussion,

unless the portions of the lung supplied by the affected tubes collapse. After dislodgement of the casts, the normal respiratory murmur returns.

Diagnosis.—The fibrinous casts alone are sufficient for a positive diagnosis.

Prognosis.—Generally favorable. In uncomplicated cases there is rarely any danger, even though there may be severe paroxysms of cough and dyspnea. In fatal cases the lesions of associated or preceding affections have been found, such as chronic pleurisy, pneumonia and phthisis. Although this is a rare disease, cases have been treated with success by osteopathic means. If uncomplicated there should be a fair chance for a cure, depending, of course, upon the constitutional condition and the permanency of the lesions.

Treatment.—The treatment is largely that of acute bronchitis. The disorder is more extensive than in acute bronchitis, consequently severe subluxations of the ribs and vertebræ of the upper and middle dorsals occur, besides extensive muscular contractions of the chest and neck. The fibrinous casts are somewhat of the same nature of membranous exudates elsewhere, therefore the treatment should be directed to a correction of the hyperemia of the mucous membrane of the bronchial tubes, thus loosening and disorganizing the exudate. The vagi nerves supply a part of the innervation to the bronchial tubes and lungs. Any disorder to them should be corrected when diseases of the bronchial tubes and lungs exist. They contain motor fibers to these organs, and to the bronchial tubes they supply, principally the transverse fibers. In bronchitis of various forms, marked effect can be secured by close attention and treatment to the inferior laryngeal nerve. This is best treated at the inner side of the lower portion of the sternocleido muscle.

The different forms of bronchitis illustrate the point so often noted in osteopathic etiology and pathology, that the various affections of the same region should not be studied so much as types of several diseases or disease entities as different degrees of involvement, depending on the severity of the causative lesion, the function of the nerves disturbed, and the character of the tissues. It is straining a point to diagnose and classify many diseases according to signs and symptoms instead of studying the process from central causes, for, at best, peripheral manifestations, micro-organisms, etc.,

are really incidental to the importance of the primary source of disturbed nutrition. Consequently, the same treatment, if scientific, is frequently indicated for all of the disorders that may affect a given locality. After all has been said and done, the therapy as well as the pathology, must hinge upon the fundamental—uninterrupted blood channels and nerve courses are essential to health. Whether a disease is of primary or secondary origin, or whether or not it presents different symptoms in various types, the above basic principle is invariably applicable. This simplifies etiology, pathology and treatment and furnishes a backbone to theory and practice, and some day rational medicine will adopt it.

Bronchiectasis

Bronchiectasis is a dilatation of a part or the whole of the bronchial tube. As a rule this affection is a secondary one, the most common cause being chronic bronchitis. The inflammation weakens the bronchial walls so that they are unable to resist the strain that is put upon them during violent paroxysms of coughing. After dilatation has once commenced, the weight of the secretion which accumulates tends to further distend the weakened walls and the elasticity, becoming impaired, is finally lost. Dilatation of the bronchi is also associated with emphysema, compression of a bronchus, aneurism or mediastinal tumor, bronchopneumonia, measles and whooping cough in children, and also traction associated with fibroid induration. Hence the bronchial dilatation is especially associated with bronchitis, interstitial pneumonia, and sometimes chronic pleurisy. It is rarely a congenital effect in such cases. It is commonly unilateral. The lesions presented to the osteopath are largely like those found in chronic bronchitis, i. e., derangement of the upper four or five dorsal vertebræ and ribs, and lesions of the cervical vertebræ involving the vagi. These lesions obstruct the nerve force to the bronchial tubes and thus cause the dilatation.

Pathologically, the dilatation is usually either cylindrical or saccular, which may occur in the same lung. The entire bronchial tree may be converted into a series of sacs opening into each other. These have smooth, shining walls in the most dependent parts which are sometimes ulcerated. In extreme conditions the dilatations may form large cysts immediately beneath the pleura; as a rule, the lung tissue lying between the sacculi

becomes cirrhotic. **Partial dilatation** is more common. The bronchial mucous membrane is involved with an occasional narrowing of the lumen. The narrowings are most commonly cylindrical, sometimes saccular.

In all forms there is decided change in the bronchial wall. In the large dilatations, the epithelium is changed. The elastic and muscular layers are thin and atrophied. These dilatations frequently contain fetid secretions and when these secretions are retained, the lining membrane becomes ulcerated.

Symptoms.—There is always cough, which occurs in severe paroxysms. In some cases a change of position will cause a paroxysm of coughing—very likely due to the emptying of the contents of a dilated tube into a normal one. The sputum is mucopurulent and is greenish brown in color, is fluid, and has a sour, or more frequently, a fetid odor. On standing, it separates into three layers; the upper is frothy and thin, the middle mucoid, and the lower is a thick sediment of cells and granular debris. Microscopically, the sediment consists of pus corpuscles, fatty acid crystals which are arranged in the form of bundles, and sometimes red blood discs and hematoidin crystals. Elastic fibers may be found if ulcers are present.

Physical Signs.—When distinctly present, they are those of a cavity in the lungs. When chronic pleurisy and interstitial pneumonia are associated, there may be retraction of the chest wall. The percussion resonance is impaired. On auscultation, bronchial, or even amphoric, breathing is heard occasionally with metallic rales.

Diagnosis.—In a number of cases this was formerly impossible, where the X-ray is now proving of great assistance. History, paroxysmal cough, characteristic copious sputum and an absence of tubercle bacilli with little impairment of the general health will serve to distinguish bronchiectasis from pulmonary tuberculosis. Circumscribed empyema which has ruptured into the lung may simulate bronchiectasis. This is of a much more sudden onset, has a history of previous pleurisy, the health is gradually impaired, and there is thoracic oppression and dyspnea on the slightest exertion.

Prognosis.—Is generally unfavorable. However this largely depends upon the cause.

Treatment.—Largely the same as in chronic bronchitis. Severe lesions are found in the dorsal vertebræ about the region of the third, fourth and

fifth, and many times lesions of the pneumogastric at the upper cervical vertebræ are also found. The lesions are much of the same nature as those of bronchitis, but, as a rule, there is a much deeper or more extensive lesion. These lesions weaken the motor innervation to the muscular coats of the bronchial tubes, and in many instances the extensive lesions involve the vasomotor nerves controlling the blood supply to the bronchial tubes. In most cases marked lesions of the ribs on either side will be found, usually in the region corresponding to the affected vertebræ.

The position of the patient is important; the head should be low in sleeping. In certain fetid cases surgery should be considered.

Care should be taken as to the hygienic surroundings of the patient. The diet should be carefully regulated and nutritious, as in chronic bronchitis.

Bronchial Asthma

Bronchial or **spasmodic asthma** is a chronic affection, characterized by a paroxysmal dyspnea due to a spasmodic contraction of the muscles of the bronchial tubes or to swelling of their mucous membrane.

Osteopathic Etiology and **Pathology.**—The majority of lesions causing bronchial asthma are from the second to the seventh dorsal region, inclusive, either in the ribs posteriorly or anteriorly, or in the vertebræ. These lesions involve vasomotor nerves to the bronchioles which produce the narrowing of the tubes and thus cause the dyspnea. Usually the lesion is at the third, fourth or fifth rib on the right side, although, as stated, a lesion may be found above or below this point at the anterior or posterior ends of the ribs or in the vertebræ corresponding to the same region. Probably lesions are found more on the right side, because most people are right-handed; these muscles being better developed would tend, when contracted, to draw the ribs from their articulation. The third, fourth and fifth ribs are usually found involved because it is the region of greatest vasomotor innervation to the bronchial tubes.

In a number of cases there will be found a posterior curvature of the dorso-lumbar region; and accompanying this condition will be catarrh and dilatation of the stomach, congestion of the liver, and, perhaps, intestinal

indigestion and constipation. Careful attention should be given to the digestive organs.

Lesions involving the pneumogastric at the atlas and axis are fairly frequent. These irritate fibers of the pneumogastric to the muscles of the bronchioles and thus produce narrowing of the tubes and consequently the paroxysms. Other points to note are the costal cartilages and hyoid bone, and probably, in a few instances, lesions to the phrenic.

Attacks may be induced reflexly by various excitants, as dust, diseases of the upper respiratory tract, etc., but the lesions to the vasomotor and motor nerves are the predisposing causes. Laughlin[93] says: “It is questionable whether reflex causes alone are sufficient to produce genuine asthma without the existence of specific lesions affecting the direct nerve connections of the part involved.” No doubt a neurotic tendency is often a predisposing factor. Overeating, and particularly certain foods will frequently excite an attack.

Pathologically, true asthma is a pure neurosis. There is more or less chronic inflammation of the bronchial tubes, shown by injection and thickening of the bronchial mucosa in the majority of cases. There may be found the morbid states peculiar to chronic bronchitis and emphysema. Whether the constriction of the tubes is due to spasms of the bronchial muscles or to swelling of the mucosa, or to both, the primary, predisposing and irritating influences are common to both. These are vertebral and rib lesions affecting the spinal nerves at their exit and the sympathetic chain along the head of the ribs; irritating lesions to the vagi, constricting pulmonary vessels, and to the cervical sympathetics, causing disturbance of the same, would be factors in the pathological chain. Reflex irritations may be found in various regions, but the principal osseous lesions, according to Dr. Still, are on the right side from the second to the sixth dorsal.

Symptoms.—The attack may come on at any time, but usually it comes on in the night during sleep. The onset may be sudden or the attack may be preceded by premonitory sensations, such as tightness in the chest, flatulence, sneezing, chilliness and a copious discharge of pale urine. Nervous symptoms, headache, vertigo, neuralgia, and an anxious, nervous, restless feeling may precede the attack. There is a sense of oppression and anxiety, followed by dyspnea. Soon the respiratory efforts become violent,

the patient is obliged to sit up or runs to the window for air. The shoulders are raised, the hands are placed upon something firm to keep the shoulders fixed so that the accessory muscles of respiration can be brought into play. The contracted tubes resist the entrance of air. Expiration is prolonged and wheezy. In severe cases the face becomes pale, the skin is covered with perspiration, the extremities are cold, the lips, finger tips and eyelids are livid, owing to defective oxygenation of the blood. The pulse is small and quick and the temperature is normal or subnormal. The attack may terminate suddenly, sometimes with a spell of coughing; this is especially so of severe cases, as the cough is generally absent in brief paroxysms.

The **cough** is at first very tight and dry and accompanied by a tough, scanty expectoration which is expelled with great difficulty. The **sputum** contains rounded masses of matter, the so-called "pearls" of Lænnec. Microscopically, they are found to be of a spiral structure, containing cells derived from the bronchial mucous membrane and fatty degenerated pus cells. A second form is contained in the inside of the coiled spiral of mucin, a filament of great clearness and translucency, that is most probably composed of transformed mucin. Curschmann's spirals are found in the early stages of the attack and for a time these were supposed, by their irritation, to excite the paroxysms. Their spiral form is unexplained. Curschmann believes that these spirals are found in the finer bronchioles and to be a product of bronchiolitis.

Physical Signs.—Inspection shows enlargement of the chest which is fixed and barrel-shaped. The breathing is labored and the chest moves but slightly. The diaphragm is lowered and fixed. **Percussion** yields hyperresonance, especially in cases which have had repeated attacks or when the asthma is associated with emphysema. **Auscultation.**—With inspiration and expiration are heard sonorous sibilant rales which are more marked on expiration. As the secretion increases, which is later in the attack, the rale becomes moist. The attack lasts for a variable period, rarely less than an hour. In severe attacks the paroxysms recur for three or four nights or more with spontaneous remissions during the day. In some cases the relief seems to be absolute, but in the majority of cases there is more or less oppression and cough for a day or two, sometimes for many days.

Diagnosis.—The physical signs, examination of the sputum and the history of the case makes the diagnosis easy.

Prognosis.—It is not a fatal disease and only dangerous when complications arise. Under osteopathic treatment the prognosis is usually favorable, unless there are serious complications, as this is a disease that osteopathy has treated with signal success. In long standing cases emphysema invariably develops.

Treatment.—Asthma, unless complicated with bronchial and lung diseases, is usually readily relieved during the paroxysms. Cases of many years' standing have been cured in a few treatments. It should be borne in mind that asthma is a respiratory neurosis.

To relieve an attack the osteopath should locate the lesion and, if possible, correct it. Oium[94], in the acute attack, standing at the head of his patient inserts the tips of both thumbs well under the angles of the jaw and then brings direct pressure on both vagi as they pass over the transverse processes of the axis. Pressure must be brief and let up to be applied again. Immediate relief is given in many cases. Adjust upper three cervicals if found deranged.

If the muscles are so severely contracted that it is impossible to make out the nature of the lesion, then strong inhibition, with an upward, outward movement over the angles of the ribs involved, will be sufficient. The object to be gained in every case is to relieve pressure or irritation to the vasomotor or motor nerves, so that the narrowed tubes may be relaxed. Strong inhibition, such as placing the knee in the patient's back, at the same time pulling on the shoulders, will have temporary effect, but it is always best to reduce the lesion if possible. In severe cases dilatation of the rectum may relieve the paroxysm, and in a few instances it will be necessary to treat the uterus locally.

During the interval between the attacks is the time to remedy the disease. Then one is able to locate exactly the position of the disturbed tissues that are causing the paroxysms and apply treatment in the regions given under etiology. Many cases of asthma are cured in from one to three months' treatment. One treatment a week is sufficient, provided one is able each time to accomplish something toward a correction of the lesion and that the patient does not suffer during the meantime. Too frequent treatments may simply act as an irritant to the nervous lesions.

Attention should always be given to the diet and hygiene. Gastric digestion should be complete before retiring or it may induce an attack. Complications are treated according to the disease. Examine the upper respiratory tract, the digestive tract, and the pelvic organs when there is reason to believe the paroxysm may be induced reflexly. Laughlin sums up the treatment as follows: (1) Removal of specific lesion; (2) removal of exciting causes; (3) removal of reflex causes; and, (4) treatment of the patient to improve the condition of the general nervous system.

FOOTNOTES:

[93] Laughlin—Asthma—Journal of the American Osteopathic Association, Oct., 1914.

[94] Journal A. O. A. 1918.

DISEASES OF THE LUNGS

Emphysema

Used in a general way, emphysema is a term which implies the presence of air in the interstitial tissue, but when applied to the lungs there are two applications of the term, having widely different significations, viz: Interlobular or interstitial emphysema and vesicular emphysema.

Interlobular Emphysema.—This is caused by rupture of air vesicles, deep in the lung structure, the air escaping into the interlobular connective tissue. It is not a very serious condition, rarely produces symptoms and affords no physical signs. It usually results from violent acts of coughing in which the expiratory strain is very great, as in whooping cough and in bronchial asthma; also, from wounds of the lung.

The air bubbles escape into the interlobular septa and are sometimes seen like little rows of beads outlining the lobules. The pleura may become detached and larger vesicles may form. In rare cases the rupture may take place at the root of the lung and the air passes along the trachea into the subcutaneous tissue of the neck and chest wall, which gives rise to a very peculiar and distinctive crepitation upon palpation. Rarely there is rupture of the superficial vesicles, producing pneumothorax.

Vesicular Emphysema.—Dilatation of the infundibular passages and alveoli or an increase in their size either symmetrical, involving both lungs, or localized. Vesicular emphysema is divided into compensatory, hypertrophic and atrophic forms.

Compensatory.—This occurs when a region of the lung has been disabled from any cause and does not expand fully during inspiration; the healthy portion of the lung must then distend and do vicarious work or the chest wall will sink in to occupy the space. This happens with portions of healthy lungs in the neighborhood of tubercular areas and cicatrices, areas of collapsed lung or parts prevented from expansion by pleuritic adhesions (in this case the compensatory emphysema is chiefly at the anterior margins

of the lungs). As a rule this distention is physiologic and beneficial, the alveolar walls being simply stretched. Later they may atrophy, the air cells becoming fused.

Hypertrophic Emphysema.—This is enlargement of the lung, due to dilatation of the air vesicles and atrophy of the walls.

Osteopathic Etiology and **Pathology**.—An important predisposing cause of emphysema is often found to be due to derangements of the tissues, usually vertebræ and ribs, which affect the innervation to the lung tissues. Such lesions are found in the vagi and spinal dorsal nerves. The atlas may be involved, but it is generally the ribs and dorsal vertebræ. Distinction should be made between cause and effect in the skeletal changes. No doubt in many instances a vicious circle is thus established. Congenital weakness of the lung tissues, probably due to non-development of the elastic tissue, is a predisposing factor. This disease has a markedly hereditary character and frequently starts early in life. The heightened pressure within the air cells upon an already weakened lung tissue produces emphysema. Hence, the obstinate cough of chronic bronchitis and expiratory straining of asthma are sometimes the immediate cause. In all attacks of severe coughing or straining efforts, the glottis is closed and the air is forced into the upper part of the lungs, forcibly expanding them, and here is where emphysema is found to be most advanced. This disease is also found in players of wind instruments, in glass blowers and in those whose occupation necessitates heavy lifting or straining.

Pathologically, the thorax is barrel-shaped. The lungs are enlarged and do not collapse when the thorax is opened, as they have lost their elasticity. The organs are pale, soft and downy to the feeling and pit on pressure. Enlarged air vesicles may readily be seen beneath the pleura. Microscopically, there are seen atrophy of the vesicular walls and a diminished amount of elastic tissue. There is more or less obliteration of the capillaries, and the epithelium of the air cells undergoes a fatty change. There is usually chronic inflammation of the bronchial tubes, which may be roughened and thickened. The diaphragm is lowered and the subjacent viscera are displaced. The most important morbid changes are found in the heart, the right chamber being dilated and hypertrophied. This is caused by the increased tension in the pulmonary artery, which is enlarged and the seat of atheromatous degeneration. In long standing cases the hypertrophy is

general. Changes in the liver, kidneys and other viscera are those associated with prolonged venous engorgement.

Symptoms.—The onset of the disease is usually gradual. The first symptom to be noticed is the shortness of breath. In rare cases it may exhibit a more acute development, as after whooping cough, and then the first symptom will be dyspnea. In some cases this persists all the time, while in moderate emphysema the dyspnea is noticed only on slight exertion, such as going up-stairs, running or walking rapidly. The lungs are always filled with air which is charged with carbon dioxid and does not change, as the patient is constantly making ineffectual efforts to draw in air. The inspiration is shortened and the expiration is greatly prolonged and is often harsh and wheezy. The pulse-rate is accelerated; the temperature is usually normal. Cyanosis is a characteristic symptom in well established cases and is of an extreme grade not seen in any other affection. Bronchitis is frequently found in combination, especially in winter. In this case there will be the symptoms of the associated bronchitis, cough, expectoration and sometimes oppression. As the patient advances in age and there are successive attacks of bronchitis, the condition gets worse. In advanced cases, the result of cardiac failures, there may be venous engorgement, dropsy and effusions into the serous sacs.

Physical Signs.—Inspection.—There is a marked change in the shape of the thorax. The chest is rounded with increased circumference, giving the characteristic barrel-shaped chest. The sternum bulges, as do also the costal cartilages. The intercostal spaces are wide, especially in the hypochondriac region, and narrow above. The clavicles and muscles of the neck stand out with great prominence and the neck itself seems to be shortened on account of the elevation of the thorax and sternum. The curve of the spine is increased and there is a winged condition of the scapulæ. These changes give the patient a stooping posture. The chest does not expand, but is raised up by the scaleni and sternocleidomastoid muscles which stand out prominently and are hypertrophied. The heart's apex beat is invisible and there is usually marked epigastric pulsation. On **palpation**, vocal fremitus is found diminished, but not absent; the apex beat is rarely felt. There is distinct shock over the ensiform cartilage. This is due to the displacement of the heart and engorgement of the right ventricle. There is marked pulsation in the epigastrium. On **percussion** there is sometimes increased resonance,

almost amounting to tympany. The upper level of hepatic dullness is depressed. The heart dullness may be obliterated and the upper limit of splenic dullness may also be lowered. The **percussion** note is greatly extended. **Auscultation** reveals that the inspiration is short and feeble while there is prolonged expiration, the normal ratio being reversed. In associated bronchitis rales are frequently heard.

Diagnosis.—Unless complicated the diagnosis is generally easily made. The enlargement of the thorax, with dyspnea and hyperresonance and a prolonged expiration will differentiate emphysema from **chronic bronchitis**. **Pneumothorax** is of sudden development while emphysema is of slow development. Pneumothorax is usually unilateral, and it gives a tympanitic percussion note. In auscultation there is amphoric breathing and metallic tinkling and absence of any vesicular murmur.

Prognosis.—The disease is rarely fatal, although death may result from heart failure, dropsy or pneumonia. Thorough and persistent treatment will generally relieve the primary condition. The disease, as a rule, runs a long course but does not necessarily shorten life.

Atrophic emphysema is a senile change.

Treatment.—In cases of recent occurrence one may be able to build up the altered lung tissue by treatment of the innervation to the lung structure, viz.: the vasomotor nerves from the second to the seventh dorsal, the vagi, and the cervical and dorsal sympathetics. When a number of air vesicles have been converted into one sac, it is impossible to restore the altered lung structure and a treatment to relieve the symptoms and to prevent the further progress of the disease is indicated. In all cases treatment should be applied to correct any vertebræ or ribs of the upper dorsal region that may be displaced, and to raise and spread the ribs so that the lung structure may be better nourished and strengthened and that the aeration of the blood will be more perfect. Treatment of the vagi nerves is important, as their physiological action on the lungs is to increase their movement.

The general health of the patient is an important consideration and everything should be done to promote as healthy a condition as possible. The digestion should be carefully looked after and everything done to restore a normal state of the blood. A change of climate may prove beneficial.

Strengthening the cardiac action will be of service in relieving any dropsical tendency that might occur on account of obstruction to the pulmonary circulation. If bronchitis or asthma occurs, their respective treatments are indicated. A general treatment of the splanchnic and lung vascular areas should be given to prevent any disturbance in the circulation which might cause congestion of the liver, congestion of the hemorrhoidal veins, or catarrh of the stomach and bowels.

"Free evacuation of the bowels and measures to relieve any flatulent distention are very needful in cases of emphysema to take off from the diaphragm any pressure from below, and to allow it to descend as freely as possible. With this view also the food should be concentrated, nourishing, and not bulky."[95]

It is a good plan to instruct the nurse or attendant to aid inspiration by raising the arms strongly above the head during inspiration and to compress the chest during expiration so as to coincide with natural breathing, which will render the aeration of the blood greater and increase the elasticity of the vesicles.

Acute Lobar Pneumonia

(Croupous Pneumonia)

This is an acute, infectious disease wherein various vertebral, rib and muscular lesions predispose to a lowered nutritive state of the parenchyma of the lung, permitting the invasion of the diplococcus pneumoniæ, with consequent local inflammation and pronounced constitutional disturbances, chill, extreme prostration and fever, which terminates abruptly by crisis. Secondary infective processes are frequent.

In describing a typical case of pneumonia it is considered as a self-limiting disease. By osteopathic treatment it is often aborted or, at least, its course much shortened. In such a case it is not typical pneumonia and could not be described as such.

Osteopathic Etiology and **Pathology**.—Pneumonia occurs more often in the young up to the sixth year and in the aged. It is more frequent during the winter and spring months. "Colds," exposure and wetting are predisposing

influences that lower resistance. Climate exerts little predisposing influence. Males are, on the whole, more frequently attacked. Pneumonia may follow injuries of the chest. Various derangements of the ribs and vertebræ are always found in pneumonia; such derangements correspond with the regions of vasomotor, motor and trophic fibers of the lungs, viz., second to seventh dorsal, inclusive, and the upper cervical vertebræ, the latter region affecting the vagi. The muscles of the chest region are always severed contracted. These various disorders produce a lowered vitality of the bronchial and lung tissues, thus favoring the existence of the micrococcus lanceolatus. Unhygienic surroundings, alcoholism, any or all habits that tend to depress the nervous system, or lowered vitality from some pre-existent disease, like diabetes, Bright's disease, organic heart affection or one of the infectious fevers, favor its development. One attack undoubtedly predisposes to another and repeated attacks may occur in the same individual. The exciting cause is the invasion of the lung by pathogenic bacteria, especially by diplococcus pneumoniæ. Pneumococci are frequently found in the throat and mouth of the healthy.

Pathologically, the lung in croupous pneumonia exhibits three distinct stages—congestion, red hepatization and gray hepatization. In the **stage** of **engorgement** the tissue is red in color, firm and solid and less crepitant than the healthy lung. The cut surface is bathed in blood and stained serum. Microscopic examination shows the capillaries to be dilated and tortuous. The alveolar epithelium is swollen and the air cells filled with a variable number of red corpuscles, detached alveolar cells and a few leucocytes. During the **stage** of **red hepatization** the tissue is solid. It is reddish brown in color and of a dry, mottled appearance. It is very friable and does not crepitate, as the affected portion is airless. Its weight and specific gravity are increased so that it sinks in water. The torn surface presents a granular appearance, there being fibrinous plugs in the air cells. On microscopic examination the air spaces are found filled with coagulated fibrin. The tissue contains red blood-corpuscles and pus cells and the walls of the air cells are infiltrated. In sections properly treated the diplococcus is detected, and in some cases also the streptococcus and staphylococcus. In the **stage** of **gray hepatization**, the lung is still dense and heavy, but the surface is moister and softer, while the lung tissue is even more friable and the red color gives place to a mottled gray. The exudate loses its granular character and a yellowish white purulent liquid flows from a cut surface.

Microscopically, the air cells are filled with leucocytes, while the red corpuscles and fibrin filaments have disappeared. The stage of gray hepatization is the stage of beginning **resolution**. The exudate is softened. The cell elements are disintegrated and absorbed by the lymphatics and largely eliminated through the kidneys. In unfavorable cases the consolidated lung may become infiltrated with pus, and abscesses occur. In some instances the tissue is gangrenous, or it may become the seat of fibroid induration. These, however, are rare.

Symptoms.—The disease begins abruptly, usually with a severe chill, lasting from half an hour to an hour, the fever rising rapidly. There is a sharp pain in the side, the skin becomes harsh and dry, the face is flushed, the eyes are bright and the expression anxious. A short, dry, painful cough soon develops. The expectoration presents a characteristic, rusty or blood tinged appearance and is extremely tenacious. The temperature rises rapidly, frequently to 104 or 105 degrees F., and continues high for from five to ten days and generally terminates by crisis. The pulse is full, but the pulse-respiration ratio is not maintained. There is marked dyspnea, the respirations ranging from forty to fifty per minute. There are many fine rales. Headache, gastro-intestinal disturbances, sleeplessness, epistaxis, rarely delirium except in drunkards, may also be present.

The symptoms given are those of a typical case of pneumonia, but all are subject to modification. The onset may be gradual and the chill absent. In all cases, and especially drunkards, the temperature may not be high, while the pulse is often feeble and rapid instead of full and strong, and the physical signs may not make their appearance until the second or third day.

Special Symptoms.—The **fever** rises abruptly in the initial chill, the temperature reaching 104 or 105 degrees F., and is continuous with a variation of a degree or two. The fever terminates by **crisis** after having continued from five to nine days. The temperature commonly falls during the night and is accompanied by a profuse perspiration. The temperature may fall from five to eight degrees in eight to twelve hours. There is a wide range here depending upon promptness and skillfulness of treatment, the reaction of the tissues, and previous health. Early treatment is invaluable in modifying the course of the disease.

The **sputum** at first is mucoid and frothy. About the second day it becomes of a characteristic color, quite copious and consisting of a frothy, fluid mucus, containing small viscid masses. It is very viscid and glutinous, in some cases almost from the onset. In old and previously weak persons, there may be no expectoration. Under the microscope the sputum is seen to contain red blood-corpuscles, leucocytes, alveolar epithelium, the micrococcus lanceolatus as well as other micro-organisms, pus corpuscles and small fibrinous casts. A stabbing **pain** is a common early symptom, as well as a dry, short **cough**. The **urine** is febrile, scanty and high colored. Urea and uric acid are increased. A trace of albumin is often present, and there may be symptoms of acute nephritis. **Herpes** is common. The nasolabial herpes appear from the second to the fifth day, and they may occur upon the cheek, genitals and also upon mucosa of the tongue. It is supposed to indicate a favorable prognosis. There is redness of the cheek, usually on the affected side. The mucous membrane of the mouth is dry. The tongue is white and furred. Anorexia and thirst are present. The patient is usually constipated, but diarrhea may occur. Vomiting is common. The spleen is usually enlarged, but the liver is not perceptibly increased in size, unless there is extreme engorgement of the right heart. The **pulse** is bounding. The average pulse-rate is from 100 to 108 per minute. In consolidation the left ventricle receives a lessened amount of blood and the pulse may become small. In the aged and debilitated, a small, weak and rapid pulse may be present. The **heart sounds** are loud and clear, and in favorable cases the pulmonary second sound is accentuated, owing to the increased tension in the pulmonary vessels. Upon distension of the right side of the heart and partial failure of the right ventricle, the second sound becomes less distinct which is a very unfavorable symptom, for very much depends upon the strength of the right ventricle in pneumonia. The **blood** usually exhibits leucocytosis which disappears with the crisis. In malignant pneumonia this is absent and its continued absence is an unfavorable sign. The proportion of fibrin is also greatly increased. The diplococci can rarely be seen. Headache is common as an initial symptom and may be persistent. The disease is often ushered in by convulsions, especially in children; consciousness is usually retained throughout the whole attack, even in severe cases, though in some cases there is delirium. In drunkards delirium tremens may be present from the onset. In these cases the patient often wanders about until the preliminary excitement gives way to coma.

Physical Signs.—Stage of **Congestion.**—Diminished expansion, the movements of the affected side are defective, the face is flushed and the patient lies on the affected side. Tactile fremitus is slightly increased. There may be tympany over the involved area from diminished intrapulmonary tension. In the latter part of this stage there is impairment of resonance. Fine crepitant rales are heard at the end of forced inspiration. Great care has to be taken in examination when there is deep seated consolidation.

Stage of **Red Hepatization**.—The breathing is markedly abnormal. Very little or no expansive motion of the chest over the affected region. Vocal fremitus is markedly exaggerated. The skin is hot and dry and the pulse frequent. Dullness over the affected parts with an increased sense of resistance is present. There is high-pitched, prolonged, bronchial breathing when the lung becomes solidified. When the larger bronchi are completely filled with exudate, tubular breathing is absent. Crepitant rales may also be heard.

Stage of **Gray Hepatization**.—Largely the same physical signs are repeated in this stage as in the second. The normal manner of breathing returns, as does also the normal expansive movement of the affected side. Crepitant rales reappear. The temperature of the skin is lessened, breathing changes from bronchial to vesicular and bronchial resonance continues for some time.

Complications.—Pleurisy is the most frequent complication. Pneumonia on one side and pleurisy on the other is possible. The pain is more acute and localized. The respiration is greatly affected and the usual signs of effusion are present. Empyema may be a complication. **Pericarditis** is more common in the pneumonia of children. Though usually plastic it may be serofibrinous, but rarely the fluid is purulent. There is increased dyspnea, the pulse becomes weaker, and the heart sounds are gradually suppressed. **Endocarditis** is a comparatively frequent complication. It is more liable to attack patients with old valvular disease and to affect the left heart. The physical signs are sometimes absent and even when present are liable to be very deceptive. It may, however, be suspected in cases where the fever is protracted; when septic manifestations, such as chills, sweats or irregular temperature, develop; when embolic symptoms appear, or when a rough, diastolic murmur develops. **Meningitis** is a complication that comes on at the height of the

fever. This complication is rarely recognized unless the basilar meninges are involved. It is frequently associated with ulcerated endocarditis. Cerebral embolism causing hemiplegia has been observed. Other possible complications are neuritis, arthritis, nephritis, parotitis and various digestive disorders.

Diagnosis.—A typical case of pneumonia is easily recognized. The abrupt onset with rigor, the rapidly developed fever, the sputum, physical signs and abnormal pulse-respiration ratio, as a rule make the diagnosis easy. Frequent examination of the lungs should be made in Bright's disease, diabetes, organic affections of the heart, cancer and alcoholism, as all these affections are liable to become complicated with acute pneumonia. **Pleurisy** is often confounded with pneumonia. The resemblance between friction sounds and crepitant rales is often very close. In pleurisy vocal resonance and vocal fremitus are diminished; there is no "rusty" sputum; the percussion dullness may change with the posture of the patient, and the breathing is distant and weak. A typhoid state may be mistaken for typhoid fever. Hypostasis occurs late in typhoid fever while dullness sets in early in pneumonia. The history of the onset will be of aid, as pneumonia as a complication sets in late in the disease. The Widal test will be of value. **Acute phthisis** may begin with a chill and may resemble pneumonia very closely, especially the physical signs. Examination of the sputum will show the bacilli of tuberculosis. The X-ray will often be of aid as a diagnostic measure.

Prognosis.—This largely depends upon the previous health of the patient. At the extremes of life the prognosis is much more unfavorable. It is especially fatal in drunkards. By competent osteopathic treatment the mortality rate may be materially lessened and this disease, dreaded by both physician and patient, need not seem so fearful. The death rate from pneumonia during the past few years has been appalling. In New York and Chicago nearly one-eighth of the deaths the year around are due to pneumonia, and during certain months of the year twenty-seven or eight per cent. of all deaths are due to this disease. Drug medication is notoriously unreliable, the most competent physicians freely admitting that they are practically powerless to stay the ravages. Given a patient with a fair constitution, osteopathic treatment will offer reasonable hope to the sufferer. There is no question that osteopathy merits much commendation in

the treatment of pneumonia. Many severe cases have been cured and many more have undoubtedly been aborted. The treatment is directly applicable and specifically indicated, and coupled with good nursing and hygiene, the mortality rate of the old schools is being markedly lessened.

Treatment.—The treatment of pneumonia must be both constitutional and local. By this is meant that the systemic strength and vigor must be maintained in addition to treatment of the chief lesion of the disease, which is located in the lungs.

During the various stages of the disease, the treatment should be directed to the nerves of direct innervation that control the capillaries, and to the vasomotor nerves of the pulmonary circulation, in order that the hyperemic and inflamed state of the pulmonary capillaries and adjacent tissues may be lessened and the circulatory system equalized. The disordered tissues that should be corrected in order that the centers of the spinal cord and the nerves that influence the function and structure of the lungs may be relieved, are: contraction of the thoracic and dorsal muscles, subluxations of the ribs and dorsal vertebræ from the second to the seventh, inclusive, and the upper cervical vertebræ that may become disordered and impinge upon the vagi nerves. However, owing to the fact that the vasomotors are not especially abundant here, all increased chest mobility and deep breathing and abdominal aid will materially assist the circulation. Also, carefully treat the middle and inferior cervical regions for the lymphatics of the lungs. Each of these regions should be carefully examined and thoroughly treated whenever found involved. The specific micro-organisms that influence the course of pneumonia are naturally very important factors; but observing and improving the general health, and establishing an unobstructed circulation through the diseased lung tissues will hasten the crisis by favoring a rapid formation of antidotal substances to neutralize the poisonous substance produced by the micrococcus lanceolatus. Healthy tissues, which occur only where there is uninterrupted freedom of vascular supply and nerve force, are obtained by correction of any and all anatomical disorders. This will rapidly decrease any lethal tendency in the patient and often abort the disorder so that all that is needed is sufficient time for nature to heal the diseased tissues. The principal predisposing cause of many specific diseases, is some disorder of the anatomical tissues that interferes with normal physiological functions; and the determining of the different types

of disease is often due to the location of the lesion and the character of the micro-organism involved in each disease. What is necessary in many cases is a correction of the mechanical predisposing condition and the exciting and determining influences will be rendered inactive.

The importance of close attention to both vagi can not be overestimated. Any obstruction above or below the origin of the superior laryngeal nerve is followed by loss of motor power of the lungs, thus causing difficult and labored breathing. The lungs become surcharged with blood, because the air pressure in the lungs is low and the thorax is distended. This condition is followed by serous exudation. Thus obstruction of the vagi may be one factor in the cause of pneumonia. Obstruction of the vagi below the origin of the recurrent laryngeal nerves affects the lower and middle lobes of the lungs, and produces also a catarrhal inflammation of the upper lobes. The recurrent laryngeal nerves may be obstructed by dilatation of the aorta or subclavian artery as they wind about them; also by dislocations of the first and second ribs, which may affect the nerves not only directly, but by causing an obstruction to the subclavian vessels with a consequent disturbance of the aorta and the heart. The recurrent laryngeal nerves may be treated directly at the inner lower part of the sternomastoid.

One of the chief objects of the treatment should be to prevent **heart failure** and to lessen the pulse-respiration ratio. The average pulse-rate in typical cases is from 100 to 110 per minute and when it exceeds this to any extent, say 120, there is cause for alarm. At first the pulse is full and bounding, later it is small on account of a lessened amount of blood reaching the left ventricle and systemic circulation, owing to the extensive consolidation. In treating heart failure particular attention should be paid to the condition of the ribs on the left side over the region of the heart, the second to the fifth, inclusive. A correction of any disturbance to the inhibitory nerves of the heart, (the vagi) and the accelerator fibers of the heart (the cervical sympathetic) should be made. This means close attention to probable derangements of the vertebræ from atlas to first dorsal. General treatment of the entire system will relieve the heart of some work and favor an equalization of the vascular system. Also by the use of hydrotherapy the maintenance of the heart's action may be accomplished. Cold compresses, and not warm ones, should be used, as the latter relax the vessel walls, producing more or less paresis of the vessels, while the former stimulate the

vaso-dilators, producing dilatation and tone of the vessels, thereby causing a vigorous increase in the flow of blood. This relieves the heart by increasing the cutaneous circulation, besides increasing arterial tension. The right heart is indirectly aided by the increase of the tension in the general vascular system, and the vessels of the pulmonary circulation have more force expended upon them and a greater contraction of their vessels occurs on account of the dilatation of the cutaneous vessels. The temperature of the water used should be 60 degrees F., and the compress applied for thirty minutes or as long as necessary.

Attention to the abdominal area and diaphragm will have a definite effect upon the circulation and elimination. It is beneficial in its influence upon lungs and heart and in combatting toxemia. Carefully graduated deep breathing is of distinct benefit.

In addition to the fever treatment in the cervical and dorsal regions, the gradually cooled tub-bath will be of aid. The temperature at first should be ninety degrees F. and then gradually cooled to eighty degrees F. The duration should not be over ten or fifteen minutes. Care should be taken that the patient does not exert himself. He should be lifted in and out of the baths. These baths also have a marked effect upon the respiratory and nervous centers. The ice-bag over the chest and spine has a beneficial influence; still, with feeble children be exceedingly careful when applying or using cold methods.

During all stages of the disease, the best possible care should be taken of the patient. See the patient frequently, probably twice a day or oftener. Each time thoroughly relax the dorsal muscles and readjust the ribs, for as every osteopath of experience will note (and Dr. Still particularly emphasizes) the contracted muscles frequently and continually displace the ribs. The treatment should not be prolonged to a point of overfatigue, but a definite reaction of tissues should be secured but no further.

Carefully raise all the ribs and moderately hyperextend the spine. Release the cervical, pectoral and axillary lymphatics, and stimulate spleen and liver.

Experience has shown that the first treatment is of the greatest importance and if the osteopath will control the predominant symptoms at that time the result will be much simplified. For that reason it is best not to

leave the patient until the chest pain, fever, high pulse or whatever may be present, are well in hand, although it may mean a long visit with fairly frequent treatments. Treat the conditions existing and wait; then treat again and the result will more than repay. There is always more than a chance of aborting the disease, but the first treatment is often the crucial test. F. E. Moore and many others report numerous cases treated without a fatality and the average duration of the disease not exceeding five days. The apartment should be well aired and a temperature of 65 degrees F. maintained. In the very young the temperature should be higher. The diet is exceedingly important. Give a liquid, light and nutritious one, a milk diet being preferable. Otherwise give meat juice, broths, egg albumin and whey. Avoid starchy and saccharine foods, and give plenty of water. Good nursing and complete rest of body and mind, with careful attention to the activity of the bowels, kidneys and skin, will indirectly aid the clogged up lung fascia to perform its function and hasten an early recovery from the disease. In epidemic forms be particularly vigilant in the employment of antiseptics.

Bronchopneumonia

(Catarrhal Pneumonia)

Definition.—An inflammation of the minute bronchi and air vesicles. The affection begins with an inflammation of the capillary bronchi, which extends to the air vesicles. The micrococcus lanceolatus, streptococcus pyogenes, influenza bacillus, and staphylococcus aureus et albus are the principal exciting micro-organisms.

Osteopathic Etiology and **Pathology**.—The disease is most prevalent among the very young and the old, and may be either primary or secondary. It may occur as a sequence or in association with measles, diphtheria, whooping cough and scarlet fever. Exposure to cold, impure air, rickets and diarrhea are marked predisposing causes in children. In the old, debilitating affections and chronic diseases are predisposing causes. Bronchopneumonia occurs sometimes as a complication in smallpox, erysipelas, typhoid fever and influenza. The principal lesions found upon examination are subdislocated ribs affecting the pulmonary vasomotor nerves. The third, fourth and fifth ribs are especially apt to be subdislocated. The muscles throughout the thoracic region are generally severely contracted.

Another group of cases, the so-called **aspiration or deglutition pneumonia**, are caused by the inhalation of food particles or other substances. A lessened sensitiveness of the larynx (as in comatose states) may allow small particles of food to reach the smaller bronchi and produce inflammation, which may even cause suppuration and sometimes gangrene. Cases are liable to occur after operations about the nose and mouth. It is often secondary to carcinoma of the larynx and esophagus and after tracheotomy and glosso-pharyngeal palsy. A serious form of bronchopneumonia is caused by the **tubercle bacillus**.

Pathologically, both lungs are usually involved and become heavy. On the pleural surfaces, especially at the base, sunken purplish or slaty patches are noticed, representing collapsed lung tissue. On section small, projecting portions of consolidation are seen, separated from each other by uninflamed and collapsed tissue. The section of lung tissue is of a dark reddish color. The terminal bronchi are filled with tenacious, purulent material. Microscopically, the terminal bronchi and air cells are filled with a plug of exudation composed of leucocytes and desquamated epithelium. The walls of the bronchi are swollen and contain many leucocytes.

Symptoms.—The symptoms are frequently marked by those of the primary affection. The onset may be either abrupt or gradual. The child becomes feverish; there is increased frequency in respiration and there is an aggravated cough. The temperature rises to 102 or 104 degrees F.; respiration may rise as high as 60 or 80. The cough is hard, distressing, frequently painful and accompanied by a mucopurulent expectoration. The pulse is greatly accelerated—120 to 180 per minute. As the disease advances, signs of deficient aeration of the blood are noticed. At first there is a pale and anxious expression of the face, the lips are blue and the child makes strenuous efforts to breathe. The blood soon becomes highly charged with carbon dioxide and, by its benumbing influence upon the nerve centers, sensibility is reduced and the cough and suffering subside. The face becomes livid and death may occur within twenty-four hours from paralysis of the heart.

At the beginning of the attack dullness is absent and subcrepitant and sibilant rales are present. Areas of consolidation soon become manifested. There is slight impairment of resonance and the breathing is harsh. Upon

inspection there is, in grave cases, retraction of the sternum due to defective expansion.

Diagnosis.—This is usually easy, developing as it generally does in the course or at the conclusion of another disease, with a gradual onset as a rule, and irregular fever and a long duration, besides usually occurring in children under five. If the areas of consolidation are large, involving the greater part of a lobe, it is sometimes very difficult to distinguish bronchial pneumonia from lobar pneumonia. **Lobar pneumonia**, when occurring in children, is usually between the ages of five and fifteen. The onset is abrupt in a child of good health; it resolves rapidly; there is rusty colored sputum and continued fever falling by crisis. **Tuberculous bronchopneumonia** is very hard to differentiate from simple bronchopneumonia. A great many cases can be correctly diagnosed only after the lapse of considerable time. The presence of signs of softening, considerable disease of the apices, and examination of the sputum, or in the case of a child, of the vomited matter, would diagnose this form. If elastic fibers and tubercle bacilli are found in the sputum or vomited matter, the diagnosis is at once decided in favor of tuberculous bronchopneumonia. X-ray diagnosis should be considered.

Prognosis.—The prognosis depends on the cause. In children that are previously weak and debilitated the disease is very fatal. When the disease follows measles and whooping cough, the fatality is not so great. In adults the prognosis is about the same as in the croupous form. The deglutition variety is apt to be fatal.

Treatment.—A great deal can be done to prevent the disease, by careful attention to debilitated children in keeping them warm and protected at all times. There is usually a preexisting bronchitis. In measles and whooping cough and during convalescence, the child should be well taken care of.

A thorough, persistent treatment, but not to a point of overfatigue, of the dorsal vasomotor nerves posteriorly should be given. Gentle work over the cervical and axillary lymphatics to free the edematous barrier, correction of the tensed scaleni and deranged first ribs and clavicles, and stimulation of spleen and liver, with sufficient general treatment to start reaction, will be effective. Derangements to the third, fourth and fifth dorsal nerves are most likely to be found; the principal vasomotor innervation to the bronchials and air vesicles is from this region. Treatment over the chest anteriorly is of

great aid, especially an upward and outward manipulation to release the ribs should be given. Attention should be given the vagi nerves to increase the activity of the lungs as well as for the effect gained upon the circular fibers of the bronchi. Care should be taken, that the first rib is not impinging upon the first thoracic ganglion, or interfering with lymphatic drainage.

Ice-bags over the chest are helpful. The chest should be protected from changes in temperature by a jacket of cotton batting. The diet should consist of milk, egg albumin and broths. Keep the temperature at about 70 degrees F. and the air of the room moist and free from draughts. When the fever is high, sponging or the wet pack is helpful. The bowels from the beginning of the attack should be carefully watched.

There is danger of a **failing heart**; this is generally associated with mucous rales and cyanosis. Douching alternately with hot and cold water will usually excite coughing and overcome the difficulty. The gradually cooled bath will have a marked effect in reducing the temperature, quieting the nervous symptoms, increasing the respiratory power and promoting sleep.

Raise and carefully stimulate the abdominal viscera, and elevate the diaphragm. This is effective in both cyanosis and toxemia.

In the first stage of pneumonia, Hazzard[96] says, “There is better opportunity to correct the specific lesion, as the patient’s strength will allow of such treatment. The work is also aided by the fact that the alveoli are still open, and lung action, stimulated by treatment, may become a valuable aid in dispelling the engorgement.” This is a most valuable suggestion, but be exceedingly careful in subsequent treatments not to treat too hard and thus lame and bruise the patient.

Series I, II, III, and V of the American Osteopathic Association Case Reports present several interesting cases of pneumonia which typify the importance of immediate and direct correction of the osteopathic lesions.

Herman[97] cites an interesting case of delayed resolution, due to a depressed condition of all the ribs on the affected side with marked luxation of the eighth. The lesion at the eighth was the cause of a prolonged attack of hiccoughs which prevented resolution. It is pointed out that there is an abundant intercostal nerve supply to the diaphragm from the eighth and

ninth intercostals. C. E. Achorn instances an autopsy of patient dying of pneumonia, where a bony ankylosis was found at the second dorsal; this lesion was probably an important predisposing factor.

Broadly speaking, one should keep in mind the following: First, early treatment will frequently abort what would ultimately be pneumonia—still, in the preceding it is not these cases that are especially referred to, but those following the course of a typical pneumonic process; second, both specific and general treatment prior to the crisis will materially lessen the severity of the disease; third, the crisis corresponds to beginning resolution (during resolution expectoration and liquefaction and absorption of the exudate are paramount features) and must be met promptly and vigorously, special attention being paid to the heart; and, fourth, during convalescence, good, general attention and care of patient as to treatment, hygiene, diet, and climate, are important.

Chronic Interstitial Pneumonia

(Fibroid Induration)

Definition.—A chronic, inflammatory disease of the lungs, characterized by an overgrowth of fibrous or connective tissue.

Etiology.—With few exceptions chronic affections of the lungs cause more or less fibroid overgrowth. This is especially frequent after bronchial pneumonia and pulmonary tuberculosis. It is also excited by abscesses, hydatids, syphilis, emphysema, sarcoma and old fibrinous pleurisy. It may also be caused by compression, by aneurism or neoplasms. It may arise as a primary affection, due to the inhalation of irritating dusts (stone dust, coal dust and metal dust). There will be found deeply seated osseous lesions of the upper and middle dorsal region and corresponding ribs, and frequently of the cervical vertebræ.

Pathologically, as it involves limited or extensive areas, it is recognized as **local** or **diffuse**. It is a unilateral affection. The involved portion is shrunken and on section it is found to be tough, firm, of a greenish color and containing an overgrowth of fibrous tissue. If it affects the left side the heart may be displaced. The unaffected lung is usually enlarged

(compensatory emphysema). There is hypertrophy of the right ventricle of the heart.

Symptoms.—There is a chronic cough, which varies greatly in its severity; moderate dyspnea, and a variable expectoration. There is no fever and the general health of the patient may be preserved for a number of years. The expectoration is generally copious, muco- or sero-purulent, rarely fetid. There is retraction of the affected side, displacement of the apex beat and lateral curvature of the spinal column. The unaffected side is enlarged. The intercostal spaces disappear, the ribs sometimes even overlapping. The tactile fremitus is generally increased, but if the pleural membrane is thickened the fremitus may be decreased. There is generally impairment of resonance. A tympanitic or amphoric note may be heard over a dilated bronchus. On the sound side the percussion note is generally hyperresonant. The breathing sounds may be feeble. They may be bronchial or cavernous, but rather amphoric. Late in the disease cardiac murmurs are not uncommon.

Diagnosis.—This is never difficult. It is mainly to be distinguished from **fibroid phthisis**. In the latter both lungs are involved and there is fever and bacilli are found in the sputum. An X-ray examination should be made.

Prognosis.—The disease is exceedingly chronic and may last for many years. Death may result from gradual failure of the right heart, hemorrhage or from intercurrent attacks of acute pneumonia involving the other lung.

Treatment.—Little can be done for this condition. Intercurrent bronchitis may be somewhat relieved by the treatment for chronic bronchitis. The patient should dwell in a mild climate. Hygienic surroundings and nutritious food are indicated. Something can be done by attempting to correct the condition of the ribs and vertebræ, but this measure, from the nature of the disease, is generally palliative at best.

Congestion of the Lungs

Congestion of the lungs may be active, passive or hypostatic. The two former have particular osteopathic significance, owing to the lesions involved.

Active congestion may result from violent physical exertion, excessive alcoholic indulgence, inhalation of hot air or as a symptom in pneumonia and other pulmonary affections. There is dyspnea and cough with rusty expectoration of a frothy nature. There may be absence of fever. But generally a slight chill followed by moderate fever, pain in side, and cough are the principal symptoms. On percussion, the note is dull with increased tactile fremitus and bilateral involvement.

Prognosis is good under osteopathic treatment, but it must be promptly met as it is usually a symptom of another disease.

Treatment is the same as in the beginning of pneumonia.

Passive congestion, when not hypostatic, is mechanical and due to an impeded return of blood to the left heart from mitral stenosis, or regurgitation, dilatation of the right ventricle and cerebral disease. The lungs are large with distended pulmonary vessels with venous blood in the air spaces. There is dyspnea and cough, with blood-streaked, frothy expectorations.

The **treatment** is primarily of the condition causing the congestion, but in addition the upper ribs should be raised and thorough treatment of the abdomen and elevating the diaphragm are beneficial.

Hypostatic congestion results from a weakened heart in exhaustion, infection or old age; also from continued dorsal decubitus. Rheumatic fever, tuberculosis and other constitutional diseases, as well as organic growths, may predispose. The condition gives rise to a mild form of lobar pneumonia. **Symptoms** are not well defined and often are not recognized. There may be slight dullness, increased fremitus, moist rales and other signs of a venous engorgement.

In **treatment** the first move is to change position of the patient and then look after any underlying cause. Osteopathically, follow treatment of pneumonia. In all cases of circulatory involvement of the lungs, treatment to relax muscles or to adjust vertebræ and rib lesions to the vasomotor nerves of the lungs is very efficacious. Landois (1904) says: “Irritation of sensory nerves, particularly if intense and long continued, causes a dilatation of the vessels in the areas innervated by them.”

Edema of the Lungs

There are two forms of **edema**, collateral and general, which follow an intense congestion with transudation of serum into the air vesicles and interstitial tissue. The **collateral form** is localized and usually appears in connection with pneumonia, pulmonary infarction or abscess. In **general edema** the base of the lung is involved to a greater extent, but the whole structure is affected and hydrothorax is generally present. The **cause** of edema is not well understood, but may result from a long line of constitutional diseases. The **symptoms** are dyspnea, cough with copious, blood-streaked sputum which is expelled with difficulty. There may be fever in the inflammatory type with weak, increased pulse. Dullness over the affected area, broncho-vesicular breathing and small liquid rales are audible. The **diagnosis** must largely be made upon the bilateral dullness at the base of each lung and physical signs noted above. X-ray examination will usually be of value. **Prognosis** depends on the condition causing the edema and treatment should be directed to correcting it. Frequently edema is a terminal affection. This should be followed by osteopathic treatment to free the lungs of the effusion as outlined under pneumonia, especially relaxation of the upper dorsal and cervical muscles, separation of the upper ribs and stimulation of the heart.

FOOTNOTES:

[95] Yeo—A Manual of Medical Treatment or Clinical Therapeutics, Vol. 1, p. 597.

[96] Hazzard—Practice of Osteopathy p. 91.

[97] Herman—An Unusual Feature in a Case of Pneumonia—Journal of the American Osteopathic Association, July 1906. (This refers to lobar pneumonia.)

DISEASES OF THE PLEURA

Pleurisy

Definition.—An inflammation of one or both pleural membranes.

Varieties.—Etiologically, it may be divided into primary and secondary pleurisy; also, into acute and chronic pleurisy. Anatomically, the cases may be divided into dry pleurisy and pleurisy with effusion (serofibrinous, purulent, hemorrhagic).

Acute Pleurisy

(Fibrinous or Plastic Pleurisy)

The affection may be primary or secondary. As an independent affection it is rare. It may follow exposure to wet and cold or it may be due to mechanical injury. The disease may set in with pain in the side, slight fever and the friction sound of pleurisy may be present. These symptoms last a few days and then disappear and no exudation occurs. The pleural surfaces become more or less united.

As a secondary process, dry **plastic pleurisy** arises from extension of the inflammation in acute or chronic diseases of the lung, especially pneumonia. Abscesses, gangrene and cancers are also causes. It sometimes occurs in acute articular rheumatism, and in a large number of cases is associated with **tuberculosis**. This condition may be a complication in chronic Bright's disease and in chronic alcoholism.

In the **fibrinous form of pleurisy** the serum is scant and the membrane is covered with a sheathing of lymph, which finally organizes and adhesion takes place between the opposing surfaces.

Serofibrinous Pleurisy

This form is known as pleurisy with effusion. There is little lymph, the exudate being mainly composed of serum.

Osteopathic Etiology and Pathology.—Many cases rapidly follow exposure to cold, wet or an injury to the thorax. Exposure to cold is considered a mere predisposing agent, permitting the action of various micro-organisms. The large majority of cases are due to **tuberculous** infection of the pleura.

The osteopath finds that important predisposing causes of pleurisy are injury to the chest wall, ribs and vertebræ, and exposure to cold, causing contraction of the thoracic muscles. These injuries and strains throughout the chest result in an interference with the intercostal and phrenic nerves, and also with the intercostal and internal mammary arteries; consequently, there is produced a lowered vitality of the pleural tissues, which permits the attack of the micro-organisms. It may be secondary to rheumatism, Bright's disease, cancer and cirrhosis of the liver.

Pathologically, there is an abundant exudation of serum. Fibrin is found on the pleura, and is rarely abundant in the serous fluid in the form of flocculi. The fluid is straw colored as a rule. It varies greatly in quantity from one-half to four litres. Microscopically, there are found leucocytes, red blood-corpuscles, shreds of fibrin and occasionally cholesterin, uric acid and sugar. The composition of the fluid resembles blood serum, and is rich in albumin.

Various displacements of the adjacent organs are caused by the effusion. The lung is more or less compressed into the back part of the pleural sac. The heart is displaced. The diaphragm may be crowded downward. On the right side this lowers the liver; on the left it displaces the stomach, transverse colon and sometimes the spleen.

Symptoms.—The onset may be abrupt with a chill, severe pain in the side and fever. With few exceptions the disease comes on insidiously, pain in the side being the first symptom. The pain is sharp and cutting and is aggravated by breathing or coughing. There is moderate fever, the temperature ranging from 102 to 103 degrees F. Dyspnea may be present at the onset. This is due to the fever and pleuritic pain. When the fluid is effused slowly, dyspnea may be absent except on exertion. It is most marked when the effusion has developed rapidly. As the effusion

accumulates and the inflamed surfaces separate, the pain diminishes and, as a rule, soon disappears.

Physical Signs.—Immobility and bulging of the affected side, depending on the amount of exudation. The intercostal spaces are obliterated. The apex beat of the heart is displaced. Upon **palpation** the limited movement of the chest is more accurately determined. Tactile fremitus is largely diminished. The position of the heart's impulse can be readily located by palpation. Displacements of the liver and spleen can be felt through the abdominal walls. At first the **percussion** notes are impaired and later there is dullness which gradually rises as the fluid increases. The upper line of dullness is not horizontal when the patient is in the erect posture, but is higher behind than in front. Above the effusion in the sub-clavicular region, percussion gives a tympanitic note, the so-called Skoda's resonance. In moderate effusions the level of dullness often changes with the position of the patient. Early in the disease a friction rub can usually be heard. As the fluid accumulates, the breath sounds become weak, distant and may have a tubular or bronchial quality. Vocal resonance is usually lessened. There may be bronchophony, or it may manifest a nasal or metallic quality, resembling somewhat the bleating of a goat (Lænnec's egophony). X-ray examination should be made.

Duration.—The course is extremely variable. The fever is due to inflammation and may last for two or three weeks, when it may subside. The cough and pain disappear and the effusion, which is usually slight in these cases, may be absorbed quickly. In cases where the effusion is poured out rapidly it may be absorbed just as quickly. In cases where the effusion is poured out slowly or where the effusion reaches as high as the fourth rib, recovery is usually slower. Large effusions may persist without change for months and finally the case may become subacute or chronic. This is particularly true of tuberculous cases.

Prognosis.—This depends largely upon the cause; on the whole, prognosis is favorable. Death is a rare termination of serofibrinous effusion; death may, however, occur suddenly without sufficient lesions to explain the cause. The exudate may become purulent.

Treatment of Acute Pleurisy

An early treatment and rest in bed with a liquid diet are the measures to be employed at the beginning of the attack. Pay particular attention to any primary disease and to the general health. Rarely is there any difficulty in locating certain predisposing causes of the disturbance. Then often a rib or corresponding vertebra is badly subdislocated over the seat of the disease. The sympathetic and phrenic nerves are involved through the intercostal and phrenic nerves. A careful examination of the side of the affected chest should be made, as there may be more or less obstruction of the intercostals and the internal mammary arteries from their branching of the aorta and subclavian vessels. A dislocation of the first or second rib may affect the subclavian vessels and their branches markedly; although all the upper ribs and the thoracic muscles should be examined carefully for derangements which would affect these blood-vessels and produce an exudation. Ice-bags upon the chest, as in pneumonia, may be used. Limiting the movements of the chest with a bandage or adhesive strips will give considerable relief.

When the effusion has taken place, carefully raising and spreading the ribs with attention to special points of involvement, will at times cause absorption of the fluid. The daily amount of liquid food should be greatly lessened with a view of depleting the blood serum from various tissues; thus the serum collecting in the pleura, which is a lymph space, will also be absorbed. Treatment of the bowels, kidneys and skin, so that they may be rendered active, will aid in the depletion of the blood serum.

It may be necessary in some cases to aspirate, especially if other methods fail and if the effusion is large. The points of operation are in the mid-axillary line at the sixth interspace or at the angle of the scapula at the eighth interspace. In puncturing, the needle should be held close to the margin of the upper rib so as to avoid the intercostal artery. Withdraw the fluid slowly and if faintness is produced, desist.

Empyema should be treated surgically. Simply tapping is rarely sufficient. A free incision, as in abscess, and thorough drainage should be made. Care must be taken that the drainage tube is large enough.

“In cases of pleurisy the axilla and the inner arm may be tender and painful; this is due to the pleuritic inflammation being carried by the way of the ‘nerve of Wrisburg.’

"The pleuritic pain in the costal muscles compels restricted movement of the ribs and also limits the respiratory function of the diaphragm. These painful cramps and stitches are independent of the pain arising alone from the inflamed pleural surface, and the diminution of the respiratory movements is due to a particularly contractured state of the muscles of the chest as is demonstrated by the fact that the patient can not draw a long breath; hence one may reasonably conclude that nature has so distributed nerves to the pleura as to enable that serous membrane to control the muscles which create movements of the adjacent costal surfaces and thus insure its quietude during the stages of inflammation or repair." (Ranney).

Chronic Pleurisy

Definition.—Chronic inflammation of the pleural layers. There are two forms, exudative and dry or plastic pleurisies.

Chronic Pleurisy with Effusion.—This may follow an acute serofibrinous type. Some cases develop very slowly. In most cases in children, the fluid changes to pus early in the disease. The fluid may remain for months without changing to a purulent character. In such cases the character and physical signs do not differ from those in acute serofibrinous pleurisy.

Chronic Dry Pleurisy.—These cases originate in two ways:

First, this may succeed pleural effusion when the fluid portion of the exudate is absorbed and the pleural layers are opposed. They are separated only by fibrinous elements that become organized into firm connective tissue. This process goes on at the base, principally, which, if it follows the acute form, produces but slight flattening, but if it succeeds the chronic form or empyema, the extent of retraction and flattening will be marked. Calcification may occur in these firm, fibrous membranes and occasionally little pouches of fluid are found between the false bands.

Second, a large number of cases are dry from the onset. This condition may follow directly **acute plastic pleurisy**. It may be of **tuberculous** origin or it may set in without any acute symptoms. No matter how slight the plastic exudate may be, it invariably tends to become organized, thus producing adhesion of the layers. This is undoubtedly the result when the

pleurisy is primary or secondary. The adhesions are generally circumscribed. When the adhesions are of tuberculous origin they may be locally confined to one pleura or they may be bilateral. In these cases both the parietal and costal layers are thickened, and embodied in the thickened pleura are found firm fibrin masses and small tubercles.

Occasionally, vasomotor symptoms arise in chronic pleurisy, especially in cases of tuberculous origin, and are probably due to the involvement of the first thoracic ganglion. These almost invariably mean that there is a displacement of the first, second, or third rib. Unilateral flushing or sweating of the face or dilatation of the pupil are frequently noticeable.

Symptoms.—Definite symptoms are rarely present. In some cases the physical signs are quite pronounced, while, on the other hand, they may be entirely negative. In mild cases there may be slight immobility of the affected side with feeble breath sounds. In other cases there may be very full chest expansion while the breath sounds are feeble. In a large number of instances the physical signs are quite distinct. There is displacement of the viscera, retraction of the chest walls, curvature of the spinal column and dropping of the shoulders. There are feeble breathing and creaking, leathery friction sounds. Dullness is found at the base.

Treatment.—The treatment of chronic pleurisy is largely that of acute pleurisy. Gymnastic and methodical breathing exercises should be employed in helping to correct the thoracic walls. Care must be taken not to injure the chest and pleura if adhesions have formed. Surgical work may be necessary in some cases.

The vasomotor symptoms that are sometimes manifested in chronic pleurisy and are claimed to be due to involvement of the first thoracic ganglion, are an interesting feature to the osteopath. Such cases would probably present to the osteopath a marked lesion of the upper dorsal vertebræ or the second or third rib. These vasomotor symptoms are also found in pleurisy associated with tuberculosis of the apex of the lung.

The osteopath frequently treats these cases and he should be cautious about over-treating or straining the chest wall. The adhesions are persistent and often there is more or less pain, so care must be exercised when attempting to structurally readjust. Do not expect to completely relieve

every case, but nevertheless there are few cases but that can be benefited. Occasionally the pain alone is due simply to pleurodynia.

DISEASES OF THE URINARY SYSTEM

Diseases of the Kidneys

(Renal Hyperemia)

Definition.—An increase in the amount of blood to the vessels of the kidney. It is active hyperemia when there is arterial congestion, passive hyperemia when there is venous congestion.

Osteopathic Etiology and Pathology.—Active hyperemia may be caused by injuries to the renal splanchnics, especially the tenth to twelfth dorsal segments; injuries over and to the kidneys; exposure to cold when the body is very warm; poison given, as diuretics; eruptive fevers and pregnancy, or follow genito-urinary operations. Passive hyperemia may be caused by obstructive diseases of the general circulation, as chronic heart, lung and liver diseases, or by pressure on the renal veins by tumors, growths and the pregnant uterus. Thrombosis of the renal veins may produce passive hyperemia, but rarely.

Pathologically, in active hyperemia the kidney is swollen and slightly enlarged. Upon removal of the capsule, the kidney is found to be brown and mottled. On section the parts bleed freely, the Malpighian bodies are distended, and microscopical examination shows a cloudy swelling of the renal epithelium. In passive hyperemia the kidney is swollen, hard, firm and of a bluish red color. Later there is an overgrowth of connective tissue and some infiltration between the tubules. The Malpighian bodies occasionally become shriveled and the renal epithelium fatty.

Symptoms.—In **active hyperemia** the urine is scanty, of high specific gravity and of high color, containing some albumin and casts. Pain is experienced over the loins, following the course of the ureters, and the bladder is irritable. There are headache, nausea and vomiting. When from infection, fever may be present.

In **passive hyperemia** the symptoms are primarily those caused by the disease producing the disorder. There is weight over the loins and dropsy. The urine is diminished, of high specific gravity, highly colored, albuminous and occasionally shows a few hyaline casts.

Prognosis.—**Active hyperemia.**—Usually favorable if it can be treated in time. If prolonged, acute nephritis may develop. **Passive hyperemia.**—Depends on the cause. If the disease is prolonged, it terminates in interstitial nephritis.

Treatment.—**Active hyperemia.**—Absolute rest and thorough treatment to the renal splanchnics and treatment over the abdomen to the kidneys directly by carefully raising them. Adjust the lower ribs if found lesioned. Water should be drunk liberally and the patient encouraged to use vapor baths. Favorable hygienic surroundings, warmth and good food are indispensable. Warm applications over the loins are helpful.

Passive hyperemia.—The treatment largely depends upon the cause, but too much importance cannot be given to the treating of the vasomotor fibers of the kidneys from the eighth dorsal to the first lumbar. Textbooks state that the vasomotor fibers to the kidneys are from the ninth to the twelfth dorsal vertebræ, inclusive, but osteopathic experience shows we can affect vasomotor fibers slightly higher. Treatment here has a distinct effect on the blood pressure within the glomeruli. The renal epithelium is extremely sensitive to circulatory changes. Even the compression of a renal artery for only a few minutes causes marked disturbances. Hence any irritation or obstruction to the vasomotor innervation of the renal blood-vessels may result in serious conditions. The superior cervical ganglion of the sympathetic and the sciatic center have important bearing on the secretions of the kidney, through vasomotor fibers. Due attention should be paid to the bowels, and the patient required to take plenty of rest and a light diet.

Acute Parenchymatous Nephritis

(Acute Bright's Disease)

Definition.—An acute, inflammatory process affecting the epithelium of the uriniferous tubules and due to the action of cold or toxic agents upon the kidneys, as well as to injuries to the renal splanchnics; is characterized by

certain nervous symptoms with fever, dropsy, and scanty and highly colored urine. This inflammation involves more or less the whole kidney.

Osteopathic Etiology and Pathology.—This disease is caused by exposure to cold and wet while the body is warm and perspiring. Excessive use of alcohol may be a factor. May be caused also by infectious diseases, such as scarlet fever, diphtheria, measles, smallpox, acute tuberculosis and others; also by certain specific poisons which are eliminated by the kidneys, as turpentine, chlorate of potash, carbolic acid, phosphorus, ginger, cantharides and oil of mustard; also by pregnancy, as this is supposed to compress the renal veins, or through toxic agents. Syphilis may be an underlying cause. Blows and injuries to the back at the tenth, eleventh and twelfth dorsals are frequently the cause. Lesions are found from the sixth dorsal to the fourth lumbar. The lower three ribs may be at fault, while the innominate and muscular contractions have been found to be pathological factors. Lordosis may be a contributing cause. Loudon places considerable importance on cervical lesions and McConnell believes vasomotor disturbance plays an important causative role in the disease.

Pathologically, at times the kidney alteration may be so slight as not to be recognizable by the naked eye, the appearance varying according to the stage and severity of the disease. The kidneys become enlarged, engorged and of a bright red color, and later have a mottled appearance; and when the capsule, which is non-adherent, is stripped off, the kidney is found to be soft and inelastic. In most of the cases in which the disease is due to toxic agents brought to the kidney through the blood-vessels, the glomeruli suffer first. The epithelium of the glomeruli and tubules is the seat of cloudy swelling and, in the later stages, of fatty change and hyaline degeneration. The tubules are clogged by altered cells, leucocytes and blood-corpuscles. In mild cases the interstitial tissue is simply inflamed, but in all cases it becomes more or less mixed with leucocytes and red blood-corpuscles. Osteopathic lesions produced upon animals in the region of the ninth to the twelfth dorsal, resulted in acute nephritis. The autopsy findings were distinctly typical.

Symptoms.—The onset is usually sudden, with moderate fever, pain in the back in the lumbar region and over the kidneys and following the ureters. Nausea and vomiting may be present. Dropsy soon appears, beginning with slight swelling or puffiness in the face below the eyes, later

showing itself in edema of the abdominal walls and extremities. Uremic symptoms may develop. The urine is characteristic; is diminished in quantity and of high specific gravity; at first the sediment is copious and reddish brown in color, becoming less in amount and of high color. This sediment contains casts of the uriniferous tubules, free blood, epithelial cells, uric acid and urates. There are large quantities of albumin in the urine.

The presence of albuminous matter in the urine, even in large quantities, is not sufficient evidence to warrant a diagnosis of Bright's disease nor is the amount a guide as to the severity of the case, for grave conditions often show a slight amount (Loudon).[98]

Diagnosis.—The general symptoms may be very slight, for the most severe cases may manifest slight edema of the feet, or there may be only the puffiness under the eyes and of the eyelids. In such cases the diagnosis must depend upon examination of the urine. With previous history, suddenness of the attack and character of the urine, ordinarily the diagnosis will be quite easy.

Prognosis.—Although this disease is generally grave, the prognosis is favorable and the majority of cases recover under judicious treatment.

Treatment.—Cases of acute nephritis require rest, quiet and warmth. Many cases recover under these conditions alone. It is absolutely necessary, however, that these conditions exist no matter what other treatment is used. A thorough treatment to the renal splanchnics cannot be overestimated for it is here (tenth to twelfth dorsal, inclusive) that a majority of the lesions producing acute nephritis occur. Besides correcting the vertebral and rib displacements in this region, a very effective treatment is to have the patient lie flat upon the back and then the osteopath, reaching around the patient with the fingers of one hand on either side near the spines of the lower dorsal vertebræ, raise the patient so that the entire body, except the shoulders and the feet, are lifted clear of the bed. Thus the treatment springs the spine anteriorly and produces a marked effect upon the kidneys through the renal vasomotor nerves. Occasionally lesions in the upper cervical region interfere with the normal activity of the renal nerve fibers passing to the kidneys by way of the superior cervical ganglion of the sympathetics.

Another very effectual treatment for the kidneys is treating them through the abdomen by a careful pressure upon the kidneys through the abdomen

on either side of the umbilicus, thus lightly working each kidney outward and upward. This treatment relaxes any tissues about the blood-vessels, nerves and lymphatics to and from the kidneys that may be contracted and thus aids in establishing a normal activity of the involved organs. It also helps in relaxing tissues about the ureters and prevents the clogging up of the latter with debris. Bandel and Stearns report cases in which an impacted colon was an important factor in this particular.

The above means have for their object the direct relief of the congestion of the kidney. This is further aided by keeping the bowels active, which supplements the action of the kidneys, and by increasing the activity of the skin. This also aids in relieving dropsical effusions. The hot pack, in which the patient is wrapped in a wet sheet and then covered by a number of blankets, is an exceedingly good method to relieve the kidneys of some of the work and lessen their congestion, besides arresting uremic intoxication. This can be repeated daily if necessary. Where there is dropsy and scanty urine, the indications are to increase the secreting action of the kidney; besides treatment through the renal splanchnics, which contain the vasomotor nerves of the kidneys, stimulating treatment to the vagi will help to increase the urinary secretion. Hot fomentations, placed directly over the region of the renal splanchnics, is a valuable aid in cases which do not respond quickly to osteopathic stimulation. Treatment of the liver is important. Injections of cold water into the intestines will tend to stimulate the secretion of the kidneys, but this should be used with the greatest caution; in some cases tepid water would be better (see uremia).

The diet of the patient with acute nephritis is important. Give food that is easy of digestion and which contains a minimum amount of nitrogen. The stomach is quite likely to be irritable, consequently food that is adapted to it should be selected. Milk and weak animal broths are undoubtedly the best foods. The return to a solid diet, especially of meat, should be very slow. Suitable adjuvants to the milk diet are rice and farinaceous preparations. Loudon[99] recommends complete withdrawal of all foods for twenty-four to forty-eight hours and the reducing of nitrogenous foods to a minimum; a diet of milk and cream after the fast, followed by cereals and broths, then eggs and fish until albumin disappears from the urine. Alkaline mineral waters are useful to help maintain an alkaline urine, thus tending to

withdraw exudates. The patient should be treated daily at first and later on every other day, for case reports show frequent treatments hasten recovery.

For treatment of acute uremia in Bright's disease, see uremia. Complications should be treated as affections independent of the renal disorder.

Chronic Parenchymatous Nephritis

Definition.—A chronic inflammation of the kidney, involving the epithelium, glomeruli and interstitial tissue, characterized by dropsy, increasing anemia, albuminous urine and acute uremia.

Osteopathic Etiology and Pathology.—It may be the result of acute nephritis. It follows the same diseases as already mentioned in acute nephritis. More often it follows the same diseases as already mentioned in the acute form, syphilis, tuberculosis, purulent conditions, focal infections (streptococcus), alcohol, scarlatina and pregnancy contributing the greater number. It is more common in the male sex and in early adult life. Habitual exposure to cold and dampness; chronic lesions of the spine, chiefly in the lower dorsal region, are causative factors.

Pathologically, the **large white or a yellowish white kidney** is the most common kidney lesion. In this form the kidney is enlarged, often to twice its normal size, is smooth, and the capsule very thin. The tubes, on microscopic examination, are found to be choked with broken down granulated epithelium and fibrinous casts. The capillaries show hyaline changes. The interstitial tissue is increased everywhere, but not to an extreme degree. Catarrhal swelling and hyperemia (to a slight degree) are found in the pelvis of the kidney.

In the **second stage**—that of the **small white kidney**—there is a reduction in the size of the organ, due to the destruction of the renal epithelium and the contraction of the overgrown connective tissue. Some hold that this may be a primary, independent form and not always preceded by the large white kidney. The organ is pale in color, rough and granular, the capsule being thickened and somewhat adherent. There is an accumulation of fatty epithelium in the convoluted tubules, constituting marked areas of fatty degeneration and giving the organ a white or whitish

yellow appearance. It is this which gives the name of small granular fatty kidney to this form. There are extensive interstitial changes, degeneration of tubules and destruction of great numbers of the glomeruli.

Chronic hemorrhagic nephritis is a variety associated with this stage. The organ is enlarged, and scattered throughout the cortex are found brown hemorrhagic foci due to hemorrhages into and about the tubes. Otherwise the changes are similar with those found in the first form.

Symptoms.—It usually begins as a chronic affection and the symptoms slowly become apparent. Failing health and loss of strength, dyspepsia and anemia, waxy appearance with puffiness of the face, dropsy and increased arterial tension with hypertrophy of the left ventricle, gradually make their appearance. Uremic symptoms are common, while dropsy is marked and persistent. Vomiting and sometimes profuse diarrhea occur; in fatal cases there is sometimes found to be ulceration of the colon. The urine, as a rule, is diminished in quantity, is often very scanty, although it is frequently normal in color and appearance. There is an abundance of albumin, heavy sediment, hyaline and granular tube casts, epithelium from the kidneys and pelvis, leukocytes and often red blood-corpuscles. If fatty degeneration takes place, there will be fatty casts and oil globules. In the later stages the urine is abundant, low specific gravity, considerable albumin, and many casts.

Diagnosis.—In the inflammatory stage, where there is enlargement of the kidney, extreme pallor, scanty urine, albumin, and tube casts, history of infections, pregnancy, or exposure to cold and wet, and lesions in the lower dorsal region, the diagnosis is clear.

Prognosis.—Always give a guarded prognosis; relapses are frequent, but cases have been cured. There is always a tendency for the subchronic forms to become chronic.

Treatment.—The treatment requires persistent work, especially over the renal splanchnics, and strict attention on the part of the patient to hygienic principles. The lower dorsal lesions are very apt to be refractory owing to extensive fibrotic changes of the deep muscles and capsular ligaments. But repeated effort will usually secure results. Care should be taken as to exposure to cold and overexertion. The quality of the blood should be improved, as it is anemic and contains various toxic products. Strict

attention should be paid to the diet. Iron is largely used for anemic conditions, but this principle we hold to be wrong. It is not more iron that is wanted, but an ability of the system to assimilate the iron which it has. Relative to diuretics von Noorden says: “It would be the greatest paradox to economize the renal work to the utmost in one direction (diet, sweating, etc.) and on the other hand excite them to increased activity by means of the strongest stimulants we possess, (drugs). I regard such prescribing as radically wrong.” The diet should be carefully selected and of minimum amount. The pure milk diet is undoubtedly the best. The use of meat seems to favor uremic convulsions.

The digestive organs should be kept in as good condition as possible, particular attention being paid to the liver and bowels. The use of suitable clothing is important; wool should be worn next to the body. The skin is a powerful adjuvant to kidney elimination, and the suppression of the action of the skin throws extra work on the kidneys. Possibly stimulation of the lung function would aid in the elimination. Rest, with a proper amount of fresh air and outdoor exercise, is essential.

In conditions calling for attention to the skin and bowels the treatment will be the same as in acute parenchymatous nephritis. There is a ganglion on each side of the umbilicus within a radius of an inch that sends fibers to the kidneys (Dr. Still). Just what is the function of these ganglia is unknown. The treatment of the complications is independent of that for the renal trouble. For direct treatment to the kidneys see acute Bright’s disease.

Interstitial Nephritis

Definition.—A chronic inflammation of the kidney in which there is reduction in its size due to an extensive destruction of the tubular substance, with an overgrowth, and later a contraction, of the connective tissue elements. Cardio-vascular changes, arteriosclerosis and cardiac hypertrophy are usually associated.

Osteopathic Etiology and Pathology.—Osteopathic lesions to the renal splanchnics are important predisposing causes. The disease may follow parenchymatous nephritis; or it may be caused by a continued passive congestion due to valvular heart disease. Gout; cystitis (often following

gonorrhea), the inflammation extending up the ureters to the kidney; heredity; old age; long continued worry, anxiety or grief; chronic alcoholism, overeating; syphilis; tuberculosis; focal infections, especially of streptococci; chronic mineral poisoning (as from lead), and alterations in the renal ganglionic centers are causes. It chiefly occurs in males during middle life.

Pathologically, both kidneys are involved (although one may be more affected than the other), and reduced in size, often to less than half their normal size. After removing the capsule, which is thickened and adherent, the surface is found to be uneven, or granular and containing small cysts. The kidney is hard, tough and resistant, the color varying from a darkish brown to a yellowish gray. The cortical portion is especially reduced in size. On microscopic examination, the connective tissue appears greatly increased; this contracts, compressing the tubules and blood-vessels, causing their destruction. There is general arterial sclerosis, and the left side of the heart is hypertrophied. There are frequent nasal and retinal hemorrhages, due to the brittleness of the arterial walls which predispose them to rupture; hence, apoplexy is a frequent termination. The ganglionic centers, being interfered with, undergo fatty degeneration and atrophy. There are marked retinal changes—retinitis, fatty degeneration of the retinal tissues and sclerosis of the nerve fiber layers.

Symptoms.—The onset is insidious. In most cases the symptoms are latent. The general health is disturbed; there are frequent micturition, gastric disturbances, tense and bounding pulse, hypertrophy of the left ventricle, high blood pressure, disorders of vision, sleeplessness, headache, furred tongue, slight swelling of the feet, dry skin, scurvy and shortness of breath. The urine is increased in quantity, of acid reaction, light in color, low specific gravity, with a small amount of albumin, a few hyaline casts, and some epithelial cells. There is increased thirst and the patient may have to urinate two or three times during the night. There is well marked mucous cloud, slight sediment, and as the disease advances the urine may be diminished, the albumin increased and the casts become more numerous, while occasionally blood cells will be found.

Much importance should be attached to the blood pressure condition.

Diagnosis.—The early stages are not always recognizable. Later, while there is high arterial tension, thickening of the arterial walls and marked hypertrophy of the heart, the urine should be examined very carefully both night and morning, as the diagnosis will greatly depend upon the condition of the urine, which is increased in quantity, of low specific gravity, with a trace of albumin, narrow hyaline and pale granular casts, making the diagnosis usually easy.

Prognosis.—It is generally incurable, but favorable so far as the power to prolong life is concerned, provided the diagnosis be made early in the case, and the patient lives a quiet life. The case usually terminates with convulsions, coma and death. Apoplexy is frequently associated with chronic nephritis. In all forms of chronic nephritis some intercurrent infectious disease is quite possible, which is apt to be serious owing to the cachectic state.

Treatment.—The dietetic and hygienic treatment is the same as in chronic parenchymatous nephritis. The nerve and vascular supply to the kidneys should be treated as in acute parenchymatous nephritis. Freedom from worry and overwork, and if possible change of climate, should be prescribed. Frequent bathing, with friction of the skin, should be insisted upon and the bowels kept regular by a treatment of alkaline water. In all kidney cases special attention should be given the liver. The alkaline water is a good diuretic; besides it flushes the kidneys and helps to remove the debris.

These cases invariably present a rigid spine which should be carefully but thoroughly treated, traction being one of the methods that give comparatively quick and excellent results. Overcoming spinal immobility, correction of the dorsal area, attention to the chest rigidness, and frequently raising the abdominal organs will often considerably reduce the blood pressure.

The accidents and complications which so often endanger the patient, must be treated as they arise.

Amyloid Kidney

Definition.—A pathological state of the kidney in which there is a peculiar infiltration into the kidney structure of an albuminoid material of a waxy appearance.

Etiology and Pathology.—This is associated with Bright's disease and other wasting diseases. It is most frequently caused by profuse and long continued suppuration, especially of the bones, by syphilis, tuberculosis, cancer, lead poisoning and gout.

Pathologically, the kidney is large and pale, but it may be normal in size or even small, pale and granular. The capsule is not adherent, the surface of the kidney, after removing the capsule, is pale and anemic. On section the cortex is seen to be enlarged. It is homogeneous, anemic, pale, waxy and resisting. On microscopic examination there is found to be an infiltration of a homogeneous or wax-like material. This progresses until all parts of the organ are infiltrated. As the result of this pressure the structures of the kidney undergo an atrophic degeneration, the kidney becoming contracted, smaller, rough and even distorted in shape. The cortex becomes narrowed and the capsule adherent. If a section of an amyloid kidney be stained with a solution of iodine, numerous mahogany red points appear.

Symptoms.—There are similar changes in the liver, spleen and often the intestinal canal. There is a profuse, watery diarrhea, due to amyloid changes in the intestinal canal, with loss of flesh and strength, edema of the lower extremities, and ascites. There is an increased flow of pale, watery urine, of low specific gravity; albumin is abundant and usually hyaline, often fatty or finally granular tube casts occur.

Prognosis.—As a rule the prognosis is decidedly unfavorable and it must be controlled by the disease with which it is associated.

Treatment.—The primary disease demands attention, otherwise the measures of treatment indicated are those of chronic parenchymatous nephritis, with special attention to the general health and surroundings of the patient. Give a generous diet and be persistent with the treatment.

Pyelitis

Pyelitis is inflammation of the pelvis of the kidney. When a suppurative inflammation extends into the interstitial tissue of the organ, it produces a

condition called pyelonephritis. The inflammation usually starts in the pelvis of the kidney, the infection being carried there either by the circulation or the urinary tract, but it soon involves the rest of the kidney. Pyelitis is usually secondary to some other conditions such as urethritis, cystitis, or ureteritis. “Infection of the kidney rarely takes place through the blood and only when the vital membrane of the kidney is impaired.” It may start from within the organ in the interstitial tissue, caused by infectious embolism or traumatism, or the tubules may become obstructed by concretions.

Osteopathic Etiology and Pathology.—Retained decomposed urine due to pressure upon the ureters by tumors or bladder disease; calculus concretion, kinked ureter, displaced kidney, traumatic agencies, as falls, blows, strains, kicks or penetrating wounds; nephritis, pregnancy, cold and wet, are causes. Pyelitis may follow cystitis, the inflammation extending up the ureters to the pelvis of the kidney and thence to the substance of the organ, inducing pyelonephritis. Tuberculosis, focal infections, and intestinal disorders (colon bacillus), are other causes. Lesions from the ninth dorsal to second lumbar or lower, and malnutrition are predisposing factors.

Pathologically, the mucous membrane of the pelvis is usually the first affected, the inflammation generally extending from below upward. It is swollen and sometimes visibly congested and of a gray color. The pelvis and calyces are more or less dilated, while the papillæ are flattened. There is a gradual dilatation of the calyces and atrophy of the kidney substance, until the whole organ may be converted into a pus sac. If complete obstruction occurs, the fluid portion may be absorbed and the pus become inspissated and cheesy. The ureter is often dilated. In tuberculous pyelitis the apices of the pyramids are also invaded, the kidney substance is broken down and the result is the same. In the pyelitis caused by cystitis, the infection passes up the tubules or is carried by the lymphatics. The abscesses extend along the pyramids, burst through the papillæ and calyx into the pelvis of the kidney, and thus also the kidney becomes a purulent sac.

Symptoms.—Pain and tenderness over the region of the kidney first appear. In a few cases cystitis will be the only symptom. The suppurative stage is marked by high fever and a chill or a succession of chills. The general condition of the patient denotes prolonged suppuration. There is

failure of health and more or less wasting and anemia. The urine is characteristic, contains pus, which varies in quantity greatly, and where only one kidney is affected, may be suppressed for a time and there will be a sudden outflow of the pus, due to the breaking of the sac. Blood is also very constant, but hardly ever of sufficient quantity to be seen by the naked eye. The urine is usually diminished in quantity and the color pale; the specific gravity is low on account of the small amount of urea present. The reaction of the urine is acid. Pus and blood render the urine slightly albuminous. Casts from the kidney, and even portions of the kidney, may be present.

Diagnosis.—From **nephritis** by the absence of much albumin, tube casts and dropsy. From cystitis, by the history, lumbar pains and acid urine. **In cystitis the urine is always alkaline.** From **perinephritic abscess**, by the absence of edema over the lumbar region. The urine may be normal and there are lumbar pains and hectic fever. In **tuberculous pyelitis** there is a history of tuberculosis in other organs and there are tubercles in the urine. **Malaria** or **typhoid** may be suspected. The X-ray and cystoscope should be employed. An exploratory incision may be necessary.

Prognosis.—Depends altogether on the cause and extent of kidney involvement. In simple cases and some tubercular, recovery may occur, although there is a tendency in all cases for the disease to become chronic.

Treatment.—Depends upon the cause, but thorough treatment along the lower dorsal, the lumbar and sacral regions will be of considerable benefit in controlling the catarrhal process in the kidney, its pelvis, the ureter and the bladder. If pathology permits, gently raising the kidneys, ureters and neighboring organs, knee-chest position, will materially assist circulation and drainage. Fresh spring waters for diluents and restricting the diet to light food, preferably milk, are indicated. Rest is important and warm applications locally are sometimes helpful. The general health must be carefully watched as there is always considerable drain upon the system. A timely operation may materially lengthen the life in many cases. Attention to the bladder, urethra and prostate is necessary.

Uremia

The name applied to a series of manifestations resulting from the retention of poisonous materials in the blood, which should have been removed by the kidneys. Uremic symptoms may occur any time during an attack of nephritis. In chronic cases it seems likely that extensive destruction of renal tissue is the principal factor that leads to the toxemia. They may also occur when the circulation of the blood in the kidneys is interfered with or the ureters are obstructed. They are not due alone to the urea (which is found to be increased in the blood), but more probably several poisons that are retained in the blood. Traube's theory is that acute cerebral edema with anemia accounts for the symptoms. Halbert says: "A more recent and more plausible claim is to the effect that a poison is developed in the body as the result of nephritis," for retention of effete matter or ligation of renal arteries and ureters or impaired renal activity does not fully explain the cause of the stupor, coma, convulsions, sometimes paralysis, and gastro-intestinal disorders.

Symptoms.—Loss of appetite, nausea, vomiting, headache and drowsiness are the initial symptoms. Headache is usually at the back of the head and may extend down the neck. The next symptom is coma, alternating with convulsions which may range from only a slight twitching to violent epileptiform spasms. These spasms may occur without the slightest warning and are often followed by blindness which may last for several days. These attacks of coma and convulsions are sometimes ascribed to localized edema of the brain.

Transient paralysis is also due to congestion or edema of the brain and it may be of the cord. There may be mania which comes on abruptly, although the delirium is not at all violent, while profound melancholia may be found. There may be nervous symptoms develop, such as numbness in the hands and fingers, itching of the skin and cramps in the muscles—especially those of calves of the legs. Pulmonary symptoms are sometimes continuous—dyspnea, paroxysmal dyspnea and Cheyne-Stokes' breathing. These attacks of dyspnea may be as distressing as true asthma. Cheyne-Stokes' breathing may be present without coma.

Uncontrollable vomiting may set in with great abruptness, followed by hiccough and purging. There may be a catarrhal or diphtheritic inflammation of the colon with diarrhea. The breath has a urinous odor and the tongue is often very foul. The pulse is slow and full, with a temperature

below the normal, although during convulsions the pulse may become rapid and the temperature rise. Occasionally there are atypical forms of uremia which may be very confusing and obscure.

Diagnosis.—The history, subnormal temperature, the urinous odor of the breath, high arterial tension and increased second sound of the heart will distinguish the condition. Feeling of numbness, palpitation, headache, restlessness, mental wandering are not infrequently early symptoms. The phenolsulphonephthalein test for the secreting power of the kidney, and the examination of the urea in the blood are of great aid in diagnosis.

Prognosis.—Extremely grave, but one should always be very careful in his prognosis, for there is a possibility of recovery, even after the most serious symptoms have been manifested.

Treatment.—As impermeability of the kidneys produces uremia, by not allowing the various poisons to be eliminated by the renal path as they should be, the treatment must be applied directly to the kidneys. Elimination is demanded and if treatment through the abdomen to the kidneys directly and to the renal splanchnics does not bring about prompt and thorough elimination of the intoxicating properties, the bowels and skin must be made active. The vapor or hot air bath or hot pack should at once be used. An ice-bag to the head will be beneficial. An increase in the quantity of urine may be brought about by the displacement of a part of the mass of blood, which is in relative stagnation in certain parts of the vascular system. Forcing it into the main circulation in order to increase the pressure within the vessels of the kidney, is the treatment indicated. This great stagnant mass of blood is found in the arterial capillaries of the portal system in the liver and splenic tissues and should be manipulated into the general circulation in order to increase the arterial tension of the kidneys and thus favor elimination. The treatment should mainly be applied to the vasomotor nerves of the portal system, from the fifth to the ninth dorsal, and directly over the abdomen, liver and spleen.

The introduction of water, from 110 degrees to 120 degrees, or even 150 degrees, into the colon by means of injections, is useful; warm irrigations increase renal secretion, bowel action and sweating with a decrease of tension. Cold drinks will stimulate the abdominal vessels and induce absorption of a certain quantity of water to still further increase diuresis.

Cold irrigation increases blood pressure temporarily, but later it lessens the pressure; it should be used only with great caution. Milk is one of the best drinks to be used. Secretions of the liver must not accumulate. The bile must be expelled so that its toxicity will not be added to the other poisons.

The food of the patient is an important matter. A milk diet is best; avoid meat and nitrogenous foods and any food that leaves much residue. In this way the nutrition of the patient is kept up with a minimum of urea formation and, besides, there will be very little intestinal putrefaction. Emergency measures not mentioned above are repeated high normal salt enemata (two to three pints), the alcohol sweat and venesection (about one pint). When the attack is broken the condition resolves itself into the renal disorder, generally acute Bright's disease.

This disease illustrates one phase of the uselessness of drugs; for when the impermeability of the kidney has become such that it ceases to have the power of eliminating toxic substances formed by the organism, there is then retained the medicinal substances. The kidney is as impermeable for therapeutic poisons as for the natural poisons and the employment of toxic medicines in such cases has often no other effect than to bring an association of medicinal intoxication with an uremic.

Renal Calculus

Renal calculi are concretions formed by precipitation of solids derived from the urine, and are found in the kidney or its pelvis. If large, they are called stones; the smaller masses are known as gravel or sand, according to their size. When the stones attempt to pass through the ureters, it brings on an attack of renal colic; rarely are they voided without this symptom.

Osteopathic Etiology and Pathology.—The affection occurs at all ages, more commonly, however, in children and in old people. The male sex is more liable than the female. Sedentary habits, gout and excessive meat eating are predisposing causes. Heredity seems to be a predisposing cause in some families. Inflammation of the pelvis of the kidney, caused by derangement of the ribs and vertebræ of the tenth, eleventh and twelfth dorsals or first lumbar, is an important etiological factor.

Pathologically, the chemical varieties are:

(1) **Uric acid and urates** are the most common. The stones are usually smooth or lobulated; are hard and of a reddish color. Usually in these stones, both uric acid and urates are to be found. This material may be passed in the form of sand or large stones. The sediment in the urine may be the nuclei of the stones; as may foreign matters, such as the mucus or desquamated epithelium caused by the inflammation of the pelvis of the kidney, blood clots, or, in fact, any foreign matter that may reach the urinary passages. Individuals passing a small amount of urine, and old people are the principal subjects. "As a consequence of concentration and high acidity of the urine, the uric acid and urates are readily separated in solid form and held together by the albuminous matrix."

(2) **Phosphatic Calculi** are white in color, soft and mortarlike. They are composed of phosphate of lime, ammonia and magnesium phosphate. These are found more often in the bladder than the kidney. Disease of the bladder is the cause.

(3) **Oxalate of Lime** are a mixture of oxalate of lime and uric acid. They are dark in color, very hard and uneven, with hard, pointed projections. On account of their uneven shape they have been named mulberry calculi. These stones produce great pain as they pass through the ureters.

There are other concretions of rare occurrence.

Symptoms.—There is pain in the back in the region of the kidneys with more or less tenderness. The pain may be severe and paroxysmal. There may be bleeding, which is seldom profuse; this will give the urine a smoky hue, but may be present to such a small degree as to be only apparent by the use of the microscope. The stone may obstruct the ureter and cause pyonephrosis or hydronephrosis. Pyelitis of a catarrhal character is common. In pyelitis there may be intermittent fever of several degrees, then sweating. There may or may not be pus in the urine.

Renal Colic is caused when the calculus attempts to pass through the ureter so that ureteral spasms result. The stone, however, may become lodged at the entrance to the ureter. There is a sudden onset and great pain which starts in the back, radiating downward into the groin, down the side of the thigh and into the testicle and glans penis. The testicle is often retracted, the face pale, the features pinched, and there is frequently vomiting. There are cold sweats and the pulse is weak. The paroxysm may

last only a few minutes or extend over several hours. If uric acid is found, it points to uric acid or oxalate of lime calculi and the urine is acid in reaction. If alkaline phosphatic stones may be suspected, examination of the urine directly after the attack aids greatly in diagnosis, for at other times the urine is usually negative.

Diagnosis.—Biliary Colic.—The jaundice in biliary colic comes on very soon after the obstruction begins. The stools are without bile and the pain extends from the right hypochondriac region to the upper abdomen and the right shoulder. The urine is negative and a stone may be passed in the stools. **Renal colic** is often **simulated** when the ureter is obstructed from any cause whatever. It may be compressed from a floating kidney or tumor, or obstructed by a clot of blood, fragments of hydatid cysts or plugs of mucus. **Lumbo-abdominal neuralgia**, **intestinal colic**, **and renal tuberculosis** may simulate renal colic. The X-ray plate is of decided value.

Prognosis.—As complications may arise, it is best to give a guarded prognosis, but the prognosis is generally favorable. It is a disease that is very apt to recur when strains or falls affect the innervation to the kidney, but many cases have been permanently cured. If the stone is large, its passage along the ureter may prove fatal unless surgical interference is instituted at once, but if it is renal sand it may be easily voided in the urine and thus the prognosis will be favorable.

Treatment.—Treatment should be given toward overcoming the cause producing the calculi, which will often be found at the tenth rib. Treat the kidneys thoroughly, both through the renal splanchnics and directly through the abdomen, anteriorly. But direct abdominal treatment should be given very cautiously. Treatment here corrects disorders and seems to release some solvent that acts upon the various forms of calculi and disintegrates the ones already formed and prevents the formation of others. Possibly this solvent is an internal secretion of some gland; possibly like the splenic secretion is to the biliary calculi (Dr. Still.). Dr. Still held that one of the functions of the suprarenal capsule was to prevent the formation of these concretions.

In the **uric acid tendency**, the free use of alkaline mineral waters for the solution of uric acid may be helpful. Much may be done by dieting. The amount of nitrogenous food should be limited, eating a minimum amount of

meat and using plenty of milk and vegetables. In the **phosphatic tendency**, diluted drinks freely used are helpful. Meats are indicated. Milk and vegetables should not be used freely as they tend to make the urine alkaline. In all instances care of the general health and avoidance of beer drinking and excessive meat eating are demanded.

During an attack of **renal colic**, when a stone had lodged in a ureter, one may be able, by very careful manipulation, to aid the stone in its progress downward, (somewhat after the manner of manipulating gall-stones), but do not delay surgical measures too long. By inhibiting the nerve force of the spinal nerves along the lumbar and sacral regions (chiefly tenth dorsal and first lumbar), relief may be given. The nerves of the ureters are derived from the inferior mesenteric, spermatic and pelvic plexuses. Employ the hot bath; this may relax the spastic condition. Cloths wrung out of hot water and applied locally are of aid. Occasionally a change of posture will give relief. Even inversion of the patient is sometimes followed by immediate cessation of the pain. The patient may drink freely of hot lemonade or water. An anesthetic may be of aid in the manipulation of a renal calculus in the ureter, as the anesthetic will relax the tissues over the abdomen, making it much easier for one to get near the impacted calculus, but **be cautious**. Morphine may be necessary. During the intervals the patient should lead a quiet life and avoid sudden exertions of any kind. It is important to keep the urine abundant, consequently have the patient drink a large quantity of distilled water. “Renal calculus is brought about by lesions affecting the suprarenal capsule of the kidney, or spinal lesions from the tenth dorsal to the first lumbar, affecting the lower ribs.”

Movable Kidney

This means a distinctly mobile condition of the kidney (almost always acquired, but may be congenital), due to the lax condition of the tissues which support it and to the elongation of the renal vessels which allow the kidney to move in certain directions. Rapid loss of tissue that absorbs the fat surrounding the kidney is a cause. There are almost invariably lesions in the dorso-lumbar region that predispose to an abnormal mobility of the kidney. These lesions undoubtedly weaken the innervation to the surrounding and supporting kidney structures. A posterior spine, with

consequent downward and constricting displacement of the floating ribs, is common, although lateral and anterior spines (dorso-lumbar region) may be found. Strains, heavy lifting, and various violent exertions are important exciting factors. Tight lacing, pregnancies, an enlarged liver and gastro—and enteroptosis are also important factors. This condition is found more commonly in women, and undoubtedly is a frequent cause of direct, gastro-intestinal, reflex, and obscure disturbances. There are very different degrees of mobility in different cases. It may be so slight as hardly to be recognized or so great that it can easily be felt by the hand through the abdominal walls, resembling a movable tumor in the abdomen.

Symptoms.—Often there are no noticeable symptoms. Sometimes when the displacement and mobility of the kidney are most marked, the reflex symptoms are not noticeable. The right kidney is the one usually affected, on account of its relation to the liver which moves during the respiratory act. Usually there is pain in the lumbar region and the patient experiences a heavy, dragging pain in the abdomen, which especially manifests itself while standing and walking. There may be intercostal neuralgia. Various colicky and other gastro-intestinal pains, and nervous symptoms as neurasthenia, melancholia, hysteria and headache are common. There may be obstinate indigestion, palpitation of the heart, flatulence and cardialgia; also, an irritable bladder, due to pressure. At times the kidney becomes tender and swollen as a result of twisting of the renal vessels or of the ureter (Dietl's crises), causing engorgement of the organ; this may be associated with agonizing pain and symptoms of collapse. Hydronephrosis may be manifested.

Diagnosis.—The shape of the tumor, marked mobility, and lessened resistance on percussion of the renal region will make the diagnosis. The disorder very rarely proves fatal. In doubtful cases utilize the X-ray.

Treatment.—Many cases rarely give trouble directly, but may be a source of reflex and obscure symptoms. Attention to the general health of the patient and persistent treatment of the dorso-lumbar region greatly strengthen the relaxed tissues about the kidney and cure a number of cases. Having the patient attempt to replace the organ after he goes to bed will be of value. Treatment of the abdomen to strengthen the walls and lessen any liver congestion and to keep the bowels active is very beneficial. Teach the patient how to stand and walk correctly, especially holding the abdomen in

and up. A liberal diet to the point of increasing the weight is worthy of trial. The use of supports is not always satisfactory. Surgical treatment for fixing the kidney is of permanent value, but do not advise operation unless absolutely indicated. (See Prolapsed Organs, Part I).

To **determine the presence of a movable kidney**, it is best to have the patient in the dorsal position, the head slightly lowered and the abdominal walls relaxed by flexing the thighs moderately upon the abdomen. Then with the left hand in the lumbar region behind the eleventh and twelfth ribs, and the right hand in the hypochondriac region, the kidney can usually be detected after full inspiration followed by complete expiration; or, have the patient in a standing posture with the body bent slightly forward and the hands placed upon a table, then perform bimanual palpation; or, perform the manipulation in the knee-elbow position. When in this position (knee-elbow), if the kidney has become dislodged, a resonant note will be obtained by percussion over the normal location of the kidney.

FOOTNOTES:

[98] Journal of the American Osteopathic Association, July, 1904.

[99] Journal of the American Osteopathic Association, Dec., 1904.

DISEASES OF THE BLADDER

Cystitis

Cystitis is an inflammation of the mucous membrane of the bladder. Retention of the urine; foreign bodies, such as stones, in the bladder; the use of dirty catheters; exposure to wet and cold; injuries to the bladder and over the pubes; irritations to the sacral nerves; spinal lesions in the dorsal enlargement of the cord; innominate lesions; irritating drugs; enlarged prostate and urethral strictures are the principal causes of cystitis. The disease may be secondary to fevers, infectious diseases and inflammation of adjacent organs. A displaced uterus may produce a chronic irritation of the bladder.

Pathologically, there is hyperemia of the mucous membrane of part or of the whole of the bladder, with redness, congestion and edema. The secretion of mucus that covers the mucous membrane is of a dirty gray color. If the congestion is very extensive, a bursting of the capillaries may take place. In a few cases the neck of the bladder and the urethra, where it passes through the prostate, is involved. In chronic cases the mucous membrane becomes thickened and covered with patches of false membrane. The muscular coat of the bladder becomes hypertrophied and the veins tortuous.

Symptoms.—The onset may be sudden with rigors and fever, but in many cases a frequent desire to micturate will be the first symptom. This is followed by tenderness and pain over the bladder and contiguous parts, loss of appetite, depression and sleeplessness. Tenesmus of the bladder, caused by a spastic condition of its muscles, and a burning along the urethra are usually present. The urine is alkaline in reaction and contains pus, epithelium and blood.

Diagnosis.—The diagnosis is usually easy. **Pyelitis** causes pains in the lumbar region and along the ureters and there is a frequent desire to urinate. The bladder is not subject to spasms and the urine is of an acid or neutral reaction.

Prognosis.—In many cases the prognosis is favorable, but in cases of long standing and in hypertrophy of the bladder, prognosis must be guarded.

Treatment.—Rest in bed with strict attention to diet is necessary. Milk is the best food and avoid highly seasoned articles and acid foods. The use of plenty of pure water is helpful to dilute the urine, and if necessary the bladder should be washed out carefully. If the case is severe, emptying the bladder several times a day with a catheter will be necessary. Always be careful about the cleansing of the instruments. Warm applications over the pelvic region will be comforting to the patient. Lifting the abdominal viscera from the bladder is of assistance. The patient may be placed in the knee and chest position for this or the usual method employed.

Treatment to the second, third and fourth sacral nerves controls the neck of the bladder, and strong inhibition will generally control the spasms of the sphincter. The fundus of the organ is supplied by sympathetic fibers from the pelvic plexus. Direct treatment over the bladder, if applied carefully, will act on the terminal fibers of the sympathetic. Lesions to the nerves of the sphincter of the bladder oftentimes occur between the fifth lumbar and sacrum, also from a displaced innominate. Such lesions are apt to be found in cases of incontinence of urine. The lesion to the vertebra is usually a lateral one.

Thorough treatment to the genito-urinary center (lower dorsal and upper lumbar) will also be of aid. In males direct treatment of the prostate gland is occasionally important as is also the plexus of nerves at the trigone of the bladder. In **treating** the **prostate gland** introduce a finger into the rectum and work about the base of the gland to relax the tissues, and thus remove obstructions of the vascular, lymphatic and nervous structures to the gland. Do not work too much upon the gland itself (commonly once a week or ten days), as it may irritate, but release surrounding edema. Also treat the innervation at the eleventh and twelfth dorsals, fifth lumbar, and first, second and third sacrals. Spreading the ischii will occasionally be beneficial; this tends to release the anterior commissure where it is attached to the symphysis.

Follow the above with a “general treatment” in order to secure a general systemic reaction. This is of value in all infectious disorders.

It is important in **young boys** to examine the condition of the penis in bladder diseases. The prepuce may become adherent or other irritations may be found that are a source of disturbance to the bladder, or even to the kidneys, on account of the intimate connection of the sympathetic system in this region and the relation of one organ to another.

An **irritable bladder** is usually due to disorders of nearby tissues, especially the urethra, vagina, uterus and rectum.

Enuresis, exclusive of paralysis, is frequently due to some local mechanical disturbance. **Nocturnal enuresis** or **bed wetting** is caused by lower dorsal and lumbar lesions (especially the fifth lumbar), displacements of the innominate, or phimosis, hooded clitoris, contracted meatus, highly acid urine, worms, lack of discipline, etc. The patient is usually **neurotic**, which demands attention to the neuromuscular system of the entire body. Care of the general health and habits is important. Constipation may be present.

DISEASES OF THE CIRCULATORY SYSTEM

DISEASES OF THE PERICARDIUM

Pericarditis

Pericarditis is an inflammation of the serous membrane covering the heart and its reflection in front over the chest. Primary inflammation of the pericardium is rare. Such cases usually result from cold and exposure or injury or tuberculosis, and are most commonly met with in children.

The exciting causes of **secondary pericarditis** are rheumatism, Bright's disease, tuberculosis, gout, diabetes, eruptive fevers, various septic conditions and dyscrasia. Pericarditis may result by extension of inflammation from contiguous organs, as the disease may occur in pneumonia, pleuropneumonia, chronic valvular diseases, and ulcerative diseases of the esophagus, bronchi, vertebræ, ribs, stomach, etc.

Displacement of the ribs over the heart and involvement of the corresponding vertebræ predispose to pericarditis, by weakening the innervation of the pericardium and thus disturbing the circulation. Lesions of the cervical region affecting the left phrenic are to be considered. Upper rib lesions may disturb the internal mammary artery and the lymphatics, which have important relationship with the pericardium. The disease may occur at any age. Males are more frequently attacked than females.

The morbid conditions vary with the stage. The stages are (1) acute, plastic, or dry pericarditis; (2) pericarditis with effusion, serofibrinous, hemorrhagic or purulent; (3) absorption or adhesive pericarditis. These different stages or varieties commonly succeed one another, although medical writers place so much importance in them that each is described separately. **Acute pericarditis** is by far the most common and often the inflammation subsides at this point instead of going on to more serious

involvement. There is a possibility that in some cases the forms are independent of each other.

The changes are the same as in various serous membranes. Hyperemia and alteration of the epithelium is most marked on the visceral layer. This is followed by an exudation from the hyperemic vessels. There is roughening and loosening of the epithelium and the fibrin is precipitated upon the walls of the pericardium. More or less lymph is exuded and sometimes injected capillaries burst and cause a bloody exudation. From this stage the morbid appearances vary according to the progress of the disease. The disease may undergo resolution and fatty degeneration and absorption of the products in point take place. As the stage of effusion occurs, the parietal and visceral layers of the pericardium are separated by a serofibrinous exudate. This condition may increase until the quantity of the exudation is considerable, or the effusion may become absorbed. Rarely does the exudate become purulent.

Adhesions may be formed between the layers of the pericardium, during the last stage, by bands of various lengths or the layers are more or less separable.

Symptoms.—Simple cases may not present any symptoms. Usually a chill or cold feeling at the heart, followed by pains in the cardiac region, ushers in the attack. Fever is commonly present, rarely exceeding 103 degrees F. Tenderness over the heart is noticeable. There is dyspnea and the patient is restless.

In the **effusive stage** the symptoms depend largely upon the amount of diffusion. The pain is sharp and stitch-like. Nausea, vomiting and hiccough sometimes occur. The pulse is irregular and feeble. Insomnia, headache and even delirium may occur. Distention of the veins of the neck may cause dysphagia and a cough may be present, owing to the irritation of the trachea. The recurrent laryngeal nerve may be compressed as it winds about the aorta and thus cause aphonia.

The friction sound is a characteristic physical sign of the first stage. In the effusive stage there may be precordial bulging. The area of dullness is enlarged, the diaphragm and liver may be crowded downward, causing an epigastric bulging. As the effusion increases, the heart sounds become less distinct; the friction is not heard. In the **third stage** there is usually a return

to normal, although **adhesions** may form and cause precordial retraction and permanently embarrass the heart's movements. The young are more subject to permanent disability. Extension of heart impulse, which is undulatory; diastolic shock to hand placed over heart; increased area of dullness; prominent precordia; position of patient does not change apex beat; and when pericardium is adherent to diaphragm a systolic tug is noted over points of attachment, are essential signs and symptoms.

Diagnosis.—Pericarditis is frequently overlooked. It is a serious disease and one should be especially careful. In cases of rheumatism the osteopath must always be on his guard. Tonsillitis may be the origin of the infection. Care has to be taken in distinguishing between dilatation and cardiac hypertrophy and pericardial effusion. Hydro-pericardium may be mistaken for pericardial effusion.

To distinguish between endocarditis and pericarditis should not be a difficult task if one understands thoroughly the nature of each disease. A large pericardial effusion may be confounded with a pleural effusion. In doubtful cases utilize the X-ray.

Prognosis.—In mild cases of pericarditis the large majority rapidly recover in two to three weeks. In cachectic subjects and where adhesions have formed, the duration is longer. Relapses may occur. The purulent effusions are always serious.

Treatment.—Demands prompt and effective measures. Absolute rest mentally and physically, is necessary. Too much stress cannot be laid upon this point, as death has occurred from neglect of this. To quiet the heart's action is the first necessary requisite, and then give treatment to limit the inflammation. In the early stage relaxing the upper dorsal musculature to control innervation, and raising and freeing all the upper ribs and clavicles to promote lymphatic drainage is effective. In the second stage prevention of cardiac failure and promotion of absorption are the indications to be met. Too much importance cannot be placed upon the point that general strength, good nursing, dieting and free elimination are essential, not only in securing a rapid subsidence of the inflammation, but to prevent further complications.

Raising and separating the ribs over the heart will be of great aid in lessening the inflammation and promoting absorption. In many cases

lesions to the ribs on the left side and subdislocations of the vertebræ affecting the vasomotor nerves, the lymphatics and nerves to the heart will be found. The first five ribs and corresponding vertebræ is the region where one may expect to find the lesions. In addition to absolute rest, an inhibiting treatment in the dorsal region between the scapulæ will aid in slowing the heart's action. Correcting any lesion that may be found to the vagi nerves will also be a help in controlling the heart's action; besides, most of the vasomotor fibers to the heart are in the vagi. These lesions are usually found at the atlas. One should also examine carefully all the cervical vertebræ for derangements that might affect the cervical sympathetic, especially the superior and middle cervical ganglia. These ganglia are primarily affected from the fifth cervical to the first dorsal. Inhibition for a few minutes between the transverse process of the atlas and the occipital bone to the posterior occipital nerves will be of great aid in controlling the tumultuous action of the heart; also, inhibit in the upper dorsal. The warm bath will quiet the heart, but care should be taken not to weaken the patient. The general treatment has the effect of lessening nervousness and quieting the heart.

The function of the phrenic nerve must be borne in mind when regarding the pericardium. The phrenic is usually primarily affected at the third, fourth and fifth cervicals, and occasionally there are connecting fibers as low as the fourth and fifth dorsals. Ice-bags may be found of value in retarding the progress of the effusion and in lessening the heart's action. Liquid food, as milk and broths, should be given throughout the disease. If the effusion is very large the services of a surgeon should be secured and tapping performed. If the effusion is of a purulent nature, a free incision should be made with antiseptic precautions.

In chronic cases carefully graduated breathing exercises and moderate stretching of the adherent regions, if pathology permits, should be considered.

Endocarditis

Endocarditis is an inflammation of the lining membrane of the heart. The process is usually confined to the valves; the lining of the cavity of the heart may also be affected, especially in severe cases. Three forms are

recognized: simple acute endocarditis, ulcerative endocarditis, and chronic endocarditis.

Simple Acute Endocarditis.—This form usually results from acute articular rheumatism. Tonsillitis may be associated with endocarditis. It may also be caused by other infectious diseases, especially scarlet fever, but rarely, by typhoid fever, measles, chicken-pox, diphtheria, smallpox and erysipelas. Acute endocarditis is frequently found in chorea. It is also met with in diseases attended with emaciation and general weakness, as cancer, gout, Bright's disease and diabetes. It is not uncommon in phthisis. Micro-organisms play an exciting part, but back of this the osteopath finds lesions of the heart innervation important predisposing features. Prophylactic osteopathic treatment is a potent factor in preventing endocardial changes in the above diseases. Keeping the muscles relaxed and the osseous tissues intact is of great value.

Pathologically, the left side of the heart is most commonly involved. The disease is characterized by the presence of small vegetations on the segments or on the lining membrane of the chambers, although in mild cases there is simply swelling of the valves. The mitral valves are more often affected than the aortic. The vegetations appear, usually, on the auricular surface of the mitral and the ventricular surface of the aortic valves, a little back of the valve edge. Their seat corresponds to the point of maximum contact (Sibson). These growths are liable to be broken off at any time and carried as emboli by the blood current to distant organs, particularly the brain, spleen and kidneys. This is not uncommon in acute endocarditis or chronic valvulitis. In favorable cases the vegetation is ultimately absorbed and the valve is but slightly altered beyond a simple sclerotic thickening. This is often the starting point of sclerotic valvulitis. Osteopathic measures undoubtedly lessen the liability of cardiac involvement, prevent extensive changes and promote absorption of disease products, by lowering heart tension and improving the cardiac nutrition, as well as increasing free elimination of the toxins in the blood.

During the fetal life, the right side of the heart is most commonly involved. The chorda tendinæ are sometimes affected, but rarely alone.

The vegetations are composed of proliferated connective tissue cells. The superficial elements undergo a coagulation-necrosis and fibrin is deposited

from the blood. Micro-organisms are found and are the specific agent in causing acute endocarditis.

Symptoms.—A large number of cases are latent, the autopsy first disclosing the lesion. In many cases there are slight fever, a frequent, sometimes irregular, pulse, palpitation and dyspnea. There is seldom any pain.

Physical signs are very uncertain. They may not be present in mild cases and in those in which the valves are not affected. Usually auscultation furnishes the only indication of endocarditis—a soft, blowing, systolic murmur which is heard most frequently at the apex, as the mitral valves are the ones generally involved. When the aortic valves are affected, the murmur is heard at the second interspace at the right edge of the sternum.

Diagnosis.—This depends entirely upon the etiology and physical signs. The greatest danger is in the disease becoming chronic.

Treatment.—The patient should be kept as quiet as possible, so that the work required of the heart may be reduced to a minimum. The disturbed circulation can be controlled by careful attention to the vasomotor nerves at the various centers along the spine. Attention should be given the disease that is causing the endocarditis. Keep the patient well protected by flannels and beware of damp rooms and sudden changes of temperature.

Treatment should be given to correct any lesion found in the upper five dorsal vertebræ or ribs and to raise and spread all of these ribs so that the heart's action will not be unduly disturbed by interferences with its innervation. The vasomotor nerves to the heart's vessels are found in the vagi nerves, consequently care should be taken that lesions to these nerves do not exist. An inhibitory treatment to the suboccipital nerves acts reflexly on the vasomotor nerves and tends to equalize the general vascular system. This treatment quiets the heart's action. Ice applied locally is advocated by many practitioners. Flannels should be placed next to the skin and the ice-bag placed over the flannel. This reduces the fever, lessens the pulse-rate and quiets the heart action. The same points are obtained by the inhibitory treatment at the suboccipital region. The ice-bag also relieves pain and oppression. Be very careful in the use of ice when there is much cardiac dilatation. Treatment of the middle and inferior cervical regions may have some effect in controlling the heart's action. A general treatment to quiet the

patient is effective. Do not allow any overexertion. The patient should have nourishing liquid food.

Emery[100] says: “Many of us have been in the habit of saying, just because we hear a decided murmur in the heart region, that the patient has valvular heart trouble; that the patient has organic heart trouble. This is a common error... When there is an anemic condition of the body, apparently the cusps of the valve will be so weakened, and the attachment will be so weakened that the blood will force its way between the valves and back into the heart, causing regurgitation murmur, when as an actual fact there is no deformity and no real disease of the valves, and as soon as the general condition of the anemia is improved, the valve will do its work fully and the murmur entirely cease. So if you have the murmur without the hypertrophied condition, which at once follows such a valvular lesion, you must be guarded in your statements, for if an actual valvular lesion existed, compensation would take place, and it would be the means of corroborating such a valvular condition; if no hypertrophy is found, then we are not justified in definitely stating that a valvular or organic lesion exists, for such a weakened condition as has been mentioned might be the only pathology present, and be the cause of the murmur.”

Ulcerative or malignant endocarditis.—This is an acute, infectious or septic disease, characterized locally by necrosis or ulceration of the valve. It is generally a secondary affection to septicemia, pneumonia, erysipelas, scarlet fever and acute rheumatism. Acute endocarditis often precedes the ulcerative variety, the latter being simply an increase in severity of the former.

Etiology and Pathology.—It is doubtful if there can be a primary form of ulcerative endocarditis. Chronic valvular defects are the most important predisposing causes. Pneumonia is most frequently, of all the acute diseases, associated with severe endocarditis. It is rare in tuberculosis, diphtheria, typhoid fever and chorea. It occurs in association with erysipelas, gonorrhea and rheumatism. Septicemia, pleurisy, meningitis and puerperal fever are other possible causes of ulcerative endocarditis.

Deep seated lesions, which means firmly anchored lateral flexions and rotations due to fibrotic changes, are important predisposing local factors,

while other lesions that disturb blood elaboration and resistance and lessen elimination, are predisposing systemic causes.

Pathologically, the lesions are either vegetative, ulcerative or suppurative. The vegetations are composed of granulation tissue, granular and fibrillated fibrin, and colonies of micro-organisms. They become necrotic and break down into ulcers. The ulcerative changes may lead to perforations or produce valvular aneurisms. Of the valves the mitral is the most frequently affected; then the aortic; then the mitral and the aortic together; then the heart walls; then the tricuspid; then the pulmonary. In a few cases the right heart alone is involved. The lesion is not always confined to the valves, but may involve the mural endocardium. The most common organisms found are the pneumococcus, streptococci and staphylococci. The bacillus diphtheriæ, bacillus coli, gonococcus, bacillus anthracis and other organisms have been found. Associated pathological changes include the lesions of the primary disease and the changes due to embolism. The spleen, kidneys, brain, intestines and skin may be the seat of embolism. When found in the lungs, they originate in the right heart.

Symptoms.—If in the course of any of the diseases previously named under etiology, chills followed by fever and sweats occur, ulcerative endocarditis should at once be suspected and a thorough examination be made. The general symptoms are high, irregular fever, delirium, sweating, great prostration, rapid pulse, hurried breathing and sometimes jaundice and diarrhea occur.

The occurrence of delirium, coma or hemiplegia points to involvement of the brain; pain in the region of the spleen, with increased dullness on percussion, point to trouble in that organ; hematuria may occur from involvement of the kidneys. More rarely there will be impaired vision from retinal hemorrhage; and there may be suppuration and sometimes gangrene in various locations, depending upon the position of the embolism.

The **septic type** is secondary to suppurating external wounds, puerperal sepsis or acute necrosis. Occasionally gonorrhea is the cause. The symptoms presented are rigors, irregular fever, sweats and exhaustion—the signs of septic infection. The symptoms may resemble a quotidian or a tertian ague. The **typhoid type** is the most common. The characteristic symptoms are irregular temperature, sweating, prostration, delirium,

drowsiness, diarrhea, petechial and other rashes, distention of the abdomen and pain in the right iliac region. The heart symptoms may be overlooked, as in the septic type. The **cardiac type** are cases of chronic valvular diseases in which fever, rigors and sweats, and the symptoms of embolism may develop. In the **cerebral** cases the symptoms may simulate meningitis. Acute delirium may be the distinctive symptom. Heart symptoms may be overlooked.

Physical Signs.—The heart symptoms may be latent. Even after a careful examination, there may be no murmur present. When murmurs are present it is often difficult to locate them.

Diagnosis.—The previous history should be considered and this, together with the symptoms, makes a correct diagnosis possible, even though physical signs are absent. The duration is from a few days to several weeks.

Treatment.—The treatment of this form of endocarditis is likely to be of little avail, although in a few cases where the source of infection can be eradicated the condition may be considerably improved and life prolonged. About the same treatment as in simple endocarditis should be followed. Absolute rest is essential and this, coupled with the local treatment of simple endocarditis and a nourishing liquid diet, constitutes the principal treatment.

Chronic Endocarditis

This condition may begin as a chronic inflammation or follow the acute form, which is more often the case. There is a **sclerosis** of the valves which causes deformity, owing to the contractions. The onset is usually insidious.

It is well known that the larger percentage of valvular lesions are the result of either acute or chronic endocarditis. Thus rheumatism stands foremost as a cause of valvular defects. Alcoholism and overeating (through introducing irritating influences into the blood, or by causing rheumatism, gout and allied diseases) are important etiological considerations. Nephritis and syphilis are considered among the causative factors. Infections and senility, when associated with high blood pressure, is a phase not to be overlooked. Chronic endarteritis extending from the aorta to the valves,

resulting in thickening and degeneration of the tissue, may be an insidious source of valve disease. This is probably often of syphilitic origin.

A potent cause of special interest to the osteopath (for the reason that his treatment is so effective), is continued **muscular strain** as seen in athletes and laborers. The heart muscle itself may be strained, particularly the valve leaflets and the tissues about the valve, which effect often terminates in valvular leakage. In addition, the orifice of the valve openings may become stretched and distorted through strain superinduced by prolonged exertion, by flabbiness of heart tissue, and by dilatation of the ventricles. In these latter cases it is seen that the leaflets of the valves may remain intact, but still they are unable to stretch completely across the opening.

With the above condition it is readily noted that thickening, curling and adhesions will take place when inflammation attacks the valves and contiguous tissues, and following these, limy infiltration and fatty degeneration may be a consequence.

Predisposing osteopathic lesions as noted in acute endocarditis, are not to be neglected.

Thickening and hyperplasia are immediate consequents of connective tissue overgrowth; and especially is chronic endarteritis accompanied with atheromatous and calcareous degeneration. Thickening, at times, is only slight and the function of valves is not impaired.

In curling or **retraction**, there occurs a shrinkage of the hypertrophic or hyperplastic tissues. This condition is very apt to become permanent.

Adhesions of the valve leaflets is a self-evident condition. It is well to note here that in acute and chronic endocarditis some part of the fibrous valve ruptures or is lacerated or eroded from strong and rapid heart action; the **laceration** or rupture or erosion always occurs at the point of maximum contact. Thus the eroded surface allows an opportunity for the rheumatic or septic micro-organisms to lodge, multiply and grow, and adhesions result. Carefully applied osteopathic methods are very efficacious in impending acute heart disturbances, and this without doubt is the reason why so many of our rheumatic cases get well without any heart affections. Keeping the heart quieted and slowed prevents the strong and rapid action and thus lessens the probability of lacerations, ruptures and erosions of the valve

tissues. General resistance is increased and elimination improved, which have a decided effect in preventing complications.

Calcification and atheroma, as has been mentioned, may follow the above diseased processes. The calcification is sometimes so marked as to be of the character of a bony ring.

The question arises here, What effect have **osteopathic lesions** as direct **causative factors** in valvulitis? It appears reasonable that the heart is not exempt from the influences of the vertebral and rib maladjustments. Furthermore, clinical experience has abundantly proven that the heart tissues are affected by these lesions in the same manner as any tissue or organ is affected. Again, osteopathic dissection reveals direct nervous connection from the upper dorsal spinal ganglia to the heart ganglia.

No one will question that the integrity of heart function and life are dependent upon normal coronary artery supply, upon vasomotor equilibrium, and upon motor control. All of these functions are influenced by the status of cervical vertebræ, upper dorsal vertebræ, and rib relations. Just what the pathological affection is when these anatomical parts are disturbed is beyond us until more careful dissection and experimentation have taken place. How cervical and dorsal sympathetics, vasomotor and motor nerves with their spinal connections, vagi and phrenic, are so disturbed as to involve valvular parts and induce inflammation, is a problem for us to investigate. Through analogous reasoning from other organic ailments and through the fact that osteopathic therapeutics corrects heart lesions, we know in a general way that the correction of osteopathic lesions decidedly influences the heart.

Two well known **physiological facts** relative to the heart are: first, the heart increases in size up to adult life, and, second, the heart muscle can actually be increased in size. This latter fact occurs in physical development and training. A heart that is weak and flabby can be increased in strength, tone and size. This helps us to understand how certain strains and distortions of the heart, with consequent valvular lesions, may be corrected through rest, exercise and treatment; somewhat analogous to the correction of an atonic, prolapsed and dilated stomach. Then it also seems probable that disturbed innervation and blood supply to heart areas or to the heart as a whole would predispose to congestions, inflammations and degenerations

whereby rheumatism, septic states, etc., and muscular strains would act only as exciting causes, not true causes.

No one is going to expect that thickened, retracted, adhered, or ruptured valves are to be made anatomically correct; but the right treatment will certainly reduce the morbid state to the minimum. Then there are cases where osteopaths have eliminated all murmurs when specialists stated the disease was incurable; showing that it is impossible by signs and symptoms to always diagnose the morbid tissue state. Only the resulting effects of size and of leakage are definitely revealed by auscultation and percussion. Hence there is a class of valvular diseases that can be successfully treated by osteopathic measures, which, if left to terminate under drug medication, will reveal (at post-mortem) the pathological signs of valvular heart disease.

Downward displacement of the **first rib** may interfere directly with the subclavian artery and thus cause constriction of that vessel and a consequent regurgitation; also, cardiac fibers of the recurrent laryngeal nerves may be impinged by a dislocation of this rib. Many lesions which interfere with the right side of the heart occur at the **second** and **third ribs** and lesions of the **third**, **fourth** and **fifth ribs** may interfere with the valves. Lesions of the **corresponding vertebræ** produce the same results as the ribs. These lesions are probably to the sympathetic nerves along the dorsal region. Lesions may be found anywhere along the cervical vertebræ which may involve inhibitory (vagi) fibers or accelerator (sympathetic) fibers to the heart. Also, in some cases the **floating ribs** are dislocated downward and cause a prolapse of the diaphragm, and thus a constriction of the aorta, which may result in regurgitation and valvular disorder.

Mitral Regurgitation.—Mitral regurgitation is a leakage of blood from the left ventricle, through the mitral valves, into the left auricle. The opening of the valve may be distorted, or the valve leaflets thickened, rigid, or retracted, thus allowing an escape or reflux of blood from ventricle into auricle. The tendinous cords may also be thickened and adhered, with consequent prevention of free action.

By a forcing back of a portion of the blood from ventricle to auricle at the same time the pulmonic veins are emptying into the auricle, an overdistention of the auricle takes place. The auricle, then, from the extra amount of work required, becomes hypertrophied and dilated. There may be

no noticeable symptoms at first. Later on shortness of breath, cough, irregularity of heart's action, indigestion, liver congestion, and so on, occur.

The **apex beat** is forcible and downward to the left. Of course the area of dullness is to the right and left. There is a **systolic murmur** in the mitral area, which is transmitted to the left axilla.

Every osteopath should understand the mechanism of this most frequent valvular lesion. Following hypertrophy and dilatation of the left auricle, the reflux may be so excessive that a residue remains. The auricle not being able to handle all the **blood**, stasis of the pulmonary vessels takes place, and pulmonary edema and hydrothorax are sequelæ. Then comes dilatation of the right ventricle and back pressure on tricuspid valves and right auricle. The **veins** throughout the body become turgescent, and the liver is apt to be indurated. It should be emphasized, however, that "back pressure" is only an effect commonly due to myocardial degeneration, caused by some infection, of which auricular fibrillation is an important part of the pathology.

Before the breaking down of the left heart compensation, osteopathic methods, as all know, are effective in maintaining balance. Even after the lungs begin to be affected, careful and thorough treatment will result in good, and in cases of general venous sluggishness treatment, particularly to liver, diaphragm, bowels and limbs, will generally materially help in slowing the downward course of the disease.

Mitral Stenosis.—In stenosis there is narrowing or constriction of the valve opening. Thus in mitral stenosis the free flow of the blood from left auricle to ventricle is hindered.

The **cusps** are usually thickened, rigid and adhered. The valve opening may be so stenosed as to be but a narrow slit. In all cases stenosis is a **structural defect**. It can occur by strains, as regurgitative effects sometimes result.

The **symptoms** of mitral stenosis are practically the same as those of mitral regurgitation, owing to similar effects upon the circulation.

Under **physical signs** we find the apex-beat is only slightly displaced. Palpation will reveal, near the apex, a rough presystolic thrill. The increased

area of dullness is to the right. There is an abruptly terminating, rough, presystolic murmur.

Aortic Regurgitation.—Aortic regurgitation is a reflux of blood from aorta to left ventricle, following ventricular systole. This is considered the **most serious** of the valvular diseases. The valve opening is either too large, so the valve leaflets do not fit tightly, or the segments themselves are thickened and retracted. Structural defects of the aortic valves are largely of the same character as in diseases of the mitral valves.

The **regurgitation** first causes dilatation of the left ventricle. This is followed by hypertrophy. If the mitral valve holds intact, no further effects result. But if the mitral valve is diseased or becomes incompetent from the dilated ventricle, the same morbid states follow as was noted under mitral regurgitation.

There is a forcible apex-beat, displaced downward to the left. The increased dullness is to the left. There is a long, loud **diastolic murmur**. The well known "water-hammer" pulse is felt.

Aortic Stenosis.—Aortic stenosis indicates a narrowing of the aortic orifice. It is a structural defect. The free flow of blood is obstructed from the left ventricle into the aorta.

Aortic stenosis is much less frequent than regurgitation. Aortic stenosis and regurgitation are very apt to be associated. The beat is commonly forcible, and the increased area of dullness is to the left. There is a systolic murmur, heard best at the right second interspace, which is conducted into both carotid arteries.

Tricuspid Regurgitation.—Tricuspid regurgitation is the most common valvular lesion affecting the right heart. It is rare as a primary lesion. The affection may be of a structural character, or functional.

Hypertrophy of the right ventricle occurs after the manner of left ventricle hypertrophy in mitral regurgitation. The sequelæ of venous turgescence follow, also, in the same way as was given under the mitral lesions. Tricuspid regurgitation rarely exists independent of some other cardiac or pulmonary ailments.

The apex-beat is diffused toward the epigastrium. Increased cardiac dullness is toward the right. There is a systolic murmur, which is heard best

just above the xiphoid cartilage. The jugular vein pulsates; in severe cases there is pulsation of the liver.

Osteopathic treatment is usually effective in relieving the engorgement of the veins, and particularly in reducing liver congestion.

Tricuspid Stenosis.—This affection is said to be the **most rare** of valvular lesions. Thickening, obstruction and adhesions from endocarditis cause the stenosis. As in other lesions of the heart, there is a congenital form. There is presystolic murmur, heard best at the xiphoid cartilage. The pulse is small and weak.

Pulmonary Regurgitation.—This is another rare lesion, and is seldom met with in a simple form.

There is forcible pulsation in the epigastrium. Increased cardiac dullness is downward. There is a diastolic murmur, heard most distinctly at the left second intercostal space.

Pulmonary Stenosis.—Another rare lesion. The effect of this lesion on the right ventricle is the same as that of aortic stenosis on the left. The congenital lesion is apt to occur with a patulous foramen ovale.

There is a systolic murmur, heard best at the second intercostal space on the left. **Many systolic murmurs** heard over the pulmonary opening **are functional**.

Combined Valvular Lesions.—When two or more lesions occur at the same time the terms, combined or associated, are employed. This is a very common occurrence. Two, three or all of the valves may be affected at the same time. **Stenosis** and **regurgitation** at the same orifice is the most common association of any two valvular lesions. When there is a joint affection of two or more valves, the **aortic** and **mitral** are most commonly associated; then mitral and tricuspid; then aortic, mitral and tricuspid.

Prognosis and Treatment of Valvular Diseases.—It is impossible to outline with exactness either prognosis or treatment of heart lesions. All will agree that the character of the lesion is the first consideration, and before records of these cases can be of any scientific benefit, we must look well to the nature of the valvular leakage or obstruction and note precisely what effect our therapeutics has. Perhaps of greatest consideration in the matter of prognosis is, to what extent **compensation** has been maintained.

We know that compensation may be perfect; that hypertrophy and dilatation may balance the valvular defect so thoroughly that even the patient is not aware of a heart lesion. As soon as compensation begins to fail, when palpitation, irregularity of pulse, dyspnea, edema, etc., appear, we know that our treatment should pass from the realm of the defensive to that of the offensive. Then when compensation fails still more, prognosis and treatment must necessarily be changed according to the increasing gravity.

In our osteopathic work we should never forget that the condition of the lesion may be greatly influenced by environment. Habits, occupation and general daily life may affect the heart ailment for good or bad. Thus in **prognosis** we have **three features** in particular to note: character of heart lesion, extent of systemic involvement, and environment. In the immediate prognosis, the extent of general venous stasis, if any, is of great importance. In other words, the gravity of the complications is of first consideration.

Aortic regurgitation is ranked by heart specialists as the most serious lesion. Aortic stenosis is a grave lesion, but not so serious as aortic regurgitation. It is often stated that the character of the lesion is not of so much consequence as the extent of involvement the lesion has engendered. Mitral stenosis is more grave than mitral regurgitation. Right side heart lesions are usually relative, and, naturally, when the right heart is diseased from extension of the ailment from the left side, the situation is serious.

It should be remembered that a heart normal in size and beating regularly is usually in a fairly healthy condition even if a murmur is present.

In our **treatment** the first point indicated is to improve, if possible, the **integrity** of **heart muscle** and lessen the **valvular defects**, if such can be done. Owing to a dearth of statistics, it is impossible to state to what extent improvement in organic lesions has been accomplished. Very likely if we had statistics and no post-mortem findings, we would still be in the dark as to much of our work. This much is positive: osteopaths have time and again apparently cured grave valvular lesions; cases that eminent specialists diagnosed as absolutely organic lesions. Our practitioners have eliminated the murmurs, reduced the size of the heart, and removed any and all systemic symptoms. These patients are well, have been well for years, and are leading active lives. But were these cases suffering from organic lesions? No doubt there was valvular leakage, hypertrophy and dilatation,

but was the valve defect a functional one? In other words, was it due to strain and distortion? In all probability the patients' days were numbered and post-mortems would have shown grave lesions and quite likely more or less organic changes.

Does it not seem likely that some functional lesions may terminate in organic lesions? Through continued stretching of the valves and their immediate tissues, fatty degeneration may take place; the same as fatty degeneration of the heart muscle, occurring in dilatation of the chambers. If we can remedy functional lesions through specific work upon nerve centers and fibers, why cannot we influence organic lesions and at least reduce the gravity to a minimum? We know functional diseases of the heart, as palpitation, rapid heart, slow heart, etc., can be corrected, and from all indications, functional valvular leakages are generally easily and quickly remedied; it is only a step farther to affect truly organic lesions. The same valves, the same nerves, and the same osteopathic lesions are noted. Then it is only a continuation of the same process from functional disease to organic disease. Indeed, no one is able to draw a line between the two. Probably, as was intimated before, careful osteopathic treatment in rheumatism and other diseases that are apt to predispose to heart affections, will keep the heart so strong functionally and organically that resulting valvular lesions are not nearly so likely to develop. The heart can be treated and controlled as can any tissue or organ. It certainly stands to reason that osteopathic therapeutics is rational in both preventing and curing valvular lesions. The M. D. gives his drugs with the hope of maintaining heart muscle integrity, of lessening a too forceful beat, of increasing waning power, of promoting general circulation, of preventing and lessening complications. We can do the same thing with our methods, even more effectually, and with no probability of harmful effects.

It would appear there are at least two ways in which organic lesions may develop. **First**, as stated above, through **functional distortion**, the normal heart muscle being strained from severe exercise, or a weak, flabby, or disused heart muscle being overtaxed by ordinary exercise. Here it will be seen that in the first instance immediate rest will probably correct the weakness; in the second, rest and general building up of the body if the atonic heart muscle resulted from some debilitating disease. If from local causes correction of the specific osteopathic lesion should be effective.

Secondly, through strong and rapid heart action the **valves** are **ruptured** or **lacerated**, always at the point of **maximum contact**, and thus present a favorable surface to micro-organisms.

Owing to the valves being a reduplication of the endocardium, they have no muscles or blood-vessels, so that in **functional leakages**, inflammation does not play a part, hence, a possibility of degeneration occurring from excessive stretching.

The large majority of **osteopathic lesions** are unquestionably found in the upper five dorsal vertebræ and the first five or six ribs on the left side, although cervical lesions, in many instances, play an important secondary, if not the primary, role. These maladjustments affect vasomotor nerves to the heart, that is, to coronary vessels, the dorsal and cervical sympathetics, the vagi, and the phrenic. We are unable to state just how these lesions disturb nerve conductivity; what present anatomy and physiology teach us does not fully explain. Osteopathic dissection must be the means to the end of the explanation. We have many clinical results, but not the physiological knowledge, as yet, to support it.

The dropping down of the first rib, as well as the clavicle, interferes with the large blood-vessels, especially the subclavian, and causes increased resistance of the heart's action and probably a certain regurgitative effect. This regurgitative effect would also occur in cases of obstruction to the aorta by constriction of the diaphragm from dropping of the floating ribs. To what extent this latter feature has been demonstrated is not known. In valvular diseases it is practical to divide them for treatment into, **first**, where the **lesion** is **compensated**; **second**, where **compensation** is **incomplete**; **third**, where **compensation** is **lost**. With all cases we should give consideration to environment, temperament, habits, food, clothing, exercise, etc. Often these secondary matters are of vital importance, especially when compensation is failing. The Schott method of treatment may be of some avail; this treatment, which is composed of a series of resistant exercises, tends to lessen peripheral resistance, develop heart muscle, and remove heart stasis.

Speaking in general, **hypertrophy** and **dilatation** follow valvular leakage, as a **secondary effect**. It is a compensatory condition, and whenever compensation is failing, there is naturally a breaking down of the

structural tissues of the heart; that is, the muscular hypertrophy is losing in integrity. Our primary aim, then, should be to keep up the compensation, which is represented in the hypertrophy, although there are cases that fail rapidly, especially in emphysema and cirrhosis of the lungs. Generally, in hypertrophy and dilatation, there is a **disproportion between** the **amount of work the heart has to do** and its **ability** to do it. One of two things has occurred; there is an increase in peripheral resistance or the volume of blood through the heart is abnormal in quantity[101]. Loudon[102] says: "The treatment of chronic disease of the heart requires a longer time, as a rule, than the same disorder in the acute stage. Some cases cannot be materially helped; a vast majority may be greatly benefited after a thorough trial; while more than we might at first suppose, can be entirely cured. We desire to quote at length from Hare relating to this point. He says: 'A chronic structural change in the heart resulting from an acute process is not always synonymous with chronic heart disease. Thus, acute endocarditis occasions a variety of changes of the mitral and aortic valves which long may indicate their presence by their characteristic murmurs, and yet in time these may wholly disappear. That many such cases outgrow the valvular trouble, especially mitral lesions, there can now be no doubt. The majority, even of those in whom valvular murmurs permanently continue, do not have their health unfavorably affected for years, and in many of these, the duration of life is not appreciably shortened.'" This statement, from such an author, gives the osteopath great encouragement; for add to those above referred to, which recover in time from all valvular trouble, the many cases of valvular insufficiency, due to dilatation, owing to osteopathic lesions to the trophic nerves, and which may be cured by removing such lesions, we find that quite a percentage of cases are thus disposed of.

"It is doubtless true, also, that the cases above mentioned having valvular thickening and vegetations, could have been cured in quicker time and greater number had osteopathic treatment been given to tone the heart, upbuild the general circulation and increase the activities of the excretory organs. The importance of the lungs is often overlooked in the treatment of cardiac diseases. The osteopath's ability to expand the chest and increase the capacity of the thorax should be demonstrated in both cardiac and pulmonary troubles. It is said to be a universal law throughout the animal kingdom 'that muscular power is directly proportional to the amount of oxygen consumed.' Hence give the power, and have your patient live as

much out of doors as practicable. **Exercise** should be **moderate** and always **stopped** short of **fatigue**."

Treatment of the abdominal organs should not be neglected, for improved circulation here and thorough removal of effete products will influence the heart. Freedom from worry, strains, etc. are essential. Tepid baths are best.

A person may have a valvular leakage and not be aware of it. Probably it is best to inform them, except in certain neurotic individuals. For then they can take special care of themselves, as to overwork, strains and intercurrent infections, and their life and usefulness be greatly prolonged.

When compensation begins to break, certain symptoms are noticed, as heart irregularity, difficult breathing, particularly at night, shortness of breath, and more or less anemia. Later there is disturbance of rhythm, cyanosis, dilatation of heart and dropsy. Frequently, considerable can be accomplished through the upper dorsal treatment, attention to the chest mobility, manipulation of the abdominal organs and diaphragm, and special attention to the diet, rest and some exercise. A light general treatment will assist the labored circulation and improve assimilation, and a change of climate may be of benefit.

Hypertrophy of the Heart

Hypertrophy of the heart is an enlargement of the heart, due to an increase in the muscular tissue. It is usually associated with dilatation. The ventricles are more often involved than the auricles, and the left ventricle is more likely to be affected.

Etiology.—Valvular disease of the heart causing an obstruction to the outflow of blood, as mitral insufficiency, diseases of the aortic valve; increased intra-vascular pressure, caused by sclerotic changes in the walls of the vessels; contraction of smaller arteries, due to irritation of toxic substances in the blood, as in Bright's disease. Overeating or drinking and excessive physical exercise would also induce hypertrophy of the left ventricle. Hypertrophy of the right ventricle is caused by valvular lesions on the right side. Lesions of the mitral valve causing an increased resistance in the pulmonary vessels are etiologic factors; also diseases of the pulmonary vessels in the lungs, as in cirrhosis and emphysema. There are conditions

affecting the heart, as the use of tea, alcohol and tobacco. Disturbed innervation, as in exophthalmic goiter; derangements of the vertebræ, and ribs corresponding to the upper five dorsals; downward displacements of the floating ribs, causing a prolapse of the diaphragm and a consequent retardation of blood through it to and from the heart, will affect the heart's action. Simple hypertrophy never occurs in the auricles; it is always accompanied with dilatation. The condition develops in the left auricle in mitral lesions; in the right auricle when there are disturbances of the pulmonary circulation. The tricuspid is rarely affected primarily.

Pathologically, the left side of the heart is more commonly enlarged than the right; the ventricles than the auricles. The shape of the heart varies when the left ventricle is hypertrophied, the conical shape being more or less lost; it lies more horizontally and is elongated. When both ventricles are enlarged the heart is round. When the right ventricle is affected, it occupies the largest part of the apex. The increase in the size of the heart is probably due to a numerical increase in the muscle cells. The muscle is firm, of deep red color and cuts with considerable resistance. Normally, the heart weighs from eight to nine ounces. In general hypertrophy it may weigh from fifteen to thirty ounces.

Symptoms.—Hypertrophy, being a conservative process or an act of **compensation**, does not necessarily present any symptoms at first. At the beginning there is rarely any pain, but a sense of fullness and discomfort is present. As the hypertrophy increases, the arteries become fuller, the veins less full and the circulation accelerated. In hypertrophy associated with arteriosclerosis the blood pressure is increased, and the pulse full and firm. Epistaxis may be of frequent occurrence and the face congested. Pains occur in the precordial region. There are nervousness, headache, hot flushes, palpitation, cough and vertigo. In hypertrophy of the **left ventricle**, the apex is lower and to the left. The carotids pulsate visibly and the radial pulse is strong and tense. Percussion reveals enlargement to the left and downward. The first sound is louder and prolonged. The aortic second sound is intensified. In hypertrophy of the **right ventricle** the enlargement is to the right edge of the sternum. The second sound in the pulmonary area is increased. The apex-beat is displaced outward. The pulse at the wrist is usually small. Hypertrophy of the **auricles** always occurs with dilatation, which is most common in the left auricle. The physical signs are

characteristic. They are caused by diseases of the mitral and tricuspid valves and diseases of the lungs, as emphysema and cirrhosis.

Diagnosis.—If a careful examination is made, hypertrophy can hardly be mistaken for any other condition. There may be a resemblance to pericardial effusion, pleuritic effusion, aneurism or mediastinal tumor, when near the heart. The X-ray will be of assistance.

Prognosis.—Depends largely upon the cause producing the hypertrophy. Remember that hypertrophy is a compensatory act. The prognosis is more or less unfavorable if resulting from emphysema, Bright's disease or in old age; also in degeneration of the vessels. In most cases of functional overaction, persistent treatment can usually accomplish considerable.

Treatment.—The treatment must be according to the cause of the hypertrophy. There are many etiological factors, consequently the treatment depends upon the influence of these factors. The principal treatment will be found under endocarditis, as valvular diseases are usually caused by endocarditis, and hypertrophy of the heart is a conservative process of nature—an act of compensation secondary to valvular and arterial lesions. The indications are to lessen the force and number of pulsations of the heart and remove the cause if possible.

Dilatation of the Heart

There may be **dilatation** with thickening of the walls, and dilatation with thinning of the walls, or they may be normal. It may be produced by impaired nutrition of the cardiac muscle or increased endocardial tension. More frequently the two conditions act jointly, although they may act singly. Impaired nutrition of the cardiac muscle may diminish the resisting power and thus cause dilatation. Weakening of the cardiac walls may occur in scarlatina, typhoid, typhus, rheumatic fever, etc. It is met with in chlorosis, anemia and leukemia. Increased endocardial tension occurs in sudden, extreme exertions and in valvular diseases. A normal heart through excessive exertion is rarely if ever dilated. The important causes are considered under hypertrophy. Both impaired nutrition and increased endocardial tension are influenced directly by the extent and severity of the

osteopathic lesion. This point has been considered under chronic endocarditis.

Pathologically, the right side is more commonly affected than the left. In advanced aortic incompetency, all the divisions may be dilated. When one ventricle alone is dilated the septum may be seen to bulge. In extensive dilatation, the auriculo-ventricular rings are often dilated. Other orifices may also be dilated. The condition is often associated with **hypertrophy** and **fatty degeneration**. The muscle may be normal in appearance. The endocardium is often opaque, and roughened in patches. There is degeneration of the ganglia of the heart.

Symptoms.—Dilatation causes weakness of the walls of the heart, but as long as the hypertrophied walls can compensate, no symptoms result. When the hypertrophy weakens, greater dilatation occurs and symptoms of venous stasis appear, as dropsy, feeble irregular pulse, dyspnea, cough and scanty urine. In some instances there may be brief precordial distress, faintness or palpitation.

Physical Signs.—On **inspection** the apex-beat is diffuse and feeble, or it may not exist. As observed by Walsh, the impulse may be visible and yet not palpable. **Palpation**—the impulse is diffuse, feeble and fluttering. The pulse is small, rapid and irregular, rarely is it slow. **Percussion**—the area of lateral dullness is increased to the right. There is increase in the dullness downward to the sixth interspace and upward to the second rib in many cases. **Auscultation**—the sounds are weak and sharp. The first sound is shorter, lacks its muscular element and becomes more like the second. The sounds are obscured, the cardiac murmurs are present. In many cases the characteristic gallop rhythm is present. When the right heart is chiefly dilated, the true apex-beat cannot be felt, while an impulse may be felt below the xiphoid cartilage, and a wavy impulse is seen in the fourth, fifth and sixth interspaces to the left of the sternum.

Diagnosis.—When a clear history can be obtained, together with the characteristic features, the diagnosis can be readily made. **Prognosis** depends upon the cause.

Treatment.—The treatment of dilatation is that of valvular heart disease. It is important that the patient should have plenty of rest, suitable food and regulated exercises.

In acute dilatation absolute rest is necessary. Limit the fluid intake, and open the bowels thoroughly. In serious cases, bleeding, a pint or more, should be considered.

Myocarditis

Myocarditis is an acute or chronic inflammation of the heart muscle. In many cases where the muscle substance of the heart is diseased, there is no doubt that **osteopathic lesions** are potent underlying factors. The lesions lessen nervous integrity and thus have a direct bearing upon the muscular strength and the likelihood of inflammatory invasion.

Acute Interstitial Myocarditis.—This affection is met with in fevers, in connection with endocarditis and pericarditis. Of the infections diphtheria and typhoid are the most frequent. Septic emboli may block the coronary arteries in pyemia, septicemia and malignant endocarditis and cause infarcts in the myocardium with abscess formation. It may be a complication of gonorrhea. Males are affected more often than females.

Pathologically, in **acute interstitial myocarditis** the changes take place in the intermuscular connective tissue. This becomes swollen and round-cell infiltration takes place. The muscle substance is pale and soft. **Acute parenchymatous degeneration** is characterized by degeneration of the muscle fibers, which are infiltrated with granules. The cardiac muscle throughout is pale and soft. **Acute suppurative myocarditis** is a rare condition. In this form abscesses occur, which vary in size from a pin's head to a pea. They vary greatly in number and are usually multiple. They may not cause any disturbance and may not be recognized before death. On the other hand the abscess may rupture into the heart cavities or the pericardium, or it may perforate the intraventricular septum, thus allowing the venous and arterial blood to intermingle. It may cause a cardiac aneurism.

Symptoms.—These are very uncertain. If during the course of any of the causal diseases, the pulse suddenly becomes rapid, small and irregular and compressible and palpitation and syncope develop, all of which point to cardiac weakness, myocarditis may be suspected. Signs of venous stasis

develop later in the affection. The physical signs are those of dilatation. This is extremely grave. Cases do, however, recover.

Treatment.—The treatment is the same as that given under endocarditis and pericarditis. Rest in bed is absolutely necessary. Pay particular attention to the nourishment and to the hygienic surroundings of the patient. Especially attention should be given to the upper dorsal area, both to the muscles and the interosseous lesions, for this influences cardiac muscle innervation and nutrition. Then lesions of the upper cervical are important owing to their relationship to the vagi which control muscular impulses of the heart muscle.

Chronic Interstitial Myocarditis.—Among the causes of this form of myocarditis are the excessive use of tobacco or alcohol; gout, rheumatism, malaria, diabetes, chronic nephritis, syphilis and lead poisoning. Acute interstitial myocarditis may lead to the chronic form. This form is "commonly caused by the narrowing of a coronary branch in a process of obliterative endarteritis" (Osler). It may be due to injuries of the anterior and lateral portions of the chest. Unquestionably **osteopathic lesions** of the upper dorsal vertebræ and ribs and cervical region affect the integrity of the heart muscle and predispose to congestion, inflammation and debility of the tissue. Males of middle life are more predisposed to chronic myocarditis.

The **pathological changes** occur most frequently in the left ventricle and the septum, but they may occur in any portion. The patches and streaks that are in the walls are sometimes only seen upon very careful examination. They are of a gray or grayish-white color, and when fibers that have undergone fatty degeneration are intermingled, they have a grayish yellow tint. The condition may be associated with hypertrophy and dilatation. A part of one of the heart cavities may become dilated, producing what is known as cardiac aneurism. There is destruction of the muscular fasciculi with subsequent development of new fibrous tissue. Fatty degeneration is also seen.

Symptoms.—Advanced fibroid myocarditis may be present without any symptoms. Slight degrees present no symptoms. The symptoms when present are: a feeble, irregular, slow pulse; attacks of angina pectoris and sometimes arhythmia. The blood pressure is increased. Upon exercising

there is more or less pain, cardiac distress and dyspnea. If fatty degeneration is also present the pulse will be quickened and irregular.

Diagnosis.—This is often very difficult and it requires careful and persistent study of a case to be able to make a correct diagnosis.

Prognosis.—This is grave, though unquestionably a number of cases have been distinctly improved through osteopathic methods. Sudden death is liable to occur at any time from complete obstruction to the coronary arteries, as this condition is associated with sclerosis and narrowing of these arteries or their branches.

Treatment.—The treatment of chronic myocarditis is largely included in chronic endocarditis. The cause of the disease should be determined, if possible. Careful treatment to the ribs of the left side, from the first to the sixth, and the corresponding vertebræ, will be of great aid in controlling the disease. The cervical region demands attention, owing to the influence of the vagi on conduction of the heart impulse and to vasomotor effect. Attention should be given to the diet and hygiene of the patient. Outdoor life, bathing of the skin, and careful treatment of the vasomotor nerves will be of great help.

Direct attention to the entire splanchnic region as vasomotor control here materially lessens the work of the heart and assists generally in maintaining the digestive and nutritive functions.

Degeneration of the Heart Muscle

In fatty degeneration, the sarcous substance of the fasciculi is converted into fat. In fatty overgrowths there is an excess of fat in and about the heart.

Fatty degeneration is very common and is due to an interference with the nutrition of the cardiac muscles. It is found in the impaired nutrition of old age, of cachectic states, of grave infectious diseases and of wasting diseases. In poisoning by arsenic and phosphorus, intense fatty degeneration is produced. Pericarditis may be associated with changes in the superficial layers of the cardiac muscle. Lesions of the coronary arteries will produce this condition; also impairment of the oxygen-carrying power of the blood. It occurs most frequently in men after forty years of age. The affection may be either general or local. It is most commonly seen in the left ventricle.

When the condition is general the heart is dilated, flabby and relaxed. Microscopically, the muscular fasciculi exhibit a loss of nuclei, and oil drops and granules appear in the fibers. The affection may be present without any noticeable symptoms. Slight degrees and localized fatty degeneration are unrecognizable. **Dilatation** must be present to produce **symptoms**. This is apt to occur early. Dyspnea; asthma; cough; angina pectoris; dropsy; slow, weak pulse; palpitation, and toward the end, Cheyne-Stokes breathing may appear. Mental symptoms, such as maniacal delusions, may come on and last for weeks. **Prognosis** depends upon the cause and extent of involvement.

The **treatment** is largely that of dilatation of the heart. An effort must be made to determine the cause, and treatment should be applied accordingly. Considerable can be done in improving the nutrition of the tissues of the heart by hygienic and dietetic measures. Light exercises will often be of aid, but care has to be taken that the exercises do not tax the patient too severely. A general treatment of the body will be a helpful measure in invigorating the system as a whole and toning the cardiac tissues. The diet should be nutritious; largely nitrogenous.

Raising the ribs over the heart and increasing the chest expansion will be of help in cases where there are attacks of dyspnea and angina. Many cases present deep seated lesions in the upper dorsal region. When there are attacks simulating apoplexy, lay the patient flat upon the back with the head slightly elevated.

Fatty overgrowth is associated with general **obesity** and sooner or later this infiltration impairs the nutrition of the cardiac muscle and true fatty degeneration results. This form occurs more frequently in men, and between the ages of forty and seventy years. The characteristic changes consist of an increase in the normal fat. The heart may be enclosed in a thick covering of fat. The fat may also be deposited between the fasciculi, sometimes reaching the endocardium. Fatty overgrowth is certain to exist in extreme obesity. No **symptoms** are produced until the muscular fibers weaken so that **dilatation** occurs. The presence of extreme obesity, combined with signs of cardiac weakness, point to fatty overgrowth. The **treatment** of fatty overgrowth of the heart is largely the same as that of obesity. Oertel’s method of lessening the amount of liquids, proteid diet and graduated exercises is effective in cases where heart compensation is intact.

Neuroses of the Heart

Palpitation is a more or less rapid action of the heart, of which the patient is conscious. There is usually an irregular or forcible action of the heart, as well as a frequency of the heart-beat. There is generally some local irritation to the cardiac nerves; especially are **lesions** found to the third and fourth ribs, although a lesion may be higher or lower in the dorsals or it may be in the cervical area. Muscular lesions are frequent. These lesions predispose to the disturbances of reflex stimuli, still the general health may be so weakened or the reflex irritation so pronounced that palpitation results independently of predisposing osteopathic lesions. Females are more liable to be affected. The neurotic state is a common source of the disorder. If palpitation is long continued it causes hypertrophy. It often occurs at puberty, during menstruation and at the climacteric period. Anemia, the acute infectious diseases, dyspepsia, disturbances of the ovaries and other pelvic organs are common causes. The abuse of coffee, tea, alcohol, tobacco; diseases of the stomach, overwork, fright, grief, anxiety, and sexual excesses are causative factors. Palpitation may be associated with organic diseases of the heart, but as a rule it is a purely nervous affection.

The patient's perception of the increased action and force of the heart is the **essential element** in palpitation. The action of the heart varies greatly and at times it may be a mere fluttering which lasts but a few minutes. In severe cases the heart beats violently and the pulse may be rapidly increased and reach 160 or more. The face is usually pale, but may be flushed. The heart's action is not increased in some cases. The attack generally lasts only a few minutes.

The first consideration in **treatment** is to locate the disturbing factor. Raising the ribs over the heart and lowering the first rib; correcting the clavicle in a few instances, or inhibiting along the upper dorsal region will usually quiet the heart's action. Stimulation of the vagi nerves, as they pass along the side of the neck, may be all that is necessary; in some cases inhibition of the superior cervical sympathetic or of the middle cervical region, acting on the depressor nerve of the heart, will lessen the tumultuous action of the heart. It will be recalled that either there is irritation of the accelerator nerves of the heart or the vagus is inhibited.

All **reflex disturbances**, as a displaced uterus, indigestion, etc., must be removed before the palpitation can be permanently stopped. Rest and confidence in the treatment are of great importance. A very few cases will require a hot bath and a general treatment and possibly an ice-bag over the heart to quiet the increased activity. In **anemic cases** hygienic measures and a proper diet, coupled with the treatment for anemia, are indicated. If the attack is severe, the patient should rest in a recumbent posture and drink something warm, besides receiving the indicated treatment. When the patient is not a decided neurasthenic a rapid five or ten minute walk will often normalize the heart's action.

Tachycardia is rapid action of the heart and commonly occurs in paroxysms. There are no heart sensations, as in palpitation. Either the sympathetics are stimulated or the vagus inhibited. It is not generally related to lesions of the heart, but is in reality a **disorder** of the **nervous system**. In some instances the condition is physiologic. Nervous strain, in the form of **osteopathic lesions** to the upper dorsal or cervicals irritating the sympathetic, is the most common cause. Emotion, fright and severe exercise are other causes. It is found in neurasthenia, anemia, hysteria and in those using an excessive amount of tobacco, tea and coffee. **Reflex stimuli** from abdominal or pelvic disorder, especially during the climacteric may induce tachycardia. In exophthalmic goitre the sympathetics are overstimulated, and in some instances the vagus inhibited, leading to "heart hurry." Tumors, hemorrhages, enlarged glands, etc., obstructing the action of the vagus, are a source of rapid heart.

Sudden onset with rapid action of the heart, small weak pulse, headache, flushed face and faintness are common **symptoms**.

The **treatment** is somewhat similar to that outlined under palpitation. Locating the cause is the first essential. Besides removing local osteopathic lesions, inhibition to the cervical and dorsal sympathetics is effective. Raising the ribs over the heart will lessen the pulse-rate.

Rest, diet and general care of the patient may be necessary. Outdoor exercise and cold bathing are beneficial. In a few cases springing the dorsal spine forward, raising the floating ribs, and slight traction of the cervical spine are effective in slowing the heart's activity. A few cases are very refractory, especially in neurotics.

Brachycardia, or slow action of the heart, is the opposite of tachycardia. In a few cases it is physiologic. It usually occurs secondarily, following infectious diseases; accompanying nervous disorders, as hysteria, melancholia and neurasthenia, and is associated with diseases of the digestive organs, pulmonary disorders and toxic effects of coffee, tea, tobacco, and drugs and the toxins of jaundice, diabetes, uremia, etc. Obstructions to the cervical sympathetics and irritations of the vagus, from osteopathic lesions, may be either direct causes in themselves or predisposing factors in the above diseases.

A **slow, weak pulse** is the characteristic symptom. The heart sounds are feeble. When the pulse beat is below sixty per minute it is diagnostic.

In the **treatment** of slow heart, as in the other neuroses of the heart, the cause should be first determined. A stimulating treatment to the cervical sympathetics and inhibition to the pneumogastric will readily relieve many cases, at least temporarily. The lesion may be directly to these nerves and of course removal of the same is essential. Inhibition of the pneumogastric probably affects the activity of the depressor nerve, and stimulation of the cervical sympathetics, besides acting on the accelerator fibers of the heart directly, influences the blood supply of the body and thus increases arterial tension. Stimulation to the upper chest anteriorly and posteriorly, over the cardiac region, will increase the rapidity of the slow heart. Rest and care of the general health is necessary.

Arhythmia, or an irregularity of the heart's action and pulse beat, often due to lesions in the cervical region interfering with the vagi, symis pathetic or vasomotor nerves to the heart. In a number of cases the first, second or third rib on the left side is at fault and a correction of it will relieve the irregularity immediately. It is claimed that there are nerves at the fourth and fifth dorsals that tend to control the rhythm of the heart-beat. Other causes are organic diseases of the heart and nervous system, reflex disturbances, excessive use of tobacco, coffee and tea.

"Normally, the contraction of the heart originates at the sinoauricular node, at the mouth of the superior vena cava, is conducted to the auricle, and thence to the ventricle by way of the auriculo-ventricular bundle (bundle of His or Gaskell's ridge). Under conditions of abnormal stimulation, contractions may originate in the auriculo-ventricular node in

the wall of the right ventricle near the coronary sinus; or in the auriculo-ventricular bundle on the ventricular side of the node; or in the auricular tissue itself."—Clinical Osteopathy.

Fibers from the right vagus pass to the sinoauricular node, and from the vagus to the auriculo-ventricular bundle. Lesions of the upper three cervicals may readily disturb the vagi through circulatory and chemical sources as well as through the communicating branch of the second spinal nerve. Thus the rhythmic power of the heart, rate and strength, and conductivity of impulse may be readily influenced, which is borne out by clinical experience.

There are several forms of irregular heart action. For a description of same it is probably best to refer the student to special works.[103]

The more common forms are **Sinus** Irregularities, the **Extrasystole**, **Paroxysmal Tachycardia**, **Auricular Fibrillation**, **Auricular Flutter**, and **Heart-block**. **Pulsus Alternans** is a rare form, and is of grave significance when the heart muscle is degenerated. A knowledge of **auricular fibrillation** is of special value, for it is a common form and often indicates a serious condition.

Most of the irregularities are not of special pathological importance, providing the heart muscle is healthy. They are best studied through instrumental means and require considerable experience in order to determine the exact condition.

Frequently, unnecessary worry has been the result in discovering irregularities in the young as well as in otherwise healthy adults. Only when the cardiac muscle is diseased or degenerated through various infections and toxic properties in the blood should they receive unusual attention.

Dorsal and lower cervical lesions that affect the heart by way of the sympathetics no doubt disturb nutrition of the heart tissues. And lesions of the vagi, particularly of the upper three cervicals, will disturb the rhythm, rate, strength, and conductivity of the impulse through auricles and ventricles. In no other organ of the body will the osteopath be better rewarded for careful and painstaking work than in normalizing the stimuli from sympathetic and vagi that influence the heart. Stimulatory and

inhibitory efforts will frequently suffice, but in our judgment it is always better to secure interosseous adjustment if possible.

Though a number of individuals with heart irregularities are of a neurotic type, that predisposes to nervous disturbances of various kinds, still it would be an interesting study, especially in cases of children, to note what percentage are the result of upper cervical lesions caused by birth injury.

Angina Pectoris

Angina pectoris is characterized by pain in the cardiac region which usually extends to the inner side of the upper arm and forearm. "This region corresponds to the peripheral distribution of the lower cervical nerves (6th and 7th in the arm) and the upper three or four dorsal nerves (in the upper arm and the chest)."[104] Occasionally similar areas of the right side are affected, and in a few there is pain in the lower jaw and back of the ears. "The starting of the pain is usually across the chest, about the level of the third ribs, or as low as the fifth ribs," although the inception may be anywhere in the left chest or the arm. The duration of the pain is from a few seconds to several minutes; sometimes it may remain for several hours.

Osteopathic lesions are invariably found in the upper dorsal, including ribs, or lower cervical region, which are predisposing factors that tend to exhaust and weaken the cardiac muscle, and disturb the coronary circulation, so that resistance is lowered. Thus toxic agents and infections may readily involve the cardiac tissues. Many cases present more or less arteriosclerosis, which involves the heart and affects its circulation. Inflammation of the root of the aorta from syphilis is a frequent cause. Valvular heart disease and chronic nephritis are other underlying factors. Worry, strenuous living, and continued physical strain are to be considered. There are a group of cases, that are comparatively mild and frequently found in women, that are of toxic origin, due to intestinal stasis as a result of constipation, adhesions, etc. The ileo-cecal section is commonly involved in these instances. Focal infections may be an exciting cause.

The **osteopathic lesions** undoubtedly affect the cardiac innervation, particularly vasomotor and trophic, thus leading to consequent disturbances of cardiac circulation and resulting irritation to the ganglia. Sclerosis and

spasm of the coronaries, ischemia, cramping, exhaustion, and degeneration of the heart muscle, and cardiac neuralgia, are various results that may take place.

The **paroxysm** usually begins suddenly, often during exertion or intense mental emotion. The pain is agonizing and of a grip-like character, and there is a feeling of impending death. The intercostal muscles are constricted and there may be a feeling of suffocation. The pains radiate up the neck and down the arm, and may be accompanied by numbness or tingling. There is usually extreme pallor, and the skin is ashen. Sweating is not uncommon, and dyspnea may be present. The attacks occur at intervals, varying from a few days to many years. After the paroxysms there is instant relief.

Other cases may present less severe attacks.

In the **diagnosis** the only condition with which true angina pectoris is liable to be confounded is pseudo-angina pectoris. **Pseudo-angina** or hysterical angina occurs chiefly in women or in neurasthenic men. These cases are often excited by toxemia. The attack usually occurs at night and is unassociated with organic heart disease. There is a feeling of cardiac **distention instead of constriction** as in true angina. There is emotional excitement and the attack lasts one or two hours, which is usually longer than that of true angina. The **prognosis** is unfavorable, although many cases live for a number of years. A few cases have recovered under a thorough course of treatment.

The **treatment** of angina pectoris consists in correcting the disordered upper dorsal vertebræ, the upper left ribs over the heart, and the lower cervicals. Invariably lesions are found in this region and if the treatment is applied to correct these disorders, the attack can frequently be relieved. By following up the treatment during the intervals, a number of cases can be practically cured. A common lesion found is a slight lateral curvature in the upper dorsal region. This curvature is oftentimes great enough to cause a subdislocation of several of the ribs, which certainly complicates the derangement, at least as far as a quick cure is concerned.

During the **attack** raise the ribs over the heart at the point of constriction so as to relieve the impinged nerve fibers. Hot drinks are of value. The vagi

and phrenic nerves may also be at fault in some cases. The sensory nerves to the heart are from the first, second and third dorsals.

Ice-bags or heat applied locally will be a helpful measure. In cases where there is high arterial tension, an inhibitory treatment to the upper and middle cervical regions will be of special aid, as it relieves this tension by affecting the vasomotor nerves. This treatment will at least overcome the **vasomotor form** of angina pectoris. Hot foot-baths and friction will also be found of value. In many cases under forty or forty-five syphilis is a cause. In cases past middle life there is often organic disease of the circulatory organs.

The patient should at all times avoid any excitement and live a very quiet life. He should take frequent vacations. He should take the best of care of himself and his food should be nutritious. In pseudo-angina the treatment is to relieve the irritation to the nerves affected as well as the underlying affection.

FOOTNOTES:

[100] Journal of the American Osteopathic Association, April, 1906.

[101] Valvular Heart Diseases, A. O. A. Journal, March, 1905.

[102] Journal of Osteopathy, February, 1904.

[103] Mackenzie, Diseases of the Heart; Lewis, Mechanism of the Heart Beat; Macleod, Physiology and Chemistry in Modern Medicine.

[104] Mackenzie, Oxford Medicine, Vol. II.

DISEASES OF THE ARTERIES

Arteriosclerosis

(ATHEROMA)

This is a thickening of the intima of the arteries, due to an inflammatory increase of the connective tissue, associated with more or less fatty degeneration and calcification.

Old age, alcohol, lead, gout, syphilis, rheumatism and other infections, laborious work, overeating, nephritis, and calcareous water tend to produce the condition. **Excessive eating** and **drinking** are common causes of both atheroma and chronic renal diseases and should always be regulated. Physical overwork, chronic intoxications, etc., produce hypertension of the vascular system and thus lead to changes of the vessel walls. A rigid spine is invariably found; this may be a causative factor in itself, or an associated condition. All of the above list of causes are important.

Pathologically, the arteries are thickened, tortuous and rigid. The intima may be occupied by rough, calcareous plates. In extreme cases the sub-endothelial tissue undergoes degeneration and breaks down in spots, forming "atheromatous abscesses." The disease may be **circumscribed** or **diffuse**; in the latter there is a widespread distribution of the affection. Owing to the general effect, the heart, liver and kidneys receive less blood and tend to atrophy. Microscopically, there is found more or less fatty degeneration of the different coats, and an overgrowth of connective tissue in the intima. The arteries most frequently affected are the aorta and coronary.

Symptoms.—Circulatory.—There is a high tension pulse and accentuation of the second aortic sound. There is also dyspnea, severe pain in the left side, palpitation, pallor, and the left ventricle is hypertrophied. **Cerebral.**—Such symptoms as headache, tinnitus, aphasia, vertigo, syncopal or epileptiform attacks may be present. **Renal.**—There is an increase in the quantity of urine, which is of a pale color and low specific

gravity; at times it is albuminous. The disturbance leads to atrophic nephritis. There may be gastro-intestinal symptoms, as constipation, pain, etc., due to hardening of the splanchnic vessels. In some cases the peripheral arteries become obliterated. The veins become hardened.

Sequelæ are cardiac dilatation, heart failure, paralysis, apoplexy, fatty heart, aneurism, contracted or senile kidney, angina pectoris, and in extreme cases, gangrene of the extremities.

Diagnosis.—The characteristic symptoms are hardened arteries, high tension of the pulse, hypertrophy of the left ventricle and accentuation of the aortic second sound. The average blood pressure is from 160 to 180 mm. of mercury, though it may be considerably higher.

Prognosis.—Many cases can be greatly benefited by osteopathic treatment, and at the incipiency the improvement is generally marked. It usually runs a very chronic course.

Treatment.—The treatment must necessarily consist, principally, in the removal of such conditions as are producing the degeneration. The rigid spine should be carefully treated by methods (preferably traction) that overcome the contractures and release the intervertebral discs. The dorsal and lumbar areas, and the abdominal organs should receive special attention. Outdoor life and plenty of rest are important. Alcoholism, gout, rheumatism, syphilis, etc., must be remedied before there can be much change in the arteries. Freeliving and all excitement must be stopped. The patient's cooperation is invaluable. A milk diet is often beneficial. Besides treatment of the primary disease, a general treatment will be of much avail in equalizing and reducing arterial tension. Brunton[105] speaks of cases of atheroma being cured by exercise and manual treatment to the rheumatic joints themselves. One, apparently suffering from senile dementia, was much improved after two years of this treatment applied to the joints, and showed benefit to the cerebral circulation. The bowels and kidneys should be kept active, and the general health of the patient carefully watched. Keeping the skin active by daily baths is an essential factor in the treatment. Very frequently the disease is not only retarded, but improved. In high blood pressure venesection may be of benefit.

FOOTNOTES:

[105] Lectures on the Action of Medicine, p. 343.

DISEASES OF THE BLOOD

By Earl R. Hoskins

General Considerations:—It has been said that each individual is a part of all the generations which have preceded him. In the same way it might be said that every drop of our blood is a part of every other cell in our bodies. The other tissues are able to maintain their existence only through the ministrations of the blood and in turn the blood derives its own substance from tissues which it supplies. We are accustomed to speak of certain organs as being those of blood formation, yet it is true that every tissue furnishes its quota of blood composition, making up the mass which we call blood.

It is in one way an algebraic sum of good and baneful substances, without which there can be no normal function, and sometimes being of itself a menace as well as an aid to other tissues, as in sepsis. There can be no perverted function of any tissue without there being a direct effect upon the blood. We may not always be able to measure this effect with our present laboratory methods. We may not be able to detect clinically the result of this alteration of the blood stream because of compensatory influences, dilution, phagocytic action, enzymatic action, oxidation, and the intricate processes of excretion. It must also be remembered that normal blood is not of a certain definite chemical or physical composition. It must vary from minute to minute according to the normal metabolic phenomena which make up our succession of events associated with life.

But comparatively little is known about this most important fluid. We have accumulated data regarding morphology and relative numbers of its formed elements and their behavior when sufficient abnormality is present to upset their wonted balance of arrangement. We have an ever widening field of investigation in the blood plasma in which we are constantly being told of newly discovered complexities. Certainly the field of the unknown is big enough to contain our unexplained blood reactions.

It is probable that as our knowledge increases our number of diseases really considered as true blood diseases will decrease and be shown to be

the effect of blood passing through certain pathologic tissues of the body. We can measure the number and proportion of formed elements, and the relative efficiency of the erythrocytes by the amount of hemoglobin which they carry. The genesis of the formed elements is to be kept in mind in considering therapy. The erythrocytes and granular cells developing in adult life, principally from the red marrow, leads our attention in decrease or increase of these particular cells to the greatest aggregation of red bone marrow which happens to be in the ribs. The anatomical relation of the ribs to the spine would seem to render them very liable to disturbances of nutrition and nerve control as a result of structural maladjustment and clinically this presumption is verified. Limitation of the motion of the thoracic spine is perforce accompanied by costal inactivity with disuse effects upon the red marrow and eventually upon the relative content of the blood stream.

We can measure the efficiency of the erythrocytes in carrying oxygen to the tissues by measuring the relative amount of hemoglobin which a given volume of blood contains. The actual changes taking place in blood character are often thus sufficiently indicated for us in terms of our present methods of examination, to at least aid in the arrival at a diagnosis. We sometimes have to remember that the adaptation to abnormality may be efficient enough to keep the apparent significance from telling the “whole truth.”

The Anemias

The class of diseases which are referred to as the Anemias are those in which there is an actual, or apparent, decrease in the oxygen carrying element or hemoglobin. This may not be due to an actual decrease in amount of hemoglobin, but rather to a decrease in the ability of the red cells to carry it. This decrease in ability may be due to alteration in the erythrocytes themselves, or to effects of change in the molecular concentration of the plasma in which they are suspended. The plasma may also contain certain poisons probably protied, which may make impossible the efficient carrying of hemoglobin by the erythrocytes.

The simplest form of anemia is that due to removal of a large percentage of erythrocytes from the body. This condition is fulfilled in acute

hemorrhage. If the amount of blood lost does not exceed the amount necessary to maintain circulation, roughly fifty per cent of the total quantity, the fluid portion lost is quickly replaced from the fluids of the body and from material ingested. The formed elements and proteids are less rapidly replaced by a compensatory increase in function of the hematopoietic tissues so that there is a gradual return to the original number and proportion.

A blood cell may be considered as passing through a life cycle of infancy, adolescence, maturity, and senility before it is finally destroyed. If the demand for new cells is not too great it will be met with mature cells. If the call is more urgent, younger and older cells will both be put into the conflict, while in a time of extreme stress all types of cells, from the "school boys" to the "gray-beards", will have to be utilized to maintain life. So, roughly, we can judge the severity of the anemic process by the reaction which the body makes to it as indicated by the character of the cells in service.

The pigment, hemoglobin, is slowly regenerated even as compared to erythrocytes, so that the color index is usually the last finding to return to normal after a hemorrhage. The leucocytes are usually increased after hemorrhage, probably as a protective mechanism, nature having learned by hard experience that she has less resistance to infection, when there is loss of a considerable quantity of blood.

To be considered, also, is the fact that constantly blood cells are outliving their usefulness—some must be disposed of. The extra function required of these older cells gives the same results as over work upon an old man—hurries his time of demise so that there is a greater percentage than usual to be sent to the salvage shops. The regeneration of blood after hemorrhage depends upon the severity of the loss, the nutrition, upon the treatment given, and indirectly the ability of resistance developed by the patient.

In the chronic anemias we may have either defective development of erythrocytes, or defective function of them, or a relatively too great destruction of these same agents.

A bank account may be depleted either by too small deposits to account for current expense, or by extravagant withdrawals. It is sometimes difficult to determine on which side the fault lies. It seems to be nature's plan not to

subject to active work an erythrocyte until after the nucleus has disappeared, judged by ordinary methods of staining. A sudden call for an increased number of erythrocytes may force the organism to send in some with nuclei, but the circulation does not receive those which have not been standardized, as to shape and staining reaction, unless the crisis is of grave import. Evidence of increased destruction of these cells is shown by broken forms—shadow forms, and by an increased excretion of the pigments derived from the breaking down of hemoglobin, namely bilirubin and urobilin. A great deal of information can be obtained by a study of the other formed elements of the blood.

In general the symptomatology of all the anemias will be that of lessened metabolism because of deficient oxygenation. This is accompanied by imperfect nutrition and general impairment of function. Among the usual results are muscular weakness, malaise, headache, dizziness, anorexia, and cutaneous and membranous pallor, with tendency to local hemorrhages. The heart is often rapid, easily disturbed in rhythm, may possess a hemic or functional murmur, and gives a soft compressible pulse of low pressure. As a compensatory attempt the respiration may be rapid, but is likely to be shallow, and dyspnea results from disproportionately small exertions.

There may be either troublesome constipation, or diarrhea; often there are alternating periods of each. In the severer forms convulsions, coma, delirium, stupor, localized edema of the ankles or eyelids may be seen.

In general the treatment of the secondary anemias will concern the removal of the cause followed by measures tending to increase the decreased element or elements in the blood stream. In the anemia resulting from hemorrhage the thirst which follows is the body’s method of calling for more fluid with which to maintain pressure in the arteries and capillaries sufficient to develop new formed elements to take the place of those lost. If the loss is severe enough to give rise to shock, emergency measures are necessary of introducing into the venous stream an artificial fluid to make up for the fluid part of the blood lost. If the condition can be predicted and a suitable donor obtained, blood transfusion is of greatest advantage to the patient. More often the urgency of the condition will require an artificial fluid to be given in haste. Probably the best so far devised solution is Fischer’s physiological salt solution. In the anemias due to chronic metal poisoning as from lead and mercury, or from systemic poisoning such as

syphilis or malaria, or from the retention of metabolic products as in some of the diseases of the kidneys or of the liver, the anemia can only be successfully treated by normalizing its primary cause—as it occurs in the role of a symptom or result, and hence is only indirectly a blood condition.

Costogenic Anemia

(Burns' Anemia)

Costogenic Anemia is a result of functional disuse-atrophy of the hematopoietic organs, there being an insufficient supply of erythrocytes to meet the demands of the metabolism of the body. It results from insufficient opportunity for nutrition and drainage of the red marrow of the ribs, and gives the clinical picture of an anemia due to too slow production of erythrocytes.

Etiology.—The condition is predisposed to by any factor which tends to limit the action and nutrition of the ribs. We are too prone to forget that the function of the ribs is to produce erythrocytes; it is really a matter of secondary importance that they make up part of the thoracic wall. The change from the horizontal to the upright position has tended to a drooping of the whole chest from gravity. The human animal seldom develops the free hinge rib motion as often seen in quadrupeds. The passage of both arterial and venous blood, is not normally free and copious, and as a consequence the tissue supplied functions less efficiently. This function of the red marrow is to produce erythrocytes. Any structural lesion of the dorsal vertebral column, or its costal articulations, which interferes with the free motion of the rib thus interferes directly with the efficient function of these particular ribs. The severity of the condition varies with the number of ribs affected and the impedance to nutrition and drainage.

Diagnosis.—The condition may be of gradual onset, and may be associated or coincident with some other condition leading to a loss of tone or opportunity for free rib action. The systemic symptoms are due to a deficient oxygenation of all tissues as a result of the above disuse. The thorax is usually rigid—forced respiration requires unusual effort without proportionate thorax expansion. The type of breathing tends toward diaphragmatic. The quantities of tidal and supplemental air are both

markedly decreased. The lack of tissue oxidation renders elimination less active, hence constipation. Gas accumulation, weakness, insomnia, with slightly increased amount of urine, and low in total solids, is the rule.

"The blood itself is rather characteristic. Coagulation time is increased; specific gravity and viscidity diminished; red cell count normal or only slightly diminished; hemoglobin 6 to 10 grams per 100 c. c. of blood (Meischer); 40% to 80% (Dare). The red cells are small, pale, vacuolated, sometimes nucleated. The white cell count is normal, slightly increased or slightly diminished. The hyaline cells are normal, or slightly relatively increased. (These, being formed in lymph nodes, tonsils, etc., are not affected by rib changes.) The mononuclear neutrophiles are relatively increased. The nuclear average of the polymorphonuclear neutrophile is low. Vacuolated and atypical neutrophiles are often found. Basophiles, myelocytes and amphophiles may be found in considerable numbers. Nuclei in all granular forms present evidences of immaturity or degeneration—they may be swollen, vacuolated, extruded, ragged, or with variable staining reaction" (Clinical Osteopathy).

Treatment.—The treatment is to obtain a normal function in the inactive tissues. This is done by getting better rib hygiene. Whatever is interfering with rib function and metabolism is to be removed. Breathing exercises are given not only to "ventilate the thorax, but to exercise its walls". Carefully selected horizontal bar work is often of great value. The diet should be of such nature as to supply material for manufacture of erythrocytes and for loading them with hemoglobin as well. Hence the foods with high chlorophyl or hemoglobin content should be emphasized.

Prognosis.—This depends on patient's desire for improvement of his condition. He can be improved by correction of whatever lesions there may be interfering with his freedom of thoracic motion. He can be benefited by manipulations which adjust the ribs, but his cooperation is essential. Lack of cooperation on the part of the patient, which would tend to increase the mobility and metabolism of the ribs, renders him more liable to any of the intercurrent pulmonary infections, as a result of his deficient thoracic ventilation.

Encourage free thoracic respiration especially when in school, or when under conditions which ordinarily would tend to slovenly habits of

breathing.

Chlorosis

(Green Sickness)

An anemia characterized by great reduction in the amount of hemoglobin. It most frequently occurs in adolescent girls. It seems to be associated with neurotic manifestations and menstrual irregularities.

Etiology.—Its cause is not well understood. Poor hygienic conditions may be a factor, but it is a condition found in all stations of life. The age and sex have led to investigation as to probability of lack of an ovarian internal secretion. The reports of workers are contradictory. The name of the condition is derived from the color of the skin, which usually ranges from a pale greenish tint to a slight pallor. Occasionally there is localized vasodilation of the cheeks giving brilliant color. Constipation accompanied by copremia seems to be either a causative factor or result. In many cases it appears to act in the dual role. Fixation of the middle and lower ribs accompanied by osteopathic lesions from the mid to the lower dorsal spine seem to be constant findings. The costal fixation leads to lessened respiratory excursion and resulting diminished oxygenation.

Diagnosis.—Chlorosis may be suspected from the color of the skin, perverted appetite, wandering neuralgias, heart palpitation, edematous infiltration, and shallow type respiration, but the diagnosis is not to be made without the aid of the blood count. The striking part of the blood picture is the great reduction in amount of hemoglobin carried by each erythrocyte. There is usually some reduction in the erythrocyte percentage but not in proportion to the decrease in color index.

There are usually many pessary-shaped and shadow erythrocytes. These are of all sizes, but seldom is the condition of such gravity as to cause more than an occasional nucleated red cell, and when found are most likely to be normoblasts. The staining reaction is of wide limits. Cells of all degrees of relative alkalinity are found and often there is a wide variation of staining reaction in the same cell. The number of erythrocytes is usually slightly decreased but not in the proportion that the hemoglobin percentage is, so that the color index is therefore strikingly low. Probably, the average color

index for a typical case of chlorosis is 50, with an erythrocyte count of 4,000,000 and a hemoglobin of 40 per cent (Dare.) This drop in color index in chlorosis is far out of proportion to the clinical symptoms which would be expected from a similar reduction resulting from the ordinary causes of secondary anemia. The blood plasma is increased and the specific gravity is lowered, sometimes reduced from 1.055 to about 1.030.

Treatment.—The treatment of any malady in which the etiology may be apparently of widely different natures will naturally rationally vary with the apparent cause. If there is copremia, which seems to be a definite causative factor, this should be at once corrected. These patients form the cathartic habit readily, so physical and dietary methods of returning the digestive motility to normal should logically be given first trial. If it is a matter of lessened metabolism as a result of insufficient exercise, or blood oxygenation, outdoor gymnastics and breathing exercises may incite the stimulus to normal erythrocyte hemoglobinization. The diet should be of such nature as to furnish material both for erythrocyte formation and iron in form for ready absorption by them. The organic iron compounds of animal hemoglobin and vegetable chlorophyl are our most common and cheapest as well as most effective sources.

The medical treatment of chlorosis is based on the empiric use of inorganic iron. “The exact method in which iron exerts a favorable influence upon chlorosis still remains unsettled. It is difficult to understand why iron salts in the food which are sufficient for all ordinary needs, are insufficient in chlorosis. It seems most probable that iron cures chlorosis by acting as a stimulant to the **blood forming organs**” (Beifeld, The Basis of Symptoms.)

Clinically, osteopaths are daily obtaining rationally the necessary stimulus to the blood forming organs by removing all impedance from these organs caused by vertebral and costal lesions and by obtaining better digestive and respiratory hygiene.

Prognosis.—Recovery is to be expected and its rate will depend upon the thoroughness of the osteopathic work and the patient’s ability to respond to the stimulus. The blood may show chlorotic relapses with concomitant symptoms if in later life secondary anemia develops from hemorrhage, hook-worm infection, or other causes.

Pernicious Anemia

This anemia is of obscure etiology, characterized by progressive destructive hemolysis of the erythrocytes, usually with fatal termination. The cells retain their hemoglobin carrying ability, so that while the hemoglobin is decreased in percentage, the proportionately greater decrease in the number of erythrocytes leads to a marked increase in the color index. The destructive influence upon the red cells may be sufficient to allow only a small percentage of the erythrocytes to appear normal and show the greater number to be deformed, or in various stages of degeneration. Cells which in times of health would have been sent to the "salvage station" are retained to carry an over-load for them of hemoglobin to the needy tissues. Immature nucleated cells of all types are drawn into the battle long before they can be efficient carriers to help supply oxygen to the tissues. Seldom will a secondary anemia be severe enough to produce megaloblasts in the blood stream yet they are a rather constant finding in pernicious anemia. With these cells of irregular carrying capacity and development, anisocytosis and polychromatophilia are expected findings.

Symptoms.—The condition must be regarded as a symptom complex or a result of pathologic process or processes. A type of anemia very similar in symptoms and blood findings to the pernicious anemia is produced by the toxins of advanced malignancy, and by at least two forms of intestinal parasites, the ankylostoma duodenale and the bothriocephalus latus. In the true pernicious anemia we have similar results but are not able to locate the primary pathology. There are present synchronously, enormously increased destruction of erythrocytes and enormously increased production of them but we are unable to determine which is primarily at fault. The belief that the cells are more fragile and too easily broken up has led to the removal of the erythrocyte destroying spleen in the hope that destruction would be delayed until regeneration of even imperfect cells would balance the need. Occasionally, the algebraic sum of regeneration and destruction may be apparently balanced and not tell the tremendous amount of pathology both productive and destructive, that the body is going through.

The first symptoms are of easily produced fatigue of all the body, brain, muscles, diminished digestive secretion, and dyspnea. As a result of poor tissue oxygenation, fatty degeneration takes place in the more active organs

as the heart, kidneys and liver. There may be extensive degeneration of varying areas of the central nervous system. Some of these areas are due to hemorrhages from the general tendency to breaking down of vessel walls. Often these areas of destruction affect the posterior horns of the spinal cord, and, occasionally, a blood count differentiates between similar symptoms of pernicious anemia and tabes dorsalis. There is seldom any emaciation; usually the patient appears "puffy" with a "pasty" color. There is variable subcutaneous edema. The symptoms being of such wide distribution and character, the patient is usually treated for all sorts of supposed conditions until some one makes a blood count at a time when there is enough disturbance of equilibrium to give the findings of pernicious anemia.

Treatment.—The treatment of the form due to intestinal parasites gives striking results on removal of the causative organisms. Some advise treating all cases having these blood findings on the assumption that the presence of these parasites is responsible for the condition. The treatment of the idiopathic form resolves itself into building up the ability of the body to resist disease and the removing of all possible agents for depressing the vitality of the body. Rest in bed coupled with the digestible and assimilable limit of nutrition often gives temporary improvement. Removal of questionable teeth also often aids for a time. Correction of troublesome osteopathic lesions is often accompanied by the same result. The symptomatic osteopathic treatment always makes the patient more comfortable, often gives temporary improvement, and, occasionally, has given a return to normal that has persisted for several years.

Prognosis.—It is nearly always possible to obtain transient improvement, but the pernicious anemia patient is usually dead within two years from the time the diagnosis is well established.

The Leucemias

As a result of any inflammatory process, there is a physiological reaction or stimulus leading to an increase in the number of neutrophilic leucocytes found in the peripheral circulation. As long as this increase does not crowd out other cells, red and white, sufficiently to interfere with their ability to function there is nothing but gain to the body of the character of more efficient bacterial destruction. After the need for these cells has passed, their

number is decreased by destruction and the lessening of their production, until an equilibrium is reached which will be maintained.

This same process of making and destroying is constantly going on for all of the different classes of cells found in the blood stream. Over-production of any type will lead to actual increase of that sort of cell in circulation, and, if unaccompanied by over-production of other types, will lead to a relative decrease of the other elements.

It is very difficult for the body to furnish normal cells very much in excess, relatively, of the normal number, so that when the stimulus leading to immense over-production is at work immature cells in great numbers are apt to be thrown into the blood stream. As an example, the case of leucocytosis which has a white count of 60,000 is extreme and the patient nearing death, yet it may not show many, if any, abnormal types of cells. A case of myelogenous leucemia with a white count of 60,000 would not be proportionately sick, and would be a mild case—yet the greater part of his white blood content would be made up of cells not found in normal blood. The leucocytosis patient is suffering more from the **cause** of his increase in number of cells, while usually the leucemia patient suffers because **of** the increase of cells. In one, the cause is usually extrinsic, and, in the other, it is intrinsic as far as the blood is concerned.

In general, then, the symptoms of a leucemia parallel in intensity the increase in cells. It takes energy to make these cells—other tissues are made to suffer from lack of this energy. Erythrocytes and white cells cannot occupy the same space at the same time. The increase in white therefore crowds the red cells out of function. Disease in relative and absolute content of erythrocytes decreases the oxygen carrying capacity of the blood stream. Hence, metabolism of the whole body suffers. Often, then, the whole apparent symptomatology of a severe leucemia is that of a secondary anemia.

The primary pathology is of hyperplasia of the particular genetic tissue of the type of cells which are in excess, and is proportionate in amount to the excess developed.

Splenomedullary Leucemia

(Myeloid Leucemia; Myelemia)

Myelemia is a disease characterized by an enormous increase in the white cell content with proportionate changes in the spleen, liver, and the blood marrow.

Etiology.—It is a disease occurring at all ages, but the majority of cases are recognized in adult males.

Heredity, trauma to the spleen, malaria, syphilis, and rapid repetition of pregnancies seem to be at least exciting factors. A few cases have been reported in which tenth, eleventh, and twelfth rib lesions were definite etiologic factors by pressure.

Diagnosis.—The patient goes through a period of vague, indefinite, and wandering symptoms. General malaise, weakness often accompanied by dyspnea, and emaciation similar in many ways to incipient pulmonary tuberculosis, except that the slight temperature changes are not typical. At the same time there may be digestive discomfort of various kinds without typical pathology. Of these early symptoms the most persistent is the **dyspnea** which is a structural result of the increase in size of the spleen. As a direct pressure result of this hyperplasia, there may develop dropsical infiltration of the lower extremities and ascitic accumulation in the abdominal cavity.

With the changes in the blood itself, the blood vessel walls break down more easily, and subcutaneous hemorrhages, epistaxis and hematemesis are common.

In an attempt to destroy the excessive amount of white cells, the liver may become enlarged. But this occurs later and of much less degree than the enormous increase in size of spleen. There may be areas of hemorrhage with resulting softening in the spinal cord. The most likely areas to suffer are the posterior and lateral horns, with resulting paraplegia, spastic or ataxic.

Usually, the course is slow, and the condition is truly chronic. But, occasionally, the rapid increase and succession of symptoms, with concomitant blood changes, change the diagnosis to acute myelogenous leukemia.

The total cell count, red plus white, is diminished, for while there is enormous relative increase of the white cells a greater actual decrease takes place in the reds. This decrease in reds is partially relative from crowding out of erythrocytes by leucocytes, but there is also actual decrease in their formation, so that there is an actual anemia present as well as a leukemia.

In some respects the red cells behave as in chlorosis, each carrying a diminished percentage of hemoglobin, resulting in a low color index. Atypical staining reactions and morphology, together with many fractured forms, are the rule. Normoblasts are common throughout the course of the disease, but megaloblasts seldom appear until near fatal termination.

The changes in the white cells are enormous, both as to numbers and character of cells found. The total white count often exceeds 350,000. This, with the accompanying reduction in number of erythrocytes, leads to a reduction of the ratio between reds and whites to as low as 1 to 5 or 3, or occasionally 1 to 1. There is an actual increase in number of all the white cells with the possible exception of the lymphocytes. In the actual increase of polymorphonuclear neutrophiles and eosinophiles is rendered a sharp relative decrease by the enormous production of myelocytes. Basophiles are usually both relatively and absolutely increased. In a white count of 350,000 it is not unusual to have present 325,000 myelocytes, with 25,000 as the actual number of ordinary leucocytes. There is, therefore, a **mild leucocytosis** coupled with a **violent** leukemia. These two are combined with an **anemia** that varies with the course of the disease.

Treatment.—The treatment is largely hygienic, including thorough osteopathic attention to the lower dorsal and costal area. Symptomatic treatment is often followed by temporary improvement both clinically and in the blood picture, but complete recovery seldom takes place. Occasionally, roentgen therapy has given a “cure” lasting several years.

Prognosis is not good. These patients are frequently carried away quickly by some oftentimes slight intercurrent infection. Even if carefully guarded from such, the course of the process usually leads to death from exhaustion in two or three years.

Lymphatic Leucemia

Clinically, this is a parallel condition to myelogenous leucemia, except that the hyperplasia of cells occurs in lymphoid tissue, and leads to an enormous over-production of lymphocytes rather than myelocytes. It is more readily divided into acute and chronic forms than myelogenous leucemia from differences in symptomatology.

In the **acute form**, adolescents are usually affected, the condition beginning with tumefaction of the lymph glands, first noted in the cervical region, but usually a general involvement. Dyspnea results from pressure upon trachea and bronchi by the enlarged glands of the mediastinum. There is pyrexia of 103 to 105 degrees, intermittent in character.

The pressure upon nerve trunks and plexuses in the thorax leads to variable anginas distributed not only in regions actually imposed upon but over all sorts of possible reflex paths. The blood vessels of the skin are easily broken down so that slight injuries result in great suggillation. The patient rapidly develops anemia, and later goes into a syndrome similar to the cachexia of malignancy. In fact, the rapid termination and clinical course of acute lymphatic leukemia is parallel to the action of malignancy. Probably the condition will eventually be properly classified as a neoplasm of the blood itself.

The **chronic form** occurs in later life, and, instead of being an abrupt rapid process, is slow, progressive and painless. It has the lymph gland hyperplasia, but the enlargement is so gradual that compensation is established to a remarkable degree. It is usually a generalized process, first noted in the cervical and axillary glands because of their accessibility. Usually both the spleen and liver are enlarged, but this also is a slow and later development.

There may be exacerbations of temperature, but they are not constant or usually severe. Hemorrhages into the skin are not common, but pruritus may be very troublesome.

The patient comes to a physician because of symptoms resulting from his secondary anemia, dyspnea, dyspepsia, and palpitation.

The **diagnosis** cannot be made without the aid of a blood study. The blood picture shows a severe anemia with both the number of erythrocytes and the hemoglobin percentage very much lowered. Of the two findings, the

hemoglobin percentage is relatively more decreased, so that the color index is markedly lowered.

In the acute form nucleated reds are common. Just before death these may show various forms and sizes as well as the normoblasts. In the chronic form normoblasts do not appear except as the case grows decidedly worse. As compared to myelogenous leucemia the anemia of lymphatic leukemia is of greater severity.

In the leucocyte count there is great increase in numbers, the greater part being composed of the lymphocytes. The lymphocytes may be either of the large or small variety, and occasionally are found in about equal proportions. In contra-distinction to the myelogenous type, the increased type of cells are of the mononuclear nongranular types. It is not very unusual to find a well advanced case of lymphatic leucemia without abnormal cells in the blood count, the expression of pathology being in the shape of disturbance in number and proportion of cells rather than in development of abnormal types. The actual number of leucocytes does not go as high in proportion to the gravity of the condition in lymphatic leukemia as it does in the myelogenous. In other words, a patient with lymphoid leucemia showing a count of 90,000 leucocytes with 90% of these lymphocytes is a much sicker man than the myelogenous case showing a 350,000 leucocyte count.

Usually there is an actual as well as relative decrease of all the granular types of leucocytes with the polymorphonuclear neutrophiles especially decreased.

The **treatment** is systemic and symptomatic. Recovery is not to be expected, but these unfortunates can be made relatively comfortable and given occasional respite by judicious osteopathic care.

Hodgkin's Disease

(LYMPHADENOMA; PSEUDO-LEUCEMIA)

In a general way, the several conditions which are clinically leucemia, yet do not possess leukemic blood, can be classified as pseudo-leukemias. We do not definitely know the cause of leucemia as yet and can but little more than speculate on the various etiologic factors of the pseudo-leucemias.

Syphilis, malaria, tuberculosis, and malignancy are all considered as factors, and probably certain cases can be definitely associated with these conditions.

All of this group of pseudo-leucemias are characterized by early swelling of cervical lymph glands, followed by general gland enlargement, and by great destruction of the erythrocytes. There may be metastatic-like growths of lymphoid tissue in other organs. The enlargement of cervical glands usually begins on one side near the angle of the jaw, and most commonly in young male adults. These glands progressively increase in size, first are soft, then later become hard through fibrous proliferation. Each gland tends to increase in size by itself, not to coalesce with its neighbors, so that each separate gland can be palpated. This is more readily done as there is little tendency to fibrous adhesion formation to the overlying skin. These glands are painless throughout the course of the disease, and tend neither to caseate nor to suppurate.

The excised glands show a combined hyperplasia and connective tissue proliferation. In the soft stage of the tumefaction, the lymphoid hyperplasia is in preponderance, while, at the stage of hardening, the fibrous tissue derived from the trabeculae and capsule of the gland is in prominence. There is increase in the size of the spleen, and occasionally of the liver, but these are never as marked as those resulting from leucemia.

The **symptoms** are, first, those due to the glandular enlargement in the order of: dyspnea, hydrothorax, dysphagia, ascites, swelling of the extremities, and jaundice.

The destruction of red cells gives a resulting anemia which goes with and exaggerates the pressure symptoms.

A process of this kind to induce such grave changes over as well protected organs as make up the lymph system, must be virulent enough to set up other symptoms, to be associated with those due to pressure or to anemia. These are usually emaciation (giving greater prominence to glandular tumefaction), cachexia, and the implantation of masses of lymphatic tissue in organs where normally only traces of this tissue exist.

Fever is dependent upon the disturbed thermic metabolism and may be practically absent or subject to wide variations.

The erythrocyte count shows a progressive decrease with a greater proportion of broken down cells and abnormal types as the condition advances. The actual count is usually between 2,000,000 and 3,500,000 per cubic millimeter. The hemoglobin usually reduces in proportion to the erythrocytes, so that there is little change in color index.

The leucocytes are not markedly changed in number (seldom over 10,000), and this is often the **diagnostic** finding between leukemia and the pseudo-leukemias. Hodgkin's disease usually has a high percentage of lymphocytes, so that there is an actual as well as relative decrease of the granular leucocytes.

The **treatment** is unsatisfactory, and is in the main symptomatic. Roentgen therapy has given temporary improvement, in some cases lasting several years. In general the **prognosis** is hopeless, the end occurring within four years of the time the condition is recognized.

DISEASES OF THE THYROID GLAND

Congestion

Physiological congestions of the thyroid gland are not uncommon during puberty, painful menstruations, pregnancy, and the menopause. The **premenstrual** congestion may persist after the menstrual function has been established, but this is comparatively rare. When the enlargement remains there is more or less hypertrophy, and it should receive appropriate treatment. Upper dorsal and cervical lesions are common. The congestion during **pregnancy** occurs in the majority of cases and seems to be a physiological process, wherein there is more or less hypertrophy and hyperplasia, which probably counteracts the waste products especially caused by this state, or due to the inactivity of the ovary. During **delivery** the gland may rapidly enlarge and remain so for an indefinite time. It seems probable that the straining due to labor may cause lesions of the upper dorsal and neck that will derange the function of the organ. When the enlargement occurs during the **menopause** special care should be taken that the goiter is not malignant.

Other possible causes of congestion are overfatigue, particularly when associated with heavy lifting; tight clothing about the neck; overuse of the voice; and in a few cases it may be discovered in boys at puberty.

The **symptoms** are congestion, the gland being very vascular, either soft or tense, somewhat painful owing to the tension of the capsule, and in persistent cases there may be hypertrophy and hyperplasia. The treatment is the same as given under simple goiter.

Inflammation of the Thyroid

Inflammation of the thyroid is not of frequent occurrence. In the several cases that the authors have seen there was some previous enlargement of the organ, which probably caused a **lowered resistance** of the local tissues. There is almost invariably some infection elsewhere in the body. The

exciting causes are usually streptococcus, staphylococcus, or bacillus coli. The inflammation may follow pneumonia, tonsillitis, rheumatism, typhoid, puerpal infections, enteritis, diphtheria, influenza, mumps, etc. Trauma, carrying weights on the head, and cold, may be etiological factors.

Commonly, one lobe is involved, though the entire gland may be affected. There is swelling, the capsule is distended and painful, and small hemorrhages occur which in the case of suppuration form the site of the abscess. The swelling involves the parenchyma and interstitial tissue.

The **onset** is usually sudden with chills, fever, and pain over the glands. The patient keeps the head flexed to release the muscular tension, swallowing is painful, and there is a sense of constriction. A rapid heart may be a prominent symptom. Much depends at this period on the **treatment** given. If the drainage can be freed, by lowering the first ribs and raising the clavicles with attention to the dorsal and cervical innervation, prompt subsidence of the condition commonly takes place. This should be carefully accomplished in order not to bruise the parts.

Diagnosis is not difficult as a rule. The symptoms and history of infection will generally suffice. Hemorrhage may occur in a goiter and somewhat simulate inflammation. A possibility of **malignancy** is to be considered.

If the condition does not yield to treatment, surgical interference may be necessary.

Tuberculosis and **syphilis** of the thyroid are rare conditions. **Woody thyroiditis** may be mistaken for malignancy. The gland is very fibrous, and when cut has a dry surface. The connective tissue is hardened and crowds upon the parenchyma. This condition is usually found in young men. It develops rapidly, with more or less pain and dyspnea. **Adenocarcinoma**, **carcinoma**, and **sarcoma** are rare diseases[106], still one should be on his guard as to their possibility. They are most apt to occur after forty. A rapid enlargement should be regarded with suspicion.

Simple Goiter

We employ the term simple goiter to designate chronic enlargement of the thyroid gland not due to inflammation, exophthalmic goiter, or malignancy, although the latter conditions are frequently associated with or follow the former. There is usually an enlargement of the gland in cretinism, and occasionally in myxedema, but the functional grade of the gland is far different from that in other diseases of the thyroid.

The disease is very prevalent in certain regions of Europe and Asia, although in the United States it is not so common, except in the environs of the Great Lakes, the District of Columbia, and the Northwest states. The second decade of life, probably owing to adolescent changes, especially in girls, develop the greater number of goiters. It is infrequently congenital, and occasionally a case will develop as early as four or five years of age.

Etiology.—Disturbed innervation of the gland unquestionably seems to be the predisposing cause of the deranged secretion and vascular changes, which if continued finally lead to hypertrophy and hyperplasia of the tissues. These lesions are found from the fifth dorsal to the occiput and to the corresponding ribs. They probably involve secretory fibers of the sympathetic that emerge from the upper dorsals, first to fifth inclusive, maximum effect second, third and fourth. "Evidence is presented that the impulses pass to outlying neurones whose cell bodies are located close below the superior cervical ganglion and also in the inferior cervical ganglion."[107]. In both these ganglia impulses to the thyroid pass from preganglionic fibers to the outlying neurones. This also includes the area of vasomotor[108] innervation of the head and neck.

In a number of cases cervical lesions alone will disturb the thyroid innervation, especially from the second to fourth segments. These may involve the superior cervical sympathetic, owing to its relationship to the rectus capitis anticus major muscle. Then there are afferent association fibers that pass down through the lateral horns and whose connecting fibers emerge via the upper dorsal.

The lymphatic drainage of the thyroid should not be neglected. Lesions of the upper ribs and clavicles are very prone to impede its circulation, and thus predispose to secondary infections.

Infection from septic foci are important secondary factors. This is particularly true of focal infections of the upper respiratory tract and buccal

cavity, although infections and toxins from various regions may be exciting factors. Toxemia due to intestinal stasis is not rarely an important consideration.

McCarrison insists that infection from certain waters is the cause of goiter. He finds that boiling the water renders it harmless.

Pathologically, the first effect upon the gland is to lessen its iodine content. The circulation is increased, with hyperplasia of the epithelial tissue, and a lessened amount of colloid material. If the condition continues, the alveoli will again become distended with the colloid material so that the epithelial tissue cells are almost flattened. This represents the so-termed **colloid goiter**. The gland, commonly the whole organ, though one side may be involved, is fairly uniform in size. In rare instances, the gland may surround the trachea—the so-termed circular goiter. Hemorrhages may occur, and there may be various alterations and degenerations. When the vessels are much dilated, it is often called a vascular goiter, though the colloid changes are present.

The **nodular goiter** is another form characterized by new formation of gland tissue that is not diffuse but circumscribed. These cases are apt to follow persistent involvement of the gland at puberty. The two forms may occur together, and there may be various combinations and changes. In the nodular goiter there is comparatively little colloid. There are many blood-vessels, and small hemorrhages are frequent. This latter point should be remembered by those who treat over the gland, which at best is a doubtful procedure. Various changes may take place, as local points of **necrosis**, **cystic** formation, and **calcification**, are not uncommon.

Symptoms.—The essential feature in goiter is distension of the alveoli and formation of new ones, associated with dilated vessels, and usually degeneration of the colloid. Often the function of the gland is not noticeably disturbed. Usually, it is for the pressure symptoms or the unsightliness, due to the distension, that the patient seeks relief. Pressure upon the windpipe, gullet, or blood-vessels is not rare, and may cause more or less difficulty in breathing or swallowing. Coughing and huskiness may be troublesome. The recurrent nerves and vagus may be compressed. Disturbance of the heart, such as palpitation, tachycardia, and hypertrophy may be caused by the

effect of pressure upon the blood-vessels, or to changes in the secretory function of the gland.

Treatment.—Adjustment of the upper dorsal and cervical lesions will be followed by recovery in the majority of cases. Dr. Still emphasized the point that the vertebral ends of the first ribs are frequently displaced upward and outward. This lesion is often found in cases following confinement. The effect of the change here is probably to the stellate ganglion, or to the lymphatic drainage of the gland. Treatment over the gland should be cautiously given, if at all. Definite correction of the lesioned vertebræ and ribs will be sufficient, but muscular manipulation and halfway measures are practically useless.

Lesions of the lower spine may be the primary source of a compensatory lesion of the upper dorsal, or they may derange the pelvic organs, or be the predisposing factor of intestinal stasis. Attention to possible focal infections, and thorough elimination, are to be considered. In goitrous regions boiling the water is of value. In obstinate cases the X-ray may be of service, and as a final resort surgery may be employed.

"Marine observed that the amount of iodine is inversely proportional to the degree of hyperplasia of the gland, and when the hyperplastic condition becomes fully developed, scarcely a trace of iodine is contained in the gland. Later, when the hyperplasia gives place to colloid goiter, the iodine increases again, both absolutely and relatively. Moreover, it has been found that if iodine be administered to an animal suffering from hyperplasia, the hyperplastic condition very quickly disappears and the animal becomes normal."[109]. His viewpoint of the hyperplasia is that an effort is being made to compensate for an "insufficiency due to inability to absorb or assimilate sufficient iodine", and thus the effect of the administered iodine is to normalize the gland by stimulation.

No one can question that this may be effective under certain conditions, particularly where there is deficient iodide in the water, but it is an essential element of the body. But it does not necessarily follow that because in thyroid disturbance the relationship between thyroid functioning and the substance containing iodine is upset that recovery depends upon furnishing more iodine to the body economy. It may be somewhat parallel to giving iron in anemia, when often the real difficulty is one of assimilation, and not

insufficient iron in the alimentary canal. Moreover, case after case of goiter has recovered through osteopathic measures following a most thorough trial of the iodine treatment. It is very obvious that the cause of the goiter rested elsewhere. Dogs are susceptible to thyroid enlargement. Lesioning of the cervical region has resulted in goiter formation, and recovery has followed adjustment of the lesion. And dogs having goiter without experimental lesions have frequently been normalized by adjusting an abnormal cervical spine.

Exophthalmic Goiter

In exophthalmic goiter there is an excess of the thyroid secretion or thyroid autacoid which passes into the circulation, due to hypertrophy or hyperplasia of the secreting cells. The disease is characterized clinically by nervousness and irritability, rapid pulse, flushed and moist skin, tremor, and increased nitrogenous metabolism. A goiter is usually present, but not always noticeable. There is apt to be protrusion of the eyes, especially after the disorder is established, though it may never appear. A disturbed coordination of the muscles of the eyelid, eyeball, and orbit are frequent characteristic symptoms.

Etiology.—The essential factor in the cause of this disease is probably osteopathic lesions that irritate the secretory fibers of the thyroid tissue. These lesions are almost invariably found in the upper dorsal, first to fifth, and most often localized at the second-third or third-fourth segments. They are definite interosseous changes, combined rotation and lateral flexion, and are generally very sensitive upon palpation. The constant stimulus thus produced passes through the sympathetic fibers to the cervical ganglia, and thence to thyroid secreting tissue, which through vascular changes and hypertrophy and hyperplasia increases the output of the thyroid hormone.

The sensitiveness of the lesions is probably of more than passing interest. For this actual tenderness is not to be confused with a neurasthenic state, which may be associated with the disease, or even be a source of confusion in the diagnosis. The lesion is of such a distinct character that there is considerable local irritation and congestion. This constant stimulus is a cause of the increased number of impulses carried to the sympathetic, and results in not only an excess of thyroid secretion and the concomitant

hypertrophic changes, but also in the rapid removal of the colloid into the circulating blood. This seems to be a very important link in the pathologic chain.

Other underlying lesions may be present, as outlined under simple goiter, and do not require repetition here.

The mechanism of the thyroid gland may be further upset or deranged by various exciting causes, such as focal infections, toxic states, intestinal stasis, and occasionally an enlarged thymus is an important factor. An inherited neuropathic tendency, excessive strain, worry, and mental shocks may have more or less influence in either predisposing or exciting the disorder.

The particular points for the practitioner to remember are that exophthalmic goiter is due to a toxic state, of which there are many gradations, from the excessive secretion of the thyroid gland; that the normal resistance of the gland is lowered through definite lesions of its innervation or circulatory channels, or occasionally of lesions of the other organs of internal secretion which are closely associated; that infections and toxins are often important considerations; and that direct manipulation of the organ may increase the disorder.

Pathology.—The enlargement of the thyroid gland is commonly an early symptom, occurring before the nervous, cardiac and exophthalmic manifestations. There are instances where it follows a simple goiter, although Graves' disease does not seem to be any more prevalent in regions where simple goiter is endemic than elsewhere. In these particular instances intestinal toxemia is often present. There are cases where the gland is very slightly enlarged, containing only small areas of hyperplasia. There is usually very little colloid, though there may be marked exceptions. It should be emphasized that there are various degrees of changes found in the gland though fundamentally of the same order. The blood supply is extensive, and the veins especially are fragile. The alveoli are distorted, due to the increase of epithelial cells. Lymphoid nodules are frequently noted through the glandular tissue.

Research work of unusual interest to the osteopathic physician pertaining to the etiology and pathology of exophthalmic goiter has been carried out at the Mayo Clinic. An examination of cervical sympathetic ganglia removed

at operation from such cases and certain animal experimentation has given definite results. The following is a summary of their principal findings:

"Degree of hyperpigmentation, granular degeneration, and reduction in the number of cells was in direct ratio to the continuance of symptoms of hyperthyroidism. The increased amount of perivascular connective tissue generally throughout the gland was similarly in direct ratio to the time during which symptoms of hyperthyroidism had continued.

"Increase of connective tissue in the ganglia from the chronic cases may be interpreted as due to the irritation from inflammation, or as merely a replacement following the destruction of the ganglionic nerve cells.

"Ganglia were intimately connected by firm adhesions to the surrounding tissue.

"There were changes in the outer and middle coats of vessels, and in the nerve fibers. There was an increase of connective tissue throughout the ganglion.

"It appears that definite histologic changes do occur as (a) hyperchromatization, (b) hyperpigmentation, (c) chromatolysis, and (d) atrophy, or (e) granular degeneration of the nerve cells. All of these are but successive steps in degeneration which, if uninterrupted, proceed to complete destruction of the ganglion cells affected. Not all of the ganglion cells in any of the ganglia examined were so completely destroyed as to render improbable their return to normal under favorable conditions. There is some evidence that in ganglia from cases clinically improved some of the cells have partially or wholly recovered."[110] They are inclined to the view that local infection in the cervical sympathetic ganglia plays an important part in the etiology.

The above pathologic changes of nerve fibers and ganglia support in many ways the findings noted at the A. T. Still Research Institute, not alone in the cervical region but in other regions of the body, that is, they are changes common to interosseous lesion pathology of various areas of the spine, and thus are predisposing factors that establish lowered resistance of tissue and derangement of function.

An important feature of the pathology is hyperplasia of the thymus. Simmonds finds it enlarged in three out of four cases. MacCallum[111] has

found it enlarged in all autopsies that he has seen. The lymphoid structures of the spleen, liver, kidneys, intestines, and bone marrow is increased, while the lymphatic glands of various regions of the body may be enlarged, especially the cervical, bronchial, and axillary. This is probably due to a toxic condition.

Dilatation and hypertrophy of the heart is common, and in advanced cases myocardial degeneration is apt to take place.

Symptoms.—The outstanding feature of hyperthyroidism is the excessive secretion of the gland. The symptoms seem to be largely dependent upon the amount thrown into the blood stream; still there is a possibility that there may be a certain perversion of the secretion, though if such exists it has not been discovered. It should be kept in view that in certain instances where the secreting activity of the gland has been markedly curtailed, by surgical means, for instance, even to hypo-functioning there may still exist some of the symptoms of exophthalmic goiter, which goes to show that other factors may be of decided importance. The thymus and other related organs, as well as the sympathetic nerves, are not to be neglected.

Kendall and Plummer (Mayo Clinic) "believe that the location of the active constituent of the thyroid, when it functions, is within the cells not of any particular set of organs or portion of the body, but that it is a constituent of cellular life and activity. Plummer states that the active constituent of the thyroid determines the rate at which any particular cell can produce energy, that is, it establishes the quantum energy which any cell can produce when it is stimulated, either from within itself or from without, so that the thyroid is directly related to the production of energy within the body. He has shown that one-third of one milligram of the active constituent of the thyroid increases the basal metabolic rate one per cent in an adult weighing approximately 150 pounds." This shows how important the secretion is not only to all related glands but to every cell of the body, and assists in establishing a physiological basis in the correlation of the symptoms of both hyper- and hypo-functioning of the organ.

As a rule the **thyroid** is not greatly **enlarged**. The size, shape, and consistency varies. It may follow a simple goiter. Many of them are soft and yielding, or cystic; others are hard, of a fibrous resistance, or nodular.

Probably in the instances where hypertrophy is not discoverable there is hyperplastic tissue scattered through the gland. Or it is possible there may be an intrathoracic thyroid, or **accessory** tissue in other regions, varying from the root of the tongue to the aortic arch, which has become diseased. Generally, both lobes are enlarged, though the derangement may be confined to a portion. Often there is pulsation and a thrill over the gland. Systolic murmurs are frequent. In the early stage of goiter, tenderness is noticeable due to the distension of the capsule.

The **eye symptoms** are: widened palpebral fissure or Dalrymple's sign; failure of the upper lid to follow the downward movement of the eyeball or V. Graefe's sign; insufficiency of convergence of the two eyes or Moebius' sign; exophthalmos, which may be unilateral (in about seventy five percent of the cases); and rareness of involuntary winking, are the principal eye signs.

Rapid heart action is an early and important symptom. This is given by all observers as the most constant of all symptoms. Palpitation is often disturbing. The pulse is forcible, especially in the vessels of the neck. There is generally a low blood pressure. The heart is apt to be dilated, and in chronic cases hypertrophy and degeneration are often found.

A **fine tremor**, eight to ten times a second, is an important symptom. This is usually present and is considered one of the cardinal diagnostic points.

Profuse sweating, emaciation, muscular weakness, especially of the legs, vomiting, diarrhea, a feeling of dyspnea, and polyuria are frequent symptoms. Anxiety, apprehension, headache, irritability, and fatigue are often early symptoms, but care should be taken that they are not entirely dependent upon a neurasthenic state.

Pruritus may be a distressing symptom. There may be abnormal pigmentation. Menstrual derangements are common, especially amenorrhea, owing to the anemia. And there may be various sexual disturbances. Exophthalmic goiter occurs oftener in women than in men.

The disease is commonly a chronic one lasting several years, unless the morbid cycle can be broken; still there are cases where it appears very suddenly and runs a rapid course.

McCarrison[112] says: “Our consideration of the morbid changes met with in Graves’ disease will have brought into prominence the fact that they are indicative of toxic action. The lymphocytosis, the lymphatic hyperplasia, the lymphocytic infiltration of the thyroid, the liver and other organs; the chronic toxic inflammatory changes in the thyroid, liver and pancreas; the changes in the muscles, in the nervous system and in the adrenals; all these point to a condition of chronic irritation as the underlying factor in their production, and to the gastro-intestinal tract as the most common source of the toxic irritant.”

Diagnosis.—The diagnosis as a rule is not difficult. Difficulty may arise where there is incomplete development of the disorder. Irritation of the sympathetic nerves is of the greatest significance, for the characteristic symptoms are dependent upon this condition. Neurasthenia, hysteria, paralysis agitans, and tobacco poisoning and alcoholism may mislead one. The enlarged and active gland, with murmur in the majority of cases, loss of weight, excessive sweating, diarrhea, tremor, and tachycardia, even without the eye symptoms, are specially significant. The tenderness of the osteopathic lesions is very often noticeable.

Prognosis.—A great deal depends upon the cooperation of the patient. Rest and diet are such important features of the treatment, that if the patient is not willing to follow instructions, great difficulty will be encountered in securing satisfactory results. Adjustment of the lesions and elimination of toxins are highly essential, but only in a certain number of cases will this suffice. This, however, will usually lessen the severity of the condition, and the patient gets along fairly well, but this may be far from securing the possible maximum results. The duration of the disease is often from five to twenty years, or even longer. And the patient frequently dies from some intercurrent disease, particularly pneumonia and tuberculosis. Weakness of the heart is the most important cause of death. Severe vomiting and diarrhea may so exhaust the patient that a fatal termination takes place. Surgical interference should not be too long delayed if there is no indication of improvement by other means.

Treatment.—Every case requires individual study, owing to the many possible exciting causes, especially those where infections and toxins play so important a role. The four cardinal features of treatment are: adjustment

of the osteopathic lesions, rest, diet, and elimination of infectious and metabolic poisons.

Specific adjustment of the upper dorsal spine is primarily essential. The work should be definitely and quickly accomplished. Soft tissue manipulations amount to but little except as a preparation for the interosseous adjustment. Do not tire the patient. Often, following exact adjustment a definite lessening of the severe symptoms will be noticed. The activity of the thyroid will be appreciably decreased; the heart's action slowed; the eye symptoms less noticeable; the tremor lessened; and the strength of the patient improved. Do not treat too often. Once a week is far better than every day. But usually twice a week in the majority of cases will secure the best results. Then later once in two weeks will be the best course to pursue. The tissues are irritable, and require time to establish a physiological balance, that if kept constantly excited by too frequent or too severe manipulation will increase rather than lessen the condition. This, however, does not apply to those cases where a certain amount of general treatment is demanded to improve systemic tone and overcome intestinal stasis, but even here do not unduly tire the patient, and keep away from the thyroid innervation except at stated intervals. There is nothing more important in osteopathic therapy, except definite adjustment, than not over-treating.

The cervical region should be normalized, and the upper ribs and clavicles carefully adjusted. But leave the gland alone, for manipulation over it further stimulates its function and there is a possibility of rupturing its fragile vessels. Normalization of the entire spine is important, owing to its bearing upon interdependent relationship, mechanically and physiologically, and the necessity of correcting all metabolic irregularities.

Both **physical** and **mental rest** are essential. This tends to lessen the excitability of the nerves, conserves the strength, increases the metabolism, improves muscle tone, and rests the heart. At least several extra hours in bed is always best. Lying down two or three hours during the middle of the day will accomplish considerable. In severe cases absolute rest in bed until the disorder is under control is imperative. In mild and moderate cases all excessive fatigue should be avoided. Unless such measures are followed the treatment otherwise may not accomplish anything. Stopping short of fatigue is the rule that must be followed.

The **diet** is important in order that the strength may be increased and harmful foods eliminated. If the carbohydrates in the small intestine are not sufficient, they may decompose into toxic substances that are harmful when absorbed into the circulation. An abundance of green vegetables and fresh fruit is best. Milk, fermented milk, butter milk, butter and cream are allowable. The patient should drink freely of water. Meat should be used sparingly, and avoid tea, coffee, and condiments.

Free elimination and fresh air are also important. It is the aggregate of details that counts so much, particularly in such a toxic and excitable disease as exophthalmic goiter. The neutral bath (95 to 96 degrees) is better than either hot or cold baths. In such a nervous disease as this, suggestion is unquestionably a valuable measure in quieting the nerves and improving the mental viewpoint.

All focal **infections**, such as often found in the throat, nose, and buccal cavity, in the appendix region, gall-bladder, etc., should be eradicated.

If under carefully controlled treatment the patient does not definitely respond within from two weeks to a month, surgical measures should be seriously considered.

Myxedema

Myxedema is a chronic disease due to loss of thyroid function, and characterized by markedly decreased metabolism, trophic disturbances of the skin and subcutaneous tissues, and a cessation of mental development corresponding to the time of the injury of the thyroid.

McCarrison restricts the term “cretinism” to those cases where there is congenital thyroid deficiency. “After the first year of life, when ossification has proceeded to the extent of closure of the fontanelles, the case is only distinguishable from one of cretinism by this fact.” In the **child**, all the functions are depressed, there is a low temperature, the bones do not develop, and the child may become stout. The mental development is retarded, and also the sex organs.

In the **adult** cases there is the same depressed metabolism. The skin is sallow, dry, and increased in thickness. The tongue is enlarged, the lips thick, and the feet and hands considerably changed in size. The nails may

be thickened, and the hair falls out. The abdomen is apt to be pendulous. Heavy pads occur below the clavicles and on the chest, neck, abdomen, and sexual organs. Usually the thyroid cannot be palpated. In a few, the gland may be goitrous.

The **mental** faculties are sluggish. The speech is slow, and the voice more or less changed. Physical exertion is an effort, and the patient may have some difficulty in walking. And there is anemia, loss of appetite, and poor digestion. The number and character of symptoms are innumerable, depending upon the extent of thyroid insufficiency, and often upon predisposing and associated disorders. But the essential symptoms are those pertaining to the skin, and the mental apathy. In children the retarded physical and mental growth is the outstanding condition. Development of the disorder is slow.

Etiology.—Lesions of the thyroid innervation may cause a lessened function of the gland, for correction of the lesions has been followed by markedly definite improvement in a number of cases. The disorder has followed operation on the gland. In other cases some form of infection, primary or secondary, is probably the cause of the injury and subsequent atrophy. In some instances there is evidently a family tendency. It occurs more frequently in women, and in cold than in hot climates. The menopause seems to be a predisposing factor. Overwork, anxiety, poor nutrition, and conditions that lower tissue resistance, are among the etiological considerations.

In well marked cases the **diagnosis** is easy. In others the disease may be mistaken for nephritis or jaundice. X-ray examination of the ossification centers is of decided value. The **prognosis**, in untreated cases, is considered hopeless, the duration being from four to seven years. The treatment with thyroid extract, or alpha-iodine, has resulted in marked improvement, though in severe cases it must be kept up continuously in order to supply the deficiency.

Treatment.—There have been several well marked cases that have responded to the osteopathic treatment. Adjustment of the lesions affecting the gland, and attention to the general health have been the methods administered. The response in a number of children has been most notable. In fact, to such an extent that all faculties and functions were completely

recovered. Even in cases where thyroid extract had been administered with comparatively little results, the adjustment of the upper dorsal and cervical lesions, with attention to the diet, elimination, and general hygiene, was followed by normalization.

That the thyroid function when deranged, hyperthyroidism, hypothyroidism, or otherwise, can often be recovered through osteopathic treatment, adds a very important therapeutic measure in the treatment of this gland. But in view of the brilliant results secured in hypothyroidism, through the administration of the thyroid extract, one should not hesitate to use it if improvement is not otherwise forthcoming. Nevertheless, the very important point remains that thyroid extract is only supplying a necessary substance, however essential, to the bodily metabolism, and does not strike at the essential etiology of the disorder.

Cretinism

It should be kept in mind that there are many gradations and alterations in both hyperthyroidism and hypothyroidism, and that a "goiter" may present either picture, partly or wholly, or on the other hand may be normally functioning.

MacCallum says: "Unlike the myxedema cases which occur anywhere and everywhere, regardless of environment or hereditary taint, these people, known as cretins, are found in regions where the condition seems to be endemic or inherent in the environment, and we can usually trace in their parents or ancestors some similar thyroid defect."

This disease is found in various countries, particularly in certain parts of Switzerland, Austria, and Italy. McCarrison presents an interesting study of 203 cases of Endemic Cretinism found in Himalayan India. He thinks it is due to infection. There are a few cases in North America, probably mostly due to immigration. It is frequently confused with myxedema.

Cretins are of short stature, flat-chested and pot-bellied. The face is broad, low forehead, broad nose, prominent cheeks, thick lips, and large nose. The development of the bones is retarded; the skin is thickened and edematous; the hair is thin, and the nails brittle; the sexual organs as a rule do not develop; and in most cases a goiter, sometimes of huge size, is

present. Most of them are stupid and apathetic; others are distinct idiots. Deafness is common.

There are sporadic and endemic cases, but the same underlying cause is probably present. It is claimed that most cases of the former should be classed as congenital myxedema.

Early diagnosis is essential. Removal of the patient from the goiter region, and thyroid substance is the treatment given, though results are not so marked as in myxedema.

FOOTNOTES:

[106] Ewing, Neoplastic Diseases; Grotti, Thyroid and Thymus.

[107] Cannon and Cattell, The Secretory ennervation of the Thyroid Gland, Am. Journal of Physiology, July, 1916.

[108] Gaskell, Involuntary Nervous System.

[109] Macleod, Physiology and Biochemistry in Modern Medicine.

[110] Collected Papers of the Mayo Clinic, 1916, ’17, ’18.

[111] MacCallum, A Text Book of Pathology.

[112] McCarrison, The Thyroid Gland.

DISEASES OF THE PARATHYROID GLANDS

Tetany

The clinical manifestations of the insufficiency of function of the parathyroid glands is well understood. This came about through the study of endemic tetany, and, especially, noting that tetany followed operations when the entire thyroid gland was removed. Considerable experimental work on animals was next in order, until the discovery was made that the thyroid gland and parathyroids are anatomically independent, and that tetany is entirely dependent upon the loss of function of the parathyroid glands. **Operative tetany** is now comparatively rare, since the surgeon is particularly careful not to injure the parathyroids in his operations on goiters, though mild forms may occur through damage of the tissues or extension of inflammatory processes.

There are **other forms** of tetany aside from operative, that occur in both adults and children, but instability and insufficiency of the function of the glands are basic to all cases. This is the common factor, which may be modified by tissue resistance and various hygienic factors.

In tetany there are paroxysmal, and often painful, contractions of the muscles of the extremities. Both sides are affected, and occasionally the spasms may extend to other muscles of the body. This is due to an abnormal excitability of the nervous system. Probably the secretion of the parathyroids have normally a restraining effect upon the nervous impulses, which when removed, or insufficient, or possibly perverted, results in the tonic spasms.

Thus the **predisposing condition** of tetany may be either **acquired** or **congenital**. Children may be born with defective parathyroids. In such instances there is probably a hypoplasia of tissue, which may markedly vary in a series of cases, and give rise to different degrees of tetany. Other factors, nutritional and toxic, would, very likely, be important exciting causes. Hemorrhages and fibrosis have been noted in some cases, that add to the injury of the tissues.

The blood and nerve tissues in tetany show a decreased amount of **calcium**. It is claimed by some that the abnormal excitability of the nervous system is due to the lack of calcium. Noel Paton[113] believes that, though this may bear some relationship, the parathyroids control the metabolism of **guanidine**, and that guanidine intoxication is the cause of the symptoms. Guanidine seems to regulate the tone of the skeletal muscles, and is closely related to urea.

Tetany may occur under many conditions: during pregnancy and nursing, the infectious and nutritional diseases, the diseases of the thyroid and very often gastro-intestinal disorders. There are various exciting causes, such as cold, worry, overfatigue, etc. Alcohol, ergot, morphine, chloroform, and other poisoning may precipitate an attack. But in all these cases the parathyroids are previously damaged.

The blood supply to the glands is from branches supplying the thyroid organ. This intimacy implies that the same sympathetic nerves to the thyroid vessels are in control. Probably there are distinct secretory nerves, as well as vasomotors, that are connected with the upper dorsal and cervical sympathetics. **Lesions** related to the corresponding spinal areas probably affect the integrity of the parathyroid function.

Schafer says: “The parathyroids are amongst the most vascular organs in the body. They are supplied each by a special branch of the inferior thyroid artery. The sinus-like capillaries come into close relationship with the epithelial cells of the gland. The nerves of the parathyroids, like those of the thyroids, pass both to the vessels and to the secreting cells. Some evidence has been adduced which seems to show that the cell-activity is controlled by the nervous system.”

Hence it would seem that in many cases of tetany, aside from those cases due to operative injury and possibly certain congenital instances, **osteopathic lesions** affecting the nerve and vascular supply of the organs may so lessen, or pervert, the secreting cells that tetanic states may supervene, especially where lowered nutrition, toxins, and infections are inciting factors.

Symptoms.—The tonic contraction of the muscles may last a few minutes or may persist for several hours, and are usually confined to the hands and feet. The fingers and toes are first affected by the spasm, which

extends upward toward elbows and knees. This is commonly preceded by numbness and more or less pain in the parts. Occasionally there is a general ill-feeling, depression, and headache. There may be rise of temperature, and some edema of the affected parts. There are no mental symptoms.

The fingers are partly flexed at the metacarpo-phalangeal joints and rigidly extended at the inter-phalangeal joints, the thumb is markedly adducted and the fingers drawn close together. The wrist may be flexed, and in severe cases the elbows flexed and adducted. When the feet are contracted the toes are drawn together, flexed, and may overlap, and the feet are arched.

Trousseau's phenomenon.—The spasm is increased by pressure over the median or ulnar nerves, or blood-vessels supplying the parts. This may also excite an attack. **Chvostek's phenomenon.**—Percussion over the facial nerve will cause quick contraction of the muscles innervated. **Erb's phenomenon.**—The electrical excitability of the motor nerves is markedly increased.

Diagnosis.—The characteristic attitude, and the irritability of the motor and sensory nerves, make diagnosis easy. It may be confused with **meningitis**, but in tetany there are no brain symptoms, while in meningitis there are no characteristic signs of tetany. Generally, there is little probability of confusing the disease with **tetanus**, or **hysteria**.

Treatment.—Most cases are of a mild type, and recovery is the rule. A great deal depends upon the underlying cause. Malnutrition, if long continued, is a very important factor that may readily predispose to the disorder. Rickets in children is often a basic consideration.

Rest, warm baths, and careful inhibitory relaxation of the tissues materially assist in controlling the spasms. Attention to the thyroid innervation should not be neglected. In indicated cases thyroid feeding may be of assistance. The diet is of special importance, for many cases present some disorder of the gastro-intestinal tract. Meat should not be given. Milk is of great value, owing to its calcium content. The administration of calcium is highly recommended, for reasons stated under etiology.

Diseases of the Thymus

There is little known relative to the functions of the thymus. It is most active during the growth of the body, attaining its greatest weight from the eleventh to fifteenth years, after which it gradually atrophies, though a certain amount of the tissue remains throughout life. There is usually a gradual atrophy of the organ after puberty, associated with increase of connective and adipose tissues. In cases where it does not atrophy, there is often hyperplasia of the entire lymphatic system in the body.

There is some relationship between the thymus and sexual organs, and in experiments where the organ has been removed, ossification is delayed, muscular weakness and tremor occur, there is hyperplasia of the thyroid, parathyroids, and adrenals, and general cachexia, acidosis, and mental deterioration take place.

The inferior thyroid and internal mammary arteries from above, and the pericardiophrenic from below, comprise its arterial supply. The nerve supply is from the sympathetic, vagus, and possibly the phrenic. In cases of exophthalmic goiter there is frequently an associated enlargement of the thymus, which may be shown by the X-ray, due to failure of normal involution or a renewal of growth, that may be definitely influenced by adjustment of the osteopathic lesions.

In some of the acute infections as pneumonia the thymus may atrophy with some fatty degeneration and increase of connective tissue. This also occurs in starvation. If the condition is not of long standing recovery will take place.

In **status lymphaticus** there is hyperplasia of the thymus and enlargement of the lymphoid tissue of the body, and hypoplasia of the cardiovascular system. This is a constitutional defect, so that slight injuries or infections may prove fatal. It is found in some cases that there is hypoplasia of the chromaffin system. Whether this latter condition is primary or secondary has not been settled.

In males the secondary sexual characteristics are not fully developed. The figure resembles the feminine type. The skin is pasty, and the beard is lacking or but little developed. In females the distribution of the hair may be somewhat similar to the male sex, slender limbs and chest, and disturbances of the menstrual function are noticeable.

The thyroid, thymus and lymphatic tissues are usually enlarged, while there is hypoplasia of the adrenals and chromaffin system.

The condition is met with in children who have a weak muscular system, increased adipose tissue, pasty complexion, enlarged tonsils and adenoids, and frequently are anemic. In children where the thymus is enlarged there may be excessive lymphocytosis.

The enlarged thymus may compress the trachea, interfering with breathing so that cyanosis and temporary loss of consciousness occur. Young children may die in the attack, probably due to compression of the trachea or to heart shock. Death in adults has occurred from trifling injuries, shocks, infections, and anesthesia. The underlying cause is probably a constitutional weakness.

Diagnosis is made from the clinical signs, percussion of the thymus and the X-ray picture, although these may not be positive. An excessive lymphocytosis is suggestive.

Treatment should consist of good general care of the patient, avoidance of injuries and shocks as far as possible, and careful attention to all lesions, especially of the upper chest and neck. By following this plan the child may overcome the condition. X-ray treatment is being employed with success in some cases. Operations have been successful in thymic hyperplasia where it has complicated exophthalmic goiter, and also in serious mechanical pressure in children.

Diseases of the Adrenal Glands

Experimental work supports the view that the cortex and the medulla have separate functions. The **medulla** of the adrenals is part of the chromaffin system, which includes tissue of the same character in the ganglia of the sympathetic, the carotid gland, and the accessory gland called Zuckerkand's organ. This system is derived from the same cells as the sympathetic nerves. The medulla receives a richer blood supply than any tissue in the body. The secretion of the chromaffin tissue is called adrenalin or epinephrin. The blood receives a continuous supply of the secretion, which acts upon the small blood-vessels and assists in maintaining blood

pressure. It also stimulates glandular tissue, and has some effect upon voluntary muscle which tends to counteract fatigue.

The **cortex** of the adrenal glands is of epithelial origin, and is part of the so-called interrenal system, which comprises very small masses of tissue in the sympathetic ganglia. These are located in the hilus of the kidney, broad ligament, inguinal canal, prostate, epididymis, and along the spermatic veins (Baker). The cortex is the chief glandular tissue of the interrenal system. The amount of tissue is not so great after puberty as before. The blood supply of the cortex is not so rich as that of the medulla. Abnormal activity is claimed to be the cause of certain sexual derangements, particularly sexual precocity.

Schafer states that the adrenals are very richly supplied with nerves. Each receives no less than thirty-three nervous filaments (Kolliker), derived in part directly from the splanchnic, in part from the suprarenal plexus, which is itself constituted by branches from the celiac, phrenic, and renal plexuses.

We have noted that in lesions (experimental) of the splanchnics a few cases presented acute pathological changes, congestion with some degeneration of cells, in the adrenals.

Macleod states that of the many functions of the adrenals that which is most directly associated with epinephrin is the production of glucose from glycogen. “When the nervous system is stimulated in such a way as to excite the glycogenolytic process, two effects both operating in the same direction with regard to the glycogenic function are developed: the one, a hypersecretion of epinephrin, which activates the sympathetic nerve endings, the other, the transmission of the nerve impulse to the liver cell.”

Addison’s Disease

This is a rare, chronic disease, more often occurring in men, that is characterized by muscular and vascular weakness, digestive disturbances, and pigmentation. Tuberculosis of the adrenals has been the most constant lesion found. In others, syphilis and atrophy have been noted, while in a few the condition seemed to be functional. It should be remembered that it is possible that lesions elsewhere in the chromaffin system may be the cause in some cases, for all the chromaffin tissues secrete adrenalin.

It is quite likely that in most cases there is some constitutional defect of the chromaffin system which underlies a certain tendency to the disorder. Infections, injuries, physical and mental strains may lower resistance and predispose to the condition.

Osteopathic lesions of the splanchnics may congest the organs, or derange the secretions, or be of such a character that hemorrhages result, or fibrous changes follow, that would definitely incapacitate the cells and lower resistance.

Pathologically, the most common change is tuberculosis. Next in importance are atrophy and interstitial inflammation. Cancer of the organs has been noted in a few. The adrenal ganglia, the semilunar ganglia, and the solar plexus are often involved. The thyroid gland may be altered, which, when affected, is usually decreased in size. Brown atrophy of the heart is common.

Symptoms.—An insidious onset with muscular weakness, languor, and weak action of the heart are generally the first symptoms. Digestive derangements, such as nausea, hyperacidity, loss of appetite, may occur at the same time, or shortly succeed the general debility. Headache, insomnia, and depression frequently take place. Pigmentation, usually, shortly follows, though there are cases where it is only slightly noted. The disease is very chronic, of several years duration, with periods of intermission. Occasionally, a case runs a very rapid course.

The general weakness is most noticeable. There is low blood pressure. The derangement of the stomach and intestines is characteristic. And the pigmentation, which at first is light yellow later assumes a dark brown color. The pigmentation may be more or less general, but the axillæ, nipples, genitals, the palms of the hands, and the neck, waist or wherever the clothing presses upon the skin, are most pigmented. And pigmentation of the mucous membrane may be noted.

Diagnosis.—In typical cases, where there is esthenia, pigmentation, and gastro-intestinal disturbances, the diagnosis is not difficult. Where the clinical picture is incomplete, the diagnosis may be very difficult.

Pigmentation may occur in several other disorders, notably: in bronzed diabetes, abdominal malignancy, tuberculosis of the peritoneum,

exophthalmic goiter, pellagra, marked intestinal stasis, stomach ulcer, pernicious anemia, certain skin diseases, etc., so great care has to be taken in atypical cases.

Treatment.—General treatment, with special attention to the adrenal innervation, diet, rest, and fresh air will accomplish something. In functional derangements, which are very few, recovery may follow. But owing to the often constitutional defect, the probability of tubercular, syphilitic, and other serious lesions, the prognosis is unfavorable.

FOOTNOTES:

[113] Paton and Finlay, Jour. Exp. Phys., 1917.

DISEASES OF THE NERVOUS SYSTEM

DISEASES OF THE NERVES

Neuritis

Neuritis is an inflammation of the nerve fibers. It may be confined to a single nerve, localized; or general, involving a large number of nerves, when it is known as multiple neuritis. Osteopathically, there are **invariably lesions** of the osseous or muscular tissues, that correspond to the nerve fibers involved. The lesion either irritates the nerve directly or disturbs the circulation to the nerve. In those cases where the osteopathic lesion is not the immediate exciting cause, there will be found anatomical irregularities that predispose to the affection.

Localized neuritis may be due to: Local osteopathic lesions; Exposure to cold; septic foci; traumatism; and inflammation of contiguous tissues.

Multiple Neuritis may be due to: Osteopathic lesions, which are associated with infectious diseases, as in diphtheria, typhoid, scarlet fever, etc.; prolonged strain or exposure; metabolic poisons, as in diabetes, anemia, tuberculosis, cancer, etc.; alcohol, lead, mercury and arsenic poisoning; and **beri-beri**, which is probably due to lack of vitamins, or possibly micro-organisms, or carbonic gas poisoning.

The inflammation may chiefly involve the connective tissue surrounding the nerve—perineuritis—or it may involve the deeper structure—interstitial neuritis. **Parenchymatous neuritis** is really a degeneration, due to excessive or prolonged irritation or pressure which cuts the nerves off from their centers. This is found in deeply seated osteopathic lesions. In experimental osteopathic lesions the first effect is degeneration of the medullary sheath. This is followed by degeneration of the axis cylinder. The local circulation is notably impaired. An acutely inflamed nerve is red and swollen. In **perineuritis** there is an infiltration of the nerve sheath with leucocytes. In the **interstitial form**, lymphoid cells are found between the

nerve bundles. In the parenchymatous form, inflammatory signs are wanting. The muscles atrophy. Associated in all these forms the **osteopathic lesion** plays either an exciting or predisposing role, by disturbing nutrition to the tissue and thus setting up inflammation, which may lead to Wallerian degeneration[114].

Symptoms.—Localized Neuritis.—In the case of a sensory nerve, there is severe pain following the course of the affected nerve, with tenderness upon pressure. This may be followed by loss of sensibility. Trophic symptoms, such as glossiness of the skin and brittle nails, arise in more chronic cases, while in advanced cases, there is wasting of the muscles. Sweating, herpes, and occasionally effusion into the joints, occur. When a motor nerve is principally affected, muscular power is impaired, motion painful and muscular twitchings will occur. Finally contractions, wasting of the muscles, and even reactions of degeneration, may take place. A rare form is the so-called **ascending neuritis**, in which the inflammation extends upward from the peripheral nerves to the larger nerve trunks, or even the spinal cord, resulting in **myelitis**. This occurs most commonly in traumatic neuritis. The duration is variable. Many acute cases get well in a few days. Other cases may persist for months and even years.

Multiple Neuritis.—Inflammation involving several nerves which are affected simultaneously or in rapid succession. **Acute form.**—The attack usually follows overexertion or exposure to cold and wet, with probably some infection. This form is characterized by a chill, followed by a rapid rise in temperature which may reach 103 or 104 degrees F.; headache; pains in the back and limbs. There is weakness of the legs or arms, depending upon region involved, which may be so severe that the muscles atrophy. Sensory symptoms are variable. Most cases recover, though there are instances where the vagi, the nerves to the bladder, rectum, or heart, may be involved.

Alcoholic Neuritis results from a moderate amount of alcoholic drinking, continued over a long time. The first symptoms are usually numbness and tingling in the fingers and toes. Loss of power soon becomes marked, first in the lower, and then in the upper, extremities. The extensor muscles are most affected, causing wrist and foot drop. Occasionally there is paraplegia. There are hyperesthesia, tenderness and pain, especially in the

legs. The cutaneous reflexes are commonly intact, and the deep reflexes, as a rule, are lost. Delirium is common, and hallucinations or illusions occur.

Neuritis from **lead poisoning** usually present the “wrist drop” and “foot drop”, with colic, and “blue line” on gums.

Infectious Diseases neuritis is due to an attack of some infectious disease, and may be local or multiple. It is due to toxic materials absorbed into the blood. It is most common after diphtheria. The symptoms presented are those of neuritis due to any other cause.

Senile neuritis is probably due to arteriosclerosis.

Diagnosis.—As a rule, the diagnosis is not difficult. In the alcoholic form in some instances, there may be difficulty, and in cases with paralysis, care should be taken. The **prognosis** of neuritis is generally favorable.

Treatment.—It is very evident that the successful treatment of neuritis depends upon being able to ascertain the cause. Rest is important in all cases. Rarely has one any difficulty in locating the deranged structures that are predisposing to the attack; and usually correction of these disturbances, which are in the region involved will give considerable relief. If the parts are too sensitive to handle insist on absolute rest and hot fomentations. The affected area should be kept warm and protected. Attention to the diet, and free elimination, are important. Metabolic disorders should be corrected, if possible. Give particular attention to any septic foci. A change of occupation may be necessary in some cases.

In alcoholic cases, the alcohol should be stopped as soon as possible. Passive movements and massage are helpful, but of course bear no comparison to specific osteopathic treatment. Relaxation of muscles along the spinal column and along the course of the nerve will at least give temporary relief.

If contractures and other changes remain after the acute attack, persistent treatment will generally result in recovery. (See also Painful Shoulders, Part I.)

Sciatica is usually a neuritis of the sciatic nerve, although all painful affections of the nerve are termed sciatica. In some cases it is a neuralgia when the nerve is swollen and presents an interstitial neuritis.

Osteopathic Etiology.—This affection occurs more frequently in males than in females. The usual period for sciatica is from the twentieth to the fiftieth year and the principal causes are **vertebral lesions** of the lower dorsal and lumbar vertebræ, especially lesions to the fourth and fifth lumbar. Occasionally the lesion is a subdislocated innominatum, a downward displacement of a floating rib or a partial dislocation of the femur. Other causes are exposure to cold, contraction of muscles, gout, rheumatism and syphilis. Contraction of the pyriformis muscle may bring direct pressure on the nerve. Focal infections, arthritis of the articular processes of the lower spine, and sacro-iliac and hip-joint disease should not be overlooked. In a few cases there are intrapelvic causes, such as uterine and ovarian tumors, rectal accumulations and the fetal head during labor. Enlarged prostate may be a factor. It is possible for the roughened edges of the sacro-iliac joint, internally, to irritate the sacral plexus as it passes over and thus keep up the pain. This may explain the occasional failure of treatment.

Symptoms.—Pain in the nerve along its course is the most constant symptom. The pain is most intense back of the thigh and above the hip-joint. The pain radiates downward through the entire nerve; it is of an annoying character and walking is especially painful. In rare cases there is wasting of the muscles, cramps, herpes and edema. In a few cases the neuritis may extend to the spinal cord.

Diagnosis.—The diagnosis of sciatica is usually easy. Care has to be taken in the examination to determine whether the affection is primary or secondary. It is difficult, in some cases, to locate the origin of the disturbance, especially if it is in the lumbar vertebræ, as frequently a very slight deviation of a vertebra will cause the disease; or some focal infection may be difficult to locate; or malformation of the fifth lumbar may be present; or asymmetry of the legs or the body be a factor. Careful palpation, measurements, and the X-ray are of diagnostic importance. **Hip-joint disease** and **sacro-iliac disease** can generally be easily distinguished from this affection. The lightning pains of **tabes** may simulate sciatica, but then there are other well defined symptoms of the disease.

Treatment.—Sciatica rarely runs a very long course, though there are cases that last for years. The treatment almost wholly depends upon the cause. If the cause can be determined at once, the probabilities are that

severe cases may be relieved by a few treatments. Correction of the vertebræ, to relieve impingements to the nerve fibers as they pass through the intervertebral foramina, usually constitutes the primary treatment. Carefully examine the pelvic organs for disturbances. Occasionally deep treatment over the iliac vessels will be of great help. The innominatum, if deranged, should be corrected and all troubles of the hip-joint that are found must be corrected.

Cases of rheumatism and gout should receive their separate treatments, besides careful manipulations of the affected leg. Rest in bed should be insisted upon; this will usually markedly lessen the duration of the inflammation. Adjustment of the special points found deranged and a thorough treatment, if conditions permit, of the entire leg will be beneficial. Hot fomentations applied along the course of the nerve, and an inhibitory treatment back of the trochanter will at least give temporary relief. Extension of the leg is effective. Placing a patient upon his back and flexing the leg and thigh upon the abdomen, at the same time keeping the leg straight and the foot flexed, is an effectual stretching method. As a rule, sciatica readily responds to osteopathy.

Neuralgia

Neuralgia means simply "nerve pain." The term neuralgia should be restricted to such nerve pains as are not caused by structural changes in the nerves. In cases where the pain is due to organic changes in the nerves, the disease should not be classed as a neuralgia, although it is practically impossible to draw an absolute line between functional and organic disturbances for the one may gradually progress (pathologically) into the other. In neuralgia there is always **disturbance** of the **blood supply** to nervous tissue, which may be of the character of congestive irritation, ischemia or altered states of the blood wherein it contains toxic substances or is below normal quality. It is well known that osteopathic lesions are very common etiological factors.

Osteopathic Etiology.—Neuralgia is essentially a disease of adults. It rarely occurs before puberty or late in life. Women are more prone to neuralgia than men and the tendency may sometimes be hereditary. Sufferers from neuralgia often present a peculiar "nervous temperament."

The exciting causes of neuralgia are impairment of general health; irritations of the nerve fiber or trunk by a displaced bone, ligament or muscle, which may affect the nervous tissue directly by mechanical irritation, or indirectly, by the disturbance of its blood supply, or toxic agents; exposure to cold or damp; overwork and worry; toxic influences of various diseases, as malaria, lead poisoning and alcoholism; irritation from carious teeth, and various septic foci.

Symptoms.—Pain, which is spontaneous and paroxysmal, is the most prominent symptom. It may be described as "darting," "shooting," "burning," "stabbing," "boring," etc. The pain is usually unilateral, following the course of the sensory nerves, and there are generally tender points along the course of the nerve. Especially are there points of tenderness near the central end of the nerve, where the displaced structures are irritating it. After the pain has continued for some time the skin becomes tender, reddened and swollen. The redness and edema are supposed to be due to vasomotor changes. Muscular spasms, trophic disturbances, skin eruptions, herpes and grayness of the hair are of rare occurrence. The duration of an attack varies from a number of minutes to a few hours.

Neuralgia of the Fifth Nerve.—This is by far the most frequent variety of neuralgia, and it is generally due to a displaced **atlas** or **inferior maxilla**. The teeth sinuses, and other possible regions of focal infections should be thoroughly investigated. Anemia and products of metabolism may be underlying factors. All the branches of the fifth nerve are rarely involved. The **ophthalmic division** is most often affected; pain and tenderness being present about the supraorbital notch or foramen, the palpebral branch at the outer part of the eyelid, the nasal branch, and occasionally an ocular pain will be felt within the eyeball. When the **infraorbital branch** is involved, pain and tenderness are principally present at the infraorbital, nasal and malar points. When the **third division** is affected, the chief tender places are the inferior dental, temporal and parietal points. In nearly all cases of neuralgia of the fifth nerve, there is extreme tenderness in the region of the articulation of the atlas and the occipital, particularly the side on which the fifth nerve is involved. This tenderness in a few cases may be found as low as the second or third cervical vertebra. The pain may be so severe as to cause edema along the course of the affected nerve fibers, grayness of the

eyebrows and locks of hair chiefly in the temporal region, and convulsive twitching of muscles.

Tic Douloureux is a vastly exaggerated neuralgia of the fifth nerve and is supposed to be a primary affection of the Gasserian ganglion. Starting in middle life from no apparent cause it increases in severity until it becomes unbearable and suicide is not an infrequent result.

Many methods to relieve have been tried including destruction of the ganglion but with various results.

Treatment should be the same as in the milder form of neuralgia but it will require critical examination to determine the causes which are liable to be obscure.

Cervico-Occipital Neuralgia.—This variety involves the **posterior branches** of the **first four cervical** nerves, affecting the region of the posterior part of the neck and head. The pain may extend as far forward as the parietal eminence and the ear. The chief tender points are about midway between the mastoid process and the spine, between the sternomastoid and trapezius (branches of the cervical plexus), and a point just above the parietal eminence. This form of neuralgia is chiefly due to **subluxation** of the **upper four** or **five cervical** vertebræ irritating the posterior branches of the spinal nerves. A draught of air or exposure to cold are common exciting causes. The pain is of a sharp lancinating nature or else it is heavy and tense. Tuberculosis of the cervical spine may be an underlying cause.

Cervico-Brachial and Brachial Neuralgia.—In these forms of neuralgia the pain is referred to the area supplied by the **four lower cervical** and the **first dorsal** nerves. The tender points are in the axilla along the course of the ulnar, the circumflex at the posterior part of the deltoid and points at the lower and posterior part of the neck. The **lesions** exciting this form of neuralgia are usually found in the upper dorsal and upper cervical spines, but they may be as low as the sixth dorsal or as high as the atlas. As far as neuralgia of the ulnar nerve alone is concerned, it can be traced to the seventh and eighth cervical and first dorsal, and the lesion may be found occasionally at the fifth dorsal vertebra or rib. How a lesion as low as the fifth dorsal affects the ulnar nerve, it is hard to say definitely. There may be fibers directly to the ulnar nerve as low as this region, the nerve may be reflexly affected, the vasomotor supply to the ulnar nerve may be disturbed,

or possibly the lesion interferes with fibers of the deep layers of the back muscles and thus contraction of muscles for some distance above the lesion would affect the ulnar and other nerves. The scaleni may be affected and involve the plexus. A bursitis may be present (See Painful Shoulders Part I). Focal infections are sometimes factors.

Trunk Neuralgia.—This includes dorso-intercostal and lumbo-abdominal neuralgia. The former, **dorso-intercostal** neuralgia, affects the intercostal nerves from the **third** to **ninth dorsal**, and is characterized by pain along the intercostal spaces, or in a few of them. The pain may be bilateral and symmetrical, which usually shows a vertebral lesion. Three points of tenderness are usually noted, viz., near the median line in front, and midway between these two points in the mid-axillary line. The pain is usually dull with acute exacerbations. **Lesions** of the **vertebræ** and **ribs** in the locality affected are by far the principal causes. Cold, exposure, strains, etc., are exciting causes of every day occurrence. When the pain is bilateral and symmetrical the lesion is usually in the vertebra; when unilateral the rib alone may be involved. The most common lesion is a crowding together of the ribs anteriorly at the fifth and sixth interspaces. Carefully exclude a possible tuberculosis of the spine or ribs, aneurism, etc.

The pain of **herpes zoster** is not neuralgic, but neuritic, involving the posterior spinal ganglion. **Pleurodynia**, strictly speaking, is neuralgia of the pleural nerves, and not of the intercostals, but a deranged rib over the region of the pain is commonly the cause of the pleurodynia.

Lumbo-abdominal neuralgia involves the posterior branches of the **lumbar nerves**. Tender points are found near the vertebræ, middle of the iliac crest, lower part of the rectus, and in the male occassionally in the scrotum, in the female in the labia. These are often bilateral and are usually of a constricting nature. The ilioscrotal branch is the one most commonly affected.

Subluxation of the **vertebræ**, and other lesions, as contracted muscles, are found along the lumbar vertebræ, and even as high as the lower dorsal vertebræ. Also lesions are found at the lumbo-sacral articulation. Pelvic disease is also a cause.

A downward displacement of the **lower ribs**, eleventh and twelfth, is a common disorder and may be the cause of severe neuralgic pains in the

region of the iliac fossæ. It may simulate ovarian inflammation, renal colic, or even appendicitis if on the right side. And septic kidney has been wrongly diagnosed from these lesions. In fact it may be a cause of inflammation of the deeper structures, such as the ovary and Fallopian tube.

A subluxation of the vertebræ at the fourth and fifth dorsals may cause severe neuralgic pains in the epigastrium.

Neuralgia of the Spinal Column.—According to medical writers this is especially found in weakly women and after concussion of the spine; that it is a troublesome symptom in hysteria, and in many cases it is due to a reflex stimulus from diseased viscera. Most of this is undoubtedly true, but they have not found out the real significance of these neuralgic pains. The various **tender points** along the spinal column are of paramount importance to the osteopath as a **guide** to his **diagnosis**; not only in certain cases, but in nearly every case. The tender points are not due, in nearly every instance, to reflex stimuli from diseased organs, but these tender points are often the result of a local lesion, and are many times the cause of the disorder to the diseased viscus. The neuralgic pains are simply a symptom that a lesion exists in the immediate locality.

Neuralgia of the Sacral Region and Coccygodynia.—This form involves the nerves in the sacral and coccygeal regions. The nerves between the bone and the skin are affected. The cause of the pain is generally due to derangement of the articulation of the **lumbar** and **sacrum**, and to severely contracted muscles over the sacral foramina; also to lower lumbar lesions. It may be a reflex from various possible disorders of the organs and tissues of the pelvis. In coccygeal neuralgia, the **coccyx** is commonly displaced in any one of the various displacements that are liable to occur. Special attention should be given to the fibro-articulation of the coccyx, and to the status of the lumbo-sacral and innominata. In adjusting the coccyx, place forefinger in rectum up to proximal end of coccyx, and with thumb externally over the section, exert traction until articulation is released; then adjust.

Neuralgia of the Legs and Feet.—This includes the **crural form**, in which the front of the thigh is the seat of the pain; also the form in which tender points are found along the course of the **sciatic** nerve. The latter form is quite a common one, although sciatica is rarely a neuralgia. It is a neuritis and will be found classed under that heading. The tender points presented

are the lumbar, sacro-iliac, gluteal, peroneal, maleolar and external plantar. The various neuralgic pains of the legs and feet are generally due to **lesions** of the **lumbar**, **pelvic** and **thigh** regions, and to **weak arches**. **Metatarsalgia** occurs when the fourth metatarso-phalangeal articulation is partially dislocated. Neuralgia in the heel, ball of the foot and toes may be due to local causes or to lesions higher up. Aside from the above care should be taken that there are no toxic factors that may be exciting causes.

Visceral Neuralgia.—This is a term applied to neuralgia of the gastro-intestinal tract, the kidneys, and the various pelvic organs.

Diagnosis and Prognosis of Neuralgia.—Neuralgia is to be diagnosed chiefly from neuritis, rheumatism, and the effects of severe pressure upon the nerves. In **neuritis** there is oftentimes a symmetrical affection, while in **neuralgia** there is a unilateral distribution and there are many remissions and intermissions and a varying of the pain from one place to another. In severe forms of neuritis, anesthesia succeeds the hyperesthesia of the sensory nerves. In cases of severe pressure upon nerves, the pain is continuous and neuritis will soon be manifested. In **rheumatism** the pain is localized in muscles or groups of muscles and does not follow the course of the nerve. The pain is increased by motion.

The **prognosis** is generally favorable, no matter how severe the attack. The prognosis is influenced only by the age of the patient and the cause.

Treatment of Neuralgia.—Consists, first, in the control of the paroxysm and, second, in the removal of its cause. In controlling the paroxysm, frequently one will be able to remove the cause. In a large majority of neuralgias the cause is directly due to a **displaced tissue**, generally a bone or muscle in the locality affected; often all that is necessary in order to perform a cure is to adjust the disordered tissue and the pain will cease. This usually can be done immediately, although there are cases which require several treatments before an adjustment of the parts can be accomplished; besides, in acute cases the involved region will be so tender that an attempt to correct the tissues sufficiently to relieve the paroxysm will be unbearable to the patient. In such instances when the cause cannot be removed at once, firm pressure or inhibition over the involved nerves for a few minutes and local application of hot packs generally disperse the pain for the time being. The rules of hygiene should be observed in all cases.

The best time to **remove** the **cause** of neuralgia is between the attacks when the tissues are not as tender or contracted to such an extent as during the paroxysm. A diagnosis can then be made much more easily, and the tissues adjusted with less pain to the patient.

The details (as to the locality treated) for each form of neuralgia will be found under the discussion of each variety. The general health and diet should be considered. Peterson[115] says: "Morphine is, among the alkaloids, the most frequent cause of insanity. It is a sad commentary on the heedlessness of some medical men, but the family physician is responsible, in almost every case, for the development of the morphine habit and its far-reaching consequences. It should be looked upon as a sin to give a dose of morphine for insomnia or for any pain (such as neuralgia, dysmenorrhea, rheumatism) which is other than extremely severe and transient."

Diseases of the Cranial Nerves

Olfactory Nerves.—This nerve may be affected at various points from its origin to distribution. The disturbances may produce hyperosmia, or anosmia. The lesions may be tumors, injuries to the head and various diseases of the brain, or diseases of the nasal mucous membrane.

The **treatment** of the nerve (beside treating the disease causing the disturbance) is to the cervical region with a view to controlling the blood supply.

Optic Nerve and Tract.[116]—The retina, optic nerve, chiasma and optic tract may be affected by various lesions.

The affections of the **retina** are organic or functional. Under organic there is hemorrhage and retinitis. Retinitis may be due to several diseases, as syphilis, Bright's disease, anemia, etc., Functional includes toxic and hysterical amaurosis, tobacco amblyopia, nyctalopia, hemeralopia and retinal hyperesthesia.

Included in the lesions of the **optic nerve**, are optic neuritis and optic atrophy.

Under lesions of the **chiasma** and **tract** are diseases of the chiasma and unilateral regions of the tract. Lesions of the tract and centers may be found

in the tract itself, in the optic thalamus and the tubercula quadrigemina, in the fibers of the optic radiation, in the cuneus, and in the angular gyrus.

A brief summary, only, has been given of the lesions found, it being the idea not to dwell upon symptoms, morbid conditions, etc., but to bring out essential osteopathic features in regard to the cranial nerves. For the various effects of these lesions and points of diagnosis, the reader is referred to the various works on nervous diseases.

Lesions peculiar to **osteopathic** practice, that affect the optic nerve and tract, are found chiefly in the upper and middle cervical vertebræ. The disorders to these vertebræ may involve fibers of the optic nerve directly—those that are supposed to originate in the cervical spine; they involve the retina and optic nerve by way of the fifth, as claimed by some; and the above lesions especially affect the blood supply to the optic nerve and tract, either interfering mechanically with the blood-vessels or obstructing and irritating vasomotor nerves. The most common lesions are subdislocations of one or all of the three upper cervical vertebræ. Still, lesions may be located as low as the third or fourth dorsal vertebra, which may influence vasomotor and sympathetic nerves, or the lymphatics. The three or four upper ribs should also receive due consideration.

Motor Oculi.—Lesions of the third nerve may affect its center or the course of the nerve. These lesions produce spasms or paralysis.

The only way that we can control the motor oculi is by way of the superior cervical sympathetic; also, it has a connection with the fourth, fifth and sixth nerves, and we can influence it to some extent by direct treatment to the eyeball and orbital muscles. It should be remembered by the osteopath that many of the lesions affecting the cranial nerves, are found upon post-mortem examination, to be the effect of lesions in the spinal region; that many predisposing lesions are the disordered anatomical spinal tissues; as for instance in the third nerve, derangements of the atlas or axis may affect the nerve sympathetically (reflexly), or possibly by direct fibers, and produce the secondary effect—the so-called primary lesions of other schools—at the center or in the course of the nerve.

Patheticus.—This nerve may be involved by tumors at its nucleus, or as it passes around the outer surface of the crus into the orbit. Aneurisms or the exudation of meningitis may also compress its fibers. This nerve is purely

motor, although it receives a few recurrent sensory fibers from the fifth nerve.

This nerve is controlled osteopathically, principally at the superior cervical sympathetic. It has connections with the sympathetic by way of the cavernous plexus.

Trigeminus.—Lesions of this nerve are found in its nucleus and in the pons, and include sclerosis, hemorrhage, disease and injury at the base of the skull, tumors, aneurisms, inflammation of the nerve, and subdislocations of the **upper three cervical** vertebræ, or the inferior maxillary.

This nerve is an extremely important one from an osteopathic point of view, as it has a vasomotor influence over various vessels of the head and face, and secretory fibers to the lachrymal, parotid and submaxillary glands; also, it controls mastication, and to some extent deglutition, and influences hearing (tensor tympanum muscle). Diseases of the nasal mucous membrane and disease of the anterior portion of the eyeballs are largely due to the **vertebral subdislocations** and to derangements to the inferior maxilla. Our principal work upon this nerve is at the upper cervical vertebræ, the inferior maxilla, and the deeply contracted muscles in the upper cervical region. For the facial points of treatment **see neuralgia of the fifth nerve**. This nerve is closely related to the sixth, seventh, eighth, ninth, tenth, eleventh and twelfth nerves. Particular emphasis is given to the importance of treating this nerve in nasal catarrh and in eye diseases of the anterior portion of the eyeball. It contains trophic fibers to the eye, sensory fibers to the sclerotic coat and iris, and vasomotor fibers to the choroid plexus.

Abducens.—This nerve is especially liable to be affected by tumors and meningitis. It is controlled osteopathically at the superior cervical sympathetic, being connected with the sympathetic at the cavernous plexus.

Facial.—Lesions may occur in the cortical centers of the nerve, the nucleus and the nerve trunk. Paralysis of the facial nerve occasionally occurs (Bell's paralysis); also facial spasm may occur. This nerve is controlled at the stylomastoid foramen. **Lesions** to the **atlas**, anteriorly or laterally, are commonly found. In the region of the stylomastoid foramen, the nerve communicates with the great auricular of the cervical plexus, the trifacial, the vagi, the glosso-pharyngeal and the carotid plexus of the

sympathetic. The facial nerve may be affected directly as it passes above the angle of the jaw.

Nearly every case of **Bell's paralysis** can be cured by osteopathic treatment. There are usually lesions to the upper two or three cervicals. Correction of the cervical vertebræ and massage of the paralyzed muscles, with care of the general health, will suffice, provided there is not an extensive central lesion. Although the disease may be due to syphilis, meningitis, tumors, etc., the most frequent causes are lesions of the **atlas**, **axis**, and **third cervical** and **exposure** to **cold**. The cold produces a neuritis in the Fallopian canal, and deep treatment beneath the angle of the jaw is effective. The **prognosis** of Bell's paralysis is favorable.

Auditory.—Lesions[117] affecting this nerve may occur anywhere from its cortical center to its distribution in the cochlea and vestibule. Disorders resulting from lesions to this nerve are nervous deafness, auditory hyperesthesia, tinnitus aurium, and Meniere's[118] disease.

The control of the nerve and the treatment of lesions affecting it, are effected principally at the **first** and **second cervical** vertebræ. The atlas is especially apt to be subdislocated anteriorly or in a rotary manner. The condition of the **upper dorsal** region should also be carefully examined, as vasomotor nerves to the ear may be impinged at this point. The auditory connects with the fifth, sixth and seventh nerves.

Glosso-Pharyngeal.—This nerve may be affected by tumors, degenerations, meningitis and various lesions. It is often very hard to determine exactly the pathology, on account of its various connections with other nerves, the vagi, facial, spinal accessory, olfactory and optic nerves.

This nerve is chiefly controlled at its exit at the jugular foramen. Osteopathically, **lesions** of the **cervical** vertebræ and **upper dorsal** vertebræ affect it. The deep muscles of the anterior and lateral regions of the neck and subdislocations of the atlas especially affect the nerve.

Pneumogastric.—On account of its extensive distribution, and the importance of its functions this is one of the most important nerves in the body. It distributes fibers to five vital organs—heart, lungs, stomach, liver and intestines—and to other organs of secondary importance. This nerve is

associated with deglutition, phonation, respiration, circulation and digestion.

Hemorrhages, softening, etc., may involve the nucleus of the nerve, while the trunk may be impinged by tumors, thickened meninges, aneurism of the vertebral artery and **subdislocation** of the **upper five** or **six cervical** vertebræ, chiefly the atlas.

The nerve is most easily controlled at its exit from the foramen. Inhibition of the suboccipital region, between the mastoid process and transverse process of the atlas, will influence the nerve markedly, probably reflexly; also direct treatment may be given the nerve as it passes along the anterior part of the neck near the trachea. The superior laryngeal branch may be treated below the great cornu of the hyoid bone and attention is particularly called to this in all affections of the throat where coughing is a feature; the inferior laryngeal, at the inner side of the lower part of the sternocleidomastoid muscle. The inferior laryngeal nerve may be affected by dislocation of the first and second ribs, producing pressure upon the nerve as it winds about the subclavian vessel. Fibers of the nerve have been traced to the spinal accessory nerve, as low as the sixth and seventh cervical vertebræ; consequently, lesions to the vagi nerves may occur anywhere in the cervical region.

Spinal Accessory.—Lesions of this nerve may cause paralysis or spasms to the structures to which it is distributed. The lesions consist of **subdislocations** of **cervical** vertebræ, chiefly the upper three or four. The nucleus may be involved by wounds, abscesses, caries of the vertebræ, tumors and meningitis. These lesions may also involve fibers of the trunk.

The special points of control of the nerve are at the jugular foramen, the sixth and seventh cervicals and the second, third and fourth cervicals.

Torticollis or **Wry-neck** is spasm of the muscles of the neck supplied principally by this nerve. There will be found either derangements of the **middle** or **lower cervical** vertebræ or the muscles are swollen from exposure to cold or from a blow. Sometimes the lesion is in the upper dorsal. The disorder is mainly a neurosis and, unless it has become chronic, the **prognosis** is favorable, and even in chronic cases, often considerable benefit can be obtained.

Hypoglossal.—This nerve may be affected by cortical, nuclear and infra-nuclear diseases, as well as by subdislocations of the upper cervical vertebræ. It communicates with the superior cervical ganglion, the vagi, the upper cervical nerves and the gustatory branch of the fifth nerve. We control the nerve at the anterior condyloid foramen and at the superior cervical ganglion.

Diseases of the Spinal Nerves

Cervical Nerves.—The **great occipital** nerve may be controlled at a point on the occiput between the mastoid process and the first cervical vertebra. The **small occipital** and the **great auricular** nerves may be controlled at a point just behind the mastoid process. The great auricular nerve and the frontal branch of the trigeminus nerve meet over the parietal protuberance. The preceding points are the places where one may inhibit the nerves and control certain headaches or neuralgic attacks, although subdislocations of the upper cervical vertebræ, or contracted muscles between the atlas and occiput are usually the cause of such disturbances. Adjustment of the lesion will usually correct the disturbance. Carefully exclude possible caries or tumors.

Treatment of the upper cervical region, by relaxing muscles and correcting deranged vertebræ, constitutes the principal treatment of an ordinary **headache**. It is best to have the patient flat upon his back and the osteopath stand at the head of the patient, and, first, thoroughly relax these contracted muscles or correct the derangement of the vertebræ; then after the foregoing has been accomplished, give an inhibitory treatment of the suboccipital region. In inhibiting, place the fingers over the contracted and tender tissue; hold tightly for several minutes, or at least until the tissues have thoroughly relaxed. Many times one will be able to detect a slight twitching underneath the fingers, and when such is felt, he knows at once that the headache is relieved. In inhibiting at any point along the spine, seek the contracted fibers and tender points and inhibit exactly over the area. Headaches that are due to a disturbed circulation of the brain, may be relieved by this inhibitory treatment in the suboccipital region. The treatment tends to reestablish a normal circulation to the brain. Although the large vascular areas such as the splanchnic, should, if possible, be

normalized. Headaches may also be due to lesions at various points along the spine and ribs, and a correction of such points is necessary in order to cure the affection. A place often found involved is the upper dorsal region. **Reflex headaches** can be cured only by relieving the irritation. The treatment to the head would only be temporary. In headaches of the chronic type it is well to examine the scalp and if not freely movable over occipital region it may be adherent to the skull and cause pressure on the occipital nerves.

Lesions to the **phrenic nerve** usually occur in the region of the third, fourth and fifth cervical vertebræ. The lesion may be due to a deranged vertebra, or to disease of the membrane of the cord, or of the anterior horn of the gray matter (See Hiccoughs).

Paralysis of diaphragm from the phrenic may be single or double. When single it is not very noticeable. When double, respiration must be carried on by the intercostals and accessory muscles. When quiet, the patient may not notice it but on exertion there may be temporary dyspnea. Bronchitis with its constant coughing is a bad complication.

Various disorders of the phrenic nerve are principally treated in the area of the origin of the phrenic nerve. Tumors, aneurism, caries, and neuritis are possible complications.

Lesions to the **brachial plexus** are usually derangements of the cervical or upper dorsal vertebræ. Focal infections should not be overlooked. Direct injuries, contraction of muscles, a deranged clavicle, a cervical rib, or a dislocated shoulder are to be thought of. (See, also, Painful Shoulders, Part I) The X-ray as a diagnostic aid may be invaluable.

In obstructions to the **musculo-cutaneous** nerve, the power to flex the forearm upon the arm is greatly impaired. The lesion is most likely to be found between the fifth and sixth cervical vertebræ.

Clinically, the **median nerve** is of special interest from the fact that atrophy of the muscles of the ball of the thumb, which is pathognomonic of progressive muscular atrophy, may be caused by an affection of this nerve. The lesion is usually from the third to the seventh cervical vertebræ.

Lesions of the **ulnar nerve** may arise between the sixth and seventh cervical vertebræ, but are oftentimes found as low as the fifth dorsal,

especially at the fifth rib on the side affected.

Lesions of the **circumflex nerve** may be found in the lower cervical vertebræ, but are commonly caused by dislocations of the humerus and clavicle.

Lesions of the **suprarscapular nerve** occur most frequently from the fifth to sixth cervical vertebræ.

The **posterior thoracic** may be lesioned at the fifth or sixth segments, or by pressure injuries to the serratus magnus.

Dorsal Nerves.—The essential osteopathic points of the dorsal nerves have been considered under intercostal neuralgia. It might be stated that the posterior fibers of the sixth and seventh dorsal nerves supply the skin of the pit of the stomach. This is of value, clinically, as severe pains in the epigastric region which may result from impingement of these nerves, are supposed by the patient to be due to stomach disorder.

Diseases of the **liver** may be manifested by **pains** in the region of the right scapula. It has been suggested that the stimulus passes from the liver up the pneumogastric to the spinal accessory and down the spinal accessory to the trapezius muscle and thus causes the "liver pain."

Intercostal neuralgia is more common on the left side of the body. The intercostal veins of the left side empty into the left superior intercostal vein or the left azygos. Thus the blood, to reach the vena cava, is obliged to take a circuitous route and stagnation is more likely to occur than on the other side.

The glandular structure of the **mammary glands** is supplied by intercostal nerves from the third to the sixth interspace. Lesions here will cause various diseases of the breasts and adjustment will cure many of them.

Lumbar Nerves.—The lumbar nerves may not only be deranged by various growths, inflammatory processes and abscesses in the abdomen, but by lesions, infections, parturition, and developmental defects of the lumbar vertebræ. Tuberculosis of spine, sacro-iliac and hip joints, is not rare. In doubtful cases utilize the X-ray plate.

Lesions in the region of the **first lumbar** may affect the **iliohypogastric** and **ilio-inguinal** nerves and causes various irritations of the penis, scrotum, labium and thigh. Also, the perineal region may be involved, as well as connecting branches of these nerves to various visceral nerves underneath.

The **genital organs** may be affected by lesions to the **genitocrural** and **external cutaneous** nerves, caused by vertebral lesions of the second and third lumbar vertebræ. The latter nerve may be irritated by pressure underneath Poupart's ligament.

Lesions at the third and fourth lumbar vertebræ and sacro-iliac articulation may affect the **obturator nerve**.

Sacral Nerves.—Lesions to the sacral nerves are especially liable to occur when an innominatum is subdislocated, as that changes the relative position of the femur with the body and causes impingement to the sacral nerves. Contraction of the pelvic and thigh muscles also affect sacral nerves. Other lesions to the sacral nerves may be located at the fifth lumbar and sacrum. It should be remembered that the centers of the sacral nerves are in the lower dorsal and upper lumbar region. Various lesions to the sacral nerves may be caused by pelvic inflammation, compressions by growths, and injuries and contractions of muscles within the pelvis. Sciatica has been described under neuritis.

FOOTNOTES:

[114] See Osteopathic Lesion—Journal of American Osteopathic Association. May, 1906, and Deason's Physiology.

[115] Nervous and Mental Diseases, p. 622.

[116] See Diseases of the Eye, Part I.

[117] See Ear Section, Part I.

[118] R. D. Emery reports a case of Meniere's disease as cured. A. O. A. Case Reports, Series IV.

GENERAL AND FUNCTIONAL DISEASES

Paralysis Agitans

(Shaking Palsy)

Definition.—A chronic, nervous disease, characterized by tremors, muscular weakness, muscular rigidity and alterations in the gait.

Etiology.—The disease usually commences after forty years of age, but occasionally it occurs from the thirtieth to fortieth years. It is more frequent in males than in females. Heredity seems to have but little influence in the cause of the disease. Among the principal causes are physical injuries, exposure to cold and wet, emotion, worry, alcoholism, sexual excesses and acute diseases. Physical injury, in conjunction with exposure to cold is the best determined cause. Disorder of the vertebræ of the cervical or dorsal regions, or of the upper and middle ribs, can generally be found. Traumatic influences probably affect the nerve centers, causing a disturbed innervation, either by the direct effect of the deranged structures upon the nervous tissues or obstructing nutritive channels to the nervous tissues.

In most cases no changes have been observed in the central nervous system or in the sympathetic ganglia. Some observers have noted induration of the pons, medulla and cord, but these changes may be due to senility or to the indirect consequences of the long disturbance of function. In a few cases, interstitial sclerosis of the peripheral nerves is observed; these are probably secondary changes. Osteopathic experience regards paralysis agitans as an affection of the central nervous system, due to a disordered structure in the locality affected.

Symptoms.—The onset is usually gradual, but may come on quite suddenly after exertion. The **initial** symptoms are usually tremor, stiffness or weakness in one hand. In rare cases, at first there may be neuralgic pains, dizziness and symptoms of a rheumatoid nature. The tremor can be controlled by the will at the onset of the disease. The affection gradually extends until an entire side or the upper or lower limbs are involved. At this

advanced stage of the disease, a peculiar muscular rigidity of the involved region takes place. Muscular weakness comes on at about the same time as the rigidity, and the loss of power varies much in degree. The condition is most marked in the fingers and hands, whence it extends to the arms and legs. It commonly passes from the right arm to the right leg, then to the left arm, and then to the left leg. At this stage the movement between the thumb and fingers is like that of crumbling bread. The writing is greatly affected and in time it is impossible to write. The trembling may be so violent as to prevent sleeping. There is occasionally an intermission of days in the tremor.

On account of the rigidity of the muscles, the patient assumes a characteristic **attitude** and **gait**. The position of the body is that of a tendency to go forward, the head is bent forward, the back curved outward, the arm bent at the elbow and held away from the body, and the knees so close together that they rub in walking. The gait is a "propulsive" one, and when once started in a forward walk, the patient's gait becomes more and more rapid and he cannot stop until he comes against some object. The expression of the face is stiff and mask-like, the speech slow and monotonous and the voice shrill. The patient is generally restless and troubled with insomnia. The general health is in fairly good condition. Reflexes are usually normal. The intellect is generally retained, although the physical ailment may cause mental depression.

Diagnosis.—Is usually easy and can oftentimes be made at a glance. **Disseminated sclerosis** has a tremor, but is shown particularly in voluntary movements. The speech is scanning and the gait ataxic. The disease begins in the lower extremities, the attitude is different from that of paralysis agitans, and there is nystagmus. In **chorea** the movements are general, irregular and more intermittent, and it particularly involves muscles of the face. Also chorea is a disease of children and young adults.

The **tremors** of old age, hysteria, and certain toxic conditions due to tobacco, alcohol, etc. are generally easily diagnosed.

Prognosis.—The disease does not necessarily shorten life; the patient oftentimes dies with some intercurrent disease. Improvement usually results from careful, prolonged treatment. Early treatment, of course, will give the

most satisfactory results, and occasionally, if taken very early, the case can be cured.

Treatment.—A most careful examination of the physical structures of the patient should be made, particular attention being paid to the **cervical** and **dorsal vertebræ**, the upper and middle **ribs** and the **muscles** along the spinal column. All irregularities found should be corrected if possible, and strong, thorough treatment given to the region of innervation of the affected parts. Traction of the rigid areas is of some value. Treatment of the arms and legs will also be of aid. All mental strain and physical exhaustion should be prevented if possible. General **hygienic measures** are to be employed. The life of the patient should be quiet and regular. Bathing, fresh air, massage and outdoor life will aid in improving the general health. **Persistent** treatment will retard the progress and frequently improve the general condition. Simple and hysterical tremor must not be confounded with that of paralysis agitans. E. Ashmore[119] reports an interesting case which shows about what may be expected under treatment.

Acute Chorea

(St. Vitus Dance)

Definition.—A functional disorder of the nervous system, chiefly affecting children, more than twice as frequent in females as males; characterized by irregular involuntary muscular contractions, often slight mental disturbance, and liability to endocarditis.

Osteopathic Etiology.—The disease affects children of all stations, but is more common among the lower classes. The greater number of cases occur before the age of twenty. It sometimes develops during the early months of pregnancy, when it often assumes the maniacal type. Chorea is frequently associated with endocarditis and rheumatism and delayed menstruation. It occasionally follows infectious diseases of childhood, especially scarlet fever. Fright, mental worry, sudden grief and overstudy may bring on an attack. Children of neurotic stock are more susceptible. Heredity plays some part as a predisposing cause. Reflex irritation from worms or from genital irritation has a slight influence upon the disease. Overwork in school is an important factor. **Derangement** of the **anatomical**

structures, involving the nervous system along the spinal column, is the most common predisposing cause. Most of the anatomical displacements are found in the cervical vertebræ, although the upper dorsal may be involved.

Pathologically, as yet, no constant anatomical lesions have been found. Emboli occur in some cases, but this might be expected, as endocarditis so frequently occurs as an effect and not the cause of chorea. "In cases not rheumatic, the most probable explanation of the symptoms is to be found in vascular changes, having their origin in disturbed nutrition." (Holt) According to osteopathic theories and investigations, the disease is due to various irritations to the spinal centers and nerves of the affected region. The disordered nerve cells may be the result of direct pressure, hyperemia, anemia, etc., and the action upon the brain centers is possibly a reflex act. Of late acute chorea is regarded by some as an infectious disease.

Symptoms.—In the majority of cases the muscular movement is not severe. They are purposeless and the child appears awkward. Restlessness, disturbed rest at night, crying spells, pain in the limbs, headache and irritability, are some of the premonitory symptoms. In **mild cases** one hand, or the hand and face, are involved. Occasionally there is some difficulty in talking. The irregular, jerky movements are characteristic of this disease. The child is anemic, and the muscles are weak. In **severe cases** the movements are general, the power of speech is lost, and the patient is unable to get about. The condition usually occurs after one or more mild attacks, although it may occur primarily. During an attack of chorea, the child's disposition changes, he becomes irritable, cannot concentrate his mind, memory is affected and hallucinations may occur. The reflexes do not usually differ from the normal. **Maniacal chorea** is most serious, and often proves fatal, although recovery may occur. This form occurs most frequently in pregnant women. Speech is greatly affected and insomnia, fever and maniacal delirium develop. The **duration** is from six to ten weeks, in the average case. Mild cases may recover in a month or less, others last six or more months. There is a tendency of chorea to recur; rheumatism seems to favor this tendency. In children recovery is the rule.

Diagnosis.—In the majority of cases chorea is easily diagnosed. The symptoms are generally very characteristic. In a few cases of hysteria there may be difficulty of diagnosis, but history and rhythmical movements will

usually differentiate. In **hereditary ataxia** the slow, irregular movements, the scolioses, scanning speech, talipes and the existence of other cases in the family, will differentiate this from chorea. **Cerebral sclerosis** usually occurs in infancy; impaired mentality, exaggerated reflexes, rigidity and chronic course of the disease, are points which render the diagnosis easy.

Treatment.—Nearly all cases can be cured.[120] The predisposing causes of chorea, osteopathically, are usually found to be subluxations of the vertebræ or ribs at any point, but particularly in the cervical vertebræ. Chorea is one of the diseases of the nervous system, in which constant morbid changes are not found upon the post-mortem examination. Possibly the reason is because the lesions causing the diseased state are not deeply seated enough to primarily affect motor centers; but are lesions of the spinal column and ribs, affecting simply the nerve fibers reflexly, as they pass through the intervertebral foramina. There will be found well marked lesions, and upon their correction the osteopath finds complete recovery largely depends.

The muscle, or group of muscles, involved, will give a **direct clue** as to where the lesion will probably be found. In nearly all cases, it is in the spinal region of innervation to the affected muscles. Other cases may be due to cerebral lesions, as well as to intestinal and uterine disturbances. Search should be made for possible **reflex** irritation, such as intestinal parasites, adherent prepuce, eye strain, nasal abnormalities, etc.

All cases should be taken from school, carefully guarded from excitement, and placed under the most favorable **hygienic** conditions, with a certain amount of discipline as to self control. The more serious cases should be placed in bed, so that rest will be secured as well as diminished liability to heart complications.

The **diet** must be carefully watched and the bowels attended to regularly. A milk diet during the early stage is highly recommended. Do everything possible to restore the general health. Mild gymnastics, in most cases, will be found of service. Amusement should be given the child, in the open air if possible. In severe cases where the skin is harsh and dry, the hot air bath, providing the strength is good, will give considerable relief from the intensity of the disease. A few cases of acute chorea run into a **chronic form**, but the latter, as a rule, yields to osteopathic treatment.

Choreiform Affections

Myoclonia is a sudden contraction of a few muscle fibers, a single muscle or of a group of muscles. A neurotic tendency, infections and toxic conditions are factors. Occasionally epilepsy may be associated with it. Osteopathically there can be but little doubt that the innervation to the muscles involved is interfered with.

The lower extremities are usually first affected and it may be sudden or gradual in appearance. It is progressive and slowly involves the arms and, rarely, the face. Usually the spasms cease during sleep.

Prognosis is rather favorable. Examination should show the cause of the nerve interference and its correction bring relief.

Dubini's disease is probably associated with certain diseases of the cord and brain and is characterized by sudden, sharp pains in the head, neck and lumbar muscles, extending to the lower extremities in the form of a short, sharp spasm, usually at regular intervals. Later there may be symptoms of hemiplegia. The disease is apt to progress and death may occur during a convulsion.

Habit spasm usually results from overstudy and nerve exhaustion with impairment of general health, and is incident to early life. The child is usually a neurotic. The symptoms are twitching of the mouth and eyelids, grimaces and jerking of the shoulders. **Treatment** for the general condition, with correction of any spinal lesions, will generally give relief.

General tic resembles habit spasms closely. In some cases the patient is apparently healthy, while in others there is some brain disorder. There are coordinate spasmodic movements of the head, face and upper trunk, swallowing and abnormal vocal sounds. The movements are rapid and frequently repeated. **Prognosis** is uncertain and will depend largely on general conditions. In **convulsive tic** there is usually a repetition of certain words or sounds with a convulsive twitching or movement of certain muscles.

Infantile Convulsions

(ECLAMPSIA)

Infantile convulsions may be due to various causes. A neurotic inheritance is an important predisposing factor. They may precede the development of many diseases of the nervous system, and also occur as the result of peripheral irritation. Dentition in association with rickets, and intestinal parasites are common causes. They may be the early symptoms of acute, infectious diseases. Scarlet fever, measles, pneumonia and smallpox are very frequently preceded by convulsions. They may be due to debility, resulting from gastro-intestinal disorders. Malnutrition is a predisposing cause. Disease of the bones, especially rickets, may be associated with convulsions. Lesions of the brain are other causes. A protracted instrumental delivery may cause a hemorrhage of the meninges.

Symptoms.—In severe cases the fit may be identical with epilepsy. It is more often not so complete as true epilepsy. Convulsions vary considerably, but there will be no difficulty in diagnosis. It may come on suddenly, or be preceded by restlessness, twitching, sometimes grinding of the teeth and fever. The spasms may be either of a tonic or clonic type preceded by a cry and loss of consciousness. The attack may be single, but the fits may follow each other with great rapidity and terminate fatally. It is rare for the child to die during a convulsion. Exhaustion and asphyxiation may cause a fatal termination. As in epilepsy the temperature often rises during the fit. A transient paresis sometimes follows, if the convulsions have been chiefly limited to one side.

Diagnosis.—The diagnosis is generally easy. The attack is usually due to the ingestion of some indigestible food or to some peripheral irritation, or an acute disease. Convulsions, appearing immediately after birth or injury, are probably due to meningeal hemorrhages or serious injuries to the cortex; although a few of these cases will present grave lesions of the cervical vertebræ, probably often due to protracted instrumental delivery. Infantile convulsions usually occur between the fifth and twentieth months. Convulsions occurring after the second year are more likely to be true epilepsy. The **prognosis** depends almost wholly upon the cause, severity and duration.

Treatment.—The **first step** in the treatment is to determine the cause if possible. Treatment in the region of the sixth and seventh dorsals will often

give relief; thorough work along the lumbar region and the sacrum will many times be sufficient, if the convulsion is due to intestinal disorder. C. M. Proctor reports that in male infants he has relieved convulsions quickly, in several cases, by pushing back the foreskin and has always found, in such cases, either a phimosis or an adherent prepuce. In female infants it might be well to examine the clitoris. Dilatation of the rectal sphincter may be of aid. It may be necessary to vomit the patient, when it is due to undigested food in the stomach; and in some cases an enema should be used, when the irritation is in the intestines. In a few cases, when the convulsions are due to dentition, a lancet applied to the gums will be all that is required. A thorough treatment to the cervical region, to control the circulation, should always be given; at the same time apply ice to the head. The patient should be put in a bath of 95 to 98 degrees F., should the preceding treatment not have the desired effect, or, better still, use the bath at once and treat at the same time.

Owing to the neurotic tendency and the ofttimes trivial causes that precipitate an attack everything possible should be done to build up the general condition—adjustment of all lesions, regulated diet and disciplined habits.

Epilepsy

Definition.—A chronic affection of the nervous system, characterized by attacks of unconsciousness, which are usually accompanied by general convulsions. When there is merely a momentary loss of consciousness it is called **petit mal**. Loss of consciousness with convulsions is called **grand mal**. When the convulsion is localized, with or without loss of consciousness, it is called **Jacksonian epilepsy**. Certain cases of temporary loss of consciousness are termed **psychic epilepsy**.

Etiology.—Epilepsy usually begins before puberty, and comparatively seldom after the twenty-fifth year. Males suffer somewhat more frequently than females. Heredity predisposes to the disease to some extent, but probably not so greatly as many writers would claim. Neuroses, as insanity and hysteria, and intermarriage of relatives, are important elements to consider. When epilepsy is inherited, it is almost always due to some morbid state of the nervous system. Other predispositions to the disease

may be caused from defective general development of the brain, from impairment of the general health, and from an exhausted nervous system.

Many **exciting causes** may be found: mental emotion, fright, excitement and anxiety; blows and injuries to the head; infectious diseases; syphilis; alcoholism; masturbation; ocular and aural irritation; disturbed and delayed menstruation. Epilepsy may be excited by reflex convulsions from intestinal worms, gastric irritation, etc. Also thickening of the membranes of the brain, pressure from a tumor at the periphery, uterine diseases and many other sources of irritation may be found, that are the exciting causes of epilepsy.

Important exciting causes of epilepsy are, undoubtedly in many cases, due to **lesions** of the **vertebræ** and **ribs** especially the vertebræ of the cervical region, although in some cases the lesion is in the lower splanchnic region or in the ribs (chiefly from the fourth to the eighth). These lesions to the spinal tissues disturb the nutrition to the vasomotor nerves. If the real seat of the disease is in the cerebral cortex and the medulla, the cervical lesion, and in fact other lesions, could readily affect the nerve force and circulation to and from these regions. The vertebral artery circulation, where a cervical lesion exists, may be involved and affect the brain. In cases where lesions of the vertebræ and ribs exist in the upper and middle dorsal region, the vasomotor innervation to the brain may be involved, for in this region the vasomotor nerves to the cranium, etc., pass from the cord into the sympathetics. Birth injuries may affect the brain tissue, through cervical lesions, hemorrhages and asphyxiation.

Conklin attaches considerable importance to stasis of the sigmoid and ascending colon. Lesions involving this region may result in toxins entering the blood and affecting nervous tissue.

To illustrate a specific exciting lesion, the following is interesting. The case was one of epilepsy that was evidently caused by a dislocated right fifth rib. By producing an irritation in the region of this rib, so that the lesion was increased, the patient could be made to immediately suffer from an attack of epilepsy. By resetting the rib, at once the sufferer would be entirely relieved. The case was cured after three months' treatment, the chief work being to keep the rib in place. Rarely a subdislocated innominate bone, or some lesion remote from the brain, is located and found to be

causing epilepsy. Important lesions in most cases will be readily located in the cervical region. Booth reports: “I have records of seven fairly defined cases of epilepsy—such as have been so pronounced by M. D.’s. I find in all of them **marked lesions** in the **upper cervical** and in most of the cases the occiput is posterior upon the atlas or twisted. In all cases there was a thickening of the soft tissues, especially in the upper cervical. The lower cervical was also much involved but not so noticeably. All of the cases also presented marked disturbances in the upper dorsal; most were decidedly anterior, and one very posterior. One was almost a confirmed drunkard; notwithstanding the fact, he recovered to such an extent that he went to work, and I understand has been holding his position for more than three years. He had had to give up his work entirely. One was a hopeless case in every particular and did not seem to receive any benefit from the treatment. I think it was entirely beyond help from any source. The others responded very well and the results were definite and decided. The length of treatment in successful cases ranges from about five weeks to a little over a year. But those that were treated the greater length of time were not treated continuously.”

After one convulsion has occurred, others readily occur, owing to the proneness to changes in the nerve centers. Very little is known as to the pathology of this disease. Convulsions may be caused from irritation of both the cortex cerebri and the medulla oblongata. From a study of the character of the auræ, one is led to believe that there is a disturbance, in most cases, in the centers of the cerebral cortex; and that the lesions so generally found along the spinal column are the true exciting causes of the disease. Perhaps in a few cases the irritation may be to the medulla reflexly. The lesions found on osteopathic examination may act reflexly, as has been stated, upon the centers in the brain and excite them; or the circulation is deranged, and consequently the nutrition to the brain and meninges, by vasomotor control and the vertebral vessels, is impaired.

The splanchnic area and the cervical region should always receive special attention. This in conjunction with all possible reflex sources, and, not least, the general health, restoring a stable nervous system if possible, are of greatest importance.

As a rule, **pathological** lesions are not found. To the naked eye the appearance of the nerve centers is largely that of healthy organs. The

changes revealed by the microscope are most probably those of secondary origin. Recent experiments seem to show that the motor zone of the cortex is affected.

Symptoms.—These will be considered under the three varieties, known as grand mal, petit mal and Jacksonian. **Grand mal.**—In most cases the seizure is preceded by a pronounced sensation known as the **aura**. This differs greatly in various individuals. It may begin in a finger or toe and rise until it involves the head, when the patient screams and falls to the floor unconscious. In other cases the sensation may start from other parts of the body, as the epigastric region, where it may simply be a slight discomfort; or other sensations may be felt, as that of a ball rising from the stomach. The aura may start from any part of the body as a numbness, tingling, chilliness, etc., and may, also, be manifested through the optic, olfactory, auditory and gustatory nerves, by flashes, smells, sounds and tastes. "Intellectual auræ" may also be manifested. Some form of auræ is met with in nearly one-half the cases of epilepsy. Others lose consciousness so early that the patient is not aware of the onset. In cases not attacked suddenly and not preceded by an aura, a prolonged prodrome may be present for several hours or a day. The patient may feel irritable, dizzy or dispirited. Or he may be quiet and calmly await the attack. In a few cases certain movements may precede an attack, as running rapidly forward in a circle, or standing on the toes and rotating rapidly. The attack proper is sudden. The patient falls with a peculiar cry. The **convulsion** or fit may be divided into **three stages**, that of **tonic** spasm, of **clonic** spasm and of **coma**.

The **tonic spasm** succeeds the epileptic cry; there are loss of consciousness, pallor of the face and the contraction of pupils. The body assumes a position of tetanic rigidity, the head is retracted and rotated, and the spine curved, owing to an unequal affection of the muscles of the two sides. The jaws are fixed, the arms are flexed at the elbow, the hands at the wrist, and the fingers are clinched. The legs and feet are extended. The muscles of the chest are involved and respiration is suspended. This stage lasts a few seconds. The **clonic spasm** follows the tonic spasm. The muscular contractions become intermittent. From slight vibratory motions, the intermittent muscular contraction becomes general. The arms and legs are thrown about violently, the muscles of the face are distorted, the eyes rolled, and the lips open and close. The muscles of the jaw contract

violently and the tongue is apt to be bitten. The pupils are dilated, the face cyanosed (though at first the face is pale and pupils contracted) and blood-streaked, frothy saliva pours from the mouth. The feces and urine may be discharged involuntarily. The temperature rises about one degree F. This stage lasts about one or two minutes. The period of **coma** may last from a few minutes to several hours. Usually if left alone, the patient will awaken after a few hours. In a few cases mental confusion follows the waking. During the stage of coma, the face is congested but not cyanotic. The muscles are relaxed and the breathing is noisy. Epileptic attacks during sleep, **nocturnal epilepsy**, are not rare. This may continue for some time without the patient being aware of it.

Petit Mal.—In this variety of epilepsy, convulsions are absent. The seizure consists of momentary unconsciousness with fixed, staring eyes, dilated pupils and rarely any twitching of the muscles. After the attack the patient resumes his work. There may be attacks of vertigo, without unconsciousness, and the patient may fall. In a few instance there may be auræ of various kinds. Petit mal may be a forerunner of grand mal or the two may alternate. Between grand and petit mal there are many grades of epilepsy varying in severity.

Jacksonian Epilepsy.—The affection is always symptomatic of lesion in the motor area of the cortex. The lesion is quite apt to be a tumor, though various injuries, inflammation, sclerosis, softening, hemorrhage or an abscess may be the cause. Consciousness is retained and the convulsions are limited in extent. Tonic and clonic spasms of the same character as in general epilepsy occur. A slight numbness, tingling, or twitching may precede the attack.

The **severity** of epilepsy **varies** extremely. The seizure may occur but once a year or it may occur several times in a day. In many cases a marked periodicity is observed. The mental functions are not, as a rule, injured, but when the seizures are frequent, the health fails and the mental capacity is reduced. Many sufferers from epilepsy are subjects of chronic gastric catarrh, and have at the same time an inordinate appetite. Quite frequently a fit may follow inordinate eating.

When there is a **series** of **convulsions**, which follow one another in rapid succession and which are associated with high fever, the term "**status**

epilepticus" is applied. The most **common form** of epilepsy is the **major** form. About two-thirds of all attacks occur between eight a. m. and eight p. m.

Diagnosis.—Uremic convulsion closely resembles an epileptic convulsion. When the history of the case, analysis of the urine, increased temperature and the general health of the patient are all closely observed, error should be avoided. In **reflex convulsions** of **children**, a careful search, and if necessary waiting a short time, will readily determine the source of the attack. When **nocturnal convulsions** take place without the knowledge of the patient the attack is epileptic. In **hysterical convulsions** the patient rarely loses consciousness. They rarely hurt themselves, never bite the tongue, the temperature is normal, opisthotonos does not occur, and the duration is usually longer. In **Jacksonian epilepsy**, the attack is limited to some portion of the body, or it may gradually extend into a general convulsion. Care should be taken to recognize petit mal.

Prognosis.[121]—Records show that many cases have been cured and a much larger number have been benefited.

Treatment.—Osteopathic treatment has been especially successful in epilepsy, as compared with other treatment. Although the osteopaths do not claim a cure in every case, by any means, still about four out of every ten have been cured, while one-half of the remaining have been greatly helped in regard to the lessening of the severity of the attack, and in rendering the attacks less frequent. Conklin through his special treatment of fasting, dieting, enemata, spinal adjustment, and particular attention to the large bowel, especially cecum and colon, has increased this percentage. This is based on several hundred cases.

Important lesions are usually found in the cervical region, from the third to the seventh vertebra, though they may be as high as the atlas. These lesions may affect the brain in various ways; probably in the manner described under the etiology. Lesions are also found in the dorsal vertebræ and when occurring below the cervical region, the lesions are generally found in the upper and middle dorsal regions, though they may be located at any point along the spinal column.

The treatment is according to the rule that applies to all osteopathic work: an individual correction of the lesions presented in the case at hand. If any

general movement or treatment might be given, it would be strong traction of the head to stretch the cervical vertebræ, or rather to separate them, so that the circulation to the brain may be equalized. Another general measure is to hyperextend the neck with fulcrum at juncture of atlas and occiput, thus releasing the upper anterior tissues that may impede cerebral circulation.

If the lesions in such cases are in the cervical vertebræ, probably they affect the cervical sympathetics. A **careful search** for a source of excitation must be made throughout the entire body. An irritation of the intestinal tract may be the exciting cause; or some irritation of the genito-urinary tract may be found, as phimosis, masturbation, etc., so that it is very necessary that great care be taken in the examination. Subjects of masturbation usually present lesions along the genito-urinary center in the spine. All possible reflex irritations should be eradicated.

Proper **hygienic measures** should be added. Pay particular attention to the bowels. Place the patient in the knee-chest position and thoroughly raise the cecum and ascending colon in order to improve circulation and promote elimination. Baths are important, and plenty of fresh air and outdoor exercise are of much significance. The patient's mind should be occupied. The question of food is an important one; general diet—carefully regulated as to the amount given—should be prescribed. A vegetable diet is usually best. Reduction of salt seems to have a good effect. The patient must not be allowed to eat too much at a time, nor too often. If the bromides are being used, they should be withdrawn gradually.

In most cases of true epilepsy a continued treatment of several months is necessary. Unless the patient can follow out the treatment for several months, or even years, in a number of cases it will be entirely useless to take the treatment; although if the lesion present is very apparent, and the patient is enjoying fair health otherwise, and has not been affected long, a treatment for a few months, or even weeks, might be all that is necessary.

Surgical interference may be indicated in Jacksonian epilepsy. Trephining has been practiced successfully in a number of cases and the risk from operation with modern surgery is so reduced that one is frequently justified in advising an operation.

During an **attack**, a special treatment cannot be given to lessen the severity of the fit in all cases; in fact, most patients prefer not to have the seizure shortened as the after effects are more disagreeable. In some cases, at the beginning of the seizure, exerting a firm pressure upon the suboccipital will quiet the patient. This treatment probably controls the circulation of the brain, by way of the superior cervical ganglion. In cases where the exciting factor seems to be in the intestines, and the peristaltic action of the bowels is reversed, causing a reversion of the nerve current of the vagi, a rapid, firm kneading over the abdomen, so as to establish normal peristalsis, will suffice to prevent an attack, if one is notified of its approach. In some cases a rapid, thorough stimulation of the solar plexus will lessen an attack. Possibly it reduces the blood pressure in the brain, by bringing blood to the splanchnic region.

In all cases during the convulsion the patient should be carefully protected from injuring himself. A towel should be twisted and placed in the mouth, so that the tongue cannot be bitten. Do not place small articles as corks, etc., between the teeth, as they are liable to enter the pharynx and cause suffocation. The patient should be watched to protect him from any injury; otherwise the attack should usually be allowed to spend itself.

Migraine

(Sick Headache)

Migraine or sick headache is a neurosis, characterized by a paroxysmal pain in the head, usually unilateral and periodical, with nausea, frequently vomiting, and disorders of vision.

Osteopathic Etiology.—The disease usually begins in the first half of life, rarely earlier than puberty and is slightly more frequent in females. Some weakened or depressed condition of the nervous system, due to lesions of the upper cervical vertebræ, lesions of the inferior maxilla, anxiety, overfatigue, anemia, digestive derangements, **eye strain** and menstrual disorders, is generally the cause. The hereditary factor is very important. This is frequently associated with derangement of the **large bowel**, especially cecum and ascending colon, resulting in toxemia.

It is supposed by some to be a **vasomotor** disturbance, because there are symptoms, as pallor and flushing of the skin, which show an involvement of the sympathetic system. It is possible a spasm of cerebral arteries, followed by vascular dilatation, takes place. The seat of the pain is believed to be in the meninges of the brain. Possibly in many cases where the atlas is found involved and causing the affection, some meningeal fiber of the fifth nerve is impinged by the lesion. Caries of the teeth and **nasal troubles** are causes of the disease in children.

Symptoms.—A **paroxysmal** headache is the principal feature of migraine. The attack may occur without warning, although there are usually malaise, restlessness and a disturbed vision preceding the headache. The **prodromal** symptoms vary to a great extent. Other prodromal symptoms besides those given, may be vertigo, spots before the eyes, tinnitus, chilliness, etc. The pain is of a sharp and stabbing nature and is oftentimes limited to the temporal region of one side. Others describe the pain as of a binding or of a boring nature. It is continuous. It may be in the occiput instead of in the side of the head.

Hyperesthesia of the surface is noticed, but the tender points of neuralgia of the fifth nerve are absent. The patient is sensitive to light and noise. Flashes of light occasionally attend the pain in the head. Hemianopia is not infrequent. The temporal artery may be contracted, the face pale and the pupil large. In others the eye is dilated, the face flushed and the pupil small. Nausea and vomiting are frequent, with loss of appetite. In some cases where the stomach is full, vomiting the contents will relieve the attack. Should the stomach be empty, vomiting of mucus may occur, and is later followed by vomiting of bile. Tenderness is commonly found about the region of the occipital and upper cervical muscles. Attacks rarely occur oftener than once in ten or fifteen days. During the intervals the patient may be quite well. The **duration** is anywhere from a few hours to several days.

Diagnosis.—The sensory symptoms, the paroxysmal character, the severity and definite course, usually readily distinguish migraine. **Growths** of the **brain** may be the cause of symptoms closely simulating migraine. In such cases an ophthalmoscopic examination may reveal a choked disc.

Prognosis.—Is usually favorable when the attacks are light and of short duration. Cases of long standing and of great severity are not so easily

cured, although in most instances great relief can be given the patient. There are very few cases in which the severity and frequency of attacks cannot at least be lessened. Oftentimes attacks of migraine cease after middle life.

Treatment.—The **atlas** or one of the **upper cervical** vertebræ is almost invariably subluxated. This is not always the direct cause of migraine, but it is an important factor in the causation. **During** the **attack** many cases can be completely, or at least partially relieved, by a careful treatment in the upper cervical region. But there are some cases where treatment of the cervical region is entirely unsuccessful, and, in fact, aggravates the attack. The details of treatment vary in every case. If any defects in general health or any error in the mode of living can be found, these of course must receive first attention. Rest, diet (a vegetable diet is best) and regularity of meals are usually to be specially considered. Anything that is known to induce an attack must be carefully avoided. In some patients the attacks cease so long as they remain free from mental work, but as soon as they return to their studies the paroxysms occur.

Every case should be thoroughly examined before a course of treatment is laid down. Causal conditions can generally be found, and the correction of such usually results in a cure, or at least in great relief. Errors in diet; digestive disturbances, as a disordered biliary tract; disorders of the pelvic organs; eye strain; nasal disorders; mental and physical fatigue, and affections of the nose may induce attacks.

A beneficial treatment for many, aside from adjusting the spinal lesions, especially the cervical and usually a rigid splanchnic area, is to place the patient in the knee-chest position and thoroughly raise the bowels of the right side beginning in the right iliac, loosening possible adhesions, etc.

The earlier the treatment, the more likelihood of a cure. Cases of long standing are generally harder to cure. Preceding a paroxysm, relief can usually be given, but after the paroxysm has reached its height it is harder to give relief. The patient should rest in a quiet room which is darkened and well ventilated. Besides the indicated osteopathic treatment (generally a cervical one), hot applications to the nape of the neck and keeping the extremities warm are helpful. The nerves involved are the vasomotor, occipital, frontal and temporal. A free evacuation of the bowels will relieve a few cases, while washing out the stomach will help others. Hot

fomentations over the splanchnics for thirty minutes may be beneficial. During the intervals, valuable adjuncts will be found in the use of systematic exercises and frequent bathing. Do not fail to have the eyes examined.

Occupation Neurosis

These are a group of maladies of the nervous system, due to excessive use of certain muscles in some oft-repeated act, and characterized by spasm of the muscles concerned. There are several varieties, as writers' cramp, telegraphers' cramp, piano players' cramp, violin players' cramp, typewriters' cramp, etc.

Professional spasms, that involve muscles of the shoulder girdle, are not rare among osteopathic practitioners, due to prolonged faulty methods of technique.

Osteopathic Etiology.—A nervous temperament predisposes to the development of the affection. Previous injuries and strains of the involved parts are important factors. Faulty methods of writing, and in the other disorders, strained or cramped positions of the affected tissues, predispose to attacks. Slight **lesions** of the bones, joints, ligaments and muscles are commonly found, involving the motor and sensory nerves of the immediate locality. The majority of all cases occur between twenty and fifty years of age.

Distinctive **pathological** changes have not been found. Each case has particular lesions of its own. The details of the case are characteristic of the one case only. The affection is often primarily a spinal one, due to deranged action of the spinal centers concerned in the various acts; though, no doubt, excessive use of a group of muscles may result in contractions, spasms, contractures and nutritional changes, that in turn will establish definite osteopathic lesions. This is an illustration of a "vicious circle."

Symptoms.—Symptoms of the various varieties of professional neuroses develop slowly and gradually. A cramp or spasm affecting the used member is an early symptom. Tremor, weakness, stiffness, fatigue and heaviness of the affected part are present most of the time. In severe cases neuritis may

develop, and a glossiness of the skin be present. Associated with the inability to perform the usual work, may be mental worry and depression.

Diagnosis.—The history of the case and the limitation of the disease to one member, usually make the diagnosis easy: **Cerebrospinal** diseases, as hemiplegia; early **tabes**, affecting the arms; and progressive **muscular atrophy**, have to be carefully excluded.

Prognosis.—As a rule is favorable. Osteopathic treatment, in the majority of cases treated, has resulted in recovery.

Treatment.—Rest of the part, mental quiet and attention to the nutrition of the patient, are the first essential considerations. A change of occupation may be necessary if excessive use of parts and faulty methods can not be corrected. The treatment consists of a correction of the parts irritating or disturbing the spinal centers or nerves affected. The ulnar, radial and median nerves all innervate muscles employed in writing. Lesions of the cord affecting these nerves may be found from the fifth cervical to the sixth dorsal. In a few cases lesions occur as high as the atlas. When the **radial** and **median** nerves are involved the lesions are principally found in the upper dorsal vertebra. When the **ulnar** nerve is involved the lesions are usually slightly lower. The lesions may affect the fibers of these nerves directly (mechanically), but more probably the vasomotor nerves are involved, as in this region the vasomotor fibers to the arm pass from the cord to the sympathetic fibers. The brachial plexus originates higher than the upper middle dorsal region, still some of its nerves are frequently affected in the dorsal region by osteopathic lesions, for removal of the same relieves the disorder.

Other lesions affecting the arms are oftentimes found in the ribs on the side involved. Any of the first five ribs may become deranged and affect the innervation of the arm. The clavicle in a few cases may be abnormally low. A bursitis may be present. Occasionally slight subdislocations of the shoulder joint (especially anterior) and elbow joint are found. Gymnastic exercises of the arm and hand, coupled with a general treatment of the shoulder, arm and hand, are beneficial. Hydrotherapy, massage and friction of the involved member are useful. In severe cases “breaking up” fibrotic tissue, and muscle training frequently secures good results.

Hysteria

Oppenheim defines hysteria as "a psychosis, which does not express itself by disorders of the intellect, but in defects of character and emotional disturbances, whose real nature is hidden under an almost unlimited and varied number of physical symptoms of disease."

The affection is about equally divided between the two sexes. A neurotic tendency, often inherited, is an important underlying factor. This condition, when associated with lack of mental discipline, is very apt to lead to the mental depression and outbreaks of hysteria. A large number of cases are between the ages of puberty and twenty-five. After forty-five the disorder is infrequent.

White, Osler's System of Medicine, says: "The significance of Freud's theory is the tracing of every case to sexual traumata during childhood. Sexual experiences differ, however, from ordinary experiences—the latter have a tendency to fade out, while the idea of the former grows with increasing sexual maturity. There results a disproportionate capacity for increased reaction which takes place in the subconscious. This is the cause of the mischief." A distinction is made between the sexual and the sensual.

Anders points out that lack of proper mental development, improper hygienic surroundings and chronic toxemia are causes.

The **direct causes** of hysteria may be many, and include physical and mental influence, or both. Traumatism of various regions of the body, but especially of the spinal column, may excite hysteria. Some slight lesion of the vertebra or rib may be all that is discoverable. A correction of the same is occasionally all that is necessary to remove the direct cause; still there is usually considerable disturbance of the spinal tissues, especially slight curvatures and muscular contractions. Prolonged emotional excitement, overwork, defective education and many moral and mental influences are potent and frequent causes. Masturbation or an adherent prepuce occasionally is the cause of the affection in boys, or any excitation that produces exhaustion. Disturbances of the sexual system in both sexes are responsible for many cases. The menstrual period and the menopause are frequent periods for the manifestation of the disease. The disease often affects prostitutes. Disturbances of the digestive, nervous and circulatory

systems, and general diseases of an exhaustive kind are exciting causes of hysteria. Dr. Still said that occasionally the colon is prolapsed and crowded down upon the pelvic organs. Hazzard[122] is of the opinion that "a majority of the cases show a depression of all the ribs, narrowing the thorax and often causing enteroptosis."

Symptoms.—The symptoms may be extremely varied, including any symptom of the many nervous diseases. The **sensory symptoms** are numerous. The most common is anesthesia, which may be found in certain parts of the body, usually one side (the left) of the body. Geometrical areas that bear no relation to the innervation is characteristic. The patient may not know of the sensory derangements until discovered by the physician. When there is **anesthesia** without other nervous symptoms, the case is commonly hysterical. The most marked symptom is analgesia, where the patient is insensible to painful impressions. A pin may be placed deeply into the flesh, and not be felt by the patient. The anesthesia may extend to the mucous surfaces, and even deeply down to the tissues of the joints. Organic and tendon reflexes are not changed. There may be other symptoms of disturbed sensation; as an absence of pressure, temperature and muscular sensation.

Hyperesthesia may be present nearly as often as anesthesia. Hyperesthetic areas may be found in various regions of the body, but especially along the spinal column and in the ovarian region. The "hysterical spinal irritability" is of special interest to the osteopath. The spinal column may be affected as a whole, or in segments, or confined to a single vertebra. Especially when a spinal irritability is in segments, or confined to a single vertebra, are local derangements of the spinal column apt to be found. Correction or even **pressure** upon these areas will often relieve the patient. Severe pain over the heart may simulate angina pectoris. **Globous hystericus** is of quite common occurrence.

Charcot refers to the ovarian hyperesthesia as follows: "It is indicated by pain in the lower part of the abdomen, usually felt on one side, especially the left, but sometimes on both, and occupying the extreme limits of the hyperesthetic region. It may be extremely acute, the patient not tolerating the slightest touch; but in other cases pressure is necessary to bring it out. The ovary may be felt to be tumefied and enlarged. When the condition is unilateral, it may be accompanied with hemianesthesia, paresis, or contracture on the same side as the ovarialgia; if it is bilateral, these

phenomena also become bilateral. Pressure upon the ovary brings out certain sensations which constitute the aura hysteria, but firm and systematic compression has frequently a decisive effect upon the hysterical convulsive attack, the intensity of which it can diminish, and even the cessation of which it may sometimes determine, though it has no effect upon the permanent symptoms of hysteria."

The **special senses** may be disturbed, although these symptoms are usually transient. There may be blindness; narrowing of the field of vision, due to anesthesia of the periphery of the retina; loss of hearing; loss of smell or loss of taste.

Motor disorders may be of different forms of paralysis, as hemiplegia, paraplegia or monoplegia. In fact all forms of **paralysis** may be found in hysterical patients. Osier says: "There is no type or form of organic paralysis which may not be simulated in hysteria." The affected muscles do not atrophy. The paralysis is usually general, and contractures are common. Local paralysis, as of the bladder, vocal cords and other parts of the body, commonly occur.

Contractures and **spasms** may also occur. True epilepsy may even be simulated by hysterical spasms, but on careful observation the characteristic attack of epilepsy is found wanting. Firm pressure may increase the severity of an attack as well as bring it on. The spasms are of various parts of the body, as the diaphragm, bronchi, abdominal muscles, bladder, etc.

Various **disturbances** of the **viscera** may occur. Of the digestive tracts, the appetite may be disturbed or depraved. Diarrhea or constipation may be present. Flatulency is a common symptom. The respiratory tract may be another point of considerable disturbance in many cases. Dyspnea, aphonia, hiccough, cough, and exaggerated breathing, as when cold water is poured on one, are common manifestations. Various **cardiac** vascular symptoms may be manifested, especially a rapid heart. Various **vasomotor** derangements are common.

Physical manifestations, as amnesia, lack of will power and an excitable nature—easily moved to laughter or tears—are frequent. The moral tone may be lowered. Even delirium, catalepsy, ecstasy and trance, may be mentioned among the psychical phenomena.

The **hysterogenous zones** are of more than passing interest to the osteopath. Tyson writes as follows, in regard to the hysterogenous zones: “These are hyperesthetic areas especially studied by Richet, on which persistent pressure will sometimes excite a hysterical attack. While the ovaries are favorite hysterogenous zones, the zones may be in any part of the body; as for example, the sides of the trunk. Such pressure may also cause an existing attack to subside. Hysterical spasms may also be localized or limited to groups of muscles.” Especially when zones along the spine and side of the trunk are located, the attack of hysteria may be completely relieved by correcting the localized deranged tissues.

Convulsive seizures are not uncommon and may follow various prodromal symptoms. Some authors divide the symptoms of hysteria into convulsive and non-convulsive forms.

These are part of the many manifestations that are presented by various hysterical patients, and it is readily seen that an osteopath has to be continually on his guard.

Diagnosis.—The diagnosis is generally quite easy. The characteristic emotional symptoms, associated with any of the many other symptoms which have no organic lesion, are characteristic of the disease. Care has to be taken, though, in some cases where symptoms are presented which have organic lesions. The history, the attack and neurotic temperament, will largely decide the nature of the affection. After the “outbreak” the patient often feels decidedly better.

Prognosis.—Death may occur from exhaustion, but such a termination is rare. Recovery is the rule, although the duration may be long. Recovery usually takes place rapidly, after the exciting cause has been determined and removed.

Treatment.—First of all, the osteopath should have due appreciation of the mental characteristics of the disease. Whatever is dominating the patient mentally must be either changed or abolished. It is not always necessary to be harsh and severe with the patient; but one should be firm and unyielding. He can do a great deal by having complete mental control of the hysterical patient.

A most careful examination should be made for an exciting cause, and when found it should be removed. This naturally constitutes a very important part of the treatment. A light general treatment is commonly indicated. The general health, especially the bowels, should be carefully attended to. The hygiene, exercise and amusement of the patient should receive due consideration. One has to gain the confidence of the patient, and then be firm but kind to him. Relative to diet Yeo[123] says: "The diet should be simple, abundant, and supplied regularly, and at not too long intervals as is frequently the case in boarding schools. All strong stimulants are best avoided, and the hysterical should not indulge in strong tea or coffee, or exciting wines and liquors."

The "rest cure" as introduced by Weir Mitchell, is applicable in some cases. This method consists of plenty of food, especially milk, absolute rest of the body and mind, massage and electricity with isolation of the patient from friends and sympathetic relatives. Doubtless a general osteopathic treatment would be much better than massage. Yeo says that to the application of hypnotism and suggestion "we look with little sympathy and less confidence."

During the hysterical **convulsions**, the patient should be watched, but extreme measures should not be practiced. There is little danger of patients hurting themselves. Throwing cold water in the face, or a cold bath may produce the necessary mental shock. Pressure over the ovary as stated in hysterogenous zones, or some other zone of the body, or pressure upon a large blood vessel, as a carotid, will oftentimes stop an attack.

Neurasthenia

"Closely allied to, and in some cases almost inseparable from, hysterical states are those morbid conditions to which, in modern times, has been applied the term neurasthenia." (Yeo). Neurasthenia is a fatigue neurosis that is characterized by mental and physical irritability and inefficiency. Headache, backache, insomnia, and debility of the gastro-intestinal tract are common symptoms.

The affection is often found in that class of people who are predisposed to hysteria. The disease is more common among men than women, usually

occurring after the twentieth year. The predisposition may be inherited or acquired. Church states that “debilitating conditions in the antecedents of neurasthenics,” and “defective education that omits discipline and the cultivation of self control” are important predisposing causes. Many of the exciting causes that produce hysteria will cause neurasthenia. Various **lesions** along the spinal column, chiefly in the cervical and upper dorsal regions, include the predisposing causes of a large majority of cases. This spinal irritation, taken in conjunction with overstrain of mind and body, or probably in many cases the spinal irritation as the predisposing cause of the over strain, results in nervous exhaustion. Particularly overwork, associated with care and anxiety, is an exciting cause of great significance.

The neurasthenic patient is generally of a **neurotic temperament**. The affection may, also, result from various chronic diseases, toxic conditions, sexual excesses, alcohol and tobacco. Thompson[124] believes that improper sexual hygiene and perversion or abuse of the marital relation are most important factors in the development of neurasthenia in both sexes, and a regulation of this is imperative for a cure. The symptoms are due, to a greater or less extent, upon **spinal**, **cerebral**, **cardiac** and **gastric disturbances**, but all of these conditions are usually dependent upon **vertebral** and **rib lesions** of the upper dorsal and cervical regions. Care should be taken whether the condition is secondary to organic lesions. The lesions in the vertebræ are generally slight lateral deviations, in the ribs upward displacements of the vertebral ends, followed by contraction of the deep muscles in the neighborhood of the lesions. A posterior condition of the atlas and a lateral lesion between the third and fourth dorsal are especially apt to be found. As to spinal areas most affected Stearns[125] says the predisposing irritations are located particularly in the first two cervical, the first two dorsal and the last two lumbar vertebræ.

These various lesions probably cause an impairment of nutrition in the nerve centers of the cord and brain, or both. Definite **morbid anatomical** changes have not been found resulting from nervous debility or irritability. Still, it seems probable that certain changes in the nerve cells may result from excessive functional activity. **Traumatism** is a prominent causative factor in both **neurasthenia** and **hysteria**. **Railway** and other **injuries** frequently produce osteopathic lesions that result in nervous disorders. That

there is a demonstrable pathological basis resting in sympathetics and spinal nerves, there can be no doubt.

Symptoms.—To enumerate the many symptoms of neurasthenia in detail is hardly necessary. The nervous debility may affect any organ of the body, owing to the exhaustion of the nervous energy, thus lessening the functional activity of that organ.

The most noticeable symptoms are various **sensory disturbances** and **muscular weakness**, dependent in part upon the spinal lesions. The patient generally feels weak and tired. Headache, pains in the back and sacrum, tender points along the spine, and various sensations of numbness, tingling, etc., are felt.

The **mental faculties** are oftentimes irritable and weak. An inability to concentrate the thoughts with depression, fear, vertigo, insomnia, and many other mental symptoms, may be manifested.

Palpitation, irregular action of the heart and pain over the precordia may be present. **Ocular** disturbances, particularly blurring of letters and narrowing of the visual field, **visceral** symptoms of many kinds, and **vasomotor** phenomena, as chilliness, flashes of heat and sweating, are among the many symptoms of which the patient complains.

Genito-urinary disorders in the male, and ovarian and uterine irritation and painful menstruation in the female, are occasionally symptoms dreaded by the sufferer. Polyuria is frequent.

The symptoms or signs of great importance to the osteopath in neurasthenia, as in many other diseases, are the tender points along the spinal column. They give direct clues as to where the lesion may be found.

Diagnosis.—Error in diagnosis can usually be prevented by a study of the history of the case and symptoms. Care must be taken in determining between symptoms of organic diseases and the symptoms of a true nervous exhaustion.

Prognosis.—Is almost invariably good. Only in cases where there is a tendency to mental disorder should the prognosis be guarded. Much depends upon the thorough cooperation of the patient. It usually takes some time to perform a cure among the poorer class, as the requirements demanded for a cure are oftentimes expensive.

Treatment.—Naturally the treatment, exclusive of the manipulation to correct the various lesions found, is extremely varied, owing to the many exciting causes and symptoms to contend with.

As has been stated, the lesions are usually found in the upper spinal region; still lesions are occasionally located in the lower spinal region, especially in female sufferers, when the pelvic organs are disturbed. The many mental symptoms, as inability to concentrate the mind, insomnia, vertigo, headache, etc., are best treated through the cervical region, with attention to the heart's action and the excretory organs. Careful attention should be paid to the deep posterior muscles between the atlas and occipital bones.

Rest is very necessary. Changes of scene and occupation, attention to the surroundings, careful dieting, hydrotherapeutic measures, pleasant companions, relief from responsibility, bathing, etc., should receive careful attention and consideration by the osteopath. Set rules cannot be given. The details of treatment that should be adopted are dependent upon the individual case. Every well trained osteopath will be familiar with such measures.

Careful attention must be given to the secretions, excretory organs and the circulation. A study of each case will bring out the various irregularities that may exist.

When the nervous involvement is extensive, a "general treatment" may be given. Such a treatment would affect the entire nervous and muscular system, and tend to equalize disturbed nerve force. Bringing the muscular system into play and relaxing contracted muscles calls for more blood and nerve force, and consequently a nutritious diet.

The "rest cure," as introduced by Weir Mitchell, may be employed to considerable advantage in many cases. Yeo says: "It is in certain cases of this disease that the 'rest cure,' devised by Weir Mitchell, has proved so remarkably successful. But there can be no sort of doubt that it has been applied far too indiscriminately, and that for this, as indeed for any special method of treatment, a careful selection of suitable cases is needful." The diet should consist principally of milk at first, followed in a few days by soft boiled eggs, boiled rice, lamb chops, graham bread, stewed fruits and butter, and a little later by roast beef, vegetables and light puddings. Porter's

system of milk diet has proved effective in many cases. Tea, coffee and alcohol should be avoided.

During the entire course of the treatment, care should be taken to correct any lesion that may bear directly upon the cervical sympathetic, the solar plexus and the hypogastric plexus, as they are the great reflex centers of the body.

FOOTNOTES:

[119] A. O. A. Case Reports, Series IV.

[120] See A. O. A. Case Reports, Series II., III., IV., V.

[121] See A. O. A. Case Reports, Series I., III., V.

[122] Practice of Osteopathy.

[123] Manual of Medical Treatment.

[124] Cosmopolitan Osteopath, October, 1903.

[125] Journal of Osteopathy, January, 1904.

DISEASES OF THE SPINAL CORD

Acute Myelitis

Acute myelitis is an acute inflammation, with softening of the substance of the cord, giving rise to marked disturbances of motion, sensation and nutrition. When the whole thickness of a section of the cord is involved, the condition is termed **transverse myelitis**. When an extensive area is involved, it is termed **diffuse myelitis**. When the gray matter around the central canal is especially affected, it is termed **central myelitis**.

Etiology.—There can be no doubt that osteopathic lesions are very potent predisposing factors. Osteopathic lesions of the spine, even of a muscular nature, readily disturb the cord circulation. It may follow repeated exposure to wet, cold or exertion; or be a sequel to the infectious diseases, as smallpox, typhoid fever, typhus, puerperal fever or measles. It may be due to traumatism or disease of the vertebræ, as caries or cancer. Syphilis is a frequent cause.

Pathology.—To the untrained, naked eye, the cord may present little or no change. The nervous tissues are in various stages of degeneration. On section the substance of the cord is red and soft, the line of demarcation between the gray and white matter is lost or extremely indistinct, and minute hemorrhages are sometimes seen. In very acute cases, affecting the white and gray matter, after injury, when the membranes are cut, the substance of the cord may flow out as a reddish creamy fluid.

The nerve fibers are much swollen and the axis cylinders broken up. Blood discs, leucocytes, and numerous granular fatty cells may also be present. The blood-vessels are distended and dilated. There may be thickening and hyaline degeneration of the vessel walls and hemorrhagic extravasation.

Symptoms.—Acute Transverse Myelitis.—This is the type most frequently met with. The symptoms differ with the situation of the lesion, which is generally in the dorsal cord. At the onset there may be pain;

numbness and tingling in the back, radiating into the limbs. There is usually moderate fever, malaise, chills, muscular pains, a coated tongue and constipation. Symptoms of **motor paralysis** soon develop, which may become more or less complete. Both motor and sensory symptoms vary to a marked degree, depending upon the pathologic involvement. The reflexes are lost at first. They may soon return and are exaggerated below the lesion. Following this the muscles often become rigid and contracted. Unless the lesion is in the lumbar or cervical cord, reaction of degeneration or much wasting of the muscles, as a rule, does not occur. A girdle sensation frequently occurs at the level of the disease. At first there is retention of the urine and feces, later incontinence. Bed-sores soon develop; also drying and hardening of the skin. The nails become thick and brittle. Death may occur from exhaustion, or heart or respiratory failure, but it is rare; segments of the cord may be completely and permanently destroyed, causing persistent paraplegia. H. A. Greene[126] reports a case, due to injury, which was greatly benefited by treatment.

Acute Diffuse Myelitis.—In the acute forms the course of the disease is rapid. The trophic disturbances are more marked than in the former type. This form is likely to follow exposure to cold, injuries, tumors, syphilis or one of the infectious diseases. There may be chills, fever, malaise, pain in the back and limbs, and occasionally convulsions. The reflexes are generally lost. The motor functions are rapidly lost. There is incontinence of urine and feces, rapid wasting of the muscles and bed-sores develop. The disease may prove fatal in from six to ten days.

Diagnosis.—Landry's Disease.—In this the bladder and rectum are not affected. Trophic disturbances are absent. There is but slight loss of sensation, no reactions of degeneration and no girdle pains. **Multiple Neuritis.**—Both arms and legs involved, and slow onset. The bladder and rectum are rarely involved; the girdle pain is absent. **Acute Poliomyelitis.** —There are no sensory symptoms and the rectum and bladder are not affected.

Prognosis.—In very acute cases death occurs in from three to ten days. Milder cases generally recover with some loss of motor power, although in a few cases treated by osteopathy recovery was complete, due probably to the case being seen early and thus degeneration prevented.

Treatment.—Lesions of the vertebræ are usually readily found in cases of myelitis. Generally, deranged vertebræ are found in the upper dorsal region, and occasionally lesions are located in the lumbar and cervical vertebræ. The treatment of myelitis is chiefly to correct these lesions, so that the normal circulation of the cord may be reestablished. One has to be very **careful** when treating the lesions not to cause additional injury to the cord. An inhibitory treatment to the muscles about the lesion may be all the treatment that can be given at first; nevertheless, it aids nature just so much in overcoming the excessive irritation of the cord tissues. Nature has the curative means, provided they may operate unobstructedly. In a few cases the ribs in the region of the spinal lesion will be found deranged and interfering with trophic fibers, blood-vessels and lymph vessels of the cord. The patient should be kept in the prone posture at first.

Warm baths and massage will be found of additional value. The bowels and bladder should receive special attention. An ice-bag to the spine may be beneficial. If there is any danger of bed-sores, use alcohol to stimulate and harden the skin. Rest, liquid diet and good nursing are necessary. Later on careful exercising of the limbs will be beneficial.

Chronic Myelitis.—This defines the conditions when the inflammation is subacute with the paraplegia and other symptoms which then naturally appear, present, and also with the signs of both degeneration and repair. The symptoms develop slowly as compared with the acute form. It should not be confused with atrophy, pachymeningitis or tumors of the cord. **Treatment** is practically the same as in acute form. Surgical measures may be indicated. Loudon[127] reports a case due to injury which was greatly benefited.

Poliomyelitis

(Infantile Paralysis)

Definition.—An acute infectious disease occurring most commonly in young children, characterized by paralysis, rapid wasting of certain muscles, and fever. It is an acute myelitis that affects the anterior horns of the cord. There are no sensory symptoms.

Etiology.—It usually occurs in children under ten years of age, and the majority of cases occur before the fourth year. It is more common in summer than in winter. The infection seems to gain entrance through the nasal mucous membrane. Traumatism, exposure to cold and overexertion, are probably predisposing causes. It has occurred in severe epidemic form.

Morbid Anatomy.—The disease is most frequently seen in either the lumbar or cervical enlargement and is usually unilateral, though there is considerable variation in the extent of the lesions. In very early cases, the condition of acute hemorrhagic myelitis, with degeneration and rapid destruction of the large ganglion cells, has been found. In older lesions the anterior cornu in the affected region is atrophied and there is destruction of the multipolar ganglion cells. The anterior nerve roots are atrophied, the muscles are wasted and undergo a fatty and sclerotic change.

Symptoms.—The child may have a slight fever, malaise, muscular twitching, headache, some rigidity of the neck, and sometimes vomiting. This may last a day or several days or only a few hours, when paralysis sets in abruptly. The **paralysis** is rarely complete and groups of muscles only may be affected. As a rule, the paralysis comes on abruptly, but it may come on slowly, taking several days to develop. In a few weeks, atrophy sets in and the limb becomes flaccid, soft and wasted. The paralysis remains stationary for a time when improvement takes place, but complete recovery is rare. Sometimes the growth of the bone of the affected limb is impaired. Usually there are no sensory disturbances and the bladder and rectum are not affected. The condition of the reflexes is dependent upon the extent of involvement of the cornual cells. Occasionally the bulbar muscles are affected.

Diagnosis.—This is not difficult except in the early stages. Careful study of the case is commonly all that is necessary. Landry's paralysis and peripheral neuritis are to be differentiated.

Prognosis.—Complete recovery is rare. Improvement is the rule. Ivie[128] tabulates sixteen cases, all showing good results. W. B. Davis[129] reports a case cured by six months treatment and still well after three years. T. M. King[129] one case cured and one greatly benefited and A. S. Craig[129] one much helped. Florence Gair, F. P. Millard, A. G. Walmsley and others report gratifying results in many cases.

Treatment.—In the treatment of chronic cases, F. P. Millard[130] says "Five minutes' time is sufficiently long in treating a patient, and sometimes too long. * * * Start in and move every spinal joint. That takes about two minutes. Spring the sacro-iliac articulations just enough to get motion. Then give a specific cervical treatment. Do not stop to relax muscles in a child. Adjust as rapidly as possible. Make every spinal joint yield to motion. Spend only one minute, or possibly two, on the cervical vertebræ. So far we have consumed four minutes. The last minute we loosen up the wrist or ankle, according to the extremities that are involved." This outline has been followed with gratifying success by Gair, Green, Bush and others in many chronic cases. The procedure in acute cases is condensed from A. G. Walmsley[130]: "Isolate, keep cool and absolutely quiet. Stop all food until the temperature drops to 100° F. or lower and until the pain subsides when fruit juices may be given followed by heavier foods. Give patient all the water he will drink. Where the spine is sensitive, and it will be in many, use hot fomentations until a specific treatment can be given. If the fever is running high cool compresses will be grateful and help reduce temperature. Irrigate the colon twice daily with saline water. Do this first thing when called. Later once daily will do and then discontinue. Look carefully to the nose and throat and wash with saline or boracic solution. Keep feet warm as they may be cold even with high fever. Treat the case over a long period. See that he does not overdo and observe all dietetic and hygienic measures." Both these men lay great stress on the importance of specific adjustments and massage of muscle tissue has little place in their treatment. This, with drill at home can be attended to by the mother.

Ivie[131], among other good ideas on treatment, gives the following: "May I suggest that when such severe results (the acute stage) follow a slight infection, that we may expect to find a lesion located at such a point as will interfere with one or more of the anterior root arteries which join and supply the anterior spinal plexuses. As there are only five or ten of the anterior root arteries (Dana), the lesions affecting them can be located throughout a wide range of the spine. In a great many cases we find that the correction of lesions well up in the dorsal and even in the cervical region have increased the amount of the improvement well beyond that received in the correction of the lumbar lesions alone. To **promote resolution**, correct the lesions, both muscular and bony, and relax the muscles of the spine

daily; move every vertebra to the limit of all its possible motions; use flexion, extension, rotation, and lateral flexion at least once every day for at least a week; and help to overcome stasis by keeping the child off its back, turning it from side to side, and letting it lie on its stomach as much as possible. The limb, to be kept in its best condition, should be kept warm; treated gently; held in a natural position by the use of sand bags and clothes cradle, thus beginning early the **prevention** of deformity; the paralyzed muscles should not be kept on a stretch, as that will retard any possible improvement; stimulating rubs and baths should be given frequently." In the **chronic stage** he advocates: "Now that the nerve cells have been given a chance to regenerate (removal of lesions), the best thing to do is to force them to work if possible. To do this, the so-called resistance exercises or educational movements are to be strongly recommended; the idea being to place the limb in a given position and then ask the child to fix all its attention on the limb and to earnestly attempt to hold it there while you move it, or to keep making the attempt while you move the limb through its whole range of motion in that direction. These movements should be so calculated that the resistance of the child will exercise the group of muscles affected. The mother or nurse can give these exercises every night on going to bed."

Acute Ascending Paralysis

(Landry's Paralysis)

Definition.—An acute disease, characterized by an advancing paralysis, beginning in the legs, passing upward to the trunk and the arms and finally it may involve the centers in the medulla. **Toxic** and **infectious** influences that congest the nerve courses and ultimately destroy the cells seem to be the important factor. The anterior gray matter of the cord is involved, and it is probable that many cases are a form of acute poliomyelitis. The spleen is congested and in some instances the lymphatics.

Etiology.—A definite cause has not been found, although osteopathic lesions are important predisposing factors. A toxic cause seems probable. The disease is most common in males between twenty and forty years of age. It may follow traumatism, exposure, cold or the infectious fevers.

Symptoms.—Weakness of the lower extremities is generally the first symptom, though the arms may be involved first. This is shortly followed by paralysis. The paralysis then extends to the trunk and within a few days the arms are also affected. The muscles of the neck are next involved and finally those of respiration, deglutition and articulation. The reflexes are abolished. The muscles are relaxed, but generally do not waste or show electrical modification. Sensation is usually not affected, but there may be tingling, numbness, hyperesthesia and muscular tenderness. The sphincters are not involved as a rule. The spleen is usually enlarged. The **course** is variable. Death often occurs in from two days to a few weeks. When the improvement takes place, the part last affected recovers first.

Diagnosis.—This is not always easy. It is sometimes impossible to differentiate between this disease and **multiple neuritis**. The history, the motor paralysis, the absence of wasting and of electrical modification, as well as the absence of involvement of the sphincters, will definitely aid in the diagnosis.

Prognosis.—The prognosis is unfavorable. A large majority of cases prove fatal. In a few cases treated osteopathically, results were favorable if the patient was seen early. The muscles of the spinal column were markedly contracted.

Treatment.—The treatment of Landry's disease consists principally of thorough treatment of the spine, especially of the lower dorsal and lumbar regions, and attention to the underlying toxic condition. The treatment should be most thorough; the vertebræ and ribs found disordered should be corrected and each vertebra should be carefully separated (if conditions permit) from its neighbor. When the paralysis has extended to the trunk and neck, a thorough treatment all along the spinal column should be given with a view to relaxing the contracted muscles and to render flexible the entire spinal column, so that the cord may be properly nourished and the progress of the disease checked. Careful relaxation of the contracted spinal muscles unquestionably has a potent effect upon the cord circulation, which tends to check and retard degenerative processes. Treatment of the limbs directly will be found a help, as well as direct treatment of all tissues paralyzed. If swallowing is impossible, the patient should be fed through the rectum, or by the stomach or nasal tube. See that the patient is carefully nursed. Massage is beneficial.

Locomotor Ataxia

(Tabes Dorsalis)

Locomotor Ataxia is frequently met with. It is a disease of the spinal cord wherein the ultimate effect is a sclerosis of a progressive character of the nerve courses of the posterior column. It is claimed that the origin is in the protoplasmic processes of the posterior spinal ganglion. The characteristic symptoms are incoordination, Argyll Robertson pupil, lightning pains and loss of knee-jerk.

Osteopathic Etiology and **Pathology**.—Most cases develop between the ages of thirty and forty, although it is occasionally seen in young men, and rarely in children from hereditary syphilis. Males are much more frequently affected than females (10 to 1, Osler), and the disease is much more frequent in cities. Predisposing causes are given as syphilis, prolonged exposure to wet and cold, and sexual excesses, although there is a disposition on the part of neurologists to confine the cause of true tabes to syphilis, some records showing as high as 90 per cent. of the cases from that cause. Tabetic symptoms develop in from five to fifteen years after syphilitic infection. There are no data to show the probable proportion of syphilitic cases which later develop tabes, but it is undoubtedly small. As all cases of tabes examined by osteopaths show spinal lesions, it is reasonable to suppose that by interfering with the nutrition to the spinal cord, they allow consequent degeneration. It is also quite probable that osteopathic treatment for syphilis would, for the same reason, prevent sclerosis and resultant tabes. That syphilis is not the only cause, is also held by some authorities. Starr cites a true case from a severe blow in the dorsal region. Osteopathic observation would lead to a differentiation of tabes, according to the cause. Cases have been recorded, which simulated true tabes in most symptoms, which did not have a history of syphilis. J. Knowles makes the point that probably certain cases simulating tabes have reached what might be called an irritation stage (pathologically) of the nerves and their centers, sclerotic changes not having taken place; and he believes these cases would naturally yield to osteopathic treatment. Teall confirms this view by being of the opinion that these cases are the ones largely due to traumatism, exhaustion or exposure, and the probabilities are that in time sclerotic changes would take place, resulting in true tabes. In such cases there can be

no question as to the osteopathic lesion, which would be sufficient to materially interfere with the peripheral sensory nerves and disturb the protoplasmic processes to the spinal ganglia and sensory tract. As a rule they are in the lower dorsal and lumbar regions. Cases are reported which had marked sacral and coccygeal lesions.

Pathologically, Dana speaks of locomotor ataxia, "as a post-infective degeneration, which first attacks the posterior spinal ganglia or corresponding cells of the special senses, due to a prolonged poisoning of these parts by the toxins of the infection." The first change is in the posterior roots. Without doubt osteopathic lesions can readily affect the nutrition of these roots. This is shown upon examination in cases where the vertebral lesions impinge the tissues surrounding the spinal nerve at its exit, (or otherwise damage nervous stimuli and circulation) and also where the displaced head of the rib crowds upwards against the spinal nerve and again where the rib impinges the corresponding sympathetic ganglion which lies anterior to the head of the rib. Very likely in many cases the syphilitic infection is an exciting factor, but it seems plausible that osteopathic lesions, traumatism, cold, exposure and excesses predispose by disturbing the circulation to involved areas. The changes are at first inflammatory, followed by degenerative changes in the nerve courses which cause connective and neuroglia overgrowths to take the place of fibers in the sensory tract, and finally in the motor tract. Thus from the posterior ganglia, a section between the columns of Goll and Burdach is involved, and the progress of the sclerotic change is upward in the cord. The pia mater and coats of the vessels are thickened. The principal changes in the cord are in the lower dorsal and upper lumbar segments and the cord may be changed in shape. In long standing cases there is degeneration of the ascending antero-lateral tract, of the direct cerebellar tract, and of the pyramidal tract. The cerebral changes in some cases consist of sclerosis in the restiform bodies in the inferior peduncles of the cerebellum, and of certain cranial nerves, especially the third, optic, vagus and auditory nerves, and also cortical changes may occur.

Symptoms.—Authorities divide the symptoms into three stages—the preataxic, ataxic and paralytic. This division is largely an arbitrary one. **Motor symptoms** are usually the most prominent. There is inability to coordinate the muscles. The patient first notices that he cannot walk steadily

when in the dark or when he has his eyes closed. Later he finds that he cannot maintain his equilibrium even in daylight; this is ascertained when the patient places his feet together and the eyes are closed (sign of Romberg). As a rule this is unaccompanied by muscular wasting, so there is no loss of motor power. Soon the gait becomes characteristic; in walking the feet are lifted high and are brought down heavily on the heel; the ball of the foot comes down last, producing what is called the "double step;" the walk is straddling: the limbs are thrown about, and there is staggering, due to **incoordination**. Incoordination also develops in the hands, but usually later in the disease. Sudden involuntary movements and palsies are other motor symptoms. The latter occur in about twenty per cent of cases and as a rule are of short duration. Paralysis and muscular atrophy do not develop until after a few years.

Pain is an early symptom and always present; it is of a darting, shooting or stabbing character and appears in paroxysms. It is most common in the legs, lasting but a second or two, and often accompanied by a hot, burning feeling. Herpes may appear along the course of the nerve. Anesthesia and hyperesthesia of certain areas may occur. A girdle sensation may be a noticeable symptom. The **muscular sense** is more or less impaired; there is a feeling as if there were cotton between the patient's feet and the floor. Retardation of tactile sensation is a common symptom. The power of localizing pain is often lost. The **knee-jerk** is lost early in the disease. Occasionally, however, cases are met where it is retained. The skin reflexes are also impaired; in some cases they may be increased at first, but later are sure to be involved with the deep reflexes. The **pupil** does not respond to the light, but still accommodates for distance, constituting the **Argyll Robertson** pupil. Ptosis may develop with or without strabismus. Optic atrophy, which may lead to blindness, paresis of the ocular muscle, and contracted pupils, may occur. The ocular symptoms may appear early in the disease.

The **visceral pains** or **crises** are chiefly gastric and are sometimes accompanied by obstinate vomiting. Laryngeal, rectal, urethral and nephritic crises may occur, and at times are exceedingly severe. Laryngeal crises may be manifested by intense dyspnea and noisy breathing. Constipation is common. There may be retention of the urine resulting in cystitis. Sexual power is generally lost early.

Trophic changes occur later in the disease. The so-called arthropathies, or joint lesions, may occur at any period of the disease. It consists of an enlargement of the joints, associated with serous exudations, which rarely become purulent; atrophy of the heads of the bones; destruction of the bones and cartilages; or spontaneous fracture or dislocation may occur, owing to the brittleness of the bones. There is no pain and the large joints are most frequently affected; these may be excited by an injury. Herpes, skin ecchymoses, edema, local sweating, alterations in the nails, perforating ulcer of the foot, onychia, decay of the teeth and atrophy of the muscles may occur. The auditory nerve is rarely affected, but in some cases there may be deafness. There may be attacks of vertigo. Olfactory symptoms are rarely met with. Cerebral symptoms are rare. **Paralysis** may develop and the patient becomes bed-ridden. The disease itself does not prove fatal; the patient may live for years until some intercurrent disease causes death.

Diagnosis.—This is usually easy when the characteristic symptoms are developed. The presence of lightning pains, absence of the knee-jerk, early ocular palsies, a squint, ptosis and Argyll Robertson pupil make the diagnosis conclusive. Care has to be taken in making diagnosis from peripheral neuritis, paresis, ataxic paraplegia, cerebral disease and some diseases in which the posterior columns are disturbed.

Prognosis will depend largely on the exciting cause, as it is least hopeful from syphilis, but the earlier the case is treated the better the chance. The progress of the disease can sometimes be arrested and occasionally cases presenting symptoms of the first and second stage are entirely relieved with persistent treatment.

Treatment.—Experience in the treatment of locomotor ataxia has been that often the disease can be checked and the symptoms relieved; but curing a case of locomotor ataxia, except in the early stages, is seldom possible. When there is degeneration of nerve centers, there is no hope for a cure. Those with a syphilitic history are by far the hardest to relieve. Antisyphilitic treatment should be considered. Cases with a syphilitic history presenting preataxic symptoms, Argyll Robertson pupil, lightning pains and loss of patellar reflex have been cured; unfortunately these cases are not always diagnosed.

The treatment consists of thorough correction of the spinal derangements found, especially through the lumbar and lower dorsal regions. If the disease has involved the arms or brain, thorough treatment should be given the entire length of the spine with a view to increasing the circulation in the spinal cord and brain, and thus checking or preventing the tissue degeneration. “In the early stage, deep massage to the muscles of the back promotes the flow of venous blood through the spinal vessels and their anastomotic branches, and is the best means of relieving the congestion which is supposed to exist.” (Starr) The lower spine will be found to be rigid and should be well sprung to get mobility.

Careful treatment of the limbs should be given, but be exceedingly **cautious** in the treatment of the limbs of **advanced cases**, as there is considerable danger of producing fractures. Stretching the thigh muscles and internal and external rotation treatment of the legs should be given. See that the bowels are moved daily and be positive that there is no retention of the urine in the bladder. A catheter has to be used in some cases. The patient should be careful about taking too much food, and especially beware of indigestible food, as it irritates or excites gastric crises.

During **painful attacks** the patient should rest in bed, and with careful treatment the attack can generally be relieved. Hot applications are of considerable aid.

At all times excesses should be avoided. Occupation of some character should be given the sufferer. Do not promise to cure the patient, and make it plain at the start that it will probably require a long time to show much improvement. Systematic exercises to reestablish coordination should not be neglected.

Hereditary Ataxia

(Friedreich’s Ataxia)

This is a rare hereditary disease, due to sclerosis of the columns of Goll and Burdach and the pyramidal tracts. There are ataxia, muscular weakness, nystagmus, speech disorders and loss of knee flex. Almost invariably there will be found a neuropathic history. Alcoholism, syphilis and insanity in the parents are predisposing causes. Tuberculosis may be a factor. Acute

diseases, especially infectious fevers, dentition and injuries to the spine may be exciting causes. It occurs most frequently in males about the seventh or eighth year and very seldom after puberty. Several members of the same family are apt to be affected. The disorder is transmitted by the female. "The degeneration of the posterior and pyramidal columns seems to occur at the time of cord development, when malnutrition or hereditary dyscrasia would disturb it most."

Pathologically, "the spinal cord is smaller throughout than normal; we have also a combined disease of the posterior and lateral tracts (Schultze), a degeneration of Goll's tract in toto, of Burdach's almost entirely, and of the direct cerebellar, the crossed pyramidal (?), and of Clarke's columns, in which we find not only atrophy of fibers, but also a degeneration of the ganglion cells. Gower's tract may likewise be involved." (Oppenheim).

Symptoms.—Impaired coordination, beginning in the legs and later extending to the arms, is the first marked symptom. The gait is peculiar; it is swaying and irregular and it lacks the pronounced stamping gait of locomotor ataxia. There is a loss of reflexes, while no sensory symptoms are present as a rule. The sphincters are normal. Nystagmus is present and is a characteristic symptom. The speech is scanning. Talipes and lateral curvature of the spine are common. The mind becomes sluggish in later stages. The course is always very slow.

Diagnosis.—This is not difficult as a rule, owing to the usual family history presented. The spinal curvature, nystagmus, incoordination, scanning speech, irregular gait, and deformity of the feet are symptomatic. In **locomotor ataxia** the gait, sharp pains, anesthesia and Argyll Robertson pupil will differentiate between the two. Differentiation will also have to be made from chorea, ataxic paraplegia and multiple sclerosis.

Treatment.—The same treatment as in locomotor ataxia is followed. Lesions presented have been found at the tenth and eleventh dorsals, and at the second and third cervicals, although, as a rule, the entire spinal column is quite debilitated. Some improvement will be noted in these cases, but not much can be expected from treatment; contractures may be prevented.

Spastic Paraplegia

Spastic paraplegia begins as a stiffness in the legs, with no sensory symptoms, but finally the muscles become rigid and slowly paralyzed. The reflexes are exaggerated.

It may occur, in a few instances, as a primary disease, "being a degeneration of the motor neurone, whose body lies in the brain cortex and whose axone lies in the lateral pyramidal tract." Usually it is secondary to tumors, inflammation and softening of the brain. Multiple sclerosis, hemorrhage, transverse myelitis, syringomyelia and other diseases of the cord, injury, exposure and overexertion are exciting causes. Syphilis may be a cause. It generally develops between the ages of twenty and forty.

Pathologically, the degeneration involves the lateral pyramidal columns of the cord. It begins at the periphery and extends upward until finally the axones atrophy and neuroglia overgrowth takes place and sclerosis of the motor tracts results.

Symptoms.—Muscular stiffness in one leg is usually the first symptom, which gradually disturbs both sides. The muscular stiffness increases to a rigidity, and even cramps, so that it is with considerable difficulty that the patient moves about. The reflexes are exaggerated. The joints, as well as the muscles are stiff, so that the toes are dragged upon the ground and the legs are kept close together, abduction of the limbs being difficult. On the whole, there is much tiredness, stiffness, rigidity and hardness of the leg muscles, so that all motions with them are performed with great effort. Sensory and trophic symptoms are lacking; control of the bladder and rectum is usually normal. The progress of the disease is slow. The upper extremities may be involved in after years, but the common extensive disturbance is with the legs, so that they may be entirely useless and the muscles atrophy from disuse, although rigidity and contractures remain.

Treatment.—The prognosis is usually unfavorable, though frequently the patient may be considerably benefited. A few cases that have been **caused** by **traumatism**, cold or exposure have yielded to osteopathic treatment and all symptoms disappeared. The treatment is largely that of locomotor ataxia. The lesions are readily located in the spinal column. In a few cases a slight posterior curvature of the dorso-lumbar region is found, but the majority of the lesions are in the lower dorsal region. Special care should be given to the bladder and bowels. Prolonged warm baths are

beneficial. Treatment of the legs is always secondary to that of the spine. The diet should be nutritious and one easily digested. Give the patient plenty of fresh air and sunlight with cheerful surroundings. E. C. Link[132] reports two cases, one of over one year's standing, completely recovered, and another much improved.

Ataxic Paraplegia

In **ataxic paraplegia** there are ataxic and spastic symptoms, due to both posterior and lateral sclerosis. Traumatism, cold and exposure are etiologic factors. It is found in diffuse myelitis, general paresis, leptomeningitis and in toxic conditions as in pernicious anemia. The posterior and lateral columns are degenerated, so that in the former there is an ascending degeneration and in the latter a descending.

Symptoms.—These comprise those of **tabes** and **spastic paraplegia**. Incoordination, ataxia, lightning pains, anesthesia, rigidness of muscles and exaggerated reflexes are the principal symptoms. The muscles easily fatigue; sensory symptoms are not so troublesome as in tabes; there may be visceral crises, sometimes Argyll Robertson pupil; and possibly spasms of the upper extremities and jaw. The course of the disease is slow.

Diagnosis.—This is not difficult as a rule. First, there is ataxia; then increased reflexes, fatigue of the muscles and paraplegia. **Tumor** of the **cerebellum** may confuse the diagnosis.

Treatment.—There is frequently a chance to greatly benefit these cases, and even in some instances a cure may be performed, provided the case is seen early. Thorough treatment of the spine to relax the muscles and to adjust the ribs and vertebræ is the indication. Stretching the spine, if carefully done, is beneficial. Muscular manipulation improves the spinal cord circulation, and osseous correction removes probable impingements to nutrient channels and nervous influences induced by cold, exposure, traumatism and secondary disturbances. Care of the general health, hygiene, diet, etc., are important.

Syringomyelia

Definition.—A chronic affection of the spinal cord in which there is an embryonal neurogliar overgrowth about the central canal, with cavity formation. It is characterized, clinically, by progressive muscular atrophy, peculiar disturbances of sensation and various trophic and vasomotor disorders. The onset generally takes place before the thirtieth year. Males are much more commonly affected than females. It is claimed by some that the disease is infectious. It frequently follows trauma.

Pathologically, the condition begins with an overgrowth of embryonal neurogliar tissue. This is followed by degeneration of the gliomatous tissue with a formation of cavities, or this cavity formation may be the result of hemorrhage. The disease, in most cases, involves only the cervical or dorsal regions, and is usually in the posterior or postero-lateral tracts. The cavity may prevail throughout the entire cord, but usually only the cervical and dorsal regions are involved. The cavities lie in the gray matter outside of the canal.

Symptoms.—The onset is slow. The symptoms depend upon the situation and extent of the cavity. As the disease most frequently involves the cervical region, the neck and arms are usually affected. At first neuralgic pains may develop in the muscles. Later there is progressive muscular atrophy and loss of painful and thermic sensations. Tactile and muscular senses are usually intact. The reflexes are increased and a spastic condition is present. The lower limbs usually escape, but when they are involved the clinical picture may be that of **amyotrophic lateral sclerosis**. A lateral curvature is present. When the disease extends into the medulla, there will be various bulbar symptoms. Trophic changes and vasomotor disorders are common.

A form of syringomyelia, known as **Morvan's disease**, is characterized by neuralgic pains, cutaneous anesthesia and painless felons.

Diagnosis.—The progressive muscular atrophy, the retention of muscular and tactile senses, and the loss of thermic and painful sensations are typical symptoms. The diseases with which it may be confounded are: **Cervical Pachymeningitis.** The pain is usually greater, the tactile sense is lost and it runs a more rapid course. **Anesthetic Leprosy.** The trophic changes are more marked, tactile sensation is lost and the phalanges often drop off.

Progressive Muscular Atrophy and **Amyotrophic Lateral Sclerosis**. Sensory symptoms are wanting.

Prognosis.—The prognosis is unfavorable. Duration is from five to twenty years.

Treatment.—Little can be done except attending to the diet and hygiene of the patient and meeting urgent symptoms. Probably, continued treatment along the spinal column would influence to some extent the circulation of the cord in the region of the involvement. Hot applications are of value in relieving pain and cramps. The X-ray has proven of some benefit in checking the progress of the disease.

Amyotrophic Lateral Sclerosis

"This is a chronic, progressive form of spinal paralysis, characterized by the symptoms of progressive muscular atrophy in the arms and by lateral sclerosis or spastic paraplegia in the legs." (Starr). It is similar to progressive muscular atrophy, except, in addition, there is sclerosis of the pyramidal tract. (See Progressive Muscular Atrophy.) Osler classes progressive muscular atrophy of spinal origin, amyotrophic lateral sclerosis and progressive bulbar paralysis as diseases of the whole efferent or motor tract, wherein these disorders may simply be various stages in the same case. He says, "A slow, atrophic change in the motor neurones is the anatomical basis, and the disease is one of the whole motor path, involving, in many cases, the cortical, bulbar, and spinal centers." There can be no question that for the student, a classification of spinal cord diseases according to the whole motor tract, the upper motor segment, the lower motor segment, etc., is a scientific classification from our present knowledge of the histology and physiology of the neurone, but for clinical purposes the usual classification is given. Osteopathically, we are greatly in need of a new nosology, either according to the cause of the disorder or to the physiological disturbance.

Amyotrophic lateral sclerosis does not occur so frequently as progressive muscular atrophy. Heredity plays a part, and it affects older people. **Injury** to the **spinal column** is undoubtedly an important factor.

Exposure and cold may be exciting causes. Infectious diseases and syphilis are probably important causes.

Pathologically, there are atrophy in the anterior cornu and sclerosis of the crossed and direct pyramidal tracts. There is sclerosis of centers in the medulla.

Symptoms.—Atonic atrophy, muscular weakness and fibrillary contractions, of varying degrees, are characteristic. The reflexes are exaggerated; the arm and leg muscles become weak and finally rigid and atrophied. This results in deformity. Disturbances of sensation are not pronounced. The sphincters may be slightly affected.

Diagnosis.—The disease is not so prolonged as progressive muscular atrophy. Differentiation has to be made from multiple arthritis and transverse myelitis and syringomyelia.

Treatment.—The same treatment as outlined for progressive muscular atrophy is indicated. The disease may be retarded and life prolonged.

Progressive Muscular Atrophy

A disease characterized by a slow, but progressive, loss of power and by muscular atrophy. Anatomically, it is characterized by degeneration of the ganglion cells of the gray matter in the cord. This atrophic affection develops just opposite to that of chronic anterior poliomyelitis. It is commonly a disease of males in middle life. Syphilis, rheumatism and lead poisoning predispose. It sometimes follows cold, wet, exposure, traumatism, mental worries, overuse of certain muscles, or prolonged emotional excitement. Hereditary influences are present in some cases. In all cases **lesions** are detected in the **vertebræ** and **ribs**, corresponding to the innervation of the diseased areas. Very likely these lesions are the starting point of the disease, by impairing nutrition to the motor cells of the anterior cornu, and thus resulting in atrophy.

Pathologically, the muscles are wasted, the fibers undergo fatty degeneration and there is an overgrowth of connective tissue. The peripheral motor fibers are degenerated. The anterior nerve roots leading to the horns are atrophied. The large ganglion cells of the anterior horns are atrophied, or even entirely removed. The neurogliar tissue is increased.

There is sclerosis of the anterior and lateral pyramidal tracts of the cord in the majority of cases. (See Amyotrophic Lateral Sclerosis). The pyramidal tracts have been found degenerated through the pons and internal capsule, even up to the motor cortex. When bulbar symptoms are present, there is degeneration of the motor nuclei of the medulla. The posterior columns are not involved.

Symptoms.—Irregular pains, numbness or exhaustion are usually felt in the region that is soon to become wasted. The upper extremities are first affected. The muscles of the ball of the thumb waste first, then the interossei. From atrophy of the interossei and lumbricales and contraction of the long extensor and flexor muscles, the deformity known as "claw hand" results. The wasting creeps up from the forearm, arm and shoulder. The muscles of the trunk are gradually affected. The muscles of the lower extremity may escape entirely. The platysma myoides does not waste and is often hypertrophied. The face muscles are attacked late or not at all. The affected muscles often twitch. Deformities and contractures develop, notably lordosis. Sensation is not impaired although the patient may complain of numbness and coldness. The bladder and rectum are not affected, but sexual power may be lost. The paralysis is flaccid and the reflexes absent in the so-called **atonic cases**. In **atonic** atrophy there is more or less spasm, the reflexes are greatly increased, there are often contractures and the wasting is usually trifling.

Diagnosis.—Differential diagnosis has to be made from syringomyelia, chronic anterior poliomyelitis, lead palsy and muscular dystrophies.

Prognosis.—The prognosis of progressive muscular atrophy is not favorable, although a number of cases have been greatly helped by an extended course of treatment.

Treatment.—The treatment consists of a thorough, stimulating treatment of the innervation of the affected regions, with manipulation of the muscles and parts diseased. **Correction** of the **lesions** to the **vertebræ** and **ribs**, which are involving the innervation to the diseased tissues, is of primary importance. A cure cannot be expected when degeneration of the nerve centers has occurred; still, the progress of the disease may be checked in many cases, and the patient occasionally gain considerable strength. When atrophy starts in the muscles of the ball of the thumb, the lesion is to the

median nerve, and derangements of the cervical vertebræ, from the fifth to the seventh, may be found. Attention to the general health is important. Outdoor life is preferable and gymnastic exercises are of value, but do not overtax the strength.

Bulbar Paralysis

(Labioglossolaryngeal Paralysis)

A progressive atrophy and paralysis, invading the lips, tongue, pharynx and larynx, due to involvement (sclerosis) of the motor nuclei of the medulla oblongata that supply these tissues. It is rarely primary, more **frequently secondary** to tabes, amyotrophic lateral sclerosis and diseases involving the motor nuclei of the medulla. Diphtheria, syphilis and lead poisoning are said to predispose. **Osteopathic lesions** of the upper cervical are also important factors in many cases. Halbert says: "The nuclei of the hypoglossal, the spinal accessory, the facial and the motor part of the trifacial nerves suffer most decidedly from the sclerotic degeneration. The nerve trunks and the muscles which they supply gradually show the effects of a similar degeneration."

The **acute form** results from hemorrhage, embolism or inflammatory softening. The onset is usually sudden. The speech is difficult or entirely lost. There are dribbling of saliva, difficult swallowing, flabbiness and flaccidity of the lips and frequent choking spells occur. These cases may prove rapidly fatal.

The **chronic form** may result from progressive muscular atrophy, insular sclerosis, amyotrophic lateral sclerosis, acute ascending paralysis or chronic poliomyelitis. The paralysis starts in the tongue, the first symptom being a slight defect in the speech. When the lips become involved, the patient cannot whistle and speech is rendered still more difficult. The lips are prominent and the lower one drops. The saliva is increased in amount and there is drooling. Mastication of the food becomes difficult. The tongue becomes atrophied and the mucous membrane wrinkled. Fibrillary tremors of the lips and tongue are present. Sensory symptoms are not present. Taste is normal. Paralysis of the larynx is not so pronounced as of the other parts.

Diagnosis.—This is generally easy as the symptoms are well marked. The **prognosis** is unfavorable.

Treatment.—Little can be done in the majority of cases. Only in those cases where the paralysis is caused by **cervical lesions** can much hope be given. Derangements of the cervical vertebræ, especially the atlas and axis, occasionally influence the circulation in the medulla to such an extent that the motor nuclei are greatly involved. The subluxated vertebras may interfere with the blood-vessels directly or through the vasomotor and trophic nerves. When the onset is not abrupt, the prognosis is more favorable. When deglutition is impaired, the stomach tube should be used in feeding the patient to prevent the food passing into the trachea.

FOOTNOTES:

[126] A. O. A. Case Reports, Series V.

[127] A. O. A. Case Reports, Series II.

[128] A. O. A. Case Reports, Series V.

[129] A. O. O. Case Reports, Series I.

[130] Millard, Poliomyelitis.

[131] Journal of the American Osteopathic Association, February 1906.

[132] Journal of Osteopathy, Oct. 1904.

ORTHOPEDIC SURGERY

By H. S. Hain

Orthopedic surgery deals with the mechanical or surgical prevention and correction of all deformities, especially those of children. It is not alone justifiable, but imperative, that orthopedic surgery be given a prominent position in any up-to-date text on the Principles and Practice of Osteopathy. The justification is threefold: though orthopedics was practiced to a limited extent before the Science of Osteopathy was developed, it has always been considered to be outside the realms of true surgery, in that it is practically bloodless, and those engaged in such practice have sought to establish it upon a platform of its own.

The basis of the practice of orthopedic surgery and osteopathy is similar, if not identical, in that it deals almost entirely with bony abnormalities. It is recognized by the whole osteopathic profession, and unconsciously by some adherents of medical science, that the maintainance and restoration of normal function are alike dependent on a force inherent in bioplasm and that function perverted beyond the limits of self-adjustment, is dependent upon a condition of structure perverted beyond those limits. This, then is the platform upon which the two sciences of osteopathy and orthopedic surgery are erected.

The technique of osteopathic practice consists of passive manipulative measures, designed to render to the organism such aid as will enable it to overcome or adapt itself to the disturbed structure; and does not seek, in itself, the aid of any instrument, mechanical appliance or plaster of Paris cast.

Surely it is but a short step from our osteopathic therapeutics to a system of therapeutics where we find all sorts of mechanical and plaster of paris appliances, etc., to help our passive manipulation in rendering to the human organism such aid as will enable it to overcome or adapt itself to a disturbed structure. This latter, of course, is the modern science of orthopedic surgery, and because of the shortness of this step, I insist that it is one of the most valuable adjuncts of the science of osteopathy. It is frequently necessary for

the osteopathic practitioner to take this step as conditions are met with that have progressed beyond the possibilities of passive manipulations and again other conditions of perverted structure can be much more quickly reduced by the aid of each.

It is then indisputable that the therapist who approaches disease from the osteopathic standpoint, above enunciated, is far more competent to deal with the mechanical problems of orthopedic surgery than any other known therapist. Secondly, in many conditions originally treated by orthopedic methods, subsequent ordinary osteopathic manipulations obtain a much more satisfactory and more lasting result than if it is withheld. Thirdly, in order to avoid possible error, it is of extreme importance that all osteopathic practitioners be particularly familiar with the conditions hereinafter described, more especially tubercular conditions of the spine, bones and joints, primary spinal curvatures and others.

It is reasonable and furthermore true that osteopathic physicians are confronted in practice with an unusually large percentage of cases indicated above, and the early recognition of such conditions is of fundamental importance in order that osteopathic manipulations be withheld and supplemented or replaced by orthopedic methods.

Space of course will not permit of the entire discussion of this vast subject but the most important and serious conditions met with in general practice are fully discussed in the following pages of this chapter.

Perhaps the commonest condition coming under this line of therapeutics, and one in which we, as osteopaths, are most vitally interested is rotary lateral curvature of the spine. From my personal observation and from experiences of some of the most prominent members of our profession, I am led to believe that this is one of our most difficult lesions to overcome osteopathically, hence my desire to go further into this condition than most of us might expect. I had opportunity to obtain personally some very valuable information from Dr. Joachim Stahl in the King's Charity Hospital in Berlin, and to him I am deeply grateful for many of the ideas of treatment presented in the following article. I believe that I have an accurate conception of the pathological condition that exists in connection with this deformity, and I believe that my treatment of it has been more successful than any that I have seen under other methods, in that I have gotten most

excellent results, in selected cases, in a comparatively short time, entirely because osteopathic manipulations and exercises were used in connection with the modified Abbott method.

Scoliosis or Rotary Lateral Curvature

Scoliosis or Lateral Curvature of the Spine is a deformity where the spine is deviated in whole or in part to one or the other side of the median line, which deviation is accompanied by an element of rotation. Though usually considered as a spinal deformity its **effects** are obvious outside the spinal area in so much as it will cause deformity of the pelvis, legs, ribs, sternum, scapulæ, and in severe cases, of the thoracic and abdominal viscera.

Curvatures of the spine are the result of one of two distinct factors: first where there is a primary disease of the bone causing more or less destruction of the bone and spinal articulations, and resulting in permanent spinal curvature. The most common example of this condition is seen in the angular curvature of Pott's disease. **Rickets** is usually responsible for a general long posterior curvature of the whole spine, as is osteomalacia with the superimposition of some lateral deviation. Further, any type of inflammation or trauma is capable of producing curvatures of various types. Second, where there is no primary disease of the bone, joints, or ligaments, and where the curvature is due to external forces acting constantly or at frequently recurring intervals on the spine.

Scoliosis or lateral curvature belongs to the second class. It is unfortunately necessary to further subdivide scoliosis into two classes; one where the curvature is a position permanently maintained but capable of being reproduced by extreme physiological movement of a normal spine, and secondly, a position which no normal spine can assume and which necessarily implies a change in the normal shape of the bones and intervertebral discs. The first may be described as a functional or postural lateral curvature, and the second as an organic or structural lateral curvature. Further, I might say that the first type may progress until it becomes the organic type.

Pathology.—In scoliosis the spine undergoes not only curvature or lateral deviation but also rotation of the vertebral bodies which you will

note always takes place towards the convexity of the curve.

Changes in the Individual Vertebræ.—The bodies may be either wedge shaped or lozenge shaped. In wedge shaped vertebræ, the bodies are compressed on the concave side and extended on the convex side, the intervertebral discs being atrophied on the shortened side. In the lozenge shaped type, the change in the bodies is most marked at the junction of the opposite curves, and is thus more commonly observed in compound curvatures. The pedicles are directed more antero-posteriorly on the convex side and more transversely on the concave side. The transverse processes on the convex side are more antero-posterior than normal, causing the vertical furrow between them and the spine to be narrower on this side. The spines point towards the concavity in structural curvatures and toward the convexity in the functional type. The vertebral foramen is rounded in the convexity and pointed in the concavity. The edge of the anterior common ligament toward the convexity is greatly thinned while it has a well marked edge on the concave border. A fibrous degeneration occurs in the muscles on the convexity owing to stretching, while atrophy from disuse takes place in those on the concave side.

Associated changes in the Viscera.—The **dorso-lumbar** curvature decrease in the volume of the lower thorax on the dorso-convex side tends to cause pleural adhesions with obliteration of the pleural sac and consequent collapse. Tuberculosis of the **lung** is common in patients who suffer from scoliosis. The **heart** is often overworked but the above lessening of the pulmonary area in turn results in hypertrophy and dilatation of the right ventricle and subsequent general venous stasis. The **kidney** on the convex side is compressed, and as a result degenerative changes are prone to occur. The **spleen** is frequently displaced upward and is liable to pathological changes. Organs such as the stomach, transverse colon, esophagus and trachea are frequently displaced owing to the bony deformity and are thereby more prone to pathological change.

Etiology.—The essential factor in the production of scoliosis is spinal insufficiency, which includes spinal muscles and ligaments as well as the bones. In many instances, however, the following factors have an important augmenting or predisposing effect.

1. Occupational Deformity.—Primarily under this classification, I have found faulty positions adopted by school children as being the most comfortable, to be perhaps most important. Occupations such as those of nurse-maids, hod carriers, or stone cutters, are apt to induce scoliosis.

2. Diseases of the Central Nervous System.—Unilateral weakness or paralysis of the muscles of the trunk are common causes of scoliosis. Anterior poliomyelitis plays a particularly important part as it may induce deformity by distortion of the lower extremity or by any inequality in the length of the limbs due to retardation of growth, as well as inducing general weakness of the muscles of the trunk. Other nervous disorders that should be considered are spastic paralysis, locomotor ataxia, syringomyelia and Friedreich's ataxia.

3. Incidental Deformity.—Scoliosis may be caused by direct injury or by fracture, Pott's Disease, or organic affections of the spine. Marked deformity caused by Sciatica or lumbar neuritis, if persistent may finally induce permanent deformity.

4. Deformities Due to Diseases of the Chest.—In **empyema** or **pleurisy** one side of the chest is retracted and it will be noticed that the curvature occurs toward the healthy side. Chronic pulmonary tuberculosis producing fibrosis of the lung gives the same result as empyema and pleurisy.

5. Deformity due to obliquity of the pelvis.—This type may be due to any inequality of the limbs, such as equinus of the foot. Congenital dislocation of the hip may play a part while one naturally lays stress on pelvic and lower lumbar lesions.

6. Deformity due to Distortion of Other Parts.—Unequal visions, unequal hearing, and torticollis by causing malposition are etiological factors especially in school children. The loss of an arm will tend to cause an asymmetrical position of the trunk.

7. Congenital Deformity.—Congenital scoliosis occurs, but is usually associated with other congenital deformities of the spine, such as the reduction or increase of the vertebræ, cervical rib, elevation of the scapula, etc. The deformity is usually not apparent until later years, though it may occur at birth.

8. Spinal Lesions.—Any osteopathic lesion predisposes to curvature because it interferes with the nerve supply and tonicity of the spinal muscles and could readily cause the faulty position.

Functional or Postural Lateral Curvature

This is a condition where there is a gradual curve to one side unaccompanied by any marked rotation. The maximum deviation may be no more than one inch and a half from the middle line, which point is generally found about the tenth dorsal vertebra. In the vast majority of cases deviation is to the left and in such the following alterations will be noticed: a general convex curve to the left; elevation, and anterior displacement of the left shoulder; posterior displacement of the right shoulder; in extension, the right side of the back will be higher than the left and in addition some torsion to the concave side, which is easily understood if one recalls the exact changes that take place during side movement of the normal spine. It is important to remember that functional scoliosis disappears when the patient is suspended or assumes the recumbent position.

Organic or Structural Scoliosis

This term is applied to cases where definite change has taken place in the vertebræ. Organic curves may be simple when the deviation is unaccompanied by any compensatory curve, or compound when a compensatory curve is present. We shall consider the deformities as they present themselves in the various regions of the spine.

Cervico-Dorsal Curvature.—This condition is comparatively rare and according to Lovett occurs in only three and six tenths per cent of cases. The head is slightly deviated towards the concave side, the shoulder on the concave side is lowered, while on the opposite side or the side of the convexity it is naturally at a higher level. The angles of the upper ribs are prominent due to the co-existing rotation.

The Dorsal Curvature.—The shoulder is raised on the convex side, and the rotation of the vertebræ is very marked, causing a very definite projection of the angles of the ribs on the convexity. This rotation also projects the scapula backwards on the convex side. On the concave side the

scapula is flat and sunken, and the inferior angle rotated inwards and at a higher level than the opposite side. Viewed from the front the thorax may not be displaced at all, or it may be displaced toward the convex side, and if the latter is the case it is, of course more prominent on the concave side. In severe cases the lower end of the sternum is deviated towards the convexity and you will find that usually the arm hangs further from the convex side than from the opposite one.

The Lumbar Curvature.—Here we find the trunk displaced toward the side of the convexity, and the waist retracted on the opposite side. The difference in the level of the hips is the most prominent deformity in this region, and it will be found that the hips are raised on the concave side. Rotation in this region is much less evident than in the dorsal region, but can be demonstrated by a fullness on the convex side of the curve, due to the projection of the transverse processes.

Dorso-Lumbar Curvatures.—This condition is similar to a certain extent, to a severe functional scoliosis. The findings observed in the last two regions above described will naturally be present in this type of curvature. It is not so frequently associated with compensatory curves as in the other types described.

Compound Structural Curves.—The appearance in this type of scoliosis will, of course, be a combination of those described above according to the types of curvature in combination, that is to say right dorsal and left lumbar, etc. If one type predominates the appearance will be chiefly that found in that particular type of curvature. The relative frequency of the common type, as given by Schaltless, in eleven hundred and thirty seven cases is as follows; functional scoliosis, 15.39%; lumbar, 11.7%; dorsal, 19%; dorso-lumbar, 20%; cervico-dorsal, 3.6%; compound, 30%.

Diagnosis.—To the osteopathic physician the diagnosis of scoliosis is not difficult. Let me caution you that true scoliosis must be distinguished from the lateral curvatures caused by Pott's disease. Vertebral rotation, the absence of pain, the extreme rigidity, the characteristic appearance of the ribs and thorax should, however, make the diagnosis of scoliosis easy.

Treatment.—In general the treatment of scoliosis is difficult to present, because every case is considerably different, and the amount of correcting

force used in any form is almost entirely a matter of judgment, as is also the time when corrective pressure should be discontinued. Continual practice in the treatment of these conditions is most essential to your success with them. I have had most gratifying results in a comparatively short time simply because I used osteopathic treatment and exercises along with a modified Abbott method.

Functional or False Scoliosis

The functional or false scoliosis might be regarded as a habitual inability to stand correctly, simply a postural malposition and lack of muscle tone without marked structural change, which is maintained for a considerable length of time or where the position is repeated several times daily. The treatment of selected types of this deformity is most successful and may well be divided into three procedures: first, the substitution of a correct attitude for the faulty one, that is careful investigation should be made to ascertain the condition which might be the cause of the incorrect position such as poor school desks which might cause the child to reach either up or down to write, poorly fitting clothing which causes a pulling on the shoulder, eye strain which would cause tilting or twisting of the neck, congenital shortening of one limb or too rapid growth, should all be looked for and removed; second, regular osteopathic manipulation, at least three times per week to increase the tonicity of the already weakened spinal muscles and aid correction, are highly essential and shortens the time required for a complete cure; third, supervised gymnastic exercises of various kinds are very beneficial to develop and bring the musculature back to normal. Such simple exercises as crawling on the hands and knees in a small circle towards the side of the convexity, and the hanging from a horizontal bar by the arm on the side of the concavity will prove to be helpful. Some authors recommend the regular army setting up exercises for some cases or a frame by means of which the hips are fixed, and rotating and side bending exercises of the head and trunk given. These last two exercises are indeed very reasonable procedures but I have found them unnecessary mainly because I used osteopathic manipulations instead.

In advising and supervising exercises it is best to have the patient’s back bared so that the effect of each movement can be noticed and the exercises

directed accordingly. Care and judgment should be used as to the number and severity of the exercises and would depend of course on the vigor of the child. Treatment should continue until the condition has been overcome, and the patient should be under observation for a couple of months afterwards so that any recurrence of the deformity would be noticed and attended.

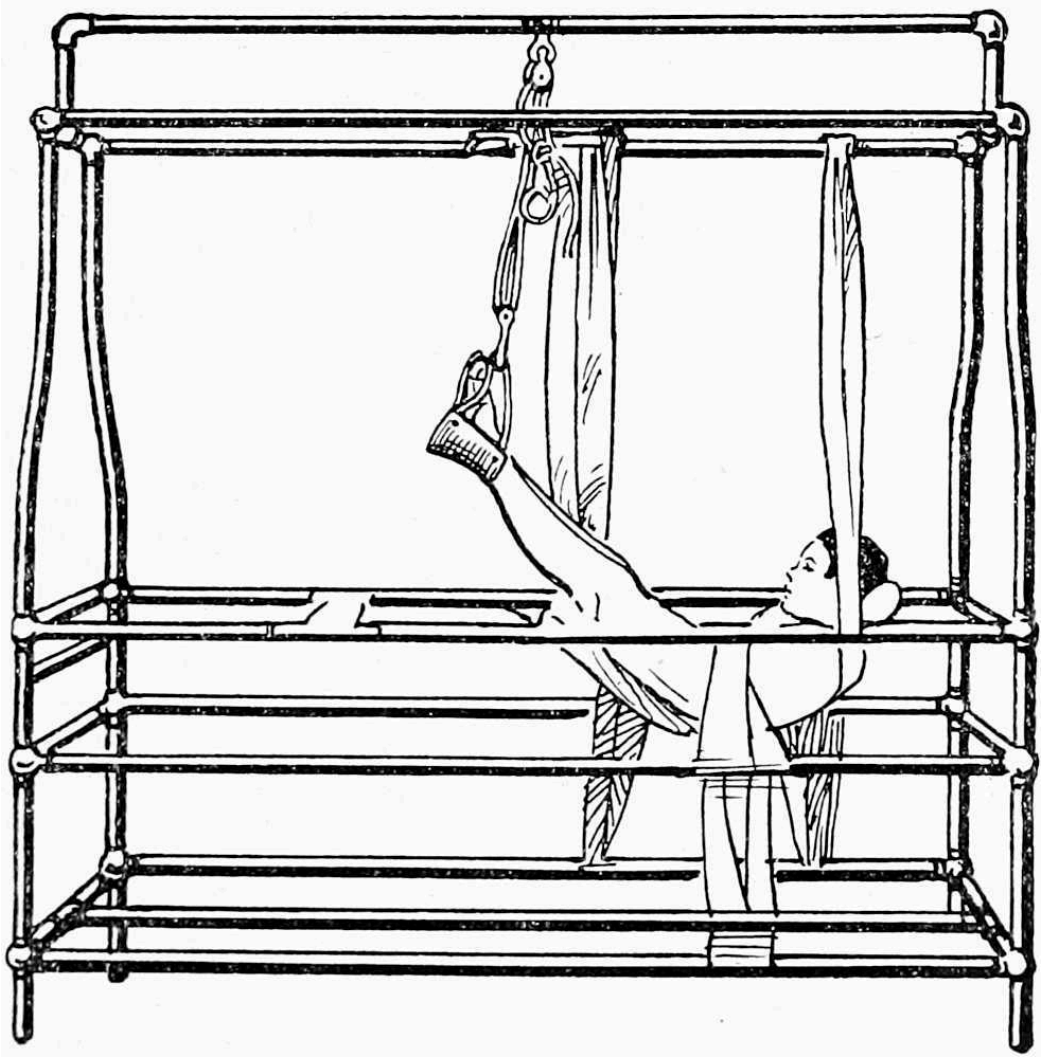
Organic or Structural Scoliosis

The treatment of organic or structural scoliosis is more complicated for it must be remembered there are two elements of the deformity demanding correction; one, the lateral curve to be corrected by a side force, and the other, the rotation of the vertebræ to be corrected by a twisting force. I find both osteopathic manipulation and gymnastic exercises are of great value in the correction of this deformity as they help to loosen the curve and develop the musculature but used alone good results can rarely be obtained especially in obstinate curvatures. I believe that I have improved nutrition and probably prevented further deformity by treatments and exercises, but I am quite positive that it is not possible to correct an organic scoliosis without the forcible correction used in the Abbott method.

As the details of treatment are tedious to follow, we will take for example a case of right dorsal curvature presenting a marked hump deformity, with a compensatory curve to the left in the lumbar region, as this is the most common type. I might say here that whether or not a compensatory curve is present, makes no difference, as treatment is directed entirely to the primary curve on the assumption that overcorrection of it will cause a secondary curve to disappear by compensation.

The patient is prepared by putting on a snug fitting undershirt and sewing pads of saddler's felt over all bony prominences, especially the crest of the ileum and anterior superior spine. Sometimes I take a piece of felt of four or five inches wide and long enough to go around the entire pelvis, just high enough to cover the brim, and fasten it in front with adhesive. Next I make a bunch of pads two or three inches in thickness and large enough to fill up the concavity of the left side, and first sew them together, and then with a few stitches fasten them to the undershirt thereby filling up the space on the concave side. The edges of the pads should, of course, be trimmed down to

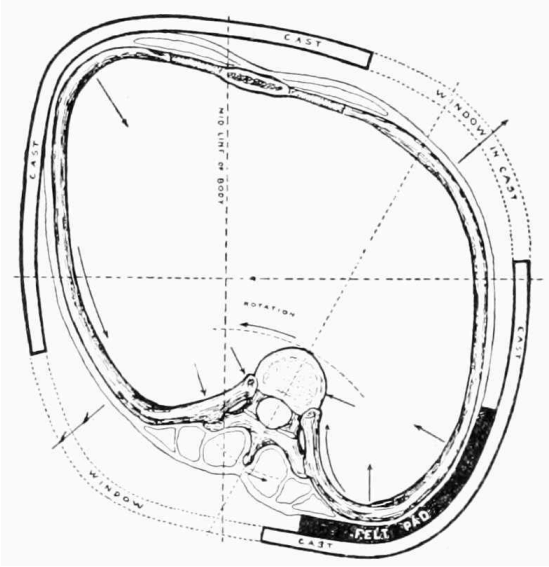
conform with the general contour of the body, the main thickness being in the middle. I then sew a single pad on the right side of the thorax in front and a little to the right side.



Patient suspended on canvas hammock in regular Abbott frame ready to apply cast for a right dorsal curvature. Notice manner of applying the correcting canvas straps.

The patient is now ready for the Abbott frame and is placed on a canvas hammock about twelve inches wide, which is cut on the bias so the right side is three inches shorter than the left. The hammock can be adjusted to the desired degree of flexion by a ratchet at the foot of the regular Abbott frame. The limbs of the patient should be elevated to increase the flexion as

this has a tendency to unlock the articulation and thereby help in overcoming the rotation. Next a canvas bandage four inches wide is passed around the patient under the axilla of the concave side and fastened to the frame on the opposite side, and another one is placed around the pelvis and fastened to the same side of the frame, both on a level with the body plane. A third bandage is next placed around the point of greatest convexity and fastened to the opposite side of the frame in such a way that it can be tightened and a direct pull be made on the curve. Before tightening the last bandage the left arm and shoulder should be brought up high beside the face and pulled backward toward the floor as it is this twisting force that produces some rotation of the thorax. The correcting bandage is now tightened being careful not to cause the patient too much discomfort.



Cross section sketch of a right dorsal curvature showing deformity in the thorax and rotation of the vertebræ, also windows which are cut in the cast to allow expansion in these two directions and the directing force of the pads. These are placed over the angles of the ribs. Arrows show directions of the various forces.

I always use ordinary absorbent cotton for padding, which is held in place by the regular gauze bandage. The plaster of Paris bandages should be applied high up under the left shoulder and well down over the sacrum and innominate bones and should be of a uniform thickness of half an inch. Sometimes I carry the plaster over the right shoulder to hold it down and back, though not always. I always let the cast set pretty well before removing the patient from the frame and if it has been applied in the morning I find it best to wait until afternoon before trimming and cutting the windows because there is less danger of breaking it. In trimming I always smooth up the edges, lower the right shoulder, but keep the left well up, trim off enough at the bottom in front to allow the thighs to be readily flexed without obstruction, and leave it low behind so as to maintain the flexion. Next, two holes or windows are cut in the cast, one over each area where the pads were inserted, and remove them. The hole in the back on the left or concave side permits

expansion of the chest to the back, while the hole on the right side in front allows the ribs, which are posterior, to move forward under pressure or the pads to be inserted at the posterior angle or backward prominence of the ribs of the convexity. The canvas bandages or straps around both the axilla and pelvis are removed, but the one about the convexity of the curve is left in place so as to assist in the after treatment. The patient usually suffers some discomfort such as difficulty in breathing and the inability to move the body freely, and should remain in bed a day or two after the cast has been applied. Usually they sleep very poorly the first few nights, but the spine soon gives under the pressure and they become comfortable. When the cast has become quite comfortable an assistant pulls on the canvas bandage which was left around the convexity, while pads are inserted so that the greatest pressure is exerted on the angle of the ribs to further overcome the rotation and decrease the lateral deformity. Also heavy felt pad may be inserted over the bulging ribs in front of the left side to push them back. Care should be taken that too much pressure is not brought to bear on the side of the convexity because if more pressure is exerted here than on the angles of the ribs, it will tend to increase rather than decrease.

Casts should be worn for different periods, some being changed in a month while others can be worn for three months. It is entirely a matter of judgment. My best results have been secured by only slightly correcting the curvature at the time the cast was applied, and relying more on the proper insertion of the pads. Often at the end of a month or six weeks, in selected cases, I have split the cast down the front and removed it by springing it apart, and administered osteopathic manipulations to the spine freely in all directions, thoroughly loosening up the muscles. Then I replace the cast and hold it together in front with moleskin adhesive and insert the pads as before. I repeat this procedure three times per week for another month, together with daily exercises each morning and evening of drawing the left shoulder up and forward while in the cast to develop the muscles of the left shoulder girdle. The treatments and exercises certainly do build up the spinal muscles for it must be realized that they have suffered in nutrition to a great extent as a result of wearing the cast. Next the cast can be worn during the day and removed at night, and gradually it can be left off several hours at a time. If no bad results occur it can be left off for longer periods until finally its use can be discontinued. However, the patient should still be under observation once a week for a couple of months to determine any

recurrence of the deformity. The resumption of active corrective treatment, or increasing relaxation in gymnastic work, will, of course, depend upon the progress of the case.

In the more obstinate cases, casts should be applied as long as further correction can be obtained. The procedure is entirely the same, only the time required for correction is longer, sometimes a year or year and a half, and when overcorrection has been maintained, it is better to use a removable jacket made of celluloid or light stiffened leather, with large windows cut over the region where pressure is to be avoided, than the removable cast described above.

In closing let me say that this method of correcting lateral curvature is best adapted to patients during their growing period and though it may be employed in older cases you will usually be disappointed in the final result. The only reason I can see for treating older cases is purely mercenary.

Congenital Dislocation of the Hip

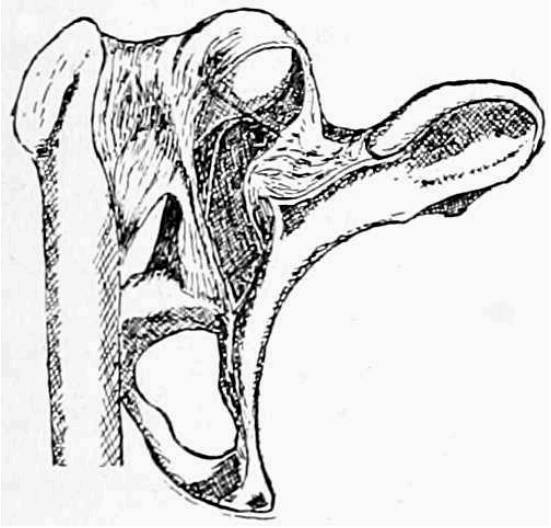
Unilateral

Undoubtedly as far back as 1829, the actual recognition of this condition was due to the pathological research of a French surgeon Dupuytren, who described this deformity with great accuracy and insisted that there was no possible chance of correction. From then on until 1886 nothing was done by medical science to overcome the deformity, though it is claimed some were made. It was in this year that the famous Bavarian surgeon, Hoffa, gave to the medical profession the results of his successful attempts at reduction by opening the hip joint from behind and enlarging the acetabulum to a size sufficient to hold the head of the femur.

Orthopedic surgery has to thank the irritating effects on the skin, of antiseptics necessary in preparing his hands for ordinary surgery, as it was due to this triviality that Lorenz, a promising surgeon of Vienna, transferred his energies to the field of bloodless surgery and gave to us the most valuable early work and present day technique in the bloodless reduction of congenital dislocation of the hip.

The name, of course, is applied to a congenital deformity which involves one or both hip joints, resulting in lameness, due to a misplacement of the head of the femur from the acetabulum. Of all congenital dislocations the hip joint is by far the most common and most important. The misplacement is far more often unilateral than bilateral and far more frequent in females than in males, the cause for the latter probably being the difference which exists in aspect and position of the acetabulum as well as the disproportionate laxity of the capsule in the two sexes. It must be remembered that normally at birth, the acetabulum covers only about one-third of the head of the femur, and our most accepted theory as to the cause of this deformity, is a defective development of the acetabulum or its posterior margin, which may be primary or secondary to an abnormally prolonged fixation of the limb in a position of flexion or adduction while in utero. At birth it is quite probable that the dislocation is a subluxation only, which becomes complete by muscular action and the use of the limb in standing and walking.

The pathology of this disease is clearly established, and varies, of course, with the age of the patient in strain and friction to which the misplaced parts have been subjected. In children over two and one-half years of age the acetabulum is usually shallow and small, and filled with a deposit of fat and fibrous tissue. It is covered with normal hyaline cartilage and nearly always the ligamentum teres is present, but is so badly stretched and ribbon-like that ultimately the artery accompanying it fails to function, resulting in a malformation of the head of the femur. The capsular ligament is elongated and thickened to accommodate the upper displacement of the femur, and the anterior wall of it is stretched tight across the acetabulum like an hour glass. The interior of the capsule is always partly lined with synovial membrane. Usually a secondary acetabulum is found upon the ileum, formed by the direct pressure of the head of the femur through the capsule and the result of irritation of the periosteum of the ileum, but it is as a rule, not deep enough to form a secure support for the head of the bone. The neck of the femur is usually shorter than normal and the upper extremity of the bone is somewhat atrophied. The pelvis is usually slightly atrophied on the affected side, and a lateral inclination of the spine may be present. The long muscles of the thigh are shortened; while those attached to the pelvis and trochanter are changed in direction and are usually lengthened.

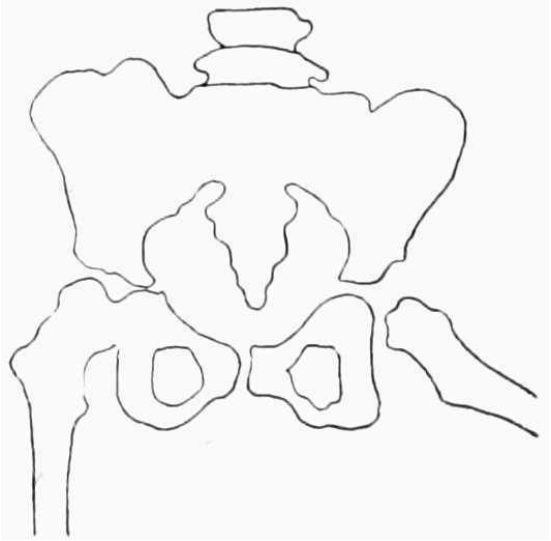


Typical congenital dislocation of the hip, showing the "hour glass" constriction of the capsular ligament.

Symptoms.—As a rule congenital dislocation of the hip is not accompanied by the defective development or deformity elsewhere, and the symptoms are so diagnostic that there is little difficulty in recognizing this condition even without the X-ray which is, of course, a positive diagnosis.

Rarely does the displacement attract attention until the child begins to walk. Often the child does not walk as early as it should. Sometimes it may be delayed until the eighteenth month or second year and then it walks with a limp which becomes more pronounced as the child grows older until at the fourth or fifth year it is very decided. The limp is peculiar and its character is explained by its cause; for the shortened limb, owing to the elasticity of the capsule, becomes still shorter when the weight is borne upon it, thus causing a peculiar lunge of the body towards the short side like the normal motion of walking downstairs. In compensation, of course, the pelvis is tilted towards the short limb and its inclination is thereby increased, so that the anterior superior spine lies at a lower level and in advance of the opposite side. Usually the affected limb is about an inch shorter than the sound one, and in adult life it is considerably more. The range of abduction is much diminished, but flexion, extension and adduction are quite normal, and the trochanter will be found elevated about an inch above Nelaton's line. If the thigh be flexed and adducted to its extreme limit, the neck and head of the femur can be easily distinguished moving under the gluteal muscles when the limb is rotated, or the head can usually be readily palpated in front when the limb is extended. Then, too, by fixing the pelvis and using traction and upward pressure on the limb, the abnormal mobility or telescopic motion is easily demonstrated and this, I might add, is a very important test.

Rarely do we find a unilateral anterior dislocation, in which the head of the bone lies beneath the anterior superior spine, but when this position is



Outline of a radiograph following reduction and removal of the first cast in unilateral dislocation of the hip. Notice the head in the socket and the thigh still flexed and abducted.

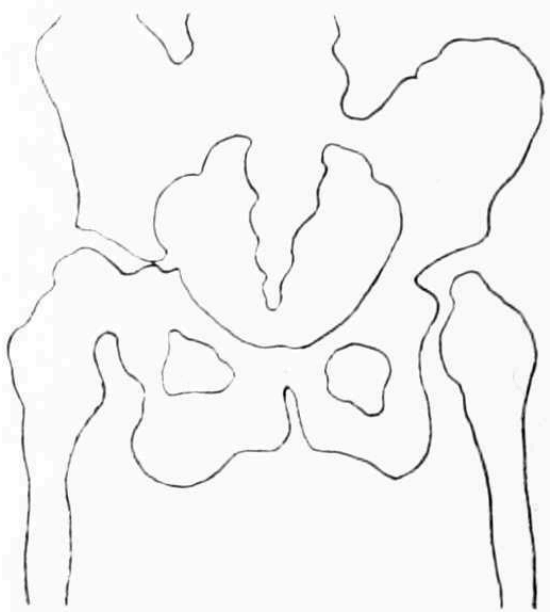
present, the symptoms are much less marked than in the ordinary form because the relation of the pelvis to the femur is more nearly normal. The limp and the shortening of the limb are less noticeable because the tissues attached to the anterior superior spine form a relatively secure support.

The X-ray, of course, makes the diagnosis complete. Even though the clinical diagnosis is certain, a radiograph is indispensable in every case, particularly for the purpose of ascertaining the exact position of the head and condition of the acetabulum and femur. The acetabulum is usually shallow and poorly developed, more particularly the iliac portion of its rim. After the reduction of the dislocation, an X-ray picture should always be taken within the first few weeks, and before the plaster of paris cast has been removed, to ascertain whether the head of the femur is still in place.

As to bilateral dislocation of the hip, the pathology, of course, is the same as in the unilateral type. The shortening of the limbs is as a rule equal or nearly so, and when both femurs are displaced backward, the pelvis is tilted forward thus presenting a marked lumbar lordosis and protruding abdomen. The pelvis seems to be abnormally wide, both buttocks are flattened and the thighs are separated by a considerable space. The characteristic limp in this condition is an exaggerated waddle, often spoken of as “sailor gait.” Again in this condition rarely do we find an anterior dislocation, but when such is the case, the entire body is swayed entirely backward, though the lumbar lordosis is not increased, in fact usually presents a peculiarly flattened appearance. Other symptoms differ only in a slight degree from those of the ordinary posterior displacement. The physical signs are the same as the unilateral displacement and are even more readily recognized by the peculiar appearance and distinctive gait of the patient. The swaggering gait of lumbar Pott’s Disease is somewhat similar, but this is an acquired clinical

condition of the spine in which the hip joints are normal in appearance and nearly so in function.

Before taking up the usual procedure for the correction of congenital dislocation of the hip, it might be interesting to touch on several cases of this deformity in young children that I have reduced without an anesthetic. If future experience proves as successful as these cases it will entirely revolutionize the treatment of this condition especially in children under twenty months of age. To begin with, these children had just started to walk and it must be remembered that at this stage the acetabula are nearly normal and there has been no muscular or ligamentous contraction because very little weight has been borne on the limb.



Outline of the same case following removal of the second cast. The head of the femur is firmly fixed in the acetabulum and the position of the limb is nearly normal.

First the pelvis is held fixed by the assistant, and the thighs completely flexed on the abdomen. Next firm pressure is made on the knee to force the head of the femur beneath the acetabulum and as the limb is abducted in the flexed position, the head is raised into the acetabulum with the thumb of the operator's other hand. The whole procedure takes but a moment's time and the child should be placed at once upon the floor and allowed to walk. Time will tell if the reduction has been successful, and if failure of retention develops, the Lorenz method followed by plaster of Paris fixation can still be used. I should always recommend the trial of this method in children who have walked not longer than six months, before resorting to the following Lorenz treatment.

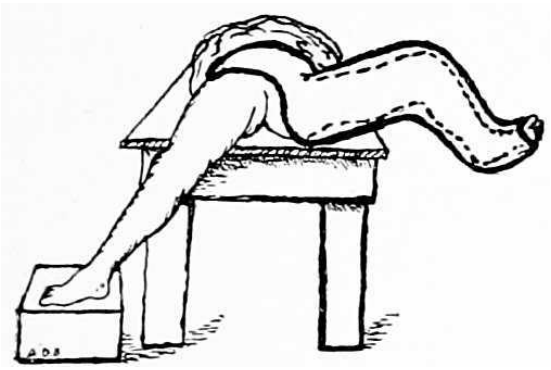
Treatment by the Lorenz Operation.—This treatment is based on the fact that there is normally present an acetabulum of sufficient size and capacity to retain the head of the femur, providing the limb can be fixed in a favorable attitude, and as soon as possible weight borne upon it to deepen

the rudimentary acetabulum. The typical operation of today is best divided into four distinct steps; first, to overcome the resistance of the tissues surrounding the joint; second, to reduce the dislocation, or rather to force the head of the femur over the posterior border of the acetabulum; third, to increase the security of the articulation by stretching the anterior border of the capsule; fourth, to fix the parts in a plaster of Paris bandage.

The child is completely anesthetized, and an assistant firmly fixes the pelvis on the table with his hand. The operator first flexes the thigh to a right angle with the body and forcibly abducts, at the same time kneading and stretching the tense adductor muscles and if necessary rupturing the adductor tendons in order to bring the limb down to the plane with the body. Next to overcome the contraction of the posterior tissues, the limb fully extended is flexed upon the trunk and gradually forced downward until the toes touch the patient's face. To overcome the resistance of the tissues on the front of the joint, it is best to move the patient to the edge of the table and forcibly extend the thigh downward behind the plane of the body. It is also well to apply direct traction in the line of the body. This preliminary stretching is absolutely necessary, because all the tissues about the joint are so shortened, and it will now be noted that with slight traction the trochanter can be drawn down to Nelaton's line.

Next reduction is attempted by grasping the limb with one hand at the knee and strongly abducting it while the palm of the other hand is placed on the anterior spine of the ilium with the thumb placed beneath the great trochanter to act as fulcrum. As the limb is gradually forced downward to and behind the body plane, the head of the femur is forced upward until it finally slips over the posterior and inferior border of the acetabulum. In the more resistant cases a padded wedge-shaped block placed behind the trochanter will be an aid in pushing the head forward and upward while the patient's knee is forced downward. A successful reduction is usually accompanied by a distinct jar and audible thud, and it would be observed that the tension upon the ham string muscles causes fixed flexion of the leg. After reduction has been made, the limb should be brought down carefully into a straight position to test the security of the re-position. If dislocation appears during this manipulation, the tissues must be still further stretched and the displacement further reduced. If displacement occurs readily due to a shallowness of the acetabulum the prognosis is not so good as where the

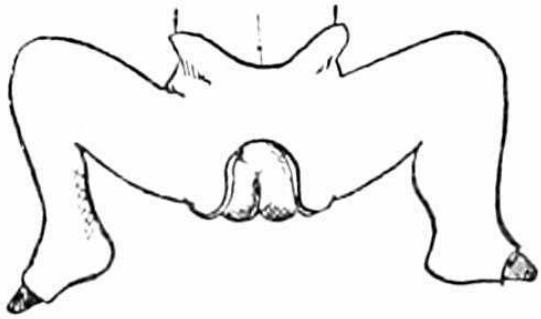
stability remains when the limb is brought down into a straight position, and one must be more particular in the fixation of it. I have also observed that the more difficult the reduction the more stable the end results. The easy replacements are usually just as easily displaced. Sometimes the head slips into the socket quietly without the distinct jar or thud but the results in these cases are just as good provided they are properly cast.



Patient in position for the first cast in a left unilateral dislocation. The thigh should be a little past a right angle in relation to the trunk, with about 80° abduction.

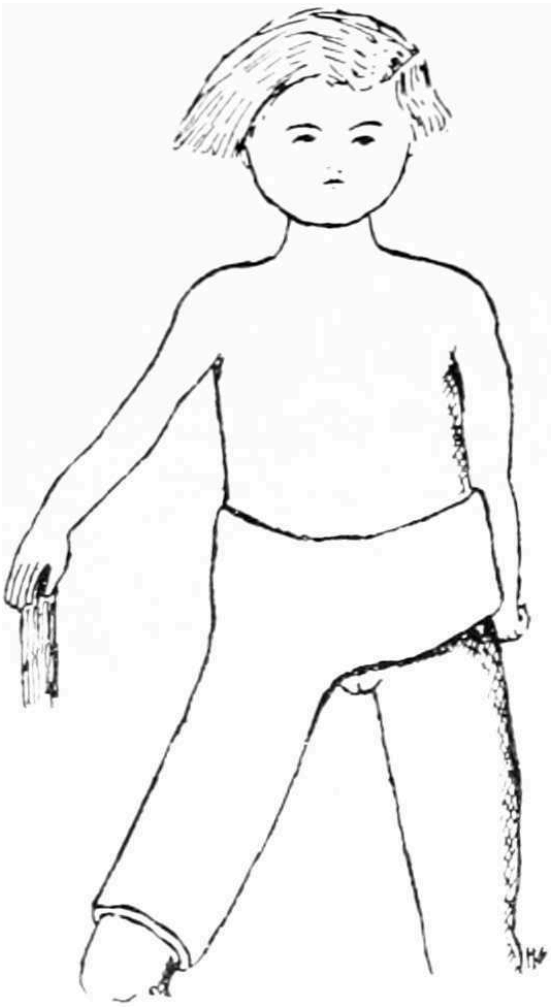
The application of the plaster spica is by far the most important part of the treatment, as the reduction is usually quite easily accomplished in children under six years of age. If the cast is improperly applied, the hip will slip out of the socket and the case is a failure. A pair of soft knitted cotton drawers are put on and the patient is placed upon a pelvic rest with the limb held in the position of greatest stability at a right angle with the trunk, or even slightly more and about eighty degrees abduction. In a case where the socket is very shallow, the position to be cast should be about one hundred degrees flexion, and in abduction the limb should lie slightly behind the plane of the body to secure the best results.

The limb and pelvis are covered with ordinary absorbent cotton which is held in place with a roller gauze bandage. A snug fitting plaster of Paris cast is now applied around the pelvis and well down over the knee. I leave this over the knee for five or six days or until the child ceases to be fretful, then I cut it away just back of the knee joint to permit motion there. The ends of the drawers are drawn back smoothly over the cast and are sewed to each other. For about a week following the operation the adductor region



Correct position and proper application of cast for double congenital dislocation of the hips.

is swollen and discolored and more or less painful due to rupturing and stretching of those tendons. After this discomfort has passed away, walking is encouraged on the theory that the weight bearing and the stimulation of functional activity will increase the stability of the joint by deepening the acetabulum.



Proper position of the limb in the second cast for unilateral dislocation.

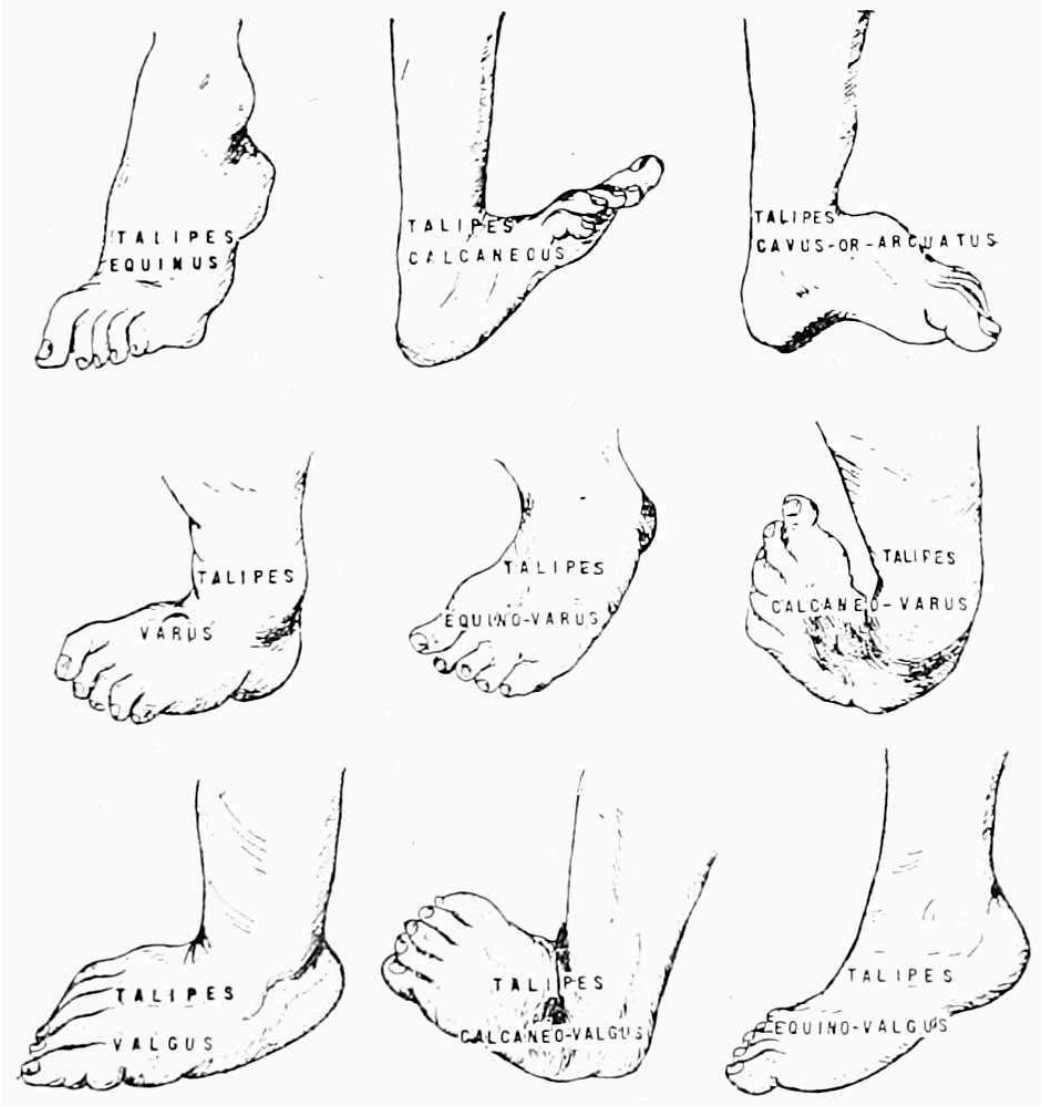
The first cast should remain from three to six months according to the stability of the joint at the time of reduction. If in young children the cast becomes offensive, it must be changed as often as is necessary. When the first cast is removed, the limb is pulled down to about thirty degrees abduction and the same amount of flexion, without an anesthetic, and a second cast is applied, which extends only to the knee, to be worn from three to six months longer. After removal of second cast, the child is permitted to get about carefully. The limb will be everted and slightly flexed, which position invariably causes much concern among the relatives of the patient, but this abnormal condition disappears after a few months' time. Sometimes for even a year following removal of the second cast there will also be a noticeable hitch in the walk of the child; but this, too, disappears and in the course of two years' time one could never tell that such an operation had been performed. Massage of the posterior and lateral muscles of the hip always helps considerably towards the relief of any stiffness or lameness.

Reduction by Open Incision

In the more resistant older cases, where manipulative reduction has failed, reduction by incision can be employed with success, but this procedure requires the exercise of care in order to do as little injury to the muscles as possible. A crucial incision of the capsule is made and the capsular constriction and ilio-psoas tendon divided. With a little traction, the head of the femur slips easily into its socket. The capsule is stretched firmly around the neck and the incision into the capsule is then closed by suture, and the limb fixed in a plaster of Paris spica in the fully abducted position. The operation should of course be done under the strictest asepsis.

Talipes or Club Foot

The word talipes signifies some deformity of the foot and is quite common in orthopedic practice, being found in nearly ten per cent of the cases coming under this branch of the science. Club foot may be classified into two types—the congenital and the acquired. The congenital type is the most common and is due probably to abnormal intrauterine pressure or to a perversion of normal intrauterine development. The acquired type is due usually to injury or infantile paralysis, but either joint disease or cerebral paralysis may be the cause. The deformity presents six different forms with most characteristic clinical pictures which, with the exception of talipes planus I have taken up in the order of frequency.



Illustrating the more common types of talipes. A combination of any may be present.

Talipes Equinovarus is usually congenital and is the most common type. It is characterized by inversion and torsion of the foot with elevation of the heel. The weight is borne on the outer side of the foot and in extreme cases upon the dorsum as well. Calluses are always present which are red and painful upon the point where the greatest weight is borne. The most common method of treating this condition is to divide the tendo Achilles at a level with the malleoli. The operation should be done aseptically and under complete anesthesia. As an assistant raises the end of the foot so as to stretch the tendo Achilles the surgeon enters the knife parallel to the border of the tendon through the skin and tendon sheath into the tendon itself. Next with a tenotome inserted into the incision and turned at right angles to the

tendon, the tendon is divided first on one-half then on the other. Care should be taken to disturb the tendon sheath as little as possible for it serves an important purpose in repair. When the division is complete as indicated by the separation of the divided ends, the tenotome is withdrawn and the minute opening in the skin, from which there is only slight bleeding, is covered with aseptic gauze. The foot is forced into dorsal flexion and if in severe cases the deformity is not then corrected, the tendons on the outer side of the foot may be shortened, while those on the inner side may be lengthened in the same manner as the tendo Achilles. A plaster of Paris cast is then applied well up to the knee with the foot in the over corrected position, care being taken that no undue pressure is brought upon the seat of operation, as this might interfere with the effusion of plastic material. Personally I believe that functional use of the limb and foot stimulate repair, and I always encourage the patient to stand and walk after the discomfort of the operation has passed. At the end of four weeks the space between the two cut ends will be filled with new material and the cast can be removed, and in another month the splice, which is somewhat larger and thicker than normal, should be strong enough for use. In the course of a year the lengthened tendon is perfectly normal.

Talipes Equinus.—In this type the patient walks on his toes with the heel highly elevated, in the same position as the horse, and it will be noticed that the foot has no dorsal flexion whatsoever. Infantile paralysis affecting the anterior muscles of the leg is usually the cause of this condition, though sometimes shortening of the leg following knee joint disease, or fracture may lead to an adaptive equinus which serves to make the limb of equal length for walking. This type is by far the easiest to remedy, and the results following operations are perfect. A simple division of the tendo Achilles is made under anesthesia and a cast applied as above, in a position of exaggerated dorsal flexion. Functional use of the limb after the cast has been removed overcomes any stiffness that might occur and perfect results are obtained in a short time, compared with the other types.

Talipes Calcaneous.—This is a condition in which the foot is held in a position of dorsal flexion. The patient walks on the heel with an inelastic gait because the spring of the foot is absent and the whole weight is borne upon the os calcis. The best procedure in this type is manipulative treatment into a position of plantar flexion to overcome the contraction of the anterior

muscles of the foot and leg, and bring about contraction and shortening of the posterior muscles. A tenotomy of the anterior tendons or an anesthetic is rarely indicated, though in severe cases, a series of casts holding the foot in position of plantar flexion may be necessary to secure good results. I have found it a help to have a shoe with a heel prolongated backward, or a steel splint laced to the leg to prevent the foot from upward motion.

Talipes Valgus.—This is a very uncommon type of deformity, characterized by eversion of the foot. The patient walks on the inside of the foot and, as a rule, experiences very little trouble. I find a manipulative treatment is best for this condition, aided by braces.

Talipes Cavus.—This form is sometimes called "**hollow foot**" and is very uncommon in this country. It is characterized by a markedly high arch sometimes as in Chinese women to the extent that the anterior part of the foot is approximated to the heel. The plantar fascia is badly contracted and one can distinctly palpate the bands beneath the skin. This condition is practically the same as the ordinary so-called "**contracted foot**" except that it is much more exaggerated. The ordinary high arch of today is usually the result of wearing too short a shoe, and if painful, long last shoes, aided by manipulations, will usually correct the trouble. In severe cases of contracted foot the plantar fascia may be divided, under anesthesia and the arch brought down and put in a cast, though this procedure is not very successful. In case it is done the patient should be made to walk in two or three weeks, as this helps materially to overcome the deformity and hasten repair of the fascia.

Talipes Planus.—This condition is commonly known as "**flat foot**" and is taken up in another part of this text. However, it is one of the classifications of "club foot" and is far the most common type.

Prognosis.—These conditions never correct themselves and if uncorrected usually get worse and the more severe types certainly become obstinate malformations. In general the tendency to relapse is strong, though if properly treated the results are excellent. In infantile cases the time required for correction is relatively short, but retentive appliances are needed for a longer time. The older the cases and larger the foot the more difficult, of course, the correction, but usually there is less danger of relapse. A perfect correction, that is when the gait and attitude are normal,

will never relapse. I find it better to leave the fixation appliance on too long than not long enough. Never remove a cast under four weeks except in the cavus type, then apply a brace such as can be obtained from any supply house for any type of case, for from one to three months longer. The tendons involved in these conditions are so apparent that it is almost impossible to make a mistake in the division of them. About the only precaution necessary is to be assured that the tendon itself is completely divided, but that the tendon sheath is only slightly disturbed.

Tuberculous Disease of the Bones and Joints

Perhaps no bony lesion has caused so much difference of opinion in this profession as tubercular conditions of the spine, bones and joints and I wish it understood that in the following discussion, it is not my desire to reopen the argument. My observations have been of cases treated both osteopathically and by fixation, in private practice and institutional work. And I have come to the conclusion that the fixation method of treatment is absolutely always indicated. In general the pathology and etiology of all tubercular bone conditions is the same. It begins as a tubercular infection of the spongy tissue of the epiphysis, the first change being a local hyperemia of the portion involved, followed by one of three courses: the diseased focus being absorbed and a spontaneous cure resulting; it may extend to the periphery of the bone and break through the periositum and empty itself there by abscess formation; or most commonly it may extend to the joint, which becomes involved through attendant injury. Repair is brought about by the formation of fibrous tissue probably arising from the layer of non-tuberculous granulation tissue which grows in and replaces the tuberculous tissue. Also the replacing material may become calcified and encapsulated. A fibrous or bony ankylosis may result from this process of repair.

The vulnerability of growing bone accounts for the frequency of tubercular bone disease in children as compared with adult life. Injury not only causes a local predisposition to the disease, but it favors its progress when it is once established. About seven-eighths of the cases of this trouble occur under fourteen years of age, more especially when the vertebræ or hip-joint are involved. The knee and ankle joints as well as the elbow and shoulder joints are more often diseased in later life. While the inherited

predisposition is very direct and positive in twenty-five percent of the cases, the acquired predisposition is of most importance since it includes lessened vitality due to poor food and imperfect hygienic surroundings. As to the distribution of the disease the vertebræ are most commonly affected, followed closely by the hip and knee joints, and then in the order of frequency the ankle, elbow, shoulder and wrist joints.

Tubercular Disease of the Spine

This condition is commonly called **Pott's Disease** or **Caries**. It is a chronic destructive process of the bodies of the vertebræ. The spine bends at the weakest point and the compression and collapse of the affected parts cause the characteristic posterior angular projection at the seat of the disease. If one vertebral body is destroyed, the projection will be sharp; if several are involved it will be less angular and if one side breaks down before the other, there may be a lateral as well as posterior distortion. The size of the deformity and its effect upon the patient depend upon its situation; that is, if either end of the spine is involved the angular projection is slight because the area of the spine directly involved in the deformity is small compared with that which is free from the disease. If the middle of the spine is affected, the deformity is great, because the entire spinal column may enter into the angular projection. In the latter area the internal organs are compressed and, of course, the effect upon the vital organisms of the body is disastrous.

Pathology.—The first indication of tubercular disease of the spine is usually found in the anterior part of a vertebral body just beneath the fibro-periosteal layer of the anterior longitudinal ligament. From this point the foci may advance along the front of the spine following the course of the blood vessels and invading the adjacent vertebral bodies. The destruction may begin in the interior of the body itself, more often in several minute foci near the upper or lower epiphysis, which coalesce, gradually enlarge and form a cavity surrounded, for a time, by unbroken cortical substances which finally collapse under the pressure of the weight above. The intervertebral discs seem to offer some resistance to the extension of the disease from one vertebra to another but once the bone is destroyed on either side, they too quickly disintegrate and disappear. Pedicles and

articulations which come into direct contact with the disease may become involved. Originally the disease is confined to one or two adjacent vertebræ and may extend in either direction, and the final area of deformity and rigidity shows that from three to six bodies may be involved before a cure is established. The infected granulations advance rapidly with the usual retrograde change of shape and structure to a cheesy degeneration and frequently liquefaction and abscess formation may follow.

Symptoms of Pott's Disease.—There are three main symptoms of Pott's disease, namely the peculiarity of attitude and gait, limitation of motion or muscular stiffness and the pain and referred pains. In the cervical region, the chin is held somewhat raised and the patient may have somewhat the same appearance as in wry-neck. In the mid-dorsal region one will always find an elevation of the shoulder besides the deformity. In the lumbar region, the patient nearly always leans backward and has a sort of sidling gait or waddle due to the contraction of the psoas and iliacus muscles. The patient in walking, stooping, or lying down most carefully guards the spine against any jar or motion, and always assumes attitudes which will relieve the strain on the involved vertebræ. There is always present an unnatural mode of standing or walking, especially when the dorsal and lumbar regions are involved, as the patient walks more on his toes and with the knees slightly bent, because in this posture all possible strain of the step may be brought into play to diminish jarring of the spine. The child becomes tired very easily and lies down or rests on the arms of a chair or seat. The pain rarely occurs in the back, but is usually referred to the peripheral end of the nerves and is thus felt in the chest, abdomen or limbs. The abdominal pain passes sometimes as a stomach ache and often times in the limbs, as rheumatism or "growing pains". I have noticed also a peculiar grunting respiration and sometimes cough especially when the mid-dorsal region is involved. Muscular stiffness is always present, all mobility being lost. The temperature is not at all diagnostic, though sometimes in the afternoon it will be one or two degrees higher than normal and does occur independently of abscesses. About the only complication that occurs is paralysis or abscess formations. Paralysis is given as a frequent complication, though I have never seen it. It is usually flaccid and bilateral and may exist from a mere muscular weakness to a complete loss of power. It is certainly uncommon under proper treatment, and the prognosis is favorable. Abscesses, though a very distressing complication, are very

uncommon in my experience and are certainly an evidence of improper or incomplete treatment. They may subside in any region and be absorbed without detriment to the patient, though if they increase in size there is no tendency towards absorption. It is best to incise them and secure complete drainage. It is hard, of course, to do this on account of the depth. Abscesses occur always in close proximity to the disease.

Treatment.—Some authors recommend a brace for the treatment of this condition, while others recommend a frame to which the patient is strapped, and rest in bed. I have found nothing that gets results like a plaster of Paris jacket applied with the patient suspended by the neck and shoulders. I make no attempt at correction of the deformity present other than the traction of the weight of the body at the time the cast is applied. The spine is, of course, fully extended by this and any undue pressure on the cord relieved. The cast should extend over the shoulders and well down over the pelvis and sacrum. If the disease is in the neck the cast should include the head as well. A large window is cut in front and one must be cut over the involved area of the spine behind. Ordinary absorbent cotton is used for padding with, of course, extra padding over all bony prominences. From two to five years' time is required for a complete recovery. The X-ray is invaluable in diagnosing this trouble, and each time a cast is removed to see how much progress has been made. The casts should be changed as often as they become soiled.

Tuberculosis of the Hip

This is a chronic tubercular condition of the head of the femur or of the acetabulum commonly known as **hip-joint disease**.

Pathology.—Primarily the head of the femur is the seat of the disease, the epiphysis being attacked in seventy-five per cent of the cases and the acetabulum in twenty-five per cent. The irritated pelvic femoral muscles which are in a state of chronic contraction crowd the head of the femur against the upper and back border of the acetabulum. Under this continual pressure, absorption of that portion of the rim takes place with actual enlargement of the acetabulum from below upwards. This is spoken of "migration of the acetabulum" and is one cause for the shortening of the limb. Changes in the head of the femur are the result of inflammation and

pressure. Partial destruction of the head also helps shortening of the limb and elevation of the trochanter above its proper level the same as the wearing away of the acetabulum. The synovial membrane is found to be reddened and thickened and granulation tissue is present, and usually the cartilage is gone from the head of the femur. Rarely does perforation of the floor of the acetabulum take place, but if such is the case a dense wall of fibrous tissue and thickened periosteum shuts off the head of the femur from the pelvic cavity. A natural cure results in two ways,—by absorption or calcification of the tubercular tissue, or by the evacuation and discharge by an external opening. This latter suppuration seems to be nature's effort to eliminate the disease, and when a cure is established this way it is usually characterized by malpositions and shortening of the limb, and, of course, an ankylosed joint.

Early Symptoms.—The most characteristic symptoms of the disease are the 'night cries', stiffness and limping, shortening of the leg, atrophy of the muscles of the hip, leg, and thigh, and the unconscious protection of the joint. A referred pain is usually present to the inside and front of the thigh near the knee or directly at the knee joint itself, due to the intimate relations and anastamosis of sciatic, obturator, and anterior crural nerves.

Diagnosis.—The chief diagnostic sign is muscular spasms or the presence of stiffness of the joints and limitations of its proper arc of motion, due to the tonic contraction of the muscles controlling the joint. If there is no limitation of motion it is almost safe to say there is no hip-joint disease. The lameness may be intermittent. The attitudes or abnormal positions of the diseased limb are caused by the action of muscles holding the limb stiffly in a distorted position. The pelvis is usually tilted and always one will find the patient assuming attitudes which will favor the diseased limb. Atrophy is very significant and a comparison of the two limbs should be made by measuring at the middle of the thigh and the middle of the calf. Nearly always one will find a deep thickening over the front of the hip joint and behind the trochanter.

Physical Examination.—1. Observe the general condition of the patient.

2. Note the attitude in standing.

3. Note character of the limp.

4. Note shortening of the limb.

5. Remove the clothing and lay patient on the back.

6. Test the function of the groin. Always begin on the sound side for comparison in order that the patient may become accustomed to the manipulation before the limb suspected of disease is tested. Tuberculosis in a joint is always accompanied by muscular spasms that positively limit motion in every direction, while in other affections only one or more limitations are observed, but never in all directions. Compare closely the motions of the sound and affected limbs while the patient is on the back. Turn patient on face and test for extension by holding pelvis flat on table with one hand and gently elevating thigh with the other. The normal range in a child is about twenty degrees backward from the line of the body and limitation of this range is perhaps the earliest indication of hip-joint disease. It is due to psoas contraction. If this range of motion is unrestricted hip disease can be practically excluded.

The X-ray completes the diagnosis when used with a thorough knowledge of the physical signs. It must be remembered that in early life a larger part of the extremity of the femur is cartilaginous and does not show well in a radiograph. The X-ray picture shows clearly the destructive effect of the disease on the femur and acetabulum and gives a clear conception of the actual condition of the joint.

Treatment.—The object of treatment of this condition is threefold: first, to relieve the pain that depresses the vitality of the patient; second, to relieve the muscular spasms that induce distortion of the limb and which stimulates the destructive process by increasing pressure and friction of the diseased surfaces of the opposing bones; third, to correct and prevent deformity by lessening pressure and by restraining motion, thereby keeping the femur from upward displacement.

Rest and protection are the two cardinal features of treatment of this condition. Sunshine, fresh air and good nutritious diet are very important.

Complete rest of the joint offers the most favorable opportunity for nature to repair this disease. The recumbent period of the treatment necessitates rest in bed for the reduction of the deformity and subsidence of acute symptoms. By the aid of traction, which is applied to the length of the

legs by means of a Buck's extension. As much weight should be applied as can be borne without discomfort to the patient.

As soon as the deformity and acute symptoms have subsided, the ambulatory treatment should be substituted to keep up the general health of the patient. This merely consists of the application of a long plaster of Paris spica of the hip which should reach well up to the thorax and extend down and include the foot. All bony prominences should be well padded, and a moderate amount of traction with about twenty degrees abduction should be used while applying the plaster bandage. Though various forms of apparatus have been devised for fixation and traction, I believe that the plaster of Paris spica is far the most effective and should always be used, changing the cast as often as it becomes soiled. Locomotion is possible with crutches providing the shoe on the well side is stilted by an iron patten which is high enough to allow the casted limb to clear the floor.

The earlier treatment is begun, the better the outlook. Recovery with perfect motion occurs in about twenty-five percent of hospital cases; fifty per cent will obtain useful motion and the other twenty-five per cent will obtain practical fixation, but it must be remembered that results will range entirely according to the thoroughness of treatment, the severity of the disease in the individual case, and the natural resistance of the child. In general, the hip should be fixed as long as it is sensitive, it should be protected and distracted as long as there is muscular spasm, and protected until the congested and inflamed bone of the epiphysis is replaced by firm healthy bone.

Tuberculosis of the Knee Joint

Tuberculous disease of the knee is next to the hip in frequency. It is a chronic destructive process of the epiphysis of the femur or tibia, or it may start in the patella, head of the fibula, or primarily in the synovial membrane of the knee joint. The condition presents two distinct types; one, the adult type beginning as a chronic synovitis, of which the early symptoms are subacute; and the other, the childhood or most common class, in which the symptoms of pain, muscular spasms and deformity seem to indicate clearly a primary disease of the bone.

Symptoms.—This disease is commonly known as "white swelling" and the symptoms as a rule are quite characteristic. The affection begins with a limp and limitation of motion, and is usually slow in progress with periods of severe pain. There is usually much swelling and this together with the distortion of the limb by muscular spasm and atrophy of the muscles both above and below the joint, gives a most characteristic knock-kneed appearance. The affected limb is usually longer at first, owing to the congestion of the epiphysis of the knee. Local heat is always present in the more acute stages and the lameness is usually a constant symptom. The differential diagnosis from other joint troubles is easy because of the slow insidious onset.

Treatment.—Like other tubercular bone conditions the fixation treatment is best. Rest in bed with a Buck's extension to overcome the deformity and the local application of hot packs until the acute symptoms have subsided, is the best preliminary treatment of this condition. Five- to ten-second exposures to the X-ray each day for ten days seems to relieve the pain and in most instances causes less marked infiltration of tissues.

When the acute stage has subsided, the ambulatory treatment by fixation in a plaster of Paris cast extending from the groin to the ankle, with about 10 degrees flexion, is most efficient.

The patient is allowed to walk about with the aid of crutches, having the shoe on the sound side stilted enough so that the diseased limb clears the floor. The functional results after conservative treatment are in the average case excellent, that is providing proper treatment is begun at an early stage. Useful motion is obtained in fifty per cent of these cases, perfect motion is restored in twenty-five per cent, and complete rigidity results in the other twenty-five per cent of cases.

Any chronic, painful inflammation confined to a single joint, in which motion is limited by muscular spasm, and in which there is a tendency towards deformity, is almost always tubercular in character.

The Plaster of Paris Bandage

The plaster of Paris bandage was perhaps first applied by Kluge of Berlin in 1829, but to the Dutch physicians Mathysen and Vander Loo belongs the

credit of the modern bandage.

It is imperative to give, in this chapter, a detailed and complete description of what constitutes a properly made plaster of Paris bandage and the application of it, in order that the general practitioner may become familiar with its use. Even though one cares not to treat the conditions heretofore enumerated, I have found that for fractures of almost every bone in the body requiring immobilization, the plaster bandage properly applied is far superior and rather to be preferred to any other form of splints.

It has been used very little in the past in private practice because the ordinary commercial bandage found in any supply house does not come up to requirements, in that it is usually air slaked or the plaster has been shaken from it by the time it is received. Then too the mesh is too closely woven and the plaster lies on the bandage instead of in the meshes and there is, in consequence, an excess of plaster; also as a rule the bandages are rolled so tightly that the water does not reach the deeper layers.

The ordinary plaster of Paris bandage made in your own office can always be successfully applied because the right quantity of plaster can be incorporated in the bandage and it can readily be made into the desired widths. The plaster of Paris to be used should be of the superior quality used by dentists and should be of the quick setting kind. It can be procured at almost any drug store but the surest place for quality will be your dentist.

Absolutely, the only kind of gauze to be successfully used is white crinoline of the ordinary variety used by dressmakers and obtainable at any dry goods store in twenty-four yard bolts. It is especially desirable to get a kind not too rich in starch or dextrin and of a mesh running about one hundred holes to the square inch.

The bandages should be made in six yard lengths, and of widths ranging from three to five inches according to the part that is to be cast; for instance the three inch widths are most suitable for casts for the extremities, while the larger ones serve best for conditions of the spine. After the length had been measured and cut the desired widths can be torn the full length without trouble. The edge of the crinoline nearly always frays out and naturally will become so entangled as to prevent rolling in the plaster or as to hinder the free unrolling of the bandage when applying it. To prevent this, three

threads should be plucked from each side of each strip before starting to roll in the plaster.

A hard surface of, at least, two feet in width should be used on which to roll in the plaster. Starting at one end, a handful of plaster of Paris is rubbed into the crinoline with the palmar surface of the hand, bearing down hard, so that all excessive plaster passes to either edge of the bandage. No more plaster should be rubbed into the crinoline than the meshes will hold, and as each successive yard is incorporated with the necessary amount of plaster, it is loosely rolled in such manner that in the center of the bandage there is a hollow cylinder of the thickness of the index finger, and the concentric layers are easily movable on one another. This manner of rolling permits of the rapid and uniform spread of water through the bandage when it is to be applied, and prevents parts of the bandage from being insufficiently moistened.

The general practitioner should always keep on hand about two dozen completed bandages that he is most accustomed to using in his daily practice. These should be corded as it were, to prevent unrolling, in an air tight container, either of glass or tin in the bottom of which is placed a small quantity of plaster of Paris, and should always be kept in a dry place. I have never found either a nurse or an office girl who could not make these bandages successfully so that in the future there is no excuse for a practitioner not using this superior form of splints.

The Immediate Use of the Bandage

While plaster of Paris is in no way harmful to either garments or surroundings, both the operator and the assistants should be properly gowned and the floor covered with newspapers to prevent unnecessary soiling. It should be borne in mind that if a properly made bandage is used, which is squeezed to the extent of ridding it of an excess of water, very few drippings will be scattered and the whole procedure of the application of the plaster differs in no way from simple roller bandaging.

The number of bandages intended for use should be taken from the container and placed in a pan near the pail holding the water, in which they are to be immersed, in a position in relation to the pail that will guard against water being splashed upon the dry bandages, which would render

them unfit for subsequent use. Water as hot as the hand will tolerate, as opposed to cold, facilitates setting. I do not recommend any chemicals to hasten setting, because a properly made bandage, prepared as above, of quick setting plaster sets in remarkably fast time.

The area to be cast should be encased in ordinary absorbent cotton of the thickness in which it comes rolled, putting an extra pad over all marked bony prominences, and a roller gauze bandage applied to hold it in place and snug to the part. Under no consideration do I advise the use of flannel bandage or the ordinary sheet wadding cotton that are recommended by some authors, because padding with these materials is always conducive to applying a cast far too tightly, especially in fractures where the swelling increases after application thereby causing constriction of the limb and interference with circulation. The regular absorbent cotton as padding beneath a cast is always best for it is almost impossible to apply a cast too tightly when it is used.

The bandage should be completely submerged on its side, and should remain so until the bubbles cease to come off, which time takes place most readily in the properly rolled dressing. When the bubbling has ceased, the bandage is lifted out of the pail and squeezed with the hands merely to free it of the excessive water, the end is found and handed to the operator ready to apply. No undue traction should be made in applying the successive turns of the bandage, though it must be remembered the cast should fit snugly to the part, and the ordinary rules of simple roller bandaging followed, except that the reverse spirals are unnecessary. The assistant should constantly rub the layers as they are applied by the operator, as this not only helps the cast to fit more snugly, but also makes the rough edges of the bandage adhere more firmly to the layer beneath, thereby making a smoother cast.

As a rule there need be no dread of an increased swelling beneath the bandage because usually several hours have elapsed after the injury before the physician has arrived and made preparations to apply the plaster. Indeed, one of the best means of limiting swelling after a fracture is the prompt application of a plaster of Paris bandage. If there is any concern that the cast is too tight, while the plaster is still soft it can be easily cut through the entire length with a knife, and thus relieve the pressure existing. Also it is a good plan to cut a window or opening over the sight of injury, which would in no way harm the object of the cast and would allow a gentle

massage to the part. A neat finish may be given to the edges of a plaster cast by turning over the ends of the cotton, in cuff-like fashion and held in the grasp of the last few turns of the plaster at either end.

On clothing you will find it best to allow the plaster to dry before removing, while on furniture or the hands it is readily removed by washing off in warm water. The water in which the bandages were immersed contains, of course, considerable plaster, and under no circumstances should this be emptied into a sink or waste pipe for it will certainly demand the services of a plumber. The water may be poured out on the ground and the paste shaken into a refuse barrel or ash pile. The best way to remove a cast is to moisten it with water or vinegar along the path of the knife. I might add that all patients are in constant fear of being cut either while you are trimming, cutting windows, or removing the cast, but because of the cotton padding underneath you will find that it is almost an impossibility. Care, of course, should be taken that the knife does not slip in any of these procedures and come in contact with the unprotected parts.

In general, for fractures of the extremities it is best to apply the plaster with the patient in the recumbent position to secure complete muscular relaxation, and the part to be cast should be supported by an assistant. It is also a general rule that in fractures of the shaft of the long bones, especially of the lower extremities, the plaster bandage should be applied to include the adjacent articulation and extend well beyond the joints.

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Transcriber’s Notes

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to: resistance is a helpful guide in diagnosis
pg 71 Changed: Still another method of adjustfng ribs
to: Still another method of adjusting ribs
pg 79 Changed: slip one hand bteween the thighs
to: slip one hand between the thighs
pg 91 Changed: In other words pathogological changes are just as real
to: In other words pathological changes are just as real
pg 111 Changed: Diagnosis, Etiology, and Tecnhique, and the general
to: Diagnosis, Etiology, and Technique, and the general
pg 112 Changed: Another joint frequent overlooked is the innominate.
to: Another joint frequently overlooked is the innominate.
pg 112 Changed: of the innominate that is preventing revovery
to: of the innominate that is preventing recovery
pg 130 Changed: There is often a shortning of the anterior structures
to: There is often a shortening of the anterior structures
pg 140 Changed: Of particular local interest to the osteopth
to: Of particular local interest to the osteopath
pg 186 Changed: goins then to the innominates
to: going then to the innominates
pg 214 Changed: The exact cause of ocular lesions, or phlycentular
to: The exact cause of ocular lesions, or phlyctenular
pg 215 Changed: diathesis and the exanthemata play their roll
to: diathesis and the exanthemata play their role
pg 220 Changed: progressive ulcer (second sage.)
to: progressive ulcer (second stage.)
pg 228 Changed: which begins by contration of the field
to: which begins by contraction of the field
pg 238 Changed: paraffin oil and the heat applied continusously
to: paraffin oil and the heat applied continuously
pg 254 Changed: Labyrinthitis is of several forms but in gerneral

to: Labyrinthitis is of several forms but in general

pg 261 Changed: mucopurulent discharge, accompanied by a bad ordor

to: mucopurulent discharge, accompanied by a bad odor

pg 271 Changed: The constitutioual causes of epistaxis

to: The constitutional causes of epistaxis

pg 275 Changed: treatment consists of throrough cleansing

to: treatment consists of thorough cleansing

pg 288 Changed: nearly always refers to the patinet's exterior

to: nearly always refers to the patient's exterior

pg 288 Changed: and hence before detrioroation has set in

to: and hence before deterioration has set in

pg 290 Changed: the term "acute confusional insantiy"

to: the term "acute confusional insanity"

pg 296 Changed: fears, particulary of impending danger

to: fears, particularly of impending danger

pg 306 Changed: mental capacity in man lie betweeen:

to: mental capacity in man lie between:

pg 311 Changed: gain is shown treatment is discontinuted

to: gain is shown treatment is discontinued

pg 314 Changed: if necessary completely elimination of the operation

to: if necessary complete elimination of the operation

pg 317 Changed: tried to cross the railraod track

to: tried to cross the railroad track

pg 340 Changed: care being taken that it is thoroghly digested

to: care being taken that it is thoroughly digested

pg 340 Changed: lymphoid elements of the inteatines

to: lymphoid elements of the intestines

pg 345 Changed: and maybe bronchial symptms.

to: and maybe bronchial symptoms.

pg 349 Changed: If there are two parosyxms in the same day

to: If there are two paroxysms in the same day

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to: twelve to twenty-four hours when consciousness

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to: A derangement of the vertebral articulation

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to: for unusually this gives only temporary relief
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to: Let the patient drink freely of water
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to: Exposure to damp cold is one of the recognized causes
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to: artery increase the susceptibility to infection
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to: blood and lymphatic supply to the lungs
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to: During convalescence a full, well-regulated,
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to: temperature is high and patient is delirious
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to: may simulate infantile paralysis
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to: Measles is an acute infectious, contagious
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to: functional integrity of the lungs and heart
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to: greater frequency than in other infectious diseases
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to: rugs and unnecessary furniture have been removed
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to: is readily transmissible, attacks children especially
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to: scratching may cause pitting
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to: are undoubtedly potent predisposing factors
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to: tonsillitis, pyorrhea alveolaris, sinusitis, etc.
pg 478 Changed: cold and dampness are presisposing factors

to: cold and dampness are predisposing factors

pg 487 Changed: Removal of the exciting cause is the most improtant

to: Removal of the exciting cause is the most important

pg 492 Changed: result of inattention to oral hygience

to: result of inattention to oral hygiene

pg 493 Changed: the ebb and flow of the crebrospinal fluid

to: the ebb and flow of the cerebrospinal fluid

pg 497 Changed: further complicacates the clinical picture

to: further complicates the clinical picture

pg 500 Changed: Stomach, liver, gall-gladder, pyloric and duodenal

to: Stomach, liver, gall-bladder, pyloric and duodenal

pg 508 Changed: confidence by making an intellegent examination

to: confidence by making an intelligent examination

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to: Referred pain from cholecystitis, chronic appendicitis

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to: There is dyspepsia, flatulency, constipation

pg 527 Changed: The nurtition is generally well maintained

to: The nutrition is generally well maintained

pg 537 Changed: (affecting reciprocal inneravtion)

to: (affecting reciprocal innervation)

pg 539 Changed: peristaltic action and the secertory nerves

to: peristaltic action and the secretory nerves

pg 545 Changed: Kinks of the pelivc colon, ileum

to: Kinks of the pelvic colon, ileum

pg 546 Changed: stretched sufficiently to resore normal function

to: stretched sufficiently to restore normal function

pg 548 Changed: appendix can be stimulated by purcussion

to: appendix can be stimulated by percussion

pg 548 Changed: pyogenes aureus, typhoid baccilli, tubercle bacilli

to: pyogenes aureus, typhoid bacilli, tubercle bacilli

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to: large proportion of cases recover

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to: tenth rib on the right side, thus interfering

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to: particularly fond of starchy and saccharine food
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to: mucous membrane, occasional superficial erosions
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to: due to the increase of epithelial cells
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to: Death in adults has occurred from trifling injuries

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to: In a few cases there are intrapelvic causes

pg 720 Changed: he knows at once that the headadche is relieved

to: he knows at once that the headache is relieved

pg 724 Changed: kness so close together that they rub in walking

to: knees so close together that they rub in walking

pg 742 Changed: these phemomena also become bilateral

to: these phenomena also become bilateral

pg 770 Changed: curvavature decrease in the volume of the lower

to: curvature decrease in the volume of the lower

pg 770 Changed: that should be considered are spastic parlaysis

to: that should be considered are spastic paralysis

pg 788 Changed: arising from the layer of non-tuberculus granulation

to: arising from the layer of non-tuberculous granulation

pg 790 Changed: flacid and bilateral and may exist

to: flaccid and bilateral and may exist

pg 790 Changed: must be cut over the invoved area

to: must be cut over the involved area

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