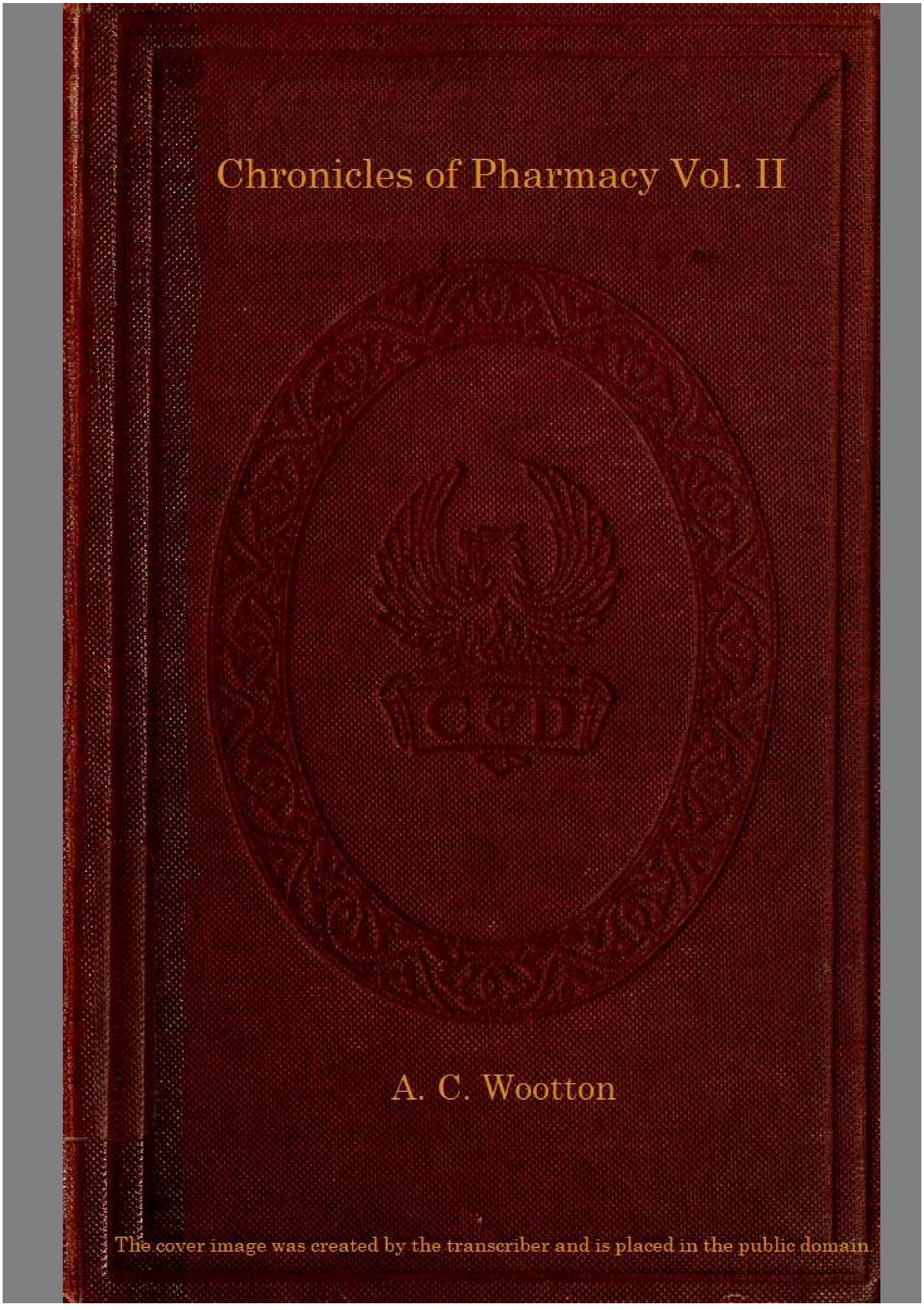
Chronicles of Pharmacy Vol. II

A. C. Wootton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CHRONICLES OF PHARMACY

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CHRONICLES OF PHARMACY

BY

A. C. WOOTTON

VOL. II

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ILLUSTRATIONS

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ERRATA

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Page	31.	*Ninth line from top, for* Clestis *read* Celestis.
,,	46.	*Bottom line, additional reference*: Vol. I., 124.
,,	166.	*Seventh line from bottom, for* Magnetic *read* Metallic.

ERRATUM.

The acknowledgment at the foot of page 308, of the source of the symbols illustrated on that page, is incorrect. The symbols in question are reproduced from Mr. C. J. S. Thompson’s book, *The Mystery and Romance of Alchemy and Pharmacy*, published by the Scientific Press, Ltd.

CHRONICLES OF PHARMACY

XV

ANIMALS IN PHARMACY

> Their next business is, from herbs, minerals, gums, oils, shells, salts, juices, sea-weed, excrements, barks of trees, serpents, toads, frogs, spiders, dead men's flesh and bones, birds, beasts, and fishes, to form a composition for smell and taste the most abominable, nauseous, and detestable they can possibly contrive.—Swift, *A Voyage to the Houyhnhms*, Chap. VI.

Animal Substances in Pharmacy.

The inclination to find medicinal virtues in parts of animals is not altogether unreasonable in its origin. Savages eat the hearts of lions and tigers to acquire some of the courage and fierceness of those beasts; and a similar instinct would suggest various organs of animals for use in medicine. The employment of foxes' lungs in asthmatic and bronchial complaints, for example, seems a most natural remedy to try, and as the lohoch, in which form these lungs were generally administered, was made up with other demulcents, it is not surprising that it should have been often found efficacious. In this section illustrations of the extravagant extent to which faith in medicines of this character has been carried will be given.

Officially Recognised Animal Medicines.

Remedies obtained from the animal kingdom were employed by the Egyptian, the Greek, and the Roman physicians. The Arabs, though they introduced musk, kermes, and bezoar into medicine, were not largely interested in animal products in their materia medica. The adoption of revolting preparations of this class developed rapidly in the sixteenth and seventeenth centuries, curiously enough alongside the introduction of the new chemical remedies. The appended list of animals and animal products which were made official in the London Pharmacopœias of the seventeenth century, namely, those of 1618, 1650, and 1677, will serve to demonstrate the diligence which had been exercised by the practitioners of that period in ransacking the world of animal life for possible means of alleviating human ills.

Ambergris, ants.

Bee-glue from entrances and cracks of hives, bezoar stones, blood of badger, bat, bull, cat, dog, frog, goat (he- and she-), goose, hare, man, partridge, pig, pigeon, stag, tortoise; bones of hare (heel-bone), oxen (leg), pigs (ankle), stags (heart and heel; the latter called the astragalus), and the triangular bone of the human skull; brains of hares and sparrows; butter, fresh and salt; buttermilk.

Cantharides, castor, caviare, cheese (old and new), civet, cochineal, cock's-comb, coral (white and red), crabs' claws, crabs' eyes, crayfish, cuttlefish, cygnets.

Eggs of ants, hens, and ostriches; egg-shells; earthworms; excrements of the cow, dog, he-goat, goose, hen, horse, horse (not castrated), man, mouse, peacock, pigeon, sheep, swallow, wolf.

Fat, lard, or grease from the badger, bear, beaver, boar, bull, bull calf, camel, capon, dog, duck, eel, fox, goat, goose, hare, hedgehog, hen, heron, horse, leopard, lion, man, mountain-mouse, pike, pig, rabbit, ram, snake, stork, thymallos (grayling), vulture, wild cat, wolf, and from cut wool; feathers of partridges, fur of the hare, frog's spawn, and hairs of the silkworm, are among the curious animal products named. Green frogs are specially ordered.

Gall of the bear, bull, cow, he-goat, she-goat, hare, hawk, kite, ox, and pig; grasshoppers.

Ham of pig; heart of bullock, pig, stag, wether; honey and virgin honey; hoof of ass, elk, she-goat, pig; horns of elk, goat, rhinoceros, stag, unicorn.

Isinglass; intestines of wolf and fox; jaw of pike.

Larks, leeches, lynx claws; liver of ass, duck, frog, otter, wild boar, wolf; lungs of bear, fox, lamb, pig.

Marrow from leg of bull, bull calf, calf, cow, dog, she-goat, lamb, ox, sheep, stag; milk of ass, cow, ewe, goat, woman; mole, mummy, musk.

Omentum (bowel membrane) of the calf, lamb, ram, and wether.

Pearls and mother of pearl, perspiration, pickle or sauce from the tunny fish, puppies.

Rennet of calf, hare, horse, kid, lamb.

Saliva of a fasting man; scorpions (land); secundines (afterbirth) of a woman; sexual parts of bull, cock, horse, and stag; silk (raw); silkworms' cocoons. Inner skin of a hen's stomach; skinks; skull of a man who has met with a violent death, and moss from that skull; sparrows (house and hedge); spermaceti; spleen of ox; sponge; spiders' webs; cast-off snake's skin; sea-shells (various kinds named); swallows' nests; stone from the heads of carp and perch, from ox-gall, from human bladders (see also bezoar stones and crabs' eyes); suet of badger, calf, cow, goat, ox, sheep, stag.

Teeth of elephants (ivory), wild boar, sea-horse, tench, toads.

Urine of boar, bull, dog, he-goat, man. In the last-named case the urine of a child not arrived at the age of puberty, and of an adult man, are separately indicated.

Vipers' flesh.

Wagtails; wax (white, red, and yellow); whelks; whey; woodlice.

In contrast with the list quoted above, representing the animal pharmacy of the seventeenth century may be placed the following fifteen articles which cover the zoology of the British Pharmacopœia of 1898:—Cantharides, cod-liver oil, cochineal, honey, lard, leeches, musk, ox-bile, pepsin, spermaceti, mutton, suet, sugar of milk, thyroid gland, wax, wool fat.

Homo: Man as a Medicine.

Man being the microcosm of the universe (the macrocosm) medicines of human origin figured very prominently in old pharmacopœias. In Lemery's "Dictionnaire Universelle des Drogues Simples," which was a standard authority all over Europe, at least until the end of the eighteenth century, the author presents a summary of the medicinal uses to which the various parts of "Homo" were applied. I quote (but slightly abbreviate) from the edition of Lemery's Dictionary of 1759:—

"All parts of man, his excrescences and excrements, contain oil and sal volatile, combined with phlegm and earth. Skull, brain, and calculus are employed in medicine, and are referred to in their proper places. Burning hair, smelt by patients, will counteract the vapours. Moss of the human skull, human blood, and human urine all have their uses in medicine. The saliva of a robust young man, taken fasting, is an antidote against the bites of serpents and mad dogs. Wax from the ears is good against whitlows. Nails from the fingers and toes, given internally either in substance or infused in wine, make a good emetic. Women's milk is pectoral, good in phthisis, and useful to apply to inflamed eyes. Fresh urine, two or three glasses drunk in the morning fasting, is good against gout, hysterical vapours, and obstructions. It may also be applied externally in gout and in skin complaints. Excrement of man can be applied to anthrax, plague bubos, and quinsies. Dried and powdered, it is recommended in epilepsy and intermittent fevers. Dose, one scruple to one drachm."

Bechler, in "Parnassus Medicinalis," 1663, quoted in Peter's "History of Pharmacy," says:—

"Powdered human bone, in red wine, will cure dysentery. The marrow and oil distilled from bone is good for rheumatism. Prepared human skull is a sure cure for the falling sickness (epilepsy). Moss grown on a skull is a hæmostatic. Mummy dissolves coagulated blood, relieves cough and pain in the spleen, and is very beneficial in flatulency and delayed menstruation. Human fat properly rubbed into the skin restores weak limbs. The wearing of a belt of human skin facilitates labour and mitigates its pain. Water distilled from human hair and mixed with honey promotes the growth of hair."

The Liquor Cranii Humani was a highly-prized remedy. It was prepared from unburied skulls, those of criminals for preference. Pomet (1694) says he had been informed by Moses Charas, who had lived for some time in England, that "The London druggists sell skulls of the dead upon which there has grown a little greenish moss called Usnea, because it resembles the moss which grows on the oak. These skulls mostly come from Ireland, where they frequently let the bodies of criminals hang on the gibbet till they fall to pieces." The market price of skulls at that time varied in London from 8s. to 11s. each, according to size, but those with plenty of moss made fancy prices. They were largely used for compounding the "Sympathetic Ointment," described by Crollius in his "Royal Chemist," and were recommended in epilepsy. Germany was the principal market. The pharmaceutical authorities of that day were very decided about the superior virtue of the skulls of persons who had died violent deaths. Lemery (1738) orders: “To make the Magistry of human skull. Calcine the skull and powder finely.” But he adds the useful comment, “This Magistry is only a dead-head of no virtue unless you employ the skull of a young man who died a violent death.”

In a paper “On the Deaths of some Eminent Persons,” printed by Sir H. Halford in 1835, it is stated that in the last illness of Charles II, when he was suffering from a stroke of apoplexy, one of the prescriptions, signed by four physicians, ordered among other ingredients 25 drops of the spirit drawn from human skulls.

Sir Theodor Mayerne’s famous Powder de Gutteta (anti-epileptic powder) contained amber, crystal, and hartshorn vitriolated, various roots and seeds, and flowers, “human skull, both crude and vitriolated, secundine of a woman,” gold and silver leaf, ambergris, etc. Fifty years later valerian alone was thought to be as effective.

Human fat was regarded as an excellent remedy in rheumatism. Pomet (1694) complains that at that time the business of the apothecaries in this luxury was seriously crippled by the competition of the public executioners. But he points out that the article provided in the pharmacies was incomparably superior to that which came from the scaffolds, because it was prepared with aromatic herbs.

Human excrement and human urine were strongly recommended by many of the chief authorities. Mme. de Sévigné, writing to her daughter on June 13, 1685, says:—“For my vapours I take 8 drops of essence of urine, and contrary to its usual action it has prevented me from sleeping.” There are other references to this delicate remedy in some other of her letters. Apparently she took a special combination of the essence with the Baume Tranquille.

Culpepper says: “That small triangular bone in the skull of a man called Os Triquetum, so absolutely cures the Falling Sickness that it will never come again, saith Paracelsus.” Culpepper also states that “the fat of a man is exceeding good to anoint such limbs as fall away in the flesh.” Lemery explains how to make a plaster from the blood of a healthy young man, after drying it, which was useful in old ulcers.

Paracelsus had a “Primum Ens Sanguinis,” which was fresh blood from a healthy young person. Crollius gives a recipe for an eye salve, which was to divide a human brain into half; mix one half with honey and apply it at night; dry and powder the other half and apply it in the morning.

Cow-Dung as a Medicine.

A female pharmacist is mentioned in Salmon’s “Bate’s Dispensatory” (1694), who, he says, made a fortune of £20,000 by selling a tincture made from cow-dung. Her formula was, cow-dung, fresh gathered in the morning, 12 lbs.; spring or rain water, 30 lb. Digest for twenty-four hours, let it settle, and decant the clear brown tincture. Salmon says it is no doubt a good medicine, and has been much used with success. “It has a pretty kind of sweet scent as if it was perfumed with musk or some other odoriferous thing.” An essence of cow-dung was an old English household remedy for gout, rheumatism, stone, etc. It was from cow-dung gathered in May; digested with a third of its weight in white wine, and distilled. In another old formula cow-dung and snails with their shells, equal parts, are prescribed. The resulting distillate was known as all-flower water, aqua omnium florum, and aqua arthritica. Dr. Rutherford, of Edinburgh, in the eighteenth century strongly recommended cow-dung poultice in rheumatic fever, and asserted that he had known of many cures from its use. It has been for centuries a popular article in the Hindu materia medica. The phosphate of soda and benzoic acid (which are the medicinal constituents of cow-dung) are better suited to modern fastidious patients in the form of laboratory products.

Excrements as Medicines.

It will be observed from the list of the excrements used in medicine officially recognised in the early London Pharmacopœias already given that those from various animals were specified. Excrements as remedies are at least as old as Dioscorides, whose work contains a special chapter devoted to an appreciation of the distinguishing virtues of the various sorts of dungs. Pliny likewise names many sorts, and states what are their particular properties.

It is evident that these substances became very popular as household remedies among the peasantry of European countries. In his treatise “On Salts,” Glauber (about 1650) explains how satisfactorily certain of these chemical products can take the place of the unpleasant remedies in use among the peasantry of his time. He says: “They purge the bodies of boys and girls with mouse dung, horse dung, and goose dung; these dissolved in wine or beer, and strained through linen cloths, they use to cure falling sickness by sweat. In the cure of erysipelas or burns and scalds, they use hogs’ dung; in all kinds of swelling, sheep’s dung; in a quinsy, dogs’ turd or human dung.”

Glauber states that he had known of wonderful cures effected by these remedies. But the reason was simple. Human dung, for example, is nothing but bread and flesh reduced into their first matters, all their bonds being loosened and rendered fit for the exercise of their virtues. The essential constituent is a salt not unlike the sal enixon of Paracelsus.

The mention of this great teacher leads Glauber to relate that once some physicians and noblemen asked Paracelsus to tell them some great secret of medicine. In reply he told them that incredible virtues were hidden in human dung. Whereupon they were very angry and departed, considering that he was mocking them. Paracelsus made a remedy which he called Zebethum Occidentale from human dung, dried and powdered. He also recommended a child’s excrement to be distilled twice, and to use the oily distillate for fistulas, canker, and as an application for premature baldness.

Album Græcum, which was dried white dogs’ turds, was regularly stocked by the apothecaries of the sixteenth and seventeenth centuries, and was given in colic and dysentery, but more generally applied externally to abscesses, ulcers, and quinsies. In Robert Boyle’s “Collection of Medicines,” 1696, “a homely but experienced medicine for a sore throat,” is said to be one drachm of album græcum made into a linctus with honey of roses.

Pigeons’ dung was reputed to be so violently heating that it was almost a caustic. Applied to the soles of the feet it would draw the humours down, but Quincy remarks there was no reason for believing that it attracted the peccant humours only. Fuller prescribes a poultice containing Venice turpentine, pigeons’ dung, and spiders’ webs to be fastened to the wrists two hours before a fit of ague is expected, to ward it off. Pectoral drinks were much improved medicinally, especially for pleurisies, if some dung of stallions had been steeped in them.

Miscellaneous Animal Remedies.

It is not possible in a short space to exhaust this unsavory topic, but a few of the more notable applications of animals or animal derivatives may be briefly mentioned.

Pigeons were cut in half while they were alive and applied to the feet of patients. Pepys alludes two or three times to this and always as an indication that the case is nearly hopeless. The Queen of Charles II was one of the instances.

Oil of Puppies was made by cutting up two newly born ones and boiling them in a varnished pot for twelve hours with one pound of live earthworms. Very good for strengthening the nerves, for sciatica, and for paralysis, says Lemery. The gall of a black puppy, says Schroder, cures epilepsy to a wonder. It had to be prepared with vinegar. Ambrose Paré says he got a recipe from a famous surgeon at Turin for a balm with which he treated gun-shot wounds with extraordinary success. It was to boil young whelps just born with earthworms, Venice turpentine, and oil of lilies.

Fox lungs were prepared for medicines by first separating them from the blood-vessels, then washing them in white wine in which hyssop and scabious had been boiled. After drying gently the lungs were kept wrapt up in hyssop, wormwood, or horehound.

Swallows, hedgehogs, toads, and frogs were prepared by cutting their throats and leaving the blood to dry on them. They were then baked in a close vessel well covered.

Snails were made into a cough syrup by hanging them in a bag with sugar and catching the droppings.

Earthworms had a great reputation for the relief of lung complaints. They were also administered with great confidence, dried and powdered, to children to drive away internal worms. Woodlice, bruised and digested in Rhine wine, made the Vinum Millepedarum given in dropsy and jaundice. Lice and bugs were also honoured remedies. The latter digested in wine or vinegar had the singular power of expelling leeches which might have been accidentally swallowed.

Culpepper quotes from Mizaldus, perhaps sarcastically, a very wonderful property of earthworms, which is that the powder of them put in a hollow tooth makes it drop out. He gives another way of making a tooth drop out, which was to “fill an earthenware crucible full of emmets, ants, or pismires, call them by which name you will, eggs and all, and when you have burnt them keep the ashes, with which if you touch the tooth it will drop out.”

The same authority offers a drink cure which looks as if it might be effectual. “Eels being put into wine or beer and suffered to die in it, he that drinks it will never endure that sort of liquor again.” He recommends the brain of a hare roasted to help children to breed their teeth; a dead mouse, dried and powdered, one whole one to be taken each morning for three consecutive days, for diabetes; grasshoppers for colic; and hedge-sparrows salted for stone.

Deers’ fat strengthened the nerves, and relieved rheumatism and gout. Hares’ grease applied outwardly ripened swellings. Rabbits’ fat had a dispersing power. The fat of cocks and hens would soften hard swellings. Goose grease was specially good against piles, deafness, and to prevent pitting after the small-pox. Bears’ grease, still sold nominally, could be had in genuine form in this country a hundred years ago. Bears were at that time fattened and killed in this country for their grease, and until even more recent times they were imported from Russia. The principal use of bears’ grease was always to make the hair grow, but it was also used as an emollient for many purposes.

The lion had a high reputation among the Romans for its medicinal value. The fat was used as an ointment in affections of the joints, and combined with oil of roses as the best cosmetic for preserving the delicacy of the complexion. An aqueous tincture of the gall was used for weak eyes, and a mixture of the gall with the fat of the lion taken in small doses was esteemed an excellent remedy for epilepsy. Roasted lion’s heart was given in fevers. It was believed that no wild beast would attack anyone anointed with lions’ fat, and that this same treatment would prevent human treachery. These statements are found in Pliny. The lion rather fell out of use in more modern times. Its fat was prescribed in the P.L. 1618, and in James’s

“Dispensatory,” 1747, is said to be successful in anointing limbs numbed with cold, and also to put in the ears for the relief of earache.

The flesh of the tiger is still eaten by the Malays to impart courage and sagacity. Marcellus quotes a prescription by Democritus of Abderos (contemporary with Hippocrates) for nervous diseases. It consisted of the spinal marrow of a hyena mixed with his gall, all boiled together in old oil.

The cat has been largely used in medicine. Galen recommends the head of a black cat to be burned in a glazed vessel, and the ashes to be used in diseases of the eye, including cataract. Pliny says that the fæces of this animal mixed with mustard cured ulcers in the head. Sylvius prescribed cats’ flesh for hæmorrhoids and lumbago. In Lemery’s “Pharmacopœia” a cat ointment is ordered. It was to be made from a newly born kitten cut up into small pieces in a pot varnished with crushed earthworms. Cats’ fæces were employed in the eighteenth century as an application for baldness, and cat’s skin was recommended to be worn over the stomach for strengthening the digestion.

Montaigne states that in his time physicians prescribed as choice remedies the left foot of a tortoise, the liver of a mole, and blood drawn from under the wing of a white pigeon.

Queen Anne’s “Oculist and Operator on the Eyes in Ordinary,” a quack named Read whom she knighted, comments in his writings on the practice of putting a louse in the eye when it is dull and obscure and wanteth humours and spirits. This, he says, “tickleth and pricketh so that it maketh the eye moist and rheumatick and quickeneth the spirits.”

Oil of ants made by pounding two ounces of live ants and macerating them in eight ounces of olive oil for forty days was used as a stimulating liniment. Oil of spiders and earthworms was prescribed by Mindererus for anointing in small-pox and plague. He recommended it as being equal to the oil of scorpions, which was a very complicated combination of drugs devised by Matthiolus. Spiders have been often employed in medicine. A live spider rolled up in butter and swallowed as a pill was a seventeenth century cure for jaundice. Spiders taste like nuts, says Lalande. Galen recommended spiders’ eggs mixed with oil of nard for toothache. Elias Ashmole in his “Diary” (1681) writes: “I took early in the morning a good dose of elixir and hung three spiders about my neck, and they drove my ague away. Deo gratias." Spiders' webs were frequently used as a febrifuge, and are well-known to be excellent to stop bleeding. Oil of lizards, twelve of them cooked alive in three pounds of nut oil, was esteemed a good application against hernia. Oil of frogs prepared in a similar way was applied to the temples to promote sleep.

Bezoar Stones.

Bezoar stones acquired their fame in the East, and were introduced to European medicine by the Arabs. The name is of Persian origin, Pad-zahr, meaning an expeller of poisons. The earliest reference known to Bezoar stones in Europe is by Avenzoar, an Arab physician who practised in Seville about the year 1000. They were included in the London Pharmacopœias from 1618 to 1746.

There were many kinds of bezoar stones sold. The most esteemed was the lapis bezoar orientale. This came from Persia and was supposed to be obtained from the intestines of the Persian wild goat. It was a calculus which had formed itself by deposits of phosphate of lime round some nucleus, such as hair, or the stone of a fruit. One in the museum of St. Bartholomew's Hospital has a date stone for nucleus. It was believed that the special virtues of the stone were due to some unknown plant on which the animal fed.

A certain kind of ape also yielded bezoar stones. These were obtained by giving the ape an emetic. There were, besides, the lapis bezoar occidentale, procured from the llamas of Peru; and the bezoar Germanorum got from the chamois of the Swiss mountains. These never commanded the same confidence as those from the East. The latter are stated by Paris and Redwood and other writers to have sold for ten times their weight in gold. No authority, however, is given for that assertion.

In a paper read before the Royal Society of London, in 1714, by Frederick Slare, F.R.C.S., the claims of the bezoar stone to the possession of medical virtues are boldly challenged; and in the course of the paper the author states that the price varied from about £3 to £5 per ounce in London. He mentions that he had asked a London druggist, one "of the upper Size," how many ounces of bezoar stones he sold yearly. He said about 500 ounces. I presume he was a wholesale druggist. Perhaps this is implied by the expression “of the upper Size.” Mr. Slare uses this fact in support of his suggestion that a large proportion of the imports of these precious commodities, though they came from India or Persia right enough, had never been inside any wild goat, antelope, or ape. He records experiments which go to show this, and also gave letters from medical officers in India, men quite competent to judge, who manifested in this particular a surprising degree of innocence. It would have been strange if the wily oriental had refrained from practising his skill on his confiding Western customers.

Mr. Slare tells us that the stone was only found in about one goat out of seven killed, and that it took some twelve stones to make an ounce, which worked out to nearly 50,000 goats to be slain annually to keep this one London druggist supplied.

The original use of the bezoar was as an antidote to poisons. It came to be the valued remedy for all kinds of fevers, was applied externally in many skin diseases, and had the reputation of being able to cure even leprosy. The dose of the oriental bezoar was from 4 to 16 grains; of the occidental 6 to 30 grains. They were also carried about in gold or silver boxes as amulets. In Portugal in time of plague the stones were let out at about the equivalent of ten shillings a day. Some designed for this use may still be seen in museums. Bezoar stones were required to be of an olive-greenish tint, to be striated, and to yield a musky odour. They were further expected to strike a green colour when rubbed on white paper which had previously been prepared with chalk.

The alchemists prepared a mineral bezoar, by treating butter of antimony with nitric acid. They got antimonious acid. The livers and hearts of vipers dried in the sun furnished the animal bezoar; and a stony concretion sometimes found in cocoa-nuts, and in high repute among the Malays as a medicine was called vegetable bezoar or calatippe.

The importance attached to bezoar stones in the seventeenth century, and, incidentally, their liability to falsification, are illustrated by a minute in the records of the Society of Apothecaries, dated May 25th, 1630, as follows:—

> Pretended bezar stones sent by the Lord Mayor to be viewed were found to be false and counterfiet and fitt to be destroyed and the whole table [or as we should say, the Court] certified the same to the Lord Mayor.

A little later, it appears that the case of these stones was tried at the Guildhall, a jury composed partly of druggists and partly of apothecaries being empannelled. This jury confirmed the verdict of the table of apothecaries and the bezoar stones were duly burnt.

Three bezoar stones were sent by the Shah of Persia as a royal gift for his brother the Emperor Napoleon, only a hundred years ago.

Ambrose Paré, who wrote in the later half of the sixteenth century, was one of the few eminent doctors who discredited the alleged medicinal virtue of the bezoards. He was surgeon to Charles IX, and relates that one day, the king being at Clermont, a Spanish nobleman brought him a bezoar stone which he assured him was an antidote against all poisons. The king sent for Paré and asked him if he knew any substance which would annul the effects of any poison. Paré said that could not be, for there were many sorts of poisons which acted in very different ways. The Spanish nobleman, however, maintained that this stone was a universal antidote, and the king was eager to test the question. So the Provost of the Palace was sent for and asked if he had any criminal in his charge condemned to death. He said he had a cook who had stolen two silver dishes, and who was to be hanged the next day. The offer was thereupon made to the cook that he should take a poison, and an alleged antidote immediately afterwards, and if he escaped with his life he should go free. The cook gladly consented, and an apothecary was ordered to prepare a deadly draught and give it, and to follow this with a dose of the bezoar. This was done. The poor wretch lived for about seven hours in terrible agony, which Paré tried in vain to relieve. After his death Paré opened him and showed that the antidote had no effect at all. It was sublimate which had been given. “And the king commanded that the stone should be thrown into the fire; which was done.”

Paré’s authority was considerable, but it was by no means strong enough to destroy public faith in the bezoar. According to Pomet and Lemery the demand for the stones was so great in France more than a century later that it was difficult to get them genuine except at fancy prices. A stone of 4¼ oz. was sold for 2,000 livres (say £75). In Savary’s “Dictionnaire de Commerce” (1741) it is stated that when bezoars arrived at Amsterdam they fetched from 300 to 400 livres apiece. They were bought by rich citizens either to serve as presents, or to be kept in their families.

Gascoyne's or Gascoign's Powder.

In the paper by Mr. Slare read before the Royal Society already referred to the author comments with similar severity on the then popular Gascoign's Powder. As evidence of the fame it possessed he says he had been told that a certain "grandee of the faculty" had got above £50,000 by prescribing this compound. I suppose this meant he had received that amount in fees for prescriptions ordering that medicine. Taking advantage of the reverence in which bezoar was held by that generation, Gascoign's Powder had assumed as a second title the name of bezoardic powder. It was also known as the Powder of the Black Tops of Crab-claws, from the ingredient in largest quantity. The professed composition of Gascoign's Powder as given by Mr. Slare was oriental bezoar, white amber, hartshorn in powder, pearls, crabs' eyes, coral, and black tops of crabs' claws. Naturally a powder of such costly ingredients was sold at a very high price. Mr. Slare recommends chalk and salt of wormwood as being in all respects as good. The former was cheap enough then; and of the salt he says two pounds could be got for the price of half an ounce of the compound.

Vipers.

Both in ancient and comparatively modern times vipers have been held in the highest esteem for their medicinal virtues, and viper fat, viper broth, and viper wine are used to this day in some remote parts of Britain, and to a still greater extent on the Continent. In some districts of France heads of vipers enclosed in little silk bags are worn by children to preserve them from croup and convulsions.

It was the addition of vipers to the confection of Mithridates that constituted the principal improvement effected by Andromachus in his composition of the electuary which came to be known as theriakon, and subsequently as theriaca. Therion was Greek for a wild beast, but came to mean specially a venomous serpent, and the compound may have been called theriaca either to indicate that vipers were an important ingredient, or that it would cure their bites.

According to Dr. Mead, Antonius Musa, physician to Octavius Cæsar, was one of the first physicians who recommended the flesh of vipers for medicinal use. Pliny states that he quickly cured inveterate ulcers by this remedy. It is possible, however, that Musa acquired his knowledge of this remedy from a Greek physician named Craterus, who had advised that in certain wasting diseases vipers should be eaten, dressed as fish. In Galen's time vipers had become common medicines, and were probably taken to some extent as a nourishing food.

Moses Charas studied vipers very closely, and wrote a treatise on their use in medicine (1669) which had a great reputation. He adopted the curious view of Van Helmont that the poison of the viper, which was supposed to be contained in the animal's saliva, was not there normally, but was created as the effect of rage and terror. According to Charas, the head of the viper, grilled and eaten, would cure its bite, or hung to the neck would cure quinsy. The brain similarly hung on the neck of an infant would greatly assist in cutting the teeth. The skin fastened round the right thigh of a woman was an excellent aid to delivery in childbirth; if given to dogs, cooked or raw, it would cure mange. The fat was a valuable application in gout, or for tumours. Those treatments he had verified by his own experience. Other virtues attributed to vipers were mentioned, but he had not proved them, and could not conscientiously guarantee their existence. One was that the person who swallowed the liver of a viper could not be bitten by any kind of serpent during the ensuing six months.

Madame de Sévigné, was a firm believer in the medicinal value of vipers. Writing to her daughter in 1679 she says: "Madame de Lafayette is taking viper broth, which much strengthens her eyesight." In 1685 she informs her son: "It is to vipers I am indebted for the abundant health I now enjoy. They temper, purify, and refresh the blood. But it is essential to have the vipers themselves, and not the powder, which is heating unless taken in broth, boiled cream, or something refreshing." Then she goes on to advise him to get M. de Boissy to send him ten dozen vipers from Poitou in a case divided into three or four compartments lined with hay and moss, so that they can be kept at their ease. He is to take two every morning. The heads are to be cut off, the bodies to be scalded and cut into small pieces, and used to stuff a fowl. He is to continue this treatment for a month.

The early London Pharmacopœias gave the following form for the Trochisci Viperum required in the preparation of Theriaca: Remove the skin, entrails, head, fat and tail, and boil the flesh of vipers in 8 oz. of water with dill and a little salt, add 2 oz. of white bread twice toasted, ground and sifted, and make into troches, your hands being anointed with opobalsamum or expressed oil of nutmeg. Dry them on a sieve turned bottom upwards in an open place. Turn them frequently until they are quite dry, and keep them in a well-stopped glass or glazed vessel. They will keep good for a year, but it is better to make the treacle with them as soon after they are made as possible.

Quincy (1724) had great confidence in their virtues. He writes, “That they are Balsamic and greatly Restorative is confirm’d by long Experience; for we have many instances in Physical Histories of Persons arriving at a healthful old age by their frequent use, as well as others who recover’d from deplorable Decays and Weaknesses.” Then he proceeds at considerable length to compare the juices of these animals with those of terebinthous plants, which are mostly evergreens. “Moreover they have been experienc’d to do wonders in cutaneous cases; the Force and Activity of their parts breaking thro’ the little obstructions in the Miliary Glands, which turn into Ichor, Scabs, and Blotches” (those old practitioners knew exactly how their remedies acted); “and by restoring a free perspiration render the skin smooth and beautiful”; and much more on cures of itch, leprosy, and the worst skin eruptions.

Viper wine was a very popular tonic. It was believed to cure barrenness in women. An essence of vipers was believed in as an aphrodisiac, but Dr. James (1747) tells us that what was then advertised and sold in London under that name was tincture of cantharides. This author is sceptical about vipers altogether. He had given the flesh, broth, and salt of vipers in large quantities, but had come to the conclusion that the broths and flesh were no better than the broths and flesh of fowl, veal, or mutton, prepared in the same way, and as to the salt, he was sure that the salt of hartshorn or any other animal salt would answer just as well.

The vipers employed for medicine were the common vipers, which in this country are usually called adders (Vipera communis).

A common recipe for viper broth was to boil together a chicken with a middling-sized viper from which the head, skin, and entrails had been removed. These made a quart of good broth.

Mummies.

The employment of mummies in medicine does not seem to have been very ancient, nor did it become permanent. Who introduced it is not known. Ephraim Chambers in his Cyclopœdia (1738) says, "Mummy is said to have been first brought into use in medicine by the malice of a Jewish physician, who wrote that flesh thus embalmed was good for the cure of divers diseases, and particularly bruises, to prevent the blood's gathering and coagulating." Pomet also says that a Jewish physician had written about the medicinal value of mummy, but he does not suggest that he had recommended it out of malice.

The trade in mummies was evidently in the hands of the Jews and Armenians at the time when Pomet wrote, and, according to him, the fading popularity of mummy as a medicine was the result of the rogueries practised by these Jews. He tells of a Guy de la Fontaine, the King's physician, who, when visiting in Egypt, went to see a Jew in Alexandria who traded in mummies, and after some difficulty was admitted into the Jew's warehouse, where he saw several bodies piled one upon another. "After a reflection of a quarter of an hour he asked him what druggs he made use of, and what sort of bodies were fit for his service. The Jew answered that as to the dead he took such bodies as he could get, whether they died of a common disease or of some contagion. As to the druggs, they were nothing but a heap of some old druggs mixed together which he applied to the bodies, which after he had dried in an oven he sent into Europe, and was amazed to see the Christians were lovers of such filthiness." This very frank Jew must have been on the point of retiring from business.

Pomet regrets that he is not able to stop the abuses of the dealers in this commodity, so he has to content himself with advising those who buy mummy to choose what is of a fine shining black, not full of bones and dirt, and of a good smell. He also tells us it is good for contusions, and to prevent the blood from coagulating in the body (1694).

Ambrose Paré, who wrote before Pomet, was even more suspicious. He mentions that it was held by some that the mummies then in use were made and fashioned in France; that they were bodies stolen at night from the gibbets, the brains and entrails removed, and the bodies dried in a furnace, and then dipped in pitch. Paré states that he never prescribes mummy.

Oswald Crollius seems to have had no objection to artificial mummies. In his "Royal Chemist" he gives a process for preparing one. The carcase of a young man (some say a red-haired young man) who had been killed, that is, did not die of disease, and, it is to be presumed, had not been buried, was to lie in cold water in the air for twenty-four hours. The flesh was to be cut in pieces and sprinkled with myrrh and a little aloes. This was then to be soaked in spirit of wine and turpentine for twenty-four hours, hung up for twelve hours, again soaked in the spirit mixture for twenty-four hours, and finally hung up in a dry place to dry.

Mummies were principally recommended for consumption, wasting of flesh, ulcers, and various corruptions.

Nicasius Le Febre, F.R.S., Professor of Chemistry to Charles II, in his "Compleat Body of Chymistry," 1670, says the best mummies for medical use were those of bodies dried up in the hot sands of Lybia, where sometimes whole caravans were overwhelmed by simooms and suffocated. "This sudden suffocation doth concentrate the spirits in all the parts by reason of the fear and sudden surprisal which seizes on the travellers." Next to these Lybian mummies Le Febre recommends the dried corpse of a young lusty man of about 25 to 30 years of age who has been suffocated or hanged. He gives directions for drying the flesh, smoking it for a philosophical month, and then it is to be given in doses of 1 to 3 grains with some old treacle (theriaca) and vipers' flesh made into an electuary with spirit of wine. It was specially good against pestilential diseases.

Dippel's Animal Oil.

Animal oil, oil of harts' horns, or empyreumatic oil, as it was variously called, or Dippel's animal oil, which was the original, was highly prized as a medicine in the eighteenth century, and disputed the palm for nastiness with the balsam of sulphur. Dippel made it from harts' horns, but later formulas directed it to be made from any bones, from blood, or indeed from any animal substance. In distilling the horn some water first came over, and this was rejected. At the end of the operation the distillate consisted of carbonate of ammonia in solution and an empyreumatic oil, very dark and fœtid. The spirit was drawn off by filtration, and the oil which remained in the filter was rectified by as many as twenty distillations, the residue increasing at each operation and the rectified oil becoming paler. As it became brown by exposure to light it was the practice to put it up in 1 drachm bottles, which were buried in sand.

The virtues of this preparation were highly vaunted. Frederick Hoffmann strongly recommended it, especially when fever threatened. Twenty to thirty drops on a lump of sugar, followed by a glass of wine, were said to procure a calm and refreshing sleep, often continuing for twenty hours. It would be almost shorter to enumerate the complaints it was not recommended for than those which its advocates alleged it would cure. Epilepsy, apoplexy, palsy, plague, pleurisy, leprosy, and all skin diseases down to ringworm, fevers, colds, and headaches of all sorts were said to yield to its virtues.

Johann Conrad Dippel, its inventor and medical sponsor, was a strange, shifty, but clever adventurer. Born in 1673, near Darmstadt, his father, a Lutheran minister, hoped to train his son to his own profession. He was sent when quite a youth to Giessen University, where he distinguished himself and soon became an ardent controversialist. At that time the Protestants in Germany were divided into Orthodox and Pietists, the latter seeking to restore the personal spirituality which they considered the orthodox Lutherans were burying in formalities. Young Dippel argued vigorously on the orthodox side, and went to Strasburg to preach his views. There he also practised alchemy and cheiromancy and, besides, got mixed up in broils and disturbances. His inconsistent life compelled him to leave Strasburg, and having spent some time at Landau, Neustadt, and Worms, he returned to Giessen, where he became as ardent a Pietist as he had previously been an Orthodox. He took his degree, and then, having exhausted his father's funds, took to travelling, and practised medicine and alchemy, occasionally reverting to theology, but now denouncing Protestantism in all its diversities.

Getting to Berlin, and securing the confidence of some wealthy believers, he established a laboratory where he produced this animal oil and, more important still, in trying to imitate a Florentine lake from cochineal, accidentally produced Prussian blue, but did not realise the value of this discovery. He claimed to have succeeded in making gold, and on the strength of his representations was able to get deeply into debt, purchasing, among other luxuries, a castle and estate for fifty thousand florins. In 1707 he was imprisoned for a short time in Berlin, and when he regained his freedom made his way to Amsterdam. He took a medical degree at Leyden, and was acquiring a good medical practice at Amsterdam when his creditors and religious antagonists compelled him to escape from Holland. He went to Altona and then to Hamburg, but was ordered to leave both these cities. Copenhagen was his next home, and there again he suffered imprisonment. He was sent to the Island of Bornholm, where he practised as a physician until he was freed on the instructions of the Queen of Denmark. His medical reputation must have been both wide and high, for in 1727 the King of Sweden who could not get cured of a malady by his own physicians sent for Dippel, who completely succeeded. His troubled life seemed likely now to be exchanged for peace and prosperity, but this was not to be. The king would willingly have kept Dippel near him, but Sweden was a Protestant nation, and the clergy and people did not forget his scoffing attacks on their cherished faith. They would not have him among them, and Dippel had to return to Germany. After residing for a short time at Lauenburg and Celle, he at last found a refuge at the Castle of Wittgenstein, the owner of which, Count Wittgenstein, was one of his adherents. There he lived from 1729 to 1734. The last event recorded of him was characteristic. It had been announced that he was dead. Dippel published an indignant denial, and declared his assurance that he would not die until the year 1808. The prophecy failed, for the next year, 1734, he was found dead in bed at the castle of Wittgenstein.

The story of his discovery of Prussian blue is curious. When he was in Berlin, an artist, named Diesbach, was preparing some Florentine lake from a combination of alum and cochineal, acted on by sulphate of iron and fixed alkali. He asked Dippel for some of the alkali left over in his retort after he had distilled some of his animal oil. This seemed to spoil the product, for it yielded a blue instead of a crimson lake. Dippel tried it himself and got the same result. But he did not appreciate the value of this product, and it was left for Scheele to trace its chemical history.

Spermaceti.

"The sovereign'st thing on earth was parmceti for an inward bruise."—*Henry IV.* Part I, Act I, Sc. 3.

Woodall (1639) writing of spermaceti, says, “It is good also against bruises inwardly taken with Mummia.”

Culpepper (1695) says, “Sperma Cœti is well applied outwardly to eating ulcers, and the marks which the small-pox leaves behind; it clears the sight, provokes sweat. Inwardly, it troubles the stomach and belly, helps bruising and stretching the nerves, and therefore is good for women newly delivered.”

Dr. James (1747) describes it as a noble medicine and refers to its chief use for outward application in small-pox to prevent the pitting. It was melted with oil of almonds, and with this mixture the pustules were kept moist when they began to harden. He says, “Although this is but a modern practice in this distemper, yet Schroder takes notice of its use in his time in smoothing and filling up the fissures or cavities made by blotches and scabs.”

Schroder was much puzzled by this substance and was doubtful whether to class it among animal or mineral substances. He decided to include it among minerals. Subsequently it was believed to be the spawn of the whale, and from this belief it acquired its name. Still its origin continued to be discussed. Gesner said it was a milk shed by the whale. Borrichius believed it to be the spinal marrow. Pomet affirms with certainty that spermaceti is the brain of the whale (cachalot). He had not only seen it prepared, but had prepared it himself. He described the process. The brain was melted over a gentle fire, then cast into moulds, cooled, and when the oil had drained off, remelted, moulded again and again until it was very white. Then, with a knife made for the purpose, it was cut into scales or flakes. Lemery says the ancients gave it the name, believing it to be the seed of the whale, which was found floating on the sea. But in (his) modern times this opinion had been rejected, and it was held to be a kind of sea froth driven by the waves to and fro. Quite recently (when he wrote) it had been learnt that it was drawn from the head of the whale.

Our spermaceti ointment was known in earlier pharmacopœias as unguentum album, and at first contained white lead.

Honey

is one of the oldest of food products, and was the only sweetening substance in popular use until quite modern times. Sugar was known in India and was imported into Greece and Rome at very early periods. The name saccharum is of Sanskrit origin, and therefore testifies to its ancient lineage, and allusions to it, likening it to honey, are to be found in the writings of many of the classic naturalists from Herodotus onwards. The Arabs, who had long brought sugar from India to the wealthy West, made great use of it in medicine, and the early apothecaries in England, France, and Germany were the makers of sweetmeats from sugar to royal and aristocratic gourmets. Queen Elizabeth's apothecaries were in the habit of presenting her with boxes of sweetmeats on her birthdays.

But sugar was a rarity and a luxury for the rich, while honey was always in use. Palestine was a land flowing with milk and honey, and the records of its employment as a food, a fermented beverage, and as a medicine, are traceable in almost all histories. The ancients had curious notions concerning it. They knew that the bees obtained it from flowers, but they thought the flowers had only caught it as it descended from the heavens. Pliny says it is engendered in the air, mostly at the rising of the constellations, and especially when Sirius is shining. He is not sure whether it is the sweat of the heavens, saliva from the stars, or a juice exuding from the air while purifying itself. He admits that its flavour affords an exquisite pleasure, but he wonders what that flavour would be if we could get the pure ethereal substance uncontaminated by the corruption of the air, its absorption by the herbs, and afterwards in the stomachs of the bees. Pliny and Galen both affirm that it was sometimes found where no bees had been, and Galen says in such cases the peasantry exclaimed that Jupiter was raining honey. The honey which came in this way was called Cibus Celestis.

Honey was used in the preparation of all the famous confections and electuaries of old pharmacy, and when these began to lose their reputation there were authorities who attributed their decline in efficacy to the substitution of sugar for honey. Dioscorides had stated that honey counteracted the evil effects of the juice of the poppy. In the sixteenth to the eighteenth centuries honey was credited with many medicinal virtues. Applied to the scalp it was a remedy for baldness; better if some dead and dried bees were ground up with it. It wonderfully promoted expectoration.

It was also claimed that it would destroy worms if drunk in milk, because the worms took to it so greedily that they killed themselves by excess. Oxymels, too, had at one time a high repute. A compound oxymel, containing a number of aromatic herbs, was handed down from Mesué to the early pharmacopœias, and was esteemed as a stimulant of the liver and kidneys.

An oil of wax was known as the Celestial Medicine. It was made by melting bees' wax, then wringing it out by hand pressure seven times in sweet wine, and finally distilling it twice. It would kill worms, cure palsy, and greatly assist in childbirth.

XVI

REMINISCENCES OF ANCIENT PHARMACY

At the Renaissance of letters at first everything had to give place to the books of the ancients; nothing was good or true except what was found in Aristotle or Galen. Instead of studying plants as they grew, they were only studied in the works of Pliny and Dioscorides; and nothing is so frequent in the writings of those times than to find the existence of a plant doubted for the simple reason that Dioscorides has not spoken of it.

J. J. Rousseau: *Dictionary of Botany*.

Precious Stones.

Marvellous virtues were attributed by the ancients to the precious stones known to them, but rather perhaps in their character of amulets than as medicines. One of the so-called hymns of Orpheus, composed probably about 500 B.C., is "On Stones," and describes the properties of many of these highly esteemed minerals. Four lines (taken from a translation in the Rev. C. W. King's "Natural History of Precious Stones") will serve as a sample:—

With its complexion of a lovely boy
The opal fills the hearts of gods with joy;
Whilst by the mild effulgence of its light
Its healing power restores the fading sight.

Coral, according to the same authority, acquired its special properties from Minerva. This substance was much valued by the Romans, who attached pieces of it by ribbons to their children's necks, in the belief that it would protect them against the designs of sorcerers; and Paracelsus adopted the same view, recommending necklaces of coral to be worn as a preventive of epilepsy, "but such impostures," says Quincy (1724), "are now deservedly laughed out of the world." Some old writers insisted that coral worn on the person changed colour, becoming dull and pale when the wearer's health failed.

In the seventeenth and eighteenth centuries coral and pearls were considerably used in medicine in the form of magisteries, tinctures, syrups, and arcana. Lemery says coral was given to infants in their mothers' milk as soon as they were born (he does not explain how) to prevent epilepsy, and he names a multitude of other disorders for which it was good. Boyle, too, in his "Collection of Remedies," recommends it in drachm doses to "sweeten the blood and cure acidity." The largest and reddest obtainable was to be chosen.

Pearls were used in medicine until the eighteenth century, when it began to be suspected that chalk had the same effect. The tiniest pearls, known as pearl seeds, ground to a fine powder, were prescribed as an absorbent, antacid, and cordial. This powder was also used, says Pomet, "by ladies of quality to give a lustre and beauty to the face." It was superseded before long by Lemery's magistery of bismuth, which, however, retained the name of pearl white. Pomet further states that a magistery of pearl was made (apparently by quacks) by combining the ground pearl with acids; an arcanum, spirits, flowers, and tinctures were also prepared and credited with marvellous virtues, "to pick fools' pockets."

Pearls, writes Jean de Renou (1607), "are greatly cordial and rejoice the heart. The alchemists consequently make a liquor of pearls, which they pretend is a marvellous cure for many maladies. More often than not, however, their pretended liquor is nothing but smoke, vanity, and quackery. I knew a barber in this city of Paris who was sent for by a patient to apply two leeches, and who had the impudence to demand six crowns of gold for his service. He declared that he had fed those leeches for an entire month on the liquor of pearls."

It is on record that Pope Clement VII took 40,000 ducats' worth of pearls and other precious stones with unicorn's horn within fourteen days. (See Mrs. Henry Cust's "Gentlemen Errant.")

Emeralds had a great reputation, especially on account of their moral attributes. They were cold in an extra first degree, so cold that they became emblems of chastity, and curious tales of their powers in controlling the passions were told. Moses Maimonides, a famous Jew who lived in Egypt in the twelfth century, in a treatise he wrote by command of the Caliph as a concise guide in cases of venomous bites or poisons generally, declared that emeralds were the supreme cure. They might be laid on the stomach or held in the mouth or 9 grains of the powdered stone might be taken in wine. But recognising that emeralds were not always handy when the need arose, Moses names a number of more ordinary remedies.

Confection of Hyacinth was a noted compound formulated in all the old pharmacopœias, and regarded as a sovereign cordial, fortifying the heart, the stomach, and the brain; resisting the corruption of the humours and the malignity of the air; and serving for many other medicinal purposes. The original formula ordered besides hyacinths (which were probably amethysts), sapphires, emeralds, topazes, and pearls; silk; gold and silver leaves; musk, ambergris, myrrh, and camphor; sealed earth, coral, and a few vegetable drugs; all made into an electuary with syrup of carnations. A similar compound, but in powder form, was known as "Hungary Powder" and was believed to have been the most esteemed remedy in the Hungary Fever, to which some reference is made in the sketch of Glauber (Vol. I, pp. 260–264). The Emperor Ferdinand's Plague Powder was another variation of the same compound. The formula given in Lemery's Pharmacopœia orders about twenty vegetable drugs with bole, hartshorn, ivory, and one scruple each of sapphires, hyacinths, emeralds, rubies, and garnets, in a total bulk of about 4½ ounces. The dose was from ½ scruple to 2 scruples.

Sir William Bulleyn, a famous physician in the reign of Henry VIII, and said to have been of the same family as the Queen, Anne Boleyn, in his "Book of Simples," which was a work of great renown in its day, gives the following recipe for Electuarium de Gemmis. "Take 2 drachms of white perles; two little peeces of saphyre; jacinthe, corneline, emerauldes, granettes, of each an ounce; setwal, the sweate roote doronike, the rind of pomecitron, mace, basel seede, of each 2 drachms; redde corall, amber, shaving of ivory, of each 2 drachms; rootes both of white and red behen, ginger, long pepper, spicknard, folium indicum, saffron cardamon, of each one drachm; troch diarodon, lignum aloes, of each half a small handful; cinnamon, galinga, zurubeth, which is a kind of setwal, of each 1½ drachm; thin pieces of gold and sylver, of each half a scruple; musk, half a drachm." The electuary was to be made with "honey emblici, which is the fourth kind of mirobalans with roses, strained, in equall parts, as much as will suffice." What that may mean I do not know. The medicine, it was said, would heal cold, disease of the brain, heart, and stomach, and Bulleyn adds, "Kings and noble men have used this for their comfort. It causeth them to be bold-spirited, the body to smell well, and ingendreth to the face good colour."

There was a theory that the engraving of a design or a monogram on a gem increased its medicinal virtues. Galen doubts this, however. He states that the jasper benefits the chest and the mouth of the stomach if laid thereupon, and for complaints of these parts he recommends a necklace of jaspers hung round the neck and reaching down to the affected part. That he knew would do good. But some recommended that a serpent should be engraved on the stones, and Galen had tried this, but could not discover that the engraved stones were any better than the plain ones (Simp. Med., ix).

The idea did not die, however. Mr. King quotes the opinion of Camillo Lionhardo, physician to Cæsar Borgia, to the effect that if precious stones were engraved by a skilful person under a particular influence, that influence would be transmitted to the stone; and if the figure engraved corresponded with the virtue of the stone itself or its natural quality, the virtue of the figure and of the stone would be doubled.

Jerome Cardan and other mystic writers of the sixteenth century gave great prominence to precious stones as remedies; and Culpepper after quoting from several of them intimates that he expects some of his readers may consider the accounts given incredible. They declared that the diamond rendered men fearless, that the ruby took away idle and foolish fancies, that the emerald resisted lust, that the amethyst kept men from drunkenness and too much sleep, and so on. Culpepper's reply to prospective sceptics is that he has named his authorities, and that he knows nothing to the contrary why it may not be as possible for these stones to have the effects attributed to them as for the sound of a trumpet to incite a man to valour, or a fiddle to dancing. Moreover, said Garcius, if the stones applied externally were so efficacious, how much more so would they be if taken internally.

The Four Officinal Capitals.

This description was applied in old medical books to Mithridatium, Venice Treacle, Philonium, and Diascordium. There were writers who ventured to criticise some of the details of composition, or some of the uses frequently made of these compounds, but the possibility of medicine existing without them was hardly contemplated previous to the eighteenth century. Of the two confections first named much has been said in other chapters; but it may be of interest to present here a conspectus of the ingredients of each, comparing the last formulas prescribed in the London Pharmacopœia with what may be regarded as the original compositions. The first pair of formulas are quoted from Galen, who gives the Mithridatium from Damocrates and the Theriaca from Andromachus. Both were in Greek verses. It is not known whether the prescription of Andromachus was versified by Nero's physician or by his son.

Antidotus Mithridatica Damocratis.

Root of round birthwort; of valerian; of each 4½ oz.; of sweet flag, 5 oz. 3 drm.; of gentian, 7½ oz.; of Ligusticum meum, 3 oz. 6 drms.; of ginger, 15 oz.; herb of dittany of Crete, 7½ oz.; of pennyroyal, and of scordium, of each 10½ oz.; leaves of laurus cassia, 12 oz.; flowers of St. John's wort, 3½ oz., of French lavender, 12 oz.; of red lavender, and of roses, of each, 7½ oz.; Celtic nard, 7½ oz.; spikenard, 15 oz.; lemon grass, 13 oz.; seeds of thlaspi, 15 oz.; of seseli, 12 oz.; of carrot, 10½ oz.; of parsley, and fennel, of each, 7½ oz.; of anise, 4½ oz.; juniper berries, 1 oz.; long pepper, 12 oz.; white pepper, and fruit of amyris opobalsamum, of each 10½ oz.; lesser cardamoms, 7½ oz.; saffron, 15 oz.; cinnamon, 15½ oz.; Arabian costus, 12 oz.; cassia lignea, 10½ oz.; trochiscs of agaric, 15 oz.; castor, 12 oz.; scincus marinus, 3½ oz.; myrrh, 16 oz.; olibanum, 15 oz.; bdellium, 10½ oz.; gum Arabic, 7½ oz.

Pulverise, mix, and sift the above. Then dissolve in 8 lb. of wine galbanum and opoponax, of each 12 oz.; sagapenum, 4½ oz.; juice of hypocist, 12 oz.; juice of acacia, 4 oz.; opium, 7½ oz.

Mix this solution with 106 lb. despumated honey, and gradually incorporate the powder. Then pour into the mixture 12 oz. of storax dissolved in 14 oz. of turpentine, and finally add 12 oz. of opobalsamum. Stir for several hours and leave the mixture to ferment in a large vessel.

Electuarium Theriacale Magnum.

Root of Florentine iris, licorice, of each, 12 oz.; of Arabian costus, Pontic rhubarb, cinquefoil, of each 6 oz.; of Ligusticum meum, rhubarb, gentian, of each, 4 oz.; of birthwort, 2 oz.; herb of scordium, 12 oz.; of lemon grass, horehound, dittany of Crete, calamint, of each, 6 oz.; of pennyroyal, ground pine, germander, of each, 4 oz.; leaves of laurus cassia, 4 oz.; flowers of red roses, 12 oz.; of lavender, 6 oz.; of St. John's wort, 4 oz.; of lesser centaury, 2 oz.; saffron, 6 oz.; fruit of amyris opobalsamum, 4 oz.; cinnamon, 12 oz.; cassia lignea, spikenard, of each, 6 oz.; Celtic nard, 4 oz.; long pepper, 24 oz.; black pepper, ginger, of each 6 oz.; cardamoms, 4 oz.; rape seeds, agaric, of each 12 oz.; seeds of Macedonian parsley, 6 oz.; of anise, fennel, cress, seseli, thlaspi, amomum, sandwort, of each 4 oz.; of carrot, 2 oz.; opium, 24 oz.; opobalsamum, 12 oz.; myrrh, olibanum, turpentine, of each 6 oz.; storax, gum Arabic, sagapenum, of each 4 oz.; asphaltum, opoponax, galbanum, of each 2 oz.; juice of acacia, and of hypocist, of each, 4 oz.; castor, 2 oz.; Lemnian bole, calcined vitriol, of each, 4 oz.; trochiscs of squill, 48 oz.; of vipers, of sweet flag, of each 24 oz.

Triturate the balsams, resins, and gums in a sufficient quantity of wine, to form a thin paste, and incorporate the whole with 960 oz. of honey.

Appended are the formulas for these two confections as given in the P.L. 1746. The drugs named in parentheses are those which the College officially authorised as substitutes.

Confectio Damocratis (Mithridatium).

Cinnamon, 14 drachms, myrrh, 11 drachms; agaric, spikenard, ginger, saffron, thlaspi seeds, frankincense, Chio turpentine, of each, 10 drachms.

Camel's hay, Arabian costus (zedoary), Indian leaf (mace), French lavender, long pepper, hartwort seeds, juice of rape of cistus, strained storax, opoponax, strained galbanum, balm of Gilead (expressed oil of nutmeg), Russian castor, of each, 1 oz.

Poley mountain, water germander, fruit of balsam tree (cubebs), white pepper, Cretan carrot seeds, strained bdellium, of each 7 drachms.

Celtic nard, gentian root, Cretan dittany leaves, red roses, Macedonian parsley seeds, lesser cardamum seeds, sweet fennel seeds, gum Arabic, strained opium, of each 5 drachms.

Sweet flag root, wild valerian root, aniseed, strained sagapenum, of each 3 drachms.

Spignel, St. John's wort, juice of acacia (catechu), bellies of seines, of each 2½ drachms.

Clarified honey, three times the weight of all the rest.

Theriaca Andromachi.

Troches of squills, ½ lb.

Long pepper, strained opium, dried vipers, of each, 3 oz.

Cinnamon, balm of Gilead (expressed oil of nutmeg), of each, 2 oz.

Agaric, orris root, scordium, red roses, navew seeds, extract of licorice, of each 1½ ounces.

Spikenard, saffron, greater cardmoms, myrrh, costus (zedoary), camel's hay, of each 1 oz.

Cinquefoil root, rhubarb, ginger, Indian leaf (mace), Cretan dittany leaves, horehound, calamint, French lavender, black pepper, parsley seeds, olibanum, Chio turpentine, valerian root, of each, 6 drachms.

Gentian root, Celtic nard, spignel, poley mountain, St. John's wort, ground pine, creeping germander, fruit of balsam tree (cubebs), aniseed, fennel seed, lesser cardamoms, bishop's weed, hartwort, treacle mustard, juice of rape of cistus, catechu, gum Arabic, storax, sagapenum, Lemnian earth (Armenian bole), calcined green vitriol, of each, ½ oz.

Creeping birthwort, lesser centaury, Cretan carrot seeds, opoponax, strained galbanum, Russian castor, Jews' pitch (white amber), sweet flag root, of each, 2 drachms.

Clarified honey, three times the weight of all the rest.

Philonium,

a famous antidote invented by Philon of Tarsus, who is supposed to have lived in the early part of the first century (a contemporary probably of Saul of Tarsus). Galen says of it that it had been in great reputation for a long time, and was one of the earliest of the compounds of the kind. Philon gives his formula in Greek verses and in such enigmatic language that it would be impossible to interpret it if Galen himself had not come to the rescue. Philon writes:—

Take of the red and odorous hairs of the young lad whose blood is shed on the fields of Mercury (saffron), as many drachms as we have senses; of the Nauplium Euboic (pyrethrum), 1 drachm; the same quantity of the murderer of the son of Menetius, preserved in sheeps' bellies (euphorbium); add 20 drachms of white fire (white pepper); the same quantity of the beans of the pigs of Arcadia (henbane); one drachm of the plant which is falsely called a root, and which comes from a country renowned because of Jupiter Pissean (spikenard); write pium, and place at the head of the word the masculine article of the Greeks (opium) 10 drachms; and mix the whole with the work of the daughters of the bull of Athens (Attic honey).

The words in parentheses are the explanations of this rather unwieldy joke as they are provided by Galen. It is conjectured from an obscure passage in Pliny that this antidote was prescribed against a peculiar form of colic which became epidemic at Rome about the time when Philon was practising there.

Philonium was the original of the confection of opium which remained in our pharmacopœias until 1867. In the first London Pharmacopœia the formula was more similar to that which Galen gives; later, a modification by Nicolas Myrepsus was adopted, the most important change being the omission of the euphorbium. Until 1746 it was called Philonium Romanum. In the P.L. 1746, the ingredients were white pepper, ginger, caraway seeds, strained opium, and syrup of poppies (or of meconium, as it was called). This had been substituted for honey in all the English formulas. The name was also changed in 1746 to Philonium Londinense. The proportion of opium in Philonium was 1 grain in 36 grains.

Diascordium,

the last of the four officinal capitals, was a medicinal compilation by Hieronymus Frascatorius, and is given in his book "De Contagio et Morbis Contagiosis." It was devised as a preventive of plague, but it acquired such popularity that Dr. James in the introduction to his Dispensatory (1747) writing of the conventional esteem in which so many compounds are held, says, "Thus the Venice Treacle invented by Andromachus under the reign of Nero, and the Diascordium of Frascatorius, have been used by almost every physician who has practised since their publication." The original formula, which was adopted in its integrity in the first P.L., was as follows:—

> Cinnamon, Cassia wood, aa ½ oz.; true scordium (water germander) 1 oz.; Cretan dittany, bistort galbanum, gum Arabic, aa ½ oz.; storax, 4½ drachms; opium, seeds of sorrel, aa 1½ drachm; gentian, ½ oz.; Armenian bole, 1½ oz.; sealed earth (Lemnian), ½ oz.; long pepper, ginger, aa 2 drachms; clarified honey, 2½ lb.; generous canary, 8 oz. Make into an electuary, S.A.

In the eighteenth century this compound became a popular household opiate, and was frequently given to children for soothing purposes, especially as the Pharmacopœia had substituted syrup of meconium (poppies) for the honey. As the preparation was rather a strong astringent it was doubly harmful as a frequently taken remedy. In the P.L. 1746 two species of diascordium were prescribed, one with and one without opium; at the same time a "pulvis e bolo compositus" was introduced in which the scordium, the dittany, the sorrel seeds, the storax, the sealed earth, the bistort, and the galbanum, as well as the wine, were omitted. Edinburgh likewise omitted the scordium and other ingredients, and made the preparation still more astringent by the addition of catechu and kino. This was called Confectio Japonica. The mangled remains of the various formulas are represented in the British Pharmacopœia by Pulvis Catechu Compositus.

Theriaca.

Theriaca was invented by Nero's physician, Andromachus, and was devised as an improvement on Mithridatium which until then was the great antidote in Roman pharmacy. The most important addition which appeared in the new formula was the introduction of vipers. Andromachus named his electuary "Galene," which meant tranquil, probably to suggest that it was a soothing, anodyne medicine. It soon, however, acquired its permanent name, for it is referred to as Theriaca by Pliny, who would have been a contemporary with Andromachus. Pliny, it may be remarked, was rather contemptuous of the polypharmaceutic compounds which were then becoming so popular. They were devised, he says, “ad ostentationem artis;” just to “show off,” as we should say.

Andromachus (or it may have been his son, a physician of the same name) wrote his formula, and described the virtues of his compound in Greek elegiac verses which he dedicated to Nero, and which Galen has preserved. The object of giving the formula in verse was that it should be less easy to modify it. The enumeration of the medicinal properties of the antidote left very little room for any other remedy. First it would counteract all poisons and bites of venomous animals. Besides, it would relieve all pains, weaknesses of the stomach, asthma, difficulty of breathing, phthisis, colic, jaundice, dropsy, weakness of sight, inflammation of the bladder and of the kidneys, and plague.

Galen, after describing its alexipharmic properties, states that he tested it by causing a number of fowls to be dosed with it. To these he brought others to which no theriaca had been given. The poison was administered to all. The fowls to which the theriaca had been given all survived, and all the others died. Galen’s encomiums on this compound were no doubt largely responsible for the marvellous reputation it enjoyed all through the centuries in which his authority was accepted. He declares that it resists poison and venomous bites, cures inveterate headache, vertigo, deafness, epilepsy, apoplexy, dimness of sight, loss of voice, asthma, coughs of all kinds, spitting of blood, tightness of the breath, colic, the iliac passion, jaundice, hardness of the spleen, stone, urinary complaints, fevers, dropsies, leprosies, the troubles to which women are subject, melancholy, and all pestilences.

Down to the seventeenth century these virtues were almost universally accepted, and many were the learned treatises written to explain its action; how one drug toned down the effect of others, and how the whole formed a sort of harmony in medicine. At the same time most of the old masters in pharmacy fancied they could suggest some improvement, and the original formula was modified in scores of ways.

In addition there arose new electuaries, modelled more or less closely on theriaca, but perhaps devised for some special complaints, and bearing the names of their authors. Many of these also attained to considerable fame.

For some centuries the theriaca made in turn at Constantinople, Cairo, Genoa, and Venice was in such reputation that customers would have it so branded. Ultimately the last-named city secured almost the monopoly of the manufacture. A reference to its production there occurs in Evelyn's Diary, dated March 23, 1646. Evelyn writes: "Having packed up my purchases of books, pictures, casts, treacle, &c. (the making and extraordinary ceremony whereof I had been curious to observe, for it is extremely pompous and worth seeing), I departed from Venice."

In the reign of Queen Elizabeth English apothecaries began to claim that they could make the confection as well as their Italian contemporaries. Some curious documents illustrating their confidence were given in an interesting research by Mr. W. G. Piper, published in *The Chemist and Druggist*, March 15, 1880. He quotes from William Turner, "the learned divine, daring Protestant, and first English botanist," the title of a work on the virtues and properties of the great Triacle (published in 1568 but not now known), and also a few paragraphs from a later volume on the same subject in which, after describing the method of making the remedy, he says: "Wherefore if there be any Apothecaries in London that dare take in hande to make these noble compositions they may know where to haue them." It appears that Hugh Morgan, the Queen's apothecary, accepted the challenge, for in a pamphlet by him (1585) he insists that his product has been compared with other "theriacle" brought from Constantinople and Venice, and has been better commended. "It is very lamentable to consider," he writes, "that straungers doe dayly send into England a false and naughty kinde of Mithridatium and Threacle in great barrelles more than a thousand weight in a year, and vtter ye same at a lowe price for 3d. and 4d. a pound, to ye great hurt of Her Maiesties subjects and no small game to straungers purses."

Preparation of Theriaca.

(From Brunschwick's "Destillir," Strassburg, 1500.)

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Mr. Piper also quoted at length from another pamphlet published in 1612 by R. Band (in a subsequent edition, R. Browne), who relates how the Master and Wardens of the Grocers' Company, having marked that "a filthy and unwholesome baggage composition" was being brought into this Realm as Tryacle of Genoa, "made only of the rotten garble and refuse outcast of all kinds of spices and drugs, hand over head with a little filthy molasses and tarre to worke it up withal," communicated with the College of Physicians, and induced them to prescribe the proper formula and to superintend the manufacture, which was then entrusted to Mr. William Besse, apothecary in the Poultry. Mr. Besse had to take "a corporall oath" before the Lord Mayor, and every year when he made the confection had to show the ingredients and the product to the College of Physicians. His triacle was sold at not above 2*s.* 8*d.* per lb. or 2*d.* per ounce. It appears from the same pamphlet that nothing was alleged against Venice Treacle except its "excessive dearness."

Prosper Alpinus, a Paduan physician, wrote an account of his three years' residence at Cairo ("De Medicina Ægyptorum") in 1591, and has much to say of the manufacture of Theriaca in that city. It was only allowed to be made in public, and the ceremony was performed once a year in the month of May in the Mosque of Morestan by the chief pharmacist of the city in the presence of all the physicians. The operator would give no information to Albinus, a Christian, about the composition; but he got what he wanted from a famous herbalist who collected all the materials for the compound. Albinus states that at that time Italians, Germans, Poles, Flemings, Englishmen, and Frenchmen came to Cairo to purchase this true Theriaca.

Theriaca (Tyriaca, as he calls it), was among the drugs recommended to Alfred the Great by Helias, the Patriarch of Jerusalem. The manuscript is quoted in "Anglo-Saxon Leechdoms" by the Rev. Oswald Cockayne. (See Vol. I, p. 124, 131.)

Many allusions in old records show how highly the confection was esteemed by those who could afford to take it. According to Buckle ("Miscell. Works," Vol. II, p. 303) it is first mentioned in English literature by Foucher de Chartres (1124). He had come to know of it in the first crusade. A "Pixis argenti ad Tyriacum" is named in the Close Roll of King John, 1208; in the old romance of Sir Tristrem (about 1250) a man is slain by a dragon; and "His mouth opened thai And pelt treacle in that man"; the "triacle box du pere apelle une Hakette garniz d'or" is mentioned among the precious effects of Henry V; in the Paston letters written in the reign of Edward IV we find allusions to "treacle pottes of Geane (Genoa) as my potecarie swerytht on to me, and moerovyr that they were never undoo syns that they came from Geane."

In early English books treacle was a term used metaphorically for the divinest blessings. Nothing could better prove the high appreciation in which it was held. Piers Ploughman (about 1370) writes, “Treuthe telleth that love ys tryacle for synne”; Chaucer (1340–1400) has “Crist, which is to every harm triacle”; in Coverdale’s Bible (1535) the sentence in Jeremiah viii, 22 is rendered “Is there no triacle in Gilead?”; Sir Thomas More (1573) writes of “laying up a store of cumfort in your hart as a triacle against the poyson of desperate dread”; and later Milton speaks of “the treacle of sound doctrine”; Jeremy Taylor says, “We kill the Viper and make treacle of him; that is, we not only escape from but get advantage by temptations.”

Laurens Catelan, Master Apothecary of Montpellier, and Apothecary in Ordinary to Monseigneur the Prince de Condé, has left a full report of his discourse on the occasion of his dispensing a batch of Theriaca at Montpellier on September 23, 1628. It is a most interesting lecture, full of curious old facts chiefly about poisonings, and inspired with an unshakable faith in the importance of the operation in which he was engaged. The exordium is explanatory of the ceremony:

“The regulations and statutes under which we live in this city,” says Master Catelan, “require that whenever we prepare either Theriaca, Mithridatium, Confection of Hyacinth, or Confection Alkermes, the compounding shall be done in public, and in the presence of the very illustrious professors of this famous University of Medicine, so that they may have the opportunity of censuring or approving the ingredients, and the public may therefore be assured of the fidelity of these important medicines.

“This is why I have here spread out before you all these drugs which are used in the composition of the great and famous Theriaca.

“But as I am honoured with the attendance of such an august assembly, I ought not, I think, to omit to lay before you some of the singularities associated with the history and composition of this remedy, and I will divide what I have to say on these subjects into three sections, namely—

“(1) The discoverer of this compound; (2) the purpose of the invention; and (3) the reasons why these drugs and no others of the multitude known to us have been chosen for this purpose.”

The lecturer then entered upon a history of Mithridates and his wonderful immunity against poisons; of his defeat by Pompey, of the recovery of his formula, of the additions made to it a hundred years later by Andromachus, and of the preservation of directions for making it which Galen wrote some fifty years after Andromachus had completed his invention.

At this point the book tells us there was an interval, and some music was performed. When the lecturer resumed he proceeded to tell of the risks which princes and nobles ran of being poisoned in those old times, and of the precautions taken against such crimes. Of the rings and amulets they wore, of the tasters they employed, and of the treatment such as Mithridates went through of accustoming his system to poisons to such an extent that they took no effect on him. He quotes in support of the belief in this method of ensuring immunity against poisons two or three stories from the classics which one would have thought would have been too strong even for a professional eulogist of Theriaca.

One case was that of a girl who ate spiders from her childhood, and was so fortified against poisons as not to be afraid to take any of them. A man is alluded to by Galen who would drink a cup of wine in which a live viper had been drowned. We have also the account of a girl whose system had been so saturated with aconite that an Indian king had sent her as a present to Alexander the Great in the hope that he would kiss her, and thus imbibe the poison with which her lips would be charged; but, fortunately, Aristotle saw her first, and recognised by her flaming eyes that she was filled with some sort of poison, and thus the Indian's purpose was frustrated.

After another interval and some more music, the lecturer came to the third part of his subject, in which he expounded the special virtues of the drugs before him. These were grouped, and it was shown that some were good for the brain, others for the chest, for the stomach, for the kidneys, the heart, and other organs. Others, like the viper's flesh, were directly sympathetic with poisons, and would go straight for them if they were inside the body, or would lie in wait for them, as it were, if they were only expected. When the subject was exhausted, it was announced that in consequence of the lateness of the hour the weighing of the ingredients would be postponed till the next day. That ceremony was duly performed on the 24th of September, and the drugs were passed on to a "pulveriser." It was not until the 16th of November that the final mixing was undertaken.

Kermes.

Kermes as a pharmaceutical term reaches us through the Arabic, qirmis, red. But it was not a native Arabic word. It was adopted into that language from the Persian, and was of Sanskrit origin. The word Krimija in Sanskrit meant produced by a worm, and was itself from krimi, a worm; worm is the direct English descendant of krimi. Kermes is responsible in modern English for carmine and crimson, but it need hardly be said that it has no connection with the Flemish kermess though it looks so like it. Kermess is kerkmess, or, in English, church-mass.

The kermes of the Arabs was the kokkos of the Greeks, coccus of the Romans. It was found on a species of oak, now called the Quercus ilex, a low, shrubby, evergreen bush with prickly leaves like the holly. The tree, however, bears acorns. The ancients generally regarded these insects as the fruit of the trees, though they were aware that worms came from them. But these they thought were produced from the corruption of the fruit. The principal use they made of them was in dyeing, and for this purpose they were employed until the superior coccus cacti from Mexico superseded the coccus ilicis. In the middle ages kermes was retained as the medicinal name, but for dyeing the insects were called vermiculi, and the cloth dyed by them was known as vermiculata. From this came the French word vermeil, and from that vermilion was derived.

Medicinally the coccus was principally employed by the Greek and Latin physicians as an application to wounds and for inflamed eyes. It acquired a very high reputation among the Arab doctors as a cordial for internal administration, and the famous Confection of Alkermes, invented by Mesué the younger, who was contemporary with Avicenna, continued in popular favour up to the eighteenth century. Meanwhile, the external application of kermes lingered in the use of scarlet cloth in measles, erysipelas, and other red diseases.

The original Confection of Alkermes contained juice of rennet apples, rose water, silk, kermes, sugar, ambergris, amber, yellow santal, lapis lazuli, pearls, musk, and leaf gold. In the sixteenth and seventeenth centuries this compound was prepared publicly at Montpellier, and was supplied from that city to all Europe. It was described as good for all maladies proceeding from the melancholic humour, faintings, palpitations, heart weakness, and in slow convalescence. It fortified the stomach, rejoiced the heart, and engendered good spirits. The dose was 1 drachm, or it might be applied externally on a piece of scarlet cloth.

Mel Ægyptiacum

is a very ancient compound used chiefly by veterinarians as an escharotic. Its name suggests Egyptian origin, but it has not been traced further back than to the "Grabadin" of John Mesué, the Arabian author, about the year 800. Scribonius Largus before him gives a similar formula under the name of Hygra. Mesué's formula was to boil 1 oz. of vinegar with 1 oz. of honey to the consistence of honey and to add 2 drachms of verdigris. This formula was modified in various ways in the different pharmacopœias in which it was adopted; alum was added in some cases, cream of tartar in others. The chemical action varied with the process, but generally the result was to reduce a part of the verdigris to an oxide of copper, metallic copper, and a little basic acetate in different proportions. The compound appeared in the London Pharmacopœia of 1721 as Unguentum Ægyptiacum; in that of 1746 as Mel Ægyptiacum; as Oxymel Æruginis in that of 1788; and as Linimentum Æruginis in the P.L. 1851. In this last edition the formula given was to dissolve 1 oz. of verdigris in 7 oz. of vinegar, and boil this with 14 oz. of honey to a proper consistence. It was not adopted in the British Pharmacopœia. In old veterinary recipes it was often combined with tincture of myrrh to form a detergent liniment, and occasionally in a very diluted form was administered internally as a tonic. On the Continent, where its employment lingered longer than in this country, an Egyptiac of Solleysel, from which the vinegar was omitted, but litharge, sulphate of zinc, and arsenic in small proportions added, was frequently preferred to the original.

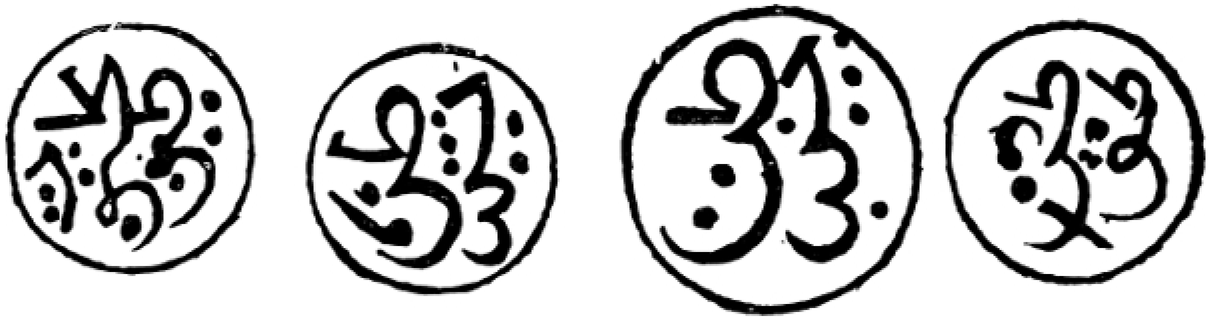
An Unguentum Ægyptiacum magis compositum, containing rock alum and sal ammoniac, in addition to the other ingredients mentioned, was included in the London Pharmacopœia 1721. In some foreign pharmacopœias camphor was prescribed as an ingredient, and in one old one theriaca is ordered.

Terra Sigillata.

Various earths were celebrated as medicines in old times, that from the Island of Lemnos especially having been esteemed from the days of Herodotus among the Greeks, and this product retained its reputation in Western Europe down to the seventeenth century. It is still used by the Turks and neighbouring nations. The Lemnian earth is a greasy clay which is dug from a desolate hill in the island and consists of silica, alumina, chalk, and magnesia, with a little oxide of iron which gives it a red tint. It acquired the fame of being an antidote to all poisons, and was given in dysenteries, internal ulcers, and hæmorrhages; also in gonorrhœa, and in pestilential fevers. Externally it was applied to festering wounds. The characteristic of the best Lemnian earth was its greasy feel and freedom from grit.

A sufficient supply of this Lemnian earth is still, and has been certainly from the time of Galen, dug out of the hill only on one day of the year, with considerable ceremony and in the presence of the principal inhabitants of the island. At present the ceremony is largely a religious one, and the day fixed for it is the 6th of August, which in the Greek church calendar is the Fête of the Saviour. Formerly the ceremony was originally associated with the worship of Diana, and the date of the performance was the 6th of May. The particular earth may not be dug by any one on any other day of the year except that formally set apart for the operation. According to Dioscorides the earth was made up into a paste in his time with goats' blood, but when Galen visited the place 150 years later he could find no evidence of this addition.

Lemnian earth was, and I presume still is, a monopoly of the Sultan of Turkey. Most of the produce of the day's digging was sent to Constantinople and was made up into round tablets of about half an ounce in weight, which were stamped with designs similar to those shown in the accompanying sketches. At one time it is said the figure of Artemis (Diana) or the goat, which was one of her symbols appeared on the tablets, and it may be from this that the story of the goat's blood originated.



Many other sealed earths were also more or less used in medicine, and were credited with similar virtues. The Terra Mellitea came from Malta and was alleged to have a special power against the bites of serpents, Malta, vipers, and St. Paul thus associating themselves in the public mind. These cakes bore the effigy of St. Paul, and a popular legend attributed their efficacy to a blessing on the earth of the island when the apostle landed there. There were besides Terra Samia, from the Isle of Samos; Terra Sicula or Fossil Bezoar from Sicily; Terra Portugallica, stamped with the figure of a rose, from Portugal; Terra Strigensis or Germanica from Strigonium in Hungary, stamped with a design, suggesting mountain peaks and cross-keys on them; and Terra Livonica. Naturally the temptation of selling soil at fabulous prices per shovelful appealed to all nations.

The appended formulas from Geoffroy's Materia Medica (written before 1731) will show how this sealed earth was used. Both are for dysentery.

Lemnian earth, ʒi, syrup of quinces, 1 oz., plantain water, and knot grass water, of each 3 oz. Spoonful doses.

Lemnian earth, conserve of red roses, conserve of hips, of each ½ oz.; syrup of bearberries sufficient to make a soft electuary. Take ʒi morning and evening.

Several so-called "alexipharmic powders" or mixtures much more complex than the preceding were prescribed in small-pox, fevers, and pestilential diseases.

Oil of Bricks.

Oil of Bricks appeared in the earlier London and Edinburgh pharmacopœias and in many foreign formularies. It was long held to be a specially valuable application in gouty and rheumatic pains, and was especially in repute as a cure for deafness. It was also sometimes given as an internal remedy. Among its synonyms were those of oleum philosophorum, oleum sanctum, oleum divinum, and oleum benedictum; but as these names were adopted for selling purposes they may not have meant much. The process given in the P.L. 1746 was to heat bricks red-hot and quench them in olive oil until they had soaked up all the oil. They were then broken into small pieces and put into a retort, and by means of a sand-bath with a gradually increasing heat a distillate of oil and so-called spirit was obtained. The spirit was water impregnated with empyreumatic oil. The oil was nothing but an empyreumatic olive oil.

Arquebusade Water

was the original of many vulnerary waters invented for application to wounds, bruises, and ulcers. It was a weak, spirituous distillate from a large number of herbs and aromatic plants, such as angelica, rosemary balm, hyssop, mint, rue, sage, and wormwood. These would furnish an antiseptic lotion. As the arquebus was displaced by the musket about the end of the sixteenth century it may be supposed that the lotion acquired its name and popularity at that same period; but these evidently lasted for a long time, as we find that a certain John Thomson took out a patent for “a concentrated balsam of arquebusade” in 1786.

Four Thieves Vinegar

is the sub-title of the Antiseptic Vinegar of the French Codex. It is a strong vinegar in which a number of aromatics with camphor and garlic have been macerated. The story of its origin is that in the year 1720 a plague was raging in the city of Toulouse, and that during the period of panic four thieves went about the city plundering the dead and dying. People wondered why they never took the disease, and when they were ultimately brought to justice and convicted, they were offered pardon if they would reveal the secret of their prophylactic. This is the legend as given by Littré, who quotes it from Abbé Lemontey. Other authors make Marseilles the scene of the exploit.

Elixir Proprietatis.

This medicine was very celebrated in all countries for several centuries, and, though not in the British Pharmacopœia, was official under the name which Paracelsus gave it in the P.L. 1724, as Elixir of Aloes in the P.L. 1746, and later as Tinct. Aloes Co. In the Ph. Ed. it was called Tinct. Aloes et Myrrhæ, and this was the most usual name for it until quite recent times, and probably is still. Paracelsus wrote about it and extolled it as a compound which would prolong life to its utmost limits. That he used the same ingredients mainly as his successors is certain, but he never gave any clear formula. His disciple, Oswald Crollius, however, deduced from his writings that it was a tincture of aloes, myrrh, and saffron, with sulphuric acid. Boerhaave substituted vinegar for the sulphuric acid and left most of that behind by distillation. Van Helmont had previously made an Elixir Proprietatis without any acid; and in many continental pharmacopœias the elixir was made alkaline by the addition of carbonate of potash. This also originated with Boerhaave. Other authors added a few spices. The Elixir of Garus which still appears in the French Codex was the same sort of preparation but with cinnamon, cloves, nutmeg, and other ingredients, diluted with syrup of maidenhair. Garus was a grocer, who acquired great popularity under the Regency with his Elixir. St. Simon says he cured the Maréchal de Villars with it, and that he would probably have saved the life of the Duchesse de Berry if the physician Chirac, jealous of his fame, had not administered to her a purgative which killed her ("Mem. de St. Simon," cxi, pp. 140–228).

Balsam of Sulphur

was a famous medicine up to our own days. It appears now to have dropped out of use. It was highly commended by Van Helmont, Rulandos, Boyle, and indeed by most of the medical experts of the seventeenth century, and was compounded from many different formulæ. The simple balsam was made by boiling one pound of flowers of sulphur with four times its weight of olive oil until the sulphur was dissolved and a thick dark balsamic substance was obtained. This was the formula of the P.L. 1746. But linseed oil and walnut oil were often prescribed in preference to olive oil, and oil of anise, oil of amber, oil of juniper, white wine, Barbadoes tar, turpentine, myrrh, aloes, and saffron; one or more of these substances were combined with the balsam in other receipts. The use of the balsam was generally for coughs, asthmas, and lung diseases. Salmon says, "It is of good use to digest crude humours and undigested matter in any part of the body, being often anointed upon the same." The terebinthinated balsam was given in stone; a combination with iron, Balsamum Sulphuris Martis, was prescribed in gravel. These balsams were applied externally to ulcers, or taken in doses of from five to forty drops.

XVII

PHARMACOPŒIAS

> But here is one prescription out of many:—
> Sodæ sulphat. ʒvi, ʒss Mannæ optim.,
> Aq. fervent, f℥iss, ʒii Tinct. Sennæ
> Haustus (and here the Surgeon came and cupp’d him),
> R. Pulv. Com. gr. iii Ipecacuanhæ
> (With more besides if Juan had not stopp’d ’em).
> Bolus Potassæ Sulphuret sumendus,
> Et haustus ter in die capiendus.
>
> Byron: *Don Juan*, Canto x (41).

The London Pharmacopœia.

The collection of medicinal formulas was a favourite occupation of ancient medical writers. Galen and Avicenna, Mesué and Serapion, Nicholas Prepositus and Nicolas of Salerno were the authors of the dispensatories most esteemed up to the sixteenth century in Europe. The College of Medicine of Florence adopted an Antidotarium in the early part of that century, and in 1524 the Senate of Nuremberg made the Dispensatory of Valerius Cordus official in that city. Augsburg followed the example of Nuremberg, and the Pharmacopea Augustana of 1601 was probably the first work of the kind designated a Pharmacopœia and issued under authoritative sanction. A quasi-official Dispensatorium for the State of Brandenburg, forerunner of the Prussian Pharmacopœia, came next in 1608, and the London Pharmacopœia, which appeared in 1618, was the first really national publication of that character. The first French Codex was published in 1639, and no other work of similar standing was issued until the next century.

The College of Physicians was incorporated by Charter in the reign of Henry VIII, in the year 1518. The idea of preparing an official pharmacopœia was first considered by the College on June 25th, 1585, “but as the matter seemed weighty” (*sed quoniam res videbatur operosa*), the deliberation on it was postponed and was only resumed on October 10th, 1589. On this occasion ten committees were appointed and to these were assigned the work of selection and compilation distributed thus:—Committee 1 was charged with Syrups, Juleps, and Decoctions; 2 took Oils; 3, Waters; 4, Liniments, Ointments, Cerates, and Plasters; 5, Juices, Conserves, Candies, and Confections; 6, Extracts, Salts, Chemicals, and Metallic Preparations; 7, Powders and Dragees; 8, Pills; 9, Electuaries, Opiates, and Eclegmas (looches); 10, Lozenges and Eye-salves.

The work must have been carried on leisurely, for it is not mentioned in the minutes again until 1614, when eight fellows were appointed to examine certain foreign Antidotarii. In 1616, an editing committee was appointed, and all the collaborators were called upon to send their papers to this body. It then appeared that many which had been prepared had been lost, a misfortune attributed to the carelessness of the recently deceased President, Dr. Forster. His successor, Dr. Atkins, put more energy into the business and consequently the manuscript was completed and in type by the day after Palm Sunday, 1618. Sir Theodore Mayerne was commissioned to write a dedication of the work to King James I, and his Majesty's proclamation requiring all the apothecaries in the realm to obey this Pharmacopœia and this only, was dated April 26th, 1618. It will be observed that exactly a century intervened between the incorporation of the College and the production of the Pharmacopœia.

The President was evidently a smart man, but the printer was still smarter, for while the former was out of town for a few days the printer rushed the publication through, "surreptitiously and prematurely," as the College officially declared, with a number of errors and imperfections, on May 7th, 1618. This presumptuous printer was one John Marriot, at the inappropriate sign of the White Lily "in platea vulgo dicta Fleet Street." On December 7th in the same year the College brought out a corrected edition, to which they appended an epilogue, expressing their opinion of their offending "typographus" in terms which left no excuse for not appreciating their dissatisfaction with him.

The first London Pharmacopœia did not err on the side of condensation. It comprised 1028 simples and 932 preparations and compounds. Among the simples were 31 animals and 60 parts of animals or derivatives from them. The herbs named numbered 271, and there were 138 roots and 138 seeds. Among the preparations were 178 simple and 35 compound waters, 3 medicated wines, 10 medicated vinegars, 1 vulnerary potion, 8 decoctions, 90 syrups, 18 mels and oxymels, 18 juices and linctuses, 115 candies and conserves, 43 species or powders, 58 electuaries, 36 pills, 45 lozenges, 151 oils of various kinds, 53 ointments, 51 plasters and cerates, and 17 chemicals.

The names of the inventors of many of the compounds were duly attached to the formulas, some of which were very elaborate and complicated. Rufus of Ephesus, physician to the Emperor Trajan, the Arabian doctors, Nicolas, Rivierus, Fracastor, Fallopius, and many others are thus quoted. There were 211 preparations with more than ten ingredients in each, and one, the Antidotus Magnus Matthioli, called for 130 substances in its composition, among the 130 being Mithridatium and Theriaca which would have contributed another hundred between them. Medicated waters which had been invented by Arnold de Villa Nova in the 13th century still commanded respect, over 200 different kinds being provided. Worms, swallows, frogs' spawn, and other animal remedies as well as the whole range of the vegetable kingdom were requisitioned to surrender their virtues to these waters by distillation. Syrups, honeys, oxymels, and lohochs were numerous and included syrups of white and red poppies, rhubarb, violets, marshmallow, coltsfoot, liquorice, oxymel of squills, and mel Egyptiaca. Powders of hot precious stones and of cold precious stones, powders of pearls and spices, and a compound senna powder; troches of various drugs; basilicon ointment and a multitude of plasters are formulated. Neapolitan ointment was our blue ointment, the mercury being killed by fasting spittle. An itch ointment was made with corrosive sublimate. May butter was a favourite ingredient in ointments. It was butter made in May, melted in the sun, strained and kept the year through. Oils was a term of wide significance. Not only were expressed and distilled oils included in the reference, but oils in which things had been infused, as oil of ants, of bricks, of earthworms, of wolves, and oil of vitriol was also in the same classification. Vipers in lozenges were there, lohoch of foxes' lungs was the great remedy for asthmatic complaints, and a modification of Vigo's plaster with its live frogs and worms and vipers' flesh was not omitted. The full list of the animal substances recognised as medicinal in this Pharmacopœia and its two successors has been given in the Section on Animal Medicines.

TITLE-PAGE OF THE LONDON PHARMACOPŒIA.
(From the reprint of the First Edition, 1627.)

Chemicals included calomel, turpeth mineral, flowers of sulphur, the mineral acids, preparations of steel and antimony, sugar of lead, and caustic potash. The inclusion of some of these may no doubt be attributed to the influence of Sir Theodore Mayerne.

After the first Pharmacopœia had been several times reprinted a new one appeared in 1650. Notable features of this issue were that the gallon hitherto 9 lb. of water was now fixed at 8 lb.; corrosive sublimate and red and white precipitate were among the additions, but it has to be remarked that the white precipitate of that day was not what we know by name but really a precipitated proto-chloride of mercury. Its true chemical composition was not recognised until some fifty years later by Deidier in his "Chimie Raisonné." Tinctures formed a new class of preparations, seven of them being formulated, castor, saffron, and strawberries being among these. Syrup of buckthorn was added to the syrups, and Gascoin powder to the powders. Mercury was now killed by turpentine. Mezereon, Winter's bark, and cochineal were among the new drugs; antimonial wine made from the regulus of antimony was adopted; and the skull of a man killed by violence, and moss from that skull were admitted.

The third Pharmacopœia (1677) did not present many remarkable features, and was apparently rather hastily produced. The most striking new formula it contained was one for "Aqua Vitæ Hibernorum sive Usquebagh." Burnt alum, flowers of benzoin, balsams of capivi and tolu, contrayerva root, Jesuits' bark, and resin of jalap were among the new drugs. Steel wine was added.

Sir Hans Sloane presided over the compilation of the P.L. of 1721, the fourth of the series. The preface to this edition claimed that all remedies owing their use to superstition and false philosophy had been thrown out, but perhaps the far-reaching effects of the false philosophy were not fully appreciated. Many of the absurd old formulas were retained, but an approach to greater simplicity is apparent. The transition from the old to the new pharmacy can be traced very easily in this volume. The names of the plants, we are told in the preface, are "not only distinguished by the names known in shops, but also by such as are sometimes used by the more eminent writers in botany." Tinctures are growing in favour, their number being increased to 18. The number of waters and syrups is largely diminished, and puppies, hedgehogs, wagtails, bread-crust plaster, lapis lazuli pills, and Galen's unguentum refrigerans are dismissed. The last-named has, however, refused to die to this day. Among new chemical preparations Hepar Sulphuris (pot. sulphuret.), Flores Salis Ammoniaci Martiales (ammonio-chloride of iron), Tinctura Martis cum Spiritu Salis (tinct. ferri perchlor.), Sal Martis (ferri sulphas), Aqua Sapphirina (solution of ammonio-sulphate of copper), Lunar Caustic, Tartar Emetic, Ens Veneris, Aurum Mosaicum, Ethiops Mineral, Spirit of Sal Volatile, Mynsicht's tincture of steel, Elixir of Vitriol, and Lime Water may be mentioned.

The P.L. 1746 (the fifth) was very different from its predecessors. Among those who took an active part in its preparation were the President of the College, Dr. Plumptre, and Drs. Crowe, Mead, Heberden, and Freind. In the preface to this work the old "inartistic and irregular mixtures" and "the antidotes superstitiously and doatingly derived from oracles, dreams, and astrological fancies" are severely condemned, and the College declares its intention of freeing the book as much as possible from whatever remains of former pedantry. Notwithstanding these good intentions the old pharmacy is still abundantly represented. Crabs' eyes, coral, bezoar stones, harts' horns, woodlice, pearls, vipers, and skinks' bellies continue to figure among the simples, and formulas for Mithridatium with 45 ingredients, and for theriaca with 61 are likewise retained. On the other hand, human fat, unicorn's horn, mummy, spiders' webs, moss from the human skull, bone from the stag's heart, and lac virginale disappear. There are now 34 tinctures, while the medicated waters have been reduced to about 30 and the syrups to about 20. Tinctures of cummin, valerian, and cardamoms, syrup scilliticus, and pilula saponacea (soporific) are new; and lixivium saponarium (liquor potassæ), sal diureticus (potassæ acetas), causticum commune fortius (potassa cum calce), sal catharticus Glauberi, pilulæ mercuriales, and spiritus nitri dulcis make their first appearance.

The sixth P.L. (1788) proceeds on the same lines. The College claims to have paid special attention to the application of the advances of chemistry to pharmacy, and to have provided that very few traces of former superstition should remain. Mithridatium, theriaca, bezoar stones, vipers, and oil of bricks are dismissed, but woodlice remain. Materia medica synonyms are now according to Linnæus. Among the new drugs admitted we find aconite, arnica, cascarilla, calumba, kino, quassia, simarouba, castor oil, senega, and magnesia; and among the new preparations may be named Dover's powder, James's powder, Mindererus's spirit, Rochelle salts, tartrate of iron, oxide of zinc, Huxham's tincture of bark, ether, Hoffmann's anodyne, the decoctions of sarsaparilla, tincture of calumba, compound tinctures of benzoin, cardamoms, and lavender, and extract of chamomile. Tincture of opium made with proof spirit deposes the Tinctura Thebaica made with wine, and elixir paregoricum assumes the name of tinct. opii camphorata. A number of other names are changed. It is significant of the declining familiarity of doctors with Latin that for the first time an English translation of the Pharmacopœia is authorised.

The seventh P.L. is dated 1809. The new chemical nomenclature is introduced, and the minim substituted for the drop. Acidum vitriolicum becomes acidum sulphuricum, and ferrum vitriolatum is changed to ferri sulphas. More than a hundred articles are omitted, and nearly that number substituted. Among the new drugs and preparations are arsenic, belladonna, cajeput, cusparia, digitalis, infusions of calumba, rhubarb, and digitalis, compound decoction of aloes, acetum colchici, confections of roses, rue, and almonds, pulv. kino co, pil. cambogiæ co, emp. opii, ung. zinci, Griffiths' mixture and pills, Plummer's pills, lin. hydrargyri, cataplasm of yeast. Prepared woodlice, crabs' claws, tutty ointment, and the electuaries fall out.

The eighth P.L. (1824) recognised bismuth, cubebs, croton oil, and stramonium, and admitted confection of black pepper as a substitute for Ward's paste, and colchicum wine in imitation of the Eau Medicinale d'Husson. But the conservative College lacked the courage to endorse the claims of morphine, iodine, and quinine, though these were pretty generally established in medical practice at the time.

The Pharmacopœia of 1836 was largely the work of Richard Phillips, a very competent pharmacist, who had mercilessly criticised the edition of 1824. This, the ninth P.L., was brought well up to date with notes indicating the methods of ascertaining the purity of medicines, better methods of preparing chemicals, and the introduction of the most important of the new products. The alkaloids aconitine, morphine, quinine, strychnine, and veratrine found admission. Iodine and bromine and their compounds, hydrocyanic and phosphoric acids, creosote, ergot, and lobelia were also among the novelties. Acetum cantharidum, aqua flor. aurant., aqua sambuci, cataplasma lini, decoct. cinchonæ (2), extract. colchici corm., extract.

colchici acet., hydrarg. iodid. and biniodid., inf. krameriæ and inf. lupuli. lin. opii, liquor sodæ chlorinatæ, mist. spt. vini Gall., pil. rhei co. and tinct. colchici were the principal new compounds. Muriatic acid now became hydrochloric acid, subcarbonate of magnesia was advanced to be a carbonate, and tartarised antimony assumed the title of antimonii potassio-tartras.

The tenth and last of the London Pharmacopœias appeared in 1851. Henbane seeds, spigelia, oyster shells, and extract of digitalis were removed after longer or shorter periods of service, together with soda and potash waters, and biniodide of mercury and veratrine ointments, which had only found admission in the preceding edition. Cod-liver oil, chloroform, atropine, gallic and tannic acids, extract of nux vomica, tincture of aconite, tincture and ointment of belladonna, iodide of sulphur, chloride of zinc, and ammonio-citrate of iron, were the principal novelties now made official.

The first Edinburgh Pharmacopœia appeared in 1699 and the last in 1841, while the first Dublin Pharmacopœia was published in 1807 and the last in 1850. The Medical Act of 1858 authorised the fusion of the Pharmacopœias of the three kingdoms, and assigned the task of carrying out this work to the General Medical Council created by that statute. The first British Pharmacopœia was issued in 1864, but it failed to give satisfaction, and was superseded by a second dated 1867. The third and fourth editions were published in 1884 and 1898.

XVIII

SHAKESPEARE'S PHARMACY.

But law and the gospel in Shakespeare we find,
And he gives the best physic for body and mind.
GARRICK: *Shakespeare's Mulberry Tree*.

The two most familiar pharmaceutical allusions in Shakespeare's writings are the apothecary and his shop in "Romeo and Juliet" (Act V., Sc. 1), and the juice of cursed hebenon which Hamlet's uncle poured into the ear of his father ("Hamlet," Act I., Sc. 5). Some remarks on both these noted allusions are given separately. The medical knowledge of Shakespeare has been discussed by several eminent doctors, notably by Dr. J. C. Bucknill, of Exeter, who published a very interesting work under that title in 1860, in which the writer almost went so far as to hint at the possibility that the great dramatist must have had some training in the medical science of the day before he took to the theatre business. A similar suggestion was made by Lord Campbell in regard to the poet's legal knowledge.

Great interest in drugs and poisons was taken by the people generally in Queen Elizabeth's reign, and the medical controversies of the period filled a good many books. It is certain that Shakespeare at least skimmed a good many of these. "Galen and Paracelsus" are mentioned in "All's Well that Ends Well" (Act II., Sc. 3). In "Coriolanus" (Act II., Sc. 1) Menenius says of a letter from Coriolanus that it gives him an estate of seven years' health, adding "the most sovereign prescription in Galen is but empiricutick, and," compared with this letter, "of no better report than a horse-drench."

Apothecaries are mentioned in "Henry VI" (Part II., Act III., Sc. 3), when Cardinal Beaufort, delirious on his deathbed, cries, "Bid the apothecary bring the strong poison that I bought of him." Also in "Pericles" (Act III., Sc. 2), the amateur physician Cerimon, a Lord of Ephesus, who had studied medicine, and "by turning o'er authorities" had made himself familiar with "the blest infusions that dwell in vegetives, in metals, stones," gives a prescription to his servant, saying, "Give this to the 'pothecary, and tell me how it works." Apothecaries' weights are used as metaphors in "All's Well that Ends Well" (Act II., Sc. 3) when Lafeu, who has given Parolles "most egregious indignity," which the latter says he has not deserved, replies "Yes, good faith, every dram of it; and I will not bate thee a scruple," and by Falstaff, who, in his interview with the Chief Justice, refers rather enigmatically to drams and scruples. Falstaff again, in "Merry Wives of Windsor," is responsible for the simile of those who "smell like Bucklersbury in simple time." The Dr. Caius in the same play, with his "by gar" and comical English, is assumed by some interpreters to have been a burlesque on Sir Theodore Mayerne, but except that Mayerne was French and certainly spoke English with a foreign accent, there is no reason for associating him with the character. Mayerne never acquired English. In one of his later letters he writes of Lady Cherosbury, for Shrewsbury. There was a very famous Dr. Caius, who had been physician to Queen Elizabeth, who founded Caius College, Cambridge, and who died in 1573, not so very long before this play was written. But it is agreed that he could not have been the original of the caricature.

Of the drugs and pharmaceutical preparations named by Shakespeare most would be familiar to anyone acquainted with the literature of the day. "Throw physick to the dogs," says Macbeth to the physician who is telling him of the mental illness of Lady Macbeth. Then, his mind recurring to the war in which he was engaged, he demands of the doctor "What rhubarb, senna, or what purgative drug would scour these English hence?" (Act V., Sc. 3). In the same play (Act I., Sc. 3), Banquo asks when the witches vanish, "Have we eaten of the insane root That takes the reason prisoner?" There are many allusions in classical literature to herbs which destroyed the reason. In Plutarch's life of Antony, for example, there is an account of some Roman soldiers in the Parthian war eating a root which deprived them of all memory, and it is said they occupied themselves in digging, and in hurling stones from one place to another. Among the ingredients of the witches' cauldron (Act IV., Sc. 1), the animal substances named recall much of the pharmacy of the period, but only one vegetable drug, "root of hemlock, digg'd i' the dark," is named. Lady Macbeth (Act II., Sc. 2) tells how she has drugg'd the possets of Duncan's grooms, so that "death and nature do contend about them Whether they live or die." In Act V., Sc. 1, she complains that "all the perfumes of Arabia" will not sweeten her hand from the smell of blood. It is also in this play that the description of Edward the Confessor curing the King's Evil (see Vol. I, p. 299) occurs.

In the "Comedy of Errors" (Act IV., Sc. 1) Dromio of Syracuse tells Antipholus of Ephesus that he has found a bark for him, put the freightage on board, and bought "the oil, the balsamum, and aqua-vitae." In Act V., Sc. 1, the Abbess declares that Antipholus having taken sanctuary in the Priory she will not let him stir, "Till I have used the approved means I have, with wholesome syrups, drugs, and holy prayers, To make of him a formal man again."

In "Much Ado about Nothing" (Act III., Sc. 4) Margaret recommends the love-sick Beatrice to "get you some of this distilled Carduus Benedictus, and lay it to your heart; it is the only thing for a qualm." This drug was in great repute in Shakespeare's time and was used for a multitude of complaints. Woodall says the distilled water of it "doth ease the pain of the head, conformeth the memory, cureth a quartane, provoketh sweat, and comforteth the vital spirits." The Physician in "King Lear" (Act IV., Sc. 4), tells Cordelia there are "many simples operative whose power will close the eye of anguish."

The story of "All's Well that Ends Well" is based on a secret remedy for fistula which Helena had acquired from her deceased father, and with which she heals the King. The Queen in "Cymbeline" is an amateur pharmacist. In Act I., Sc. 6, she tells the doctor that he has taught her how "to make perfumes, distil, preserve"; and in Act V., Sc. 5, the doctor tells the King that on her deathbed she confessed she had "a mortal mineral" which would "by inches waste you."

In the "Midsummer Night's Dream" (Act III., Sc. 1), a fairy named Cobweb gives Bottom the opportunity of alluding to the usefulness of cobwebs for cut fingers. "In Twelfth Night" Sir Toby Belch jocularly addresses Maria as "My nettle of India" (Act II., Sc. 5), probably Indian hemp. We read of "parmaceti," "the sovereign'st thing on earth for an inward bruise," and also of the "villainous saltpetre" in Act I., Sc. 3, of "Henry IV." Part I.; in the second part (Act I., Sc. 2) there is an allusion to the fashion of diagnosis by the examination of a person's water; and in Act IV., Sc. 4, we find mention of the deadly character of aconitum, and in the same scene of gold "preserving life in medicine potable." In "Antony and

Cleopatra," the Queen greets Antony's messenger with the remark that though so much unlike him yet that "coming from him, that great medicine hath with his tinct gilded thee" (Act I., Sc. 5), evidently an allusion to the tincture of gold. Another reference to potable gold is found in "All's Well that Ends Well."

The plantain for a broken shin is called for by Costard in "Love's Labour's Lost" ("plantain, a plain plantain; no salve, sir, but a plantain," Act III., Sc. 1); plantain leaf for a broken shin is also recommended by Romeo (Act I., Sc. 2). In the same scene occur the words so dear to homeopaths: "One fire burns out another's burning." In "King John" (Act V., Sc. 2,) revolt is likened to a plaster which will heal "inveterate canker of the wound by making many."

In "Henry VI.," part II. (Act V., Sc. 1) York quotes the legend of Achilles' spear "able to kill or cure"; while in "Hamlet" (Act IV., Sc. 7) Laertes declares that he will anoint his sword with unction bought of a mountebank;

> "No mortal that but dips a knife in it,
> Where it draws blood, no cataplasm so rare,
> Collected from all simples that have virtue
> Under the moon, can save the thing from death
> That is but scratched withal."

The action of drugs as charms is much in evidence in "Othello." The father of Desdemona accuses the Moor of having

> "Practised on her with foul charms,
> Abused her delicate youth with drugs or minerals
> That awaken motion."

And again Brabantio tells the Duke that Desdemona has been stolen from him

> "And corrupted
> By spells and medicines bought of mountebanks."

These allusions all occur in scenes 2 and 3 of the first Act; in the latter also Iago promises Roderigo that Desdemona shall soon be to Othello "bitter as coloquintida." At the end of this play Othello describes his "subdued eyes dropping tears as fast as the Arabian trees their medicinal gum."

Autolycus refers to aqua vitæ as a restorative in the "Winter's Tale" (Act IV., Sc. 3), as does the nurse in "Romeo and Juliet" when she finds her mistress dead (Act IV., Sc. 5). The "popinjay" takes snuff in "Henry IV." (part I., Act I., Sc. 3), Cleopatra calls for mandragora to drink "that I might sleep out this great gap of time my Antony is away" ("Ant. and Cleop.," Act I., Sc. 5). "Not poppy nor mandragora, nor all the drowsy syrups of the world," said Iago, shall medicine Othello against the poison he has given him ("Othello," Act III., Sc. 3). "Sleepy drinks" are mentioned in the "Winter's Tale," (Act I., Sc. 1), and in the same play ("Winter's Tale," Act II., Sc. 1) Shakespeare uses the word "land-damn," which some of his commentators have been disposed to identify with laudanum. The King of Sicily grossly insults his wife, Hermione, declaring her to be an adultress, Antigonus warmly defends her and assures the King that he has been "abused by some putters-on who will be damn'd for't," and he adds,

> "Would I knew the villain,
> I would land-damn him."

The idea is that this may be a misprint for laudanum, meaning, "I would poison him." It must be added that this explanation does not find much favour, and perhaps it is rather far-fetched. It is mentioned by Stevens as having been proposed by Dr. Farmer, but Furness thinks that Stevens was poking fun at the solemn nonsense of his learned friend. But the other interpretations are not much better. There is, it appears, an old dialect word "lan-dan" which meant following a man with kettles and other rough music. Another suggested meaning is an association with an old Saxon word (hland) for urine, conveying the notion that the villain is to be made ill by a suppression of urine. Both these explanations seem ludicrously insufficient to express the anger of the speaker. Damn him up with land, that is, bury him alive, is gruesome enough, but this is an obscure way of expressing the proposal. Johnson disposes of the term by the theory that it was "a word which caprice brought into fashion, and reason and grammar drove irrevocably away. It has also been assumed, and this looks likely, that the punctuation has got misplaced and that the sentence should read “I would—Lord damn him.”

Shakespeare’s favourite daughter Susannah was married to Dr. John Hall, and it is possible that the doctor and his wife lived with the poet in his later years at Stratford. Dr. Hall was a practitioner of some eminence, and wrote a book in Latin (translated into English in 1657 by James Cook) entitled “Select Observations ... Cures Empirical and Historical on Very Eminent Persons in Desperate Disorders.” The following, which is Observation 60, is worth quoting for the picture it gives of pharmacy in the Elizabethan age.

“Talbot, the first born of the Countess of Salisbury, aged about one year, being miserably afflicted with a fever and worms, so that death was only expected, was thus cured. There was first injected a clyster of milk and sugar. This gave two stools and brought away four worms. By the mouth was given hartshorn burnt, prepared in the form of a julep. To the pulse was applied Ung Populeon ʒii mixed with spiders’ webs, and a little powder of nutshells. It was put to one pulse of one wrist one day, to the other the next. To the stomach was applied mithridate; to the bowel the emplaster against worms. And thus he became well in three days, for which the Countess returned me many thanks and gave me great reward.”

The Apothecary in “Romeo and Juliet”

is a favourite illustration of the scrupulous care which Shakespeare bestowed on the revision of his dramas. The story on which the play is founded is well known to students. It was written by an Italian novelist, Luigi da Porto, of Vicenza, and was entitled “La Giuletta.” This author died in 1529. In Girolamo de la Corte’s “History of Verona,” published at Venice in 1549, it is given and stated to be a true story. An English translation of it in rhyme by Arthur Brooke appeared in 1562, and a prose translation by Painter some time later. The version by Brooke is entitled “The Tragicall Historie of Romeus and Juliet,” and it is from this that Shakespeare took not only the incidents, but, as will be seen, some of his expressions. Brooke describes Romeus in Mantua, resolved to die, and looking for a shop where he may buy poison.

Brooke’s Version, 1562.

And then from street to street he wand'reth up and down
To see if he in any place may find in all the town
A salve meet for his sore, an oil fit for his wound,
And seeking long, alas, too soon, the thing he sought he found,
An apothecary sat unbusied at his door,
Whom by his heavy countenance he guessed to be poor;
And in his shop he saw his boxes were but few,
And in his window of his wares there was so small a shew.
Wherefore our Romeus assuredly hath thought
What by no friendship could be got with money should be bought.
For needy lack is like the poor man to compel
To sell that which the city's law forbiddeth him to sell.
Then by the hand he drew the needy man apart
And with the sight of glittering gold inflamed well his heart.
"Take fifty crowns of gold (quoth he) I give them thee
So that before I part from hence thou shalt deliver me
Some poison strong that may in less than half an hour
Kill him whose wretched hap shall be the poison to devour."
The wretch by covetisse is won and doth assent
To sell the thing whose sale ere long too late he doth repent.
In haste he poison sought and closely he it bound
And then began in whisp'ring voice thus in his ear to round:
"Fair Sir (quoth he), be sure this is the speeding gear,
And more there is than you shall need; for half of that is there
Will serve, I undertake, in less than half an hour
To kill the strongest man alive. Such is the poison's power."

Shakespeare's First Rendering.

This is the rendering of the scene from Shakespeare's first quarto edition, 1597:

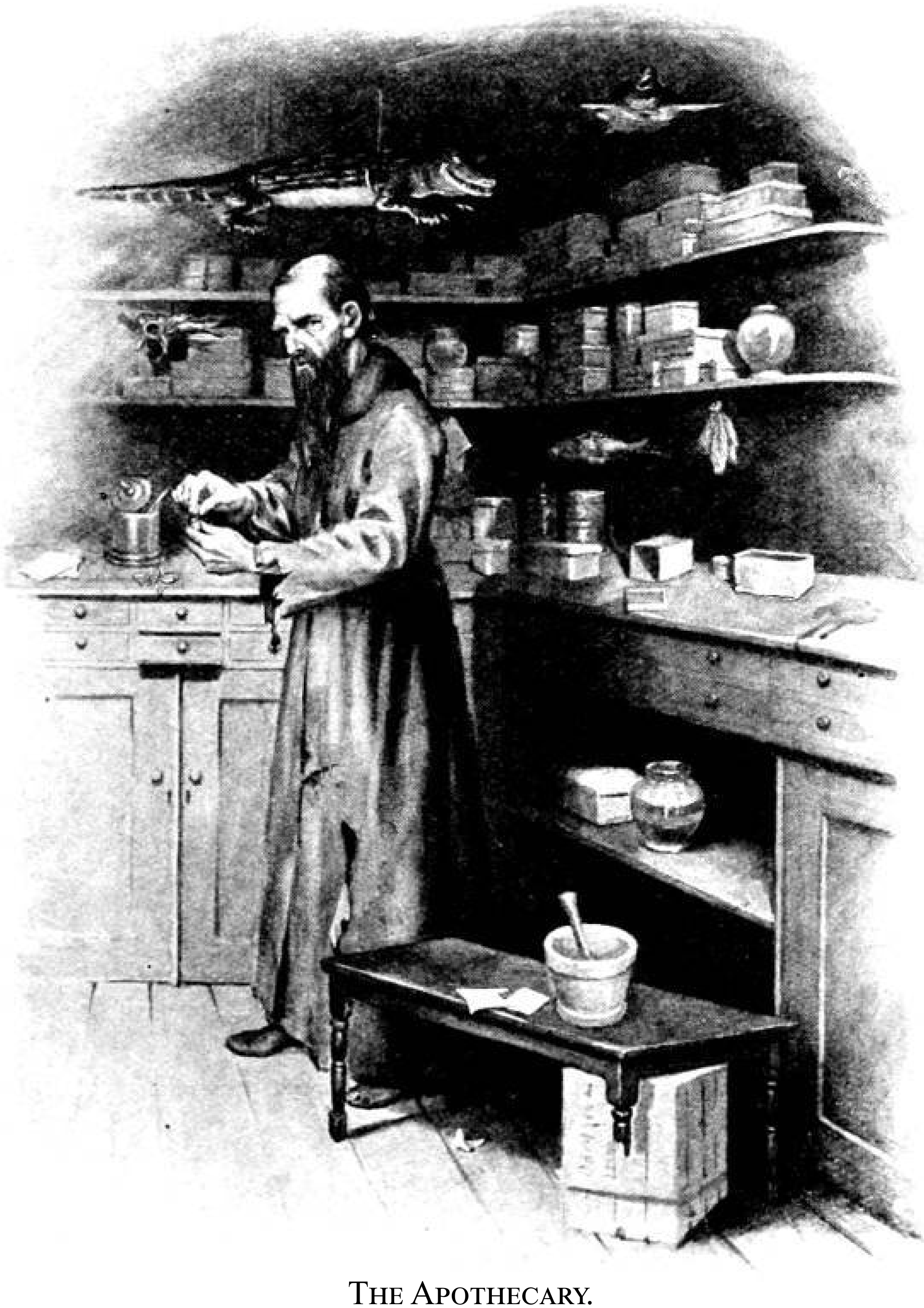
As I do remember
Here dwells a pothecarie whom oft I noted
As I past by, whose needie shop is stuft
With beggarly accounts of empty boxes.
And on the same an Aligarta hangs,
Olde ends of packthred, and cakes of roses
Are thinly strewed to make up a show.
Here as I noted thus with myselfe I thought:
Ah, if a man should need a poison now,
(Whose present sale is death in Mantua),
Here he might buy it. This thought of mine
Did but forerune my need; and hereabout he dwells.
Being holiday the beggar's shop is shut.
What ho! Apothecary! Come forth I say.
Ap. Who calls? What would you, Sir?
Rom. Here's twenty ducats.
Give me a dram of some such speeding gere
As will despatch the weary taker's life
As suddenly as powder being fired
From forth a cannon's mouth.
Ap. Such drugs I have, I must of force confesse,
But yet the law is death to those that sell them.
Rom. Art though so bare and full of poverty,
And dost thou fear to violate the law?
The law is not thy friend nor the law's friend,
And therefore make no conscience of the law.
Upon thy back hangs ragged misery
And starved famine dwelleth in thy cheeks.
Ap. My poverty but not my will consents.
Rom. I pay thy poverty but not thy will.
Ap. Hold, take you this and put it
In any liquid thing you will, and it will serve,
Had you the lives of twenty men.
Rom. Hold, take this gold, worse poison to men's souls
Than this which thou hast given me. Go hie thee hence,
Go, buy thee cloathes, and get thee into flesh:
Come cordial and not poison, go with me
To Juliet's grave, for there must I use thee.

Shakespeare was a busy man in 1597, and in the years before as well as about that date he was preparing novelties for his theatre. Later he had more leisure, and it is interesting to notice how artistically he fills out his original sketch with only just such details as make the ideas more vivid. In the revised version of this scene, published in 1609, there are no new ideas, but scarcely a line is left untouched. A comparison of title-pages in the two editions is amusing and at the same time instructive. In 1597 it reads: “An Excellent Conceited Tragedie of Romeo and Juliet as it hath been often (with great applause) plaid publiquely.” In 1609 this is toned down to “The most Excellent and Lamentable Tragedie of Romeo and Juliet as it hath been sundri times publiquely Acted.” The omission of the parenthetic (“with great applause”) is significant. The poet knows he no longer needs meretricious advertisement. The scene as we have it in our modern books is very similar to

Shakespeare’s Revised Version (Third Quarto, 1609).

Rom. I do remember an apothecary
And hereabouts he dwells—whom late I noted
In tatter'd weeds, with overwhelming brows,
Culling of simples; meager were his looks,
Sharp misery had worn him to the bones;
And in his needy shop a tortoise hung,
An alligator stuff'd, and other skins,
Of ill-shap'd fishes; and about his shelves
A beggarly account of empty boxes,
Green earthen pots, bladders, and musty seeds,
Remnants of packthread, and old cakes of roses,
Were thinly scatter'd to make up a show.
Noting this penury, to myself I said—
And if a man did need a poison now,
Whose sale is present death in Mantua,
Here lives a caitiff wretch would sell it him.
O, this same thought did but fore-run my need;
And this same needy man must sell it me.
As I remember this should be the house;
Being holiday, the beggar's shop is shut—
What ho! Apothecary!
Ap. Who calls so loud?
Rom. Come hither, man. I see that thou art poor;
Hold, there is forty ducats; let me have
A dram of poison; such soon speeding gear
As will disperse itself through all the veins,
That the life-weary taker may fall dead;
And that the trunk may be discharg'd of breath
As violently as hasty powder fired
Doth hurry from the fatal cannon's womb.
Ap. Such mortal drugs I have; but Mantua's law
Is death to any he that utters them.
Rom. Art thou so bare, and full of wretchedness,
And fear'st to die? famine is in thy cheeks.
Need and oppression starveth in thy eyes,
Contempt and beggary hangs upon thy back,
The world is not thy friend, nor the world's law;
The world affords no law to make thee rich;
Then be not poor, but break it, and take this.
Ap. My poverty but not my will consents.
Rom. I pray thy poverty and not thy will.
Ap. Put this in any liquid thing you will
And drink it off; and if you had the strength
Of twenty men, it would despatch you straight.
Rom. There is thy gold, worse poison to men's souls
Doing more murders in this loathsome world
Than these poor compounds that thou may'st not sell.

I sell thee poison, thou hast sold me none.
Farewell; buy food, and get thyself in flesh.
Come cordial, and not poison; go with me
To Juliet’s grave, for there I must use thee.



THE APOTHECARY.
(Drawn by Miss K. Righton.)

Two lines in the accepted version have been the subject of much controversy, sometimes of an acrimonious character among critics. Both sides quote one or other of the early editions in support of their contentions. One of the lines is "Need and oppression starveth in thy eyes." It is fiercely held that "starveth" in this expression should be "stareth." And in the famous line "I pray thy poverty and not thy will" ordinary readers naturally think "pay" should be substituted for "pray." The defenders of the quoted versions contemptuously reply that it is because we are only commonsense people and not poets that we cannot rise to the height of appreciating the meaning of the more recondite phrases that makes us suggest the emendations.

Hebenon.

The "juice of cursed Hebenon," which according to the Ghost, was the poison chosen by Hamlet's wicked uncle to kill his father by dropping some of it into his ears during his afternoon nap, has been much discussed by commentators. Authorities generally favour either henbane or ebony (hebenus). Some occasional opinions may be found suggesting other poisons, but they do not carry much weight. Dr. Paris, for example, in "Pharmacologia" proposes the essential oil of tobacco, quoting in support of his opinion the authority of Gerard, who says it was "commonly called the henbane of Peru." Dr. Bucknill remarks that the poet could not have meant henbane because that herb is not a virulent poison, and would not have had the effect attributed to it. But no dramatist would care to have his fancies subjected to the test of science in this way. Possibly Shakespeare would hardly have cared to justify the introduction of the ghost by strict evidence. Dr. Bucknill decides that as no poison will fit the description the term was used as a generic one for a drug producing "hebetudo animi." In Beisley's "Shakespeare's Garden" it is suggested that hebenon may have been a misprint for eneron, nightshade, which Dyce, a prominent authority, politely dismisses as a "villainous conjecture."

A plausible German interpretation of hebenon is that it is derived from *Eibenbaum*, the yew-tree. Eibe was the Saxon name for the yew, and its poisonous properties were recognised from very ancient times. It is probable that some of the quotations which have been credited to ebony may have been really due to the yew. Spenser, for example, writes: "Lay now thy Heben bow aside"; "A speare of Heben wood" and "trees of bitter gall and Heben sad." These references are more likely to be to the yew than to the ebony: and certainly could not have been applied to the henbane weeds. Gower (1390) has "Of hebanus the sleepy tree." In Marlowe's "Jew of Malta" (1592, contemporary with Shakespeare), several deadly things are grouped thus:—

> "The blood of Hydra, Lerna's bane,
> The juice of Hebon, and Cocytus' breath."

There is no tradition of poisonous properties associated with ebony, as there is with both henbane and yew, but in regard to henbane, a remarkable passage has been found in Holland's translation of Pliny which was published in London just about the time when Shakespeare was writing "Hamlet." Pliny, dealing with henbane, says (in this translation): "An oile is made of the seed thereof which if it be but dropped into the eares is ynough to trouble the braine." Shakespeare must have been a voracious reader, he probably got Holland's book as soon as it came out, and finding this passage, adopted the suggestion. He was no doubt familiar with the word hebon or hebonus, and chose that for his verse, perhaps without caring very much whether it was a correct interpretation of henbane or not. As a matter of fact, in the earlier editions of "Hamlet" the word appears as hebona. In the folios, which came later, hebonon is substituted, no doubt out of consideration for euphony.

It is notable that the player who enacts the murder of the King (Act III., Sc. 2) describes the poison as a

> "Mixture rank of midnight weeds collected,
> With Hecat's ban thrice blasted, thrice infected."

This of course does not correspond with the suggestion that the juice of hebenon was the product of some one poisonous plant.

XIX

SOME NOTED DRUGS.

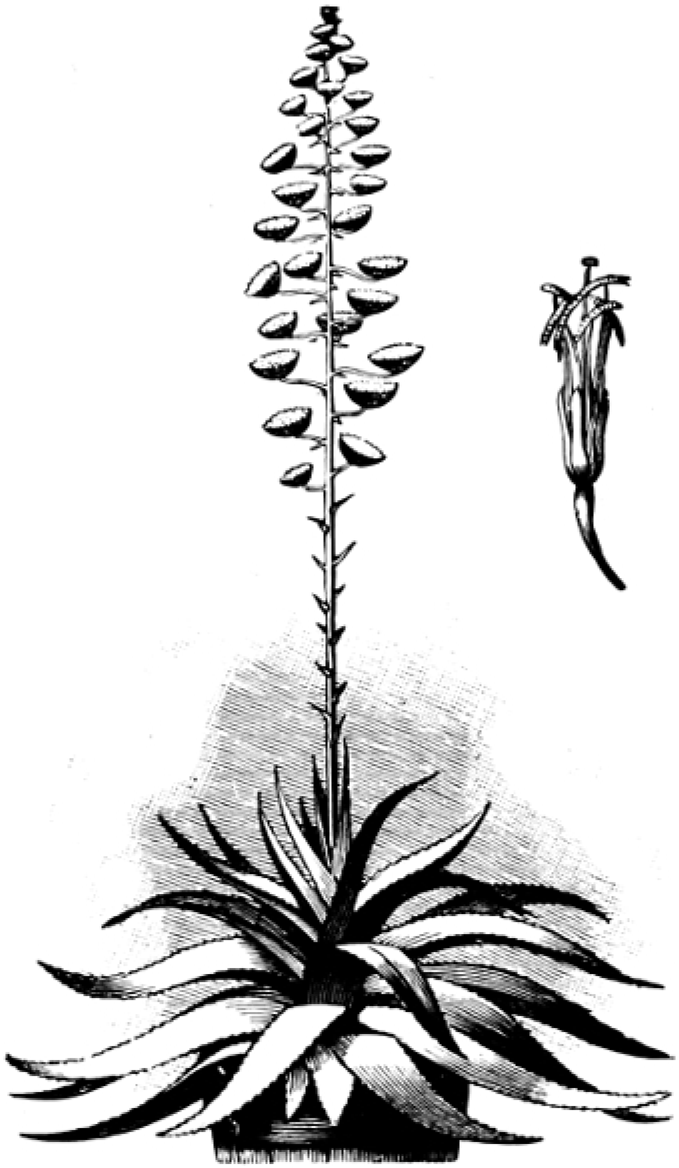
> Who was the first cultivator of corn? Who first tamed and domesticated the animals whose strength we use, and whom we make our food? Or who first discovered the medicinal herbs which from the earliest times have been our resource against disease?
>
> Cardinal Newman: Sermon on *The World's Benefactors*.

The most valuable and original records of the history of drugs are to be found in "Pharmacographia" by F. A. Flückiger of Strasburg and Daniel Hanbury of London (published by Macmillan & Co.). I have as a rule avoided copying details from that work, although I have dealt with no subject without referring to it. In this section, however, the drugs named are of course treated in "Pharmacographia," and necessarily the facts given must to some extent correspond. But comparison would show that I have only selected subjects which were capable of discussion from a somewhat different point of view from that which guided Messrs. Flückiger and Hanbury.[1]

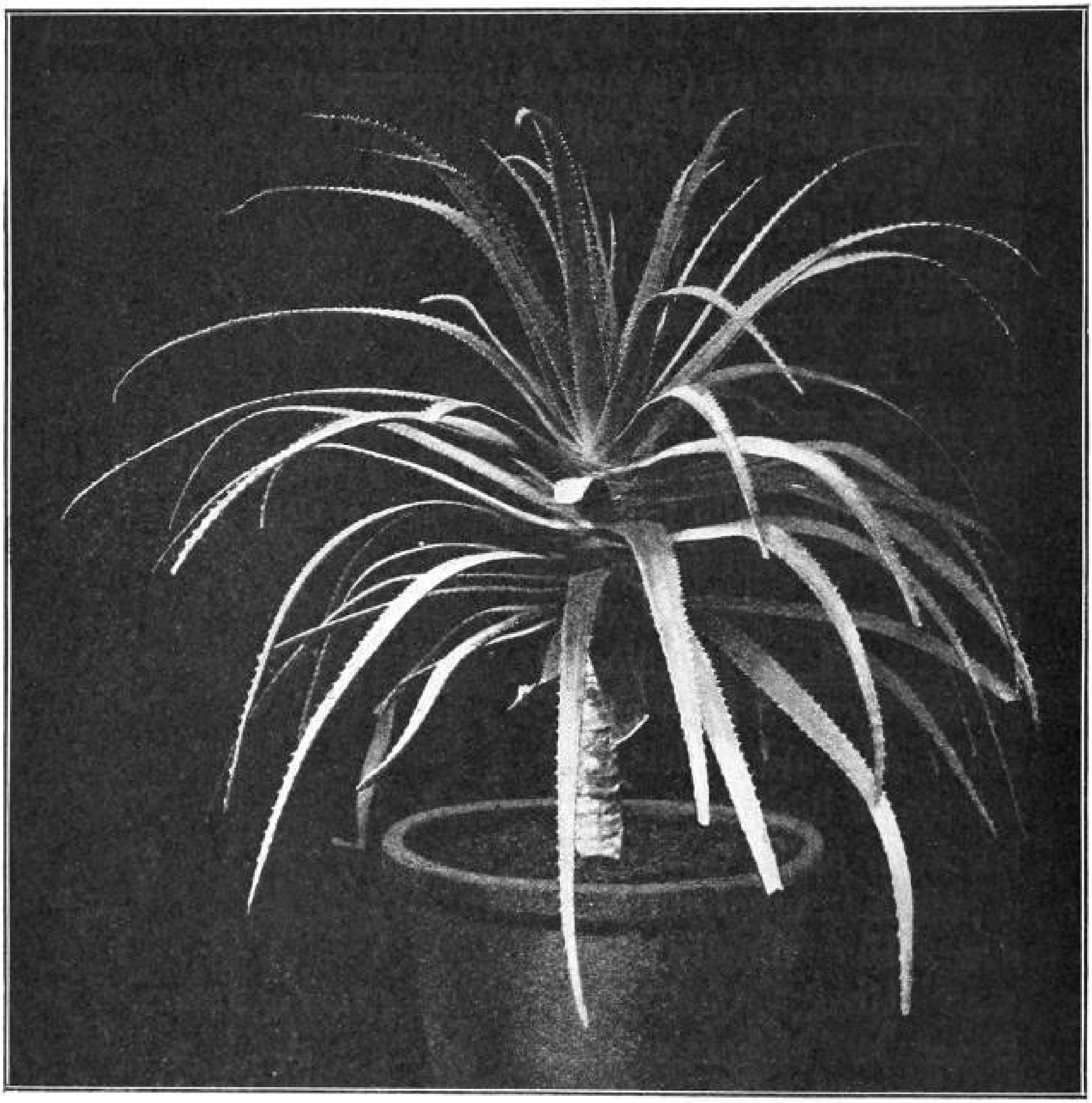
Aloes.

Dioscorides is the earliest medical writer to mention aloes as a medicine. According to him it should be given in doses of from half a drachm to one drachm as a gentle purge, or of three drachms if its full cathartic effect were required. The drug is not named by Hippocrates nor by Theophrastus.

Celsus describes it as specially valuable for city men and men of letters (urbani et literarum cupidi); he says it is an ingredient in all purgatives, and it is clear from the later Greek and Roman writers how highly this remedy was esteemed. In "Pharmacographia" Hanbury refers to the legend of Alexander the Great visiting the Island of Socotra at the instance of Aristotle particularly on account of the aloes grown there. It is said that Alexander left a colony of Ionians on the island in order to ensure a sufficient supply of the drug. Undoubtedly there were Greek Christians there in Mohammedan times and it is probable that the Arabs invented the Alexandrian origin of them.



The Aloe in Flower.



A Medicinal Aloe growing under glass in the Chelsea Physic Garden.

[This photograph was published in "London Botanic Gardens" by P. E. F. Perrédès, B.Sc., F.L.S., published by the Wellcome Chemical Research Laboratories, and is kindly lent for this book by the Director of those Laboratories, Dr. Frederick B. Power].

The fame of aloes was well maintained by the Arabian physicians, and the old Greek and Roman formulas for aloetic compounds were passed on to the Middle Ages by Mesué of Damascus, together with some new ones. It was one of the drugs recommended to Alfred the Great by the Patriarch of Jerusalem.

In 1622 Mindererus published a treatise on a special compound of aloes which he had devised. Raymond Minderer was the most famous physician of his time. He lived at Augsburg, and was the appointed medical adviser to the Duke of Bavaria and the great house of the Fuggers, the Rothschilds of the period. Minderer's book was entitled "Aloedarium," and it described in loving detail each of the nine ingredients of what is supposed to have been the lineal ancestor of our modern compound rhubarb pill. The components were:—

Aloes 3 ounces, Marum (herb mastic), and Saffron, of each 3 scruples, Agaric, Costus, and Myrrh, of each 3 half-drachms, Ammoniacum, 3 drachms, Rhubarb, 3 two-drachms (ʒvi), and Lign Aloes, 3 half-scruples. These drugs were each separately macerated in appropriate liquids, the aloes in rose water, the myrrh in rue vinegar, and so forth. Mindererus recommended these pills not so much as a purgative, but as a general tonic, especially useful to strong, fair, well-fed persons.

Following Minderer's book, and indeed slavishly copying it, came a treatise by Dr. William Marcquis of Antwerp, entitled "Aloe Morbifuga." The only notable feature of this work is that its author is clear about the importance of that part of the aloes which is soluble in water as the constituent of the drug in which the purgative properties reside. He was, in fact, the originator of our aqueous extract of aloes.

Castor Oil.

The supposed identity of the Palma Christi tree, from the seeds of which castor oil is obtained, with the Hebrew "kikaion" is mentioned in the note on Jonah's "gourd" in the section "Pharmacy in the Bible." It is not doubtful that the plant was the same as the "kiki" of Herodotus, and the "kiki" or "kroton" of Dioscorides. Avicenna quotes a reference to the seeds from Dioscorides, from which, he says, is pressed the oil of kiki "which is the oil of Alkeroa." Other Arab authors use the term "al-keroa" for the Greek "kiki." A frequent Latin name for the Palma Christi was "kikinum," or "cicinum."

Castor Oil Plant.

The earliest allusion to the oil is found in Herodotus ("Hist. Euterpe," sec. 94), where we read "The inhabitants of the marshy grounds in Egypt make use of an oil which they term the 'kiki,' expressed from the Sillicyprian plant. In Greece this plant springs spontaneously without any cultivation; but the Egyptians sow it on the banks of the river and the canals; it there produces fruit in great abundance, but of a very strong odour. When gathered they obtain from it, either by friction or pressure, an unctuous liquid which diffuses an offensive smell, but for burning it is equal in quality to the oil of olives."

From this and other references it is clear that the Egyptians held the Palma Christi plant in high esteem, and this would hardly have been the case if it was only used for the extraction of an inferior burning oil. As is stated in another section, Ebers guesses that an aperient medicine made from the fruit of the kesebt tree may have meant the ricinus seeds. The seeds of the Palma Christi, too, have been frequently found in sarcophagi; evidence that they had acquired a high reputation of some kind.

Hippocrates apparently tried to reduce the acridity of the seeds so as to make them more useful as purgatives. Dioscorides alludes to their purgative properties, but only contemplates the external employment of the oil in medicine. Pliny, however, is more explicit. Chapter xli., of Book 23 begins with the sentence: "Oleum cicinum bibitur ad purgationes ventris cum pari calidæ mensura." The whole passage is of interest. The following is the translation of it given in Bohn's "Classical Library" (Dr. Bostock): "Castor oil taken with an equal quantity of warm water acts as a purgative upon the bowels. It is said, too, that as a purgative it acts particularly upon the regions of the diaphragm (precordia). It is useful for diseases of the joints, all kinds of indurations, affections of the uterus and ears, and for burns, employed with the ashes of the murex; it heals itch, scabs, and inflammations of the fundament. It improves the complexion also, and by its fertilising tendencies promotes the growth of the hair. The cicus or seed from which this oil is made no animal will touch, and from these grape-like seeds wicks are made which burn with a peculiar brilliancy. The light, however, that is produced by the oil is very dim, in consequence of its extreme thickness. The leaves are applied topically with vinegar for erysipelas. Fresh gathered they are used by themselves for diseases of the mamillæ and defluxions. A decoction of them in wine with polenta and saffron is good for inflammations of various kinds. Boiled by themselves and applied to the face for three successive days they improve the complexion."

In Egypt and Rome, therefore, Ricinus was evidently esteemed; and though as a medicine they dropped largely out of use, it is clear from old English physic books that a traditional reputation was always associated with both the seeds and the oil. Gerard, in his "Herbal," and Piso, in an account of the natural history of the West Indies, both recommend them, the former in broth, the latter in the form of a tincture made with brandy for colic and constipation. Gerard states that the Palma Christi "of America" grew in his garden (in Holborn) and in many other gardens likewise. The seeds, however, came to be regarded as dangerous, and were clearly but little used in orthodox medicine. Quincy (1724) refers to them as "hardly ever met with in practice, unless amongst empirics and persons of no credit."

In 1764, however, Dr. Peter Canvane, of Bath, who had practised for seven years in the West Indies, published a treatise entitled "A Dissertation on the Oleum Palmæ Christi, sive Oleum Ricini, or (as it is commonly call'd) Castor Oil," in which he warmly recommended the oil as a gentle purgative, particularly in cases of "dry belly ache." His advocacy soon took effect, for in the second edition of his treatise published in 1769, he says it had become officinal, by which he meant was sold in the shops, "at Apothecaries Hall and several other shops in London and Bath." Dr. Odier, of Geneva, who visited England in 1776, became then acquainted with the medicine, and subsequently brought it to the notice of Continental physicians. It was admitted into the London Pharmacopœia in 1788.

The name "Ricinus" was in Latin the name of the parasite known as the dog-tick, *Ixodes ricinus*, and was transferred to the Palma Christi seeds because of their resemblance to the insect. In Greek the same insect was called the kroton, and Theophrastus and Dioscorides describe the Palma Christi seeds as kroton seeds. Curiously the name kroton has been applied in America to the cockroach, not from any association with ticks, but from a belief that the insects came from the Croton River when the water from that source was brought to New York in 1842. The name of castor oil is supposed to have been given to the oil in consequence of a mistaken idea in the Western Indies that the plant which yielded the seeds was *Agnus Castus*. There was, however, a castor oil and compound castor oil in medicinal use in England and other countries until the eighteenth century. The simple oil was made by digesting castorum in oil and boiling it with wine until the latter had all evaporated. The compound oil contained besides a number of aromatic gums and spices. Possibly the taste of the oil from the Palma

Christi seeds recalled that from the old oil of castor, and the name may thus have been transferred.

Cinchona.

It is not possible to determine from the legends and reports collected by the many competent naturalists who visited Peru in the seventeenth and eighteenth centuries with the special object of investigating the history of the cinchona trees whether it was known or used as a medicine by the natives before its virtues were ascertained by Europeans.

Peru was discovered in 1513, and became subject to Spain about the middle of the sixteenth century. But Hanbury points out that no reference to the bark as a febrifuge has been found earlier than the beginning of the seventeenth century. It was reported by La Condamine, and others who acquired their knowledge on the spot, that the Indians had long used the bark as a dye. The Countess Ana of Chinchon, wife of the Spanish Viceroy of Peru, was cured of a fever by the bark in 1638, but there is evidence that its medicinal value had been experienced by some of the conquering race before that date. One story is that when the Countess was ill and all the usual remedies had been found ineffective, the Corregidor of Loxa, Don Juan Lopez Canizares, who had himself been cured by the bark of a similar illness, brought some of the remedy from Loxa to Lima and staked his reputation on its infallibility. After her cure the Countess became an enthusiastic advocate of the medicine, administering it with uniform success to her dependents and others in Lima, and on her return to Spain in 1640, exerting herself to make it known there.

Another story is to the effect that a native maid in the employment of the Countess had made known the virtues of the bark to the Viceroy out of affection for her mistress, though until then the Indians had concealed the secret from their cruel rulers. The most likely account is that the bark had become known as a valuable medicine to the Jesuit missionaries who had been in the country for fully fifty years when the Countess of Chinchon was cured.

Le Condamine stated, in 1738, that the Indians had a legend that they had become acquainted with the properties of the bark in consequence of an earthquake in the neighbourhood of Loxa which had caused a number of the trees surrounding a lake near the city to be thrown into the water. An Indian violently ill with a fever and consumed with thirst had drunk water from this lake and had been rapidly cured. Another tradition was that the pumas of the country had been observed to eat the bark when they were ill, and that the Indians had learned its value from this circumstance.

The Count and Countess of Chinchon returned to Spain, as has been said, in 1640. They went to live on their estate at Chinchon Castle, about forty miles from Madrid, and their physician, Juan del Vego, followed them and resided at Seville. Vego brought with him a considerable quantity of the bark from Peru, and sold it at 100 reals per pound. Sprengel queries whether the real of Plata or the real of Vellon is to be understood; the latter was worth about 2d., the Plata or silver real being worth about 8d. It is not at all certain that Vego's bark was the first importation of the medicine into Spain. A Spanish physician named Villerobel, quoted by Badus in 1663 in a work on the Peruvian bark, states that a quantity was received in 1632, but was not tried until 1639 (a year after the cure of the Countess, it will be noted). The patient was an ecclesiastic of Alcala de Henarez, near Madrid. However this may be, Vego's reports and the experiments with his bark excited lively interest all through Spain, and from then began a controversy almost as bitter as that between the Galenists and Paracelsists. There were a large number of practitioners who could not bring themselves to believe in any medicine which Galen had not described. It was also alleged by some contemporary writers that a prompt cure of intermittent fevers was not by any means desired by a large number of medical men and apothecaries, who consequently allied themselves in opposition to this very effective bark. This statement is no doubt due to the usual uncharitableness of controversy; but it is possible that the adversaries of the new remedy might at least cling to their old prejudices with not less firmness when these and their interests ran on parallel lines.

Fevers were at that time regarded as caused by some morbific principle in the humours which occasioned effervescence, and which it was essential first of all to expel. The patient was, therefore, treated with evacuants and debilitating medicines while the fever continued, and the vital spirits were afterwards restored by a course of cordials and bitters, such as wormwood, chamomile flowers, mace, carduus benedictus, angelica, and valerian. The opponents of the bark insisted that if it palliated the fever it "fixed the humour” and ensured a relapse or some other more dangerous disease. In 1652 Leopold William, Archduke of Austria, and Governor of the Low Countries, who had interested himself in popularising the bark, fell ill with a quaternian fever. He took bark and recovered. A relapse occurred, but the complaint again yielded to the remedy. Some time after he had another attack. This time, perhaps influenced by the views already quoted, he refused to take bark and died. This event was regarded, illogically enough, as evidence of the dangerous character of the medicine.

Meanwhile, the Jesuits had been busy propagating the new remedy and proving its virtues. The provincial father brought a large supply to Rome, and explained the method of using it to a congress of Jesuits then assembled in that city. The fathers administered it all over Europe, giving it gratuitously to the poor and to their own order, but charging its weight in gold to the rich. It is said that they endeavoured to keep it as a secret medicine, and would only supply it in powder so that it might be more difficult to identify. The Procurator-General of the order, Father (afterwards Cardinal) de Lugo, making a journey to Paris in 1649, found the king, Louis XIV, himself suffering at the time from an intermittent fever. He recommended to him the use of the bark, and Louis took it and quickly recovered. The powder of the Cardinal, the Powder of the Fathers, the Jesuits’ Powder, by which names among others it was known, consequently came into strong demand. But these titles were largely responsible for the reaction which almost drove cinchona out of practice. Protestant fears and prejudices were added to the orthodox opposition of the Galenists, and besides, many practitioners administered the bark ignorantly, in too small or too large doses, while the high prices at which it was sold led to fraudulent substitution, which more than anything else discredited the bark as a medicine. Sprengel quotes complaints from the Cardinal de Lugo, the apothecary of the College of Medicine at Rome, and Vincent Protospatario, a physician at Naples, who alleged that the Spanish merchants were sending into Italy instead of the true Peruvian bark various other astringent barks devoid of any aromatic taste, but flavoured up to the necessary bitterness by aloes.

Although Sydenham in England, and a number of eminent physicians on the Continent, studied the proper methods of administration and the suitable doses of bark, it fell to a practitioner whose methods went a long way to justify charges of charlatanry firmly to establish cinchona in professional and popular favour.

Robert Talbor was assistant with an apothecary at Cambridge named Dear. It has been ascertained that in 1663 he had been entered as a sizar at St. John's College for five years, but there is no indication that he took a degree. In his writings he states that he was largely indebted to a member of the University of the name of Nott for suggestions relative to the administration of bark. The next heard of him is that he was practising in Essex. This was about 1671. He wrote a book in 1672, which he called "Pyretologia," a rational account of the cause and cure of agues. In this he refers to his own secret remedy, which, he says, consists of four ingredients, two indigenous and two exotic. He mentions Peruvian bark and intimates that it is an excellent remedy, but one that should be employed with prudence, as in the hands of inexperienced doctors it might occasion serious evils. He does not say that it was contained in his specific.

Talbor moved to London and set up his sign next door to Gray's Inn Gate, in Holborn. His treatment brought him into fame, the climax of which was that having cured the daughter of Lady Mordaunt he was sent for when Charles II was ill with an ague and cured him. He was knighted, appointed a royal physician with a salary of £100 a year, and the king caused a letter to be written to the College of Physicians asking them not to interfere with his practice in London.

Talbor next figures in Paris, and there leaped into eminence. For French convenience he assumed the name of Talbot, an English name with which they were historically familiar. He soon became a favourite in high circles. Mme. de Sévigné refers to him several times in her letters of 1679. In one she says, "Nothing is talked of here but the Englishman and his cures." In November, 1780, the Dauphin was dangerously ill with a fever. Talbor had plenty of friends at court who wanted him to be sent for. Mme. de Sévigné is again the chronicler. She writes:—"The Englishman has promised on his head to cure monseigneur in four days." If he fails she believes he will be thrown out of the window. She further states that the King (Louis XIV) insisted on seeing Talbor prepare his wine; and when she reports the fulfilment of his promise and the cure of the Dauphin she notes with malicious glee the discomfiture of the king's head physician, Antoine d'Aquin.

D’Aquin wrote bitterly against Talbor, insisted that his treatment of the Dauphin and of other persons had been founded on a mistaken diagnosis, and that in the Dauphin’s case he had made a bilious fever into a dangerous disorder. Another critic suggested that his remedy given to the Duke of Rochefoucauld in an arthritic asthma had had fatal consequences.

Louis agreed to buy Talbor’s formula, but nothing was published until after the death of the latter. Two thousand guineas and an annual pension of £100 were granted to the English doctor, and he was made a Chevalier. Shortly afterwards he went to Spain and cured the queen of that country of a fever. Then he returned to London and died in 1781, at the early age of forty.

His official formula, published after his death, directed 6 drachms of rose leaves to be infused in 6 ounces of water with 2 ounces of lemon juice for four hours. A strong infusion of cinchona was added to the above, together with some juice of persil or ache. He also made alcoholic tinctures and wines of cinchona. The French doctors were sure that he was in the habit of adding some opium to his speciality. If he did he invented a valuable combination.

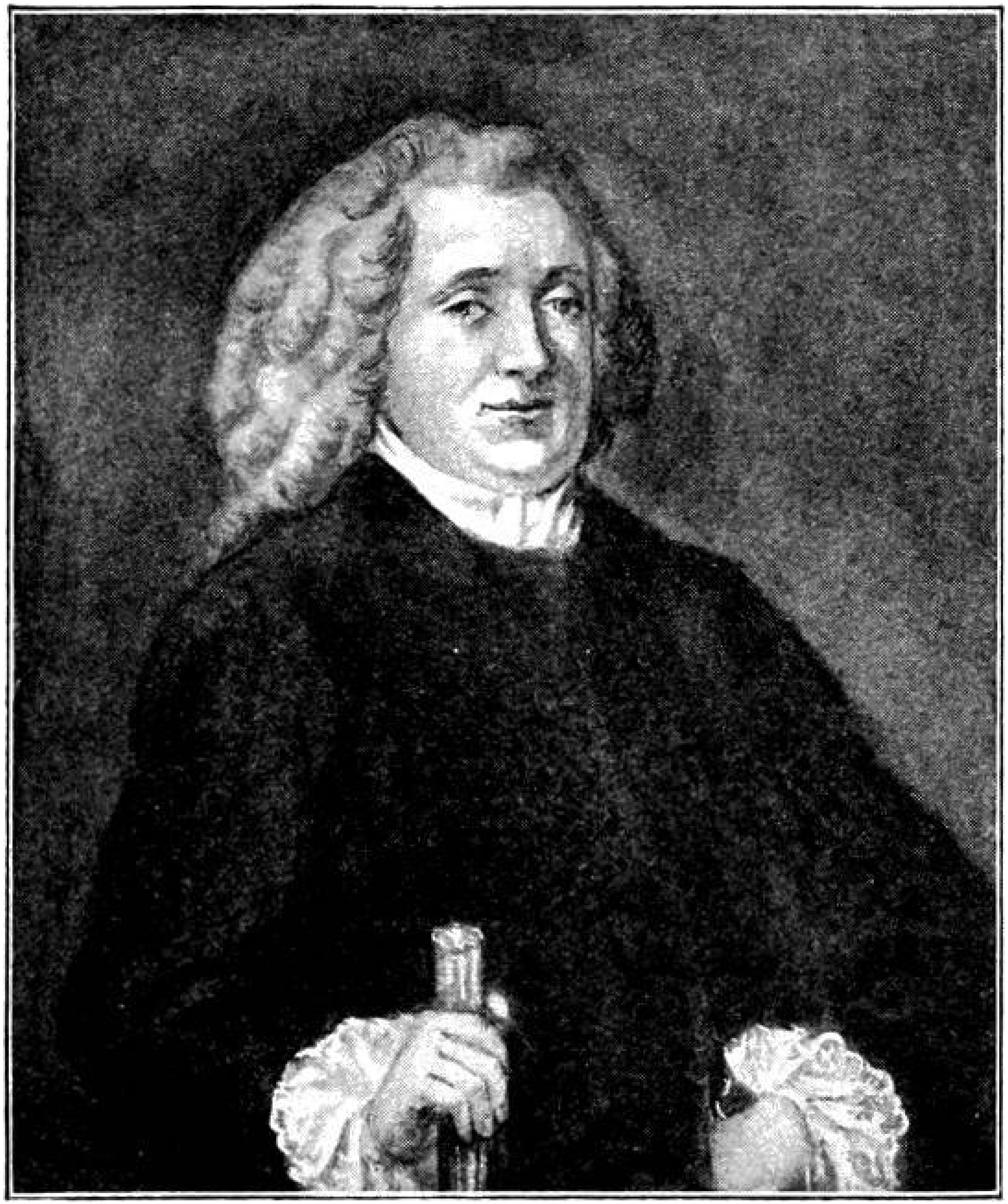
Another contemporary writer, John Jones, gives the following as Talbor’s process. He digested finely-powdered bark in juice of persil and decoction of anise separately. The mixture was placed in an earthen vessel, and having been stirred frequently he added red wine and macerated for a week. He also made a tincture of cinchona by adding 8 ounces of alcohol to 2 ounces of powdered bark.

From a handbill in a collection of quack advertisements in the British Museum Library, dated “1675, &c.,” it appears that Dr. Charles Goodal, who gave his address “at the Coach and Horses, near Physician’s Colledge, Warwick Lane,” offers “for the public good a very superior sort of Jesuit’s Bark, ready powdered, and papered into doses” at 4*s.* per ounce, or in quantity £3 per lb., and as evidence that this is a reasonable price he refers to Mr. Thain, druggist, of Newgate Street, to whom he had paid 9*s.* per lb. for a considerable quantity. Possibly it was Mr. Thain who was advertising.

Tinct. Cinchonæ Co.

The official formula for this tincture is slightly modified from that devised by John Huxham, M.D., and published in his Essay on Fevers, 1755. It first appeared in the P.L. 1788 as a College preparation.

John Huxham was born as Totnes in 1692, and was the son of a butcher. He studied medicine under Boerhaave at Leyden, but graduated M.D. at Rheims. Then he returned to England and after a time settled at Plymouth. He was a Nonconformist, and at first depended on the dissenting portion of the population for his practice, but it did not expand as fast as he wished and it is alleged that he was not above some of the tricks satirised by novelists; as, for example, being called out of chapel, riding at full speed through the streets, walking about with a gold-headed cane, wearing a red coat and followed by a footman who carried his gloves. He, however, acquired a considerable reputation both locally and nationally; was elected F.R.S. in 1739, and was awarded the Copley medal in 1755 for a treatise on antimony in which he strongly recommended an Essentia or Vinum Antimonii made by infusing 1 oz. of glass of antimony in 24 oz. of sound Madeira wine for 10 or 12 days, then decanting and filtering. He advised doses of 30 to 80 drops of this in tea, wine, beer, or other liquid, as an alterant, attenuant, and diaphoretic. The treatise though verbose does not seem to have had any special merit.



DR. HUXHAM.

His Essay on Fevers was much more important and has been highly esteemed by competent critics. He also wrote a valuable note on scurvy in seamen, recommending a more abundant supply of vegetables on voyages, and was the first to describe the malignant ulcerous sore throat now called diphtheria.

Huxham's formula for Tinct. Cinchonæ Co. as given by himself was as follows:

Cort. Peruv. opt. pulv. ℥ ii, Flav. Aurant. Hispan. ℥ iss, Rad. serpent. Virgin. ℥ iii, Croci Anglic. ℈ iv, Coccinel. ℈ ii, Sp. Vini Gallici, (Brandy), ℥ xx. F. Infusio clausa per dies aliquot (tres saltern quatuerve) deinde coletur. The dose was ʒ i to ℥ ss every 4, 6, or 8 hours with 10, 15, or 20 drops of elixir of vitriol in diluted wine. Huxham says of this tincture "it tends to strengthen the Solids, to prevent the further Dissolution and Corruption of the blood and in the event to restore its Crassis." He has previously stated that it is a very useful remedy "not only in slow, nervous fevers, but also in the putrid, pestilential, and petechial, especially in the Decline." But he adds, "if the patient is costive or hath a tense and humid abdomen, I always premise a dose of rhubarb, manna, or the like."

According to Dr. Paris, Huxham believed in complicated prescribing. "There are several prescriptions of Huxham extant," we read in "Pharmacologia," "which contain more than four hundred ingredients."

Cinchona or Chinchona.

Sir Clements Markham, whose services in introducing cinchona culture into India and Ceylon are well known, has earnestly insisted on the adoption of the name chinchona instead of cinchona in justice to the lady after whom the generic title was chosen. In a Memoir of the Lady Ana de Osorio, Countess of Chinchon, Sir Clements Markham somewhat extravagantly exalts that "illustrious and beautiful lady," whom he describes as "one of the most noble benefactors of the human race." She may have been an excellent woman, but her advocate does not furnish sufficient evidence of her virtues to justify such lavish praise. The Countess was cured of a fever by the bark, and on her return to Spain she distributed the remedy to such of her vassals as needed it. Perhaps her physician, who brought a quantity of the bark home with him and sold it, did more to make it generally known than she did by her gifts.

Still there is no doubt that Linnæus intended by the name he gave to the genus to perpetuate her memory; and it is likewise true that her name was

Chinchon and not Cinchon. The latter term, Sir Clements says, means a broad girdle or a policeman's belt, and makes the intended honour ridiculous. His opinion was that Linnæus had erred in ignorance, having been misled by several French writers. Daniel Hanbury, however, who contested some of Markham's assertions, gave good reasons for believing that Linnæus had adopted the term cinchona deliberately for the sake of euphony. Anyway he shows that Mutis, the disciple of Linnæus, who sent him the plant from which he wrote his description, while at first writing of chinchona soon followed the spelling of the master and continued to do so.

The name cinchona and derivatives from it are too well established to be dislodged now for a sentimental reason, even if it were not that the adopted name is undoubtedly easier to pronounce than the more strictly correct one would be.

Cultivation of Cinchona in the East.

Many botanists and travellers remarked upon the reckless manner in which the natives of Peru collected the bark. They felled the trees and stripped them of bark without planting new ones to take the place of those destroyed. Humboldt says that 25,000 trees were thus destroyed in a single year.

The first attempt to transport any plants to Europe was made by La Condamine in 1743. He had obtained some young plants and was conveying them down the Amazon River to Cayenne, intending to transport them to the Jardin des Plantes at Paris. At the mouth of the river a wave swept over his little vessel and washed away his whole collection. Joseph de Jussieu, who had accompanied La Condamine on his expedition, and remained in the country after him for fifteen years, was robbed of his collection at Buenos Ayres, and lost his reason as a consequence of his misfortune.

Royle in 1839 strongly advocated the introduction of cinchona into India, and suggested the Nilgiri Hills as a suitable position for the experiment. His suggestions were taken into consideration by the Government, but no immediate steps were taken. The Dutch Government first moved in the matter, sending a botanist named Hasskarl to South America in 1852. Their object was to establish cinchona gardens in Java.

All through the fifties they were carrying on their experiments, but with very slow success. The English Government were meanwhile instructing their Consuls in South America to obtain seeds, but it was not until 1859 that the collection was seriously undertaken for India. In that year Mr. (now Sir) Clements Markham was commissioned to go to South America to collect seeds of the best species. Markham has told the full story of his mission in his work on "Peruvian Bark," and has incidentally in that narrative exposed the parsimony of the authorities in their treatment of those associated in the important and profitable enterprise successfully carried through after some years of hard and often perilous labour. His principal coadjutor, Dr. Spruce, whose health was utterly ruined by his efforts, was paid a salary of £30 a month while the work lasted, and a special grant of £27 for an exhaustive report which he prepared. A pension of £50 a year was given him by the British Government for his botanical services, and after thirteen years of persistent importunity, the Indian Government granted him another £50 a year. Mr. Pritchett, who collected plants and seeds in the forests of Huanuco, was paid his salary and nothing more. To Mr. Cross, who assisted Dr. Spruce in the collection of the red bark, two grants of £300 each were made. Mr. Weir, "a most conscientious, active, and skilful worker, and, so far as his own labours were concerned, completely successful," crippled and disabled for life, got nothing from the Government, though the Horticultural Society collected some funds which yielded £27 a year.

The monumental instance of official ingratitude was, however, manifested in the case of Charles Ledger, to whom, more than to any other man, the world is indebted for cheap quinine, and out of whose adventurous services the Dutch nation have made millions in their Java dependency. Between the years 1841 and 1858 Ledger was travelling in South America in the employment of the New South Wales Government buying alpacas. He had a faithful servant, Manuel Manami, who had often told him how jealously the natives, especially those of Bolivia, guarded the knowledge of their best seeds. Manami had himself been a cascarillero or bark cutter. On Ledger's return to Australia in 1858 he found that Holland and England were eagerly seeking to plant cinchona in their Eastern possessions. The mission of Hasskarl had been practically a failure. He had not been able to enter Bolivia, and the species he brought to Java were comparatively valueless. Ledger was in South America when Markham went there on his official journey. He endeavoured to open communication with the British Government's envoy but failed. He, however, pressed his faithful Manami to secure some of the precious "rojo" (*Cinchona Calisaya*, var. *Ledgeriana*) seeds from Bolivia. Manami fulfilled this service, somewhat reluctantly, sent the seeds to his master, but was himself thrown into prison, beaten, and died soon after in consequence of the cruel treatment he underwent.

Ledger sent the seeds to his brother in England authorising him to dispose of them as he best could. They were at first offered to the British Government, but as Markham was then in India superintending the planting of the seeds he had brought from Peru, the offer was not entertained. Half of them were sold to a Ceylon planter, and the rest were taken, after some discussion, by the Dutch Government for about £33, with a promise of a further payment if the plants flourished. A year later on a report that 20,000 plants had been raised from these seeds the Dutch Government paid Ledger a further £100 and got from him a letter expressing his satisfaction. That was in 1866.

For many years Ledger was lost sight of, and it was stated in several books that he was dead. In 1895, however, a letter from him was published in *The Chemist and Druggist*, of London, dated from Goulburne, N.S.W. He wrote simply in reference to a paper which had been printed in that journal referring to the admixture of some white flowers with coca as imported. The addition of the "inga flowers," Mr. Ledger explained, was made by the natives in the belief that they kept the coca leaves fresh and green. Later it was found that Mr. Ledger was living in comparative poverty in consequence of the failure of Australian banks and the slump in land values. Efforts were made to induce the Dutch Government to make some compensation to the man who had done them such grand service, but at first a blank refusal was returned. In May, 1807, however, on his seventy-ninth birthday, Mr. Ledger received the announcement from Amsterdam that an annuity of £100 would be conferred upon him. He lived nine years after this.

CHARLES LEDGER, CINCHONA PIONEER.
(From *The Chemist and Druggist*.)

The Ledger cinchona had also been introduced into India, and as it was found to be yielding such rich bark Mr. Markham appealed in 1880 to the Indian Government to grant Mr. Ledger at least the sum of £200 to compensate him for the expenses he had been put to, which far exceeded what he was paid for the seeds. "The reply, after four months' delay, was a curt refusal," wrote Mr. Markham to *The Chemist and Druggist*, in April, 1895.

Mr. Ledger, who was born in Bucklersbury, London, on May 4, 1818, wrote a very pleasant and modest autobiographical sketch of his varied experiences for *The Chemist and Druggist*, which was published in that journal of July 27, 1895.

Cubebs

have had a rather chequered medical history. The Arab physicians used them apparently for the same medicinal purposes, that is, for checking urethral discharges, as they are generally prescribed for by our own physicians; but in the middle ages we hear of them as a popular but costly condiment. Curious particulars of this use of cubebs are given in "Pharmacographia." They were an ingredient in the P.L. formulas for Mithridate and Theriaca, probably as a stimulant. Then they seem to have dropped out of use. They were omitted from the P.L. 1809. Their re-introduction into medical practice is due to an article by Dr. Crawfurd in the *Edinburgh Medical and Surgical Journal*, 1818, but it appears that the knowledge of the anti-blennorrhagic properties of cubebs came from an English officer in Java, whose Hindoo servant had recommended to him the use of them as a medicine. The employment of cubebs in hoarseness and bronchial complaints was popularised by some American Troches, a proprietary medicine, but this use of the medicine was familiar a hundred and fifty years ago. In James's Dispensatory it is stated that cubebs are "recommended in hoarseness and loss of voice, especially when the tonsils are stuffed and obstructed."

Digitalis.

Foxglove, the common and ancient name of this handsome plant, is believed to be a corruption of a still older name, Foxes' glew, or Foxes' music, in allusion to an instrument consisting of a series of bells hanging from one support. The Norwegian name of the plant is Rev-bjelda, fox-bells. A pretty fancy, but one which is not supported by evidence, is that the original name was folks' glew, or fairy bells. In Scotland the flower is called bloody fingers, and sometimes dead men's bells; in France, gants de notre Dame, and doigts de la Vierge. The German popular name is fingerhut, finger hood or thimble, and the Latin term, digitalis, coined by Fuchs of Tubingen about 1550, was intended to be the equivalent of that designation.

The medical history of the foxglove is somewhat varied. It appears to have been used as an ingredient in external applications by old herbalists, principally for scrofulous complaints. Gerard, Parkinson, and Salmon, who wrote in the sixteenth and seventeenth centuries, extol its virtues and mention also its employment internally for the falling sickness or epilepsy. Parkinson quotes an Italian saying concerning it that it is a salve for all sores. It found a place in the London Pharmacopœia of 1650 and in several subsequent issues.

But foxglove was always a medicine with a popular rather than a professional reputation until Dr. William Withering, of Birmingham, published “An Account of the Foxglove, and some of its Medical Uses,” in 1785. Withering was a scientific pioneer of European fame, an intimate associate of Priestley, Watt, and Boulton, a painstaking botanist in whose honour a genus of the Solanaceæ was named Witheringia, and a mineralogist whose name is similarly commemorated by the name Witherite, given to barium carbonate.

WILLIAM WITHERING, M.D.
(From a print in the British Museum.)

In Dr. Withering's "Account of the Fox-glove," he narrated that ten years previously his opinion had been asked about a family recipe for the cure of dropsy which had long been the secret of an old woman in Shropshire, and which he was told had cured cases after regular treatment had failed. The medicine was composed of some twenty different herbs, but it was not difficult, he says, for one conversant with such matters to perceive that foxglove was the active ingredient.

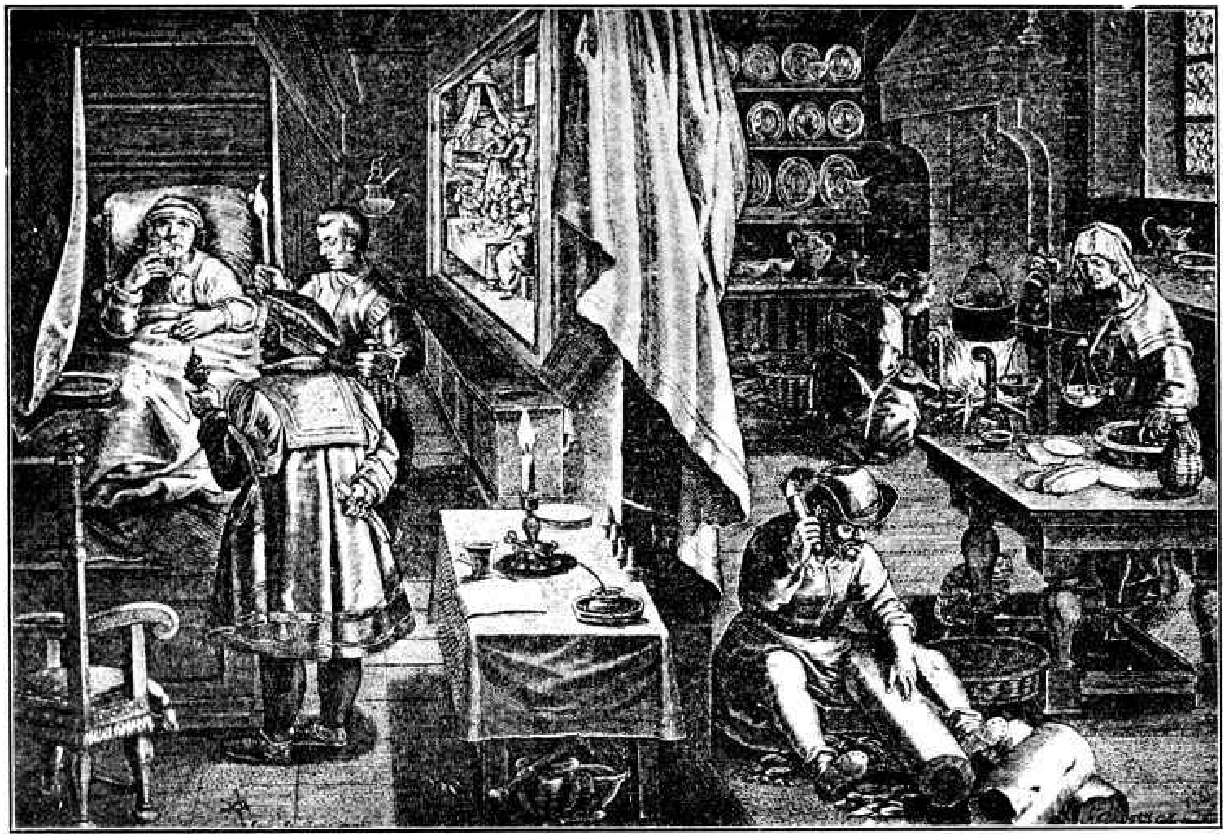
Dr. Withering details his experience as well as that of others with the drug in some hundreds of cases. He noted its action on the heart and as a diuretic. He had also ascertained that it was prescribed in family recipes in Yorkshire. An article in Parkinson’s “Herbal,” written he believed by Mr. Saunders, “an apothecary of great reputation at Worcester,” declared it to be of great value in consumptive cases. It had been admitted into the Edinburgh Pharmacopœia 1783, but many practitioners were giving it in such dangerous doses that he feared its reputation would not last long.

Dr. Withering died in 1799 at the age of fifty-eight. A foxglove is carved on his monument in Edgbaston Old Church.

Guaiacum

Came into fame in Europe in the early years of syphilis. The story told about it (perhaps it was only a clever advertisement, though it is related without any question by Leclerc) was that a certain Spaniard named Gonsalvo Ferrand having taken the disease and finding no cure for it resolved to go into the countries from which the infection had come, confident that he would there find the remedy which the natives themselves employed. He went to St. Domingo, discovered that the wood there called Huaiacon was regarded as a specific, took it himself, and was cured. This was in 1508. Whatever may be the truth of this history it seems that Ferrand was subsequently a seller of guaiacum wood (according to Freind), at seven gold crowns per pound (say 35s.), and accumulated a great fortune. Enormous popularity accrued to guaiacum by the book which Ulrich von Hutten, the German poet and reformer, wrote on the “Morbus Gallicus” in 1519. Therein he narrated his own experience; what he had suffered from this disease; how he had undergone salivation with mercury eleven times to no purpose; and how at last he had been cured completely in thirty days by a course of treatment by guaiacum. This early treatment as it was developed in the sixteenth and the seventeenth centuries deserves to be recorded. First a decoction was made by boiling 1 lb. of the wood raspings in 8 or 10 pints of water down to 5 or 6 pints. After straining this off another weaker decoction was made from the same wood. The syphilitic patient was prepared for his course of treatment by a few days' spare diet, and by a few aperient doses. Then he went to bed in a well-warmed room, and early every morning took half a pint of the first decoction warm. He was then covered with blankets and allowed to sweat for two or three hours. After being dried he was given a few biscuits with some almonds and raisins. The process was repeated in the latter part of the day, and so on for fifteen days, only enough food being given to prevent the patient from fainting. In the middle of the month a day or two's interval was granted, and during that time the bowels were evacuated by an enema. Then the treatment was renewed as before, but a rather more liberal diet was permitted. All the time the second decoction was taken for drink as freely as the patient could be induced to swallow it. Gradually the usual habits of eating and drinking were resumed.

It is not surprising to learn that the treatment just described was soon accused of so reducing the strength of many patients that they never recovered from it, and it was being abandoned when Boerhaave revived it for a time as a remedy in syphilitic cases.



Preparation of Guaiacum Remedies and their Administration.
(Etching by Stradanus, 1570.)
Reproduced (by permission) from "The Follies of Science at the Court of Rudolph II." by H. Carrington Bolton, Pharmaceutical Review Publishing Co., Milwaukee, U.S.A.

Ipecacuanha.

Although several earlier allusions to ipecacuanha have been found, the first being in an account of Brazil by a Portuguese friar given in Purchas's "Pilgrimes" (1625), where the medicine is named Igpecaya and is described as a remedy for the bloody flux, its effective introduction to European medicine was in the year 1686, when Louis XIV bought from Jean Adrien Helvetius the secret of a medicine with which he had performed a number of remarkable cures of diarrhœa and dysentery.

Helvetius, whose original name was Schweitzer, was the son of a Dutch quack, and had gone to Paris to try to sell his father's compounds there. Apparently he had also enrolled himself as a student of medicine, for he is reported to have accompanied a physician of note at the period, named Afforty, in his attendance on a merchant variously called Grenier and Garnier. The merchant, having recovered from his illness, wished to present to Afforty a parcel of a new drug which he had received from Brazil. Afforty was not tempted by the offer, but his companion was more open to be influenced by something new. He experimented with the medicine and found it of remarkable efficacy in dysentery. Thereupon he placarded the corners of the streets with his announcements of a new remedy but without stating what the drug was. Colbert, having heard of the success of Helvetius, mentioned the remedy to Louis XIV when the dauphin was ill with dysentery, and the young Dutch quack was sent for. With the consent of the court physician, D'Aquin, Helvetius treated the Dauphin and cured him. As a result the king authorised D'Aquin and his confessor, the Père de la Chaise, to negotiate with Helvetius for the publication of his secret, which he sold for a thousand louis d'or, for a share in which the merchant Garnier unsuccessfully sued. This was the beginning of a successful career which was continued by his son and his grandson. The last became France's fashionable poet and philosopher in the generation before the Revolution. The discoverer of ipecacuanha was appointed Inspector General of the Hospitals of Flanders, and became physician to the Duke of Orleans.

It appears from a treatise which Helvetius wrote that at first ipecacuanha was given in doses of two drachms, sometimes in decoctions and sometimes in enemas. Hans Sloane in England and Leibnitz in Germany wrote warmly in favour of the new remedy, but it was not till thirty years after it had been introduced that the dose was popularly reduced to some four to ten grains. Dover's lucky combination of ipecacuanha with opium had a great effect in ensuring its permanent adoption.

Kousso.

Although Bruce, the African traveller and others had described the tree which bears the kousso flowers in Abyssinia (Hagena Abyssinica) and had noted that the natives used these as worm medicine, the first knowledge of them actually made use of came through a French physician named Brayer residing in Constantinople about the year 1820. Brayer was one day in a café where was a waiter extremely emaciated and who suffered cruel pains from tapeworm. An old Armenian came into the café and told this waiter that he possessed a remedy which his son had brought from Abyssinia, and which he was sure would cure him. Brayer ascertained the successful result of the experiment and subsequently tested the remedy himself on other patients with similar results. He sent some of the flowers to the German botanist Kunth, to whom they were new, and who named the tree *Brayera anthelmintica*. Still it does not appear that much notice was taken of the reports until about the year 1850, when a Frenchman offered the flowers in London for 35s. per ounce. The fancy price attracted attention to the remedy, which proved effectual.

Opium.

The ancients recognised two kinds of opium. The superior kind was called opion, and was the juice which exuded from the poppy head while it was growing; and the second quality, which was named meconion, was an extract made from the crushed heads and leaves of the poppy.

It is doubtful whether Hippocrates was acquainted with the juice of the poppy at all. He refers to mecon but he attributes to it a purgative as well as a narcotic power; it is therefore probable that he alludes to some other plant. In any case, he made but very little use of poppy or opium if he used either. Theophrastus certainly knew opium, and Dioscorides distinguishes opion and meconion as explained above. Dioscorides also gives the receipt for the famous Dia-kodion (made from the poppy head), the original of our syrup of poppies. His process was to macerate 120 poppy heads for two days in three sextarii (a sextarius was nearly equal to our Imperial pint) of rain-water. This was boiled, strained, mixed with honey, and boiled down to a suitable consistence.

Probably the shopkeepers and travelling quacks made more use of opium in Rome than the regular physicians. Galen expressly says that he never used the drug except in very urgent cases; but he enthusiastically commends several confections such as theriaca which owed their efficiency to opium more than to any other ingredient. Indeed it may be said that the fame of those compounds was due to opium, and that by them the medicinal employment of the drug was maintained during many centuries.

We know that Paracelsus owed much of his success to the bold way in which he administered opium to his patients; evidence that his contemporaries did not use it to any great extent. His followers were as enthusiastic as himself over the virtues of opium, and before long the most serious practitioners were advocating it, and devising formulas for its suitable administration. Platerus of Basle about 1600 strongly recommended it, and Sylvius (de la Boe) a Dutch physician said that without opium he would not practise. Van Helmont about 1640 used opium so frequently that he was called the Doctor Opiatus. Sydenham about 1680 says, “Among the remedies which it has pleased Almighty God to give to man to relieve his sufferings, none is so universal and so efficacious as opium.” Many other eminent physicians might be cited to the same effect, and some who took an opposite view. Stahl, for instance, wrote a treatise entitled De Imposturis Opii. Hoffmann considered that the use of opium was greatly abused, and he believed his ether would fulfil its purpose in almost all cases.

Quassia

was sent to Linnæus from Surinam in 1763 by C. D. Dallberg, one of his pupils, with the statement that it formed the basis of a secret remedy employed there by a negro slave in endemic malignant fevers. The negro’s name was reported as Quassi, and from this Linnæus invented the name of quassia. This bitter wood was obtained from a shrub growing in Dutch Guiana, but for the English market it was subsequently superseded by the wood of a large tree growing in Jamaica, belonging to the same genus. The earlier product is, however, still used in France and Germany. Ritman, who was in Surinam in 1756, said he had met with the old negro, Quassi, there, and reported that he was almost worshipped by some, while others suspected him of magic. Ritman, however, found him a simple old man skilled in old women’s medicines.

Sarsaparilla.

Sarsaparilla was introduced to Europe early in the sixteenth century, and soon leaped into fame. The great Emperor Charles V, was cured of gout by it, or fancied he was, and this gave it an enormous advertisement. It appeared afterwards that it was really China root, another smilax, that was given to the Emperor, but it was called sarsaparilla, and the western medicine got the glory. Sarsaparilla was vaunted as a cure for syphilis, but physicians were not long in discovering that it was much more effectual whenever it was combined with mercurials. Its advocates insisted that it was a wonderful sudorific, and for many years a "sweating cure" was practised in Denmark and Sweden with apparent success. As a matter of fact sarsaparilla has no sudorific properties whatever; but it was given in long draughts, other more effective medicines were associated with it, and vigorous exercise and heavy blankets were adjuncts of the cure. It is not surprising that a sudorific result ensued.

Other confusions have distinguished the history of this so-called remedy. The species which Linnæus selected as the medicinal sarsaparilla and which he named *Smilax sarsaparilla*, happens to be about the only one of some two hundred species which has never been employed in medicine at all. It is only found in North America and not further south than Virginia. Jamaica sarsaparilla has the reputation of being the best, and that comes from Central America. The sarsaparilla which actually grows in Jamaica is not valued in European markets. The origin of the name of sarsaparilla is not agreed upon. Some authorities attribute it to sarsa—red, and parilla—a little vine. Littré derives it from zarza—a bramble, and Parilla—a hypothetical Spaniard who helped to introduce it. The native Indians call it salsa, and the French follow this origin and call it salsepareille.

Stramonium

may have been known to the ancients as a poison. Dioscorides included it among the henbanes, and Avicenna is supposed to have described it under the name of the Methel nut. Some species of Datura were frequently used in Eastern countries by thieves and sorcerers to induce delirium and subsequent coma, and the herb had the worst of reputations when Störck, of Vienna, experimented with it first on himself about 1765. In consequence of its action on the brain he gave it in cases of mania and epilepsy, and he and some practitioners who followed him claimed to have administered it in such diseases with much success. Its action as an asthma remedy was, however, a popular Indian tradition which was made known to Europeans through a General Gent about 1802. It had been recommended to him by a native, and he found so much relief from it that he introduced it to Dr. Anderson who was practising at Madras. It was stated that General Gent used it so freely and so frequently that it caused his death.

XX

FAMILIAR MEDICINES AND SOME NOTES OF THEIR HISTORIES.

Morbi, non eloquentia sed remediis, curantur.

CELSUS: *De Re Medica*.

BLACK DRAUGHT.

Laxative or cathartic potions have been prescribed in all modern pharmacopœias, most of them being preparations of senna. The original one was devised by Mannagetta, an Italian physician at the court of the Emperor Rudolph II, about 1600. His prescription became popular under the title of Aqua, or Potio Laxativa Viennensis, and was popularly known all over Germany as “Wiener Trank.” The formula was 1 oz. of senna, 6 drachms of currants, 2 drachms of coriander seeds, and 2½ drachms of cream of tartar. These ingredients were packed in a bag and suspended in hot water for a night. In the morning the liquor was strained after the bag had been pressed, and 5 oz. of manna and 3 drachms of cream of tartar added. The dose was 3 to 4 oz. In the London Pharmacopœia the alkaline salt of tartar was at first prescribed with the senna, but later the acid tartrate of potash was preferred. In the Edinburgh Pharmacopœias of the eighteenth century a formula for “Infusi Sennæ Unciæ Quatuor” was included, while the London Pharmacopœias of the same period provided an alkaline infusion, and an “Infusum Sennæ Limoniatum,” containing lemon peel and lemon juice with the object of making the draught less nauseous.

The modern combination of sulphate of magnesia with an infusion or tincture of senna, and sometimes with manna, sometimes with ammonia, and always with some aromatic ingredient, began to be used about the beginning of the nineteenth century. The earliest mention of the term “black draught” that I have met with is in Paris’s “Pharmacologia,” 1824. It was dropped out from later editions. The mixture was called “black dose” in Brande’s “Materia Medica and Pharmacy,” 1839. The phrases “black draught” and “blue pills” were not given as synonyms in the Pharmacopœia until 1885. They are essentially English. Dorvault gives a formula (practically the Mist. Sennæ Co.) entitled "Potion Noire Anglaise," and Hager has "Pilulæ Hydrargyrosæ seu pilulæ ceruleæ Anglorum."

Blaud's Pills.

These pills are probably taken in larger numbers than any other pills sold in Great Britain. If in proper condition they present iron in the form of the protocarbonate, either formed in the pills, or perhaps partially or entirely in the stomach. They are similar to Griffiths' pills, which were the popular Mist. Ferri Co. in pilular form. Dr. J. Blaud, a French provincial practitioner, in an article published in the *Revue Medicale*, in 1831, entitled "Memoires sur les Maladies Chlorotiques," gave the following formula:—

"Gummi Arabici, 5 grammes; solve calore baln. vapor in aquæ distillatæ, 30·5; syrupi simplicis 15 grammes; ferri sulfuric. sicci, 30; quibus caute mixtis adde kalii carbonici, 30; et inter agitatione ope spatula ferreæ in balneo vaporis evaporando ad massam pilularum redige; e qua forma pilulas 120; obducantur argento foliato."

There has been much discussion concerning the best method of making these pills so as to keep them from oxidation. Honey was for a long time generally used as the excipient, but glycerin and sugar are generally preferred with gum acacia or tragacanth. Pilula Ferri, B.P., is a substitute for Blaud's pills.

The Chelsea Pensioner.

An electuary for rheumatism bearing this title was evidently popular under the above name in the early part of the nineteenth century, but I have not been able to discover where or when or with whom it originated. The compilers of books of formulas naturally copy from each other, and consequently a legend once started is likely to become crystallised.

In *The Chemist and Druggist*, of June 13th, 20th, and 27th, 1896, an attempt was made to track this medicine to its origin, and a number of old formulas were sent in by correspondents. The statement is made in many books that the compound acquired its name from the circumstance that the recipe for it was given by a Chelsea Pensioner to Lord Amherst for gout and proved so successful that Lord Amherst gave him £300 and an annuity of

£20. Sometimes this story associated Lord Anson with the pensioner and the amounts given in gratitude varied from £300 to 500 guineas, with an annuity sometimes of £20, sometimes of £30, and occasionally of £100. The then living descendants of Lords Amherst and Anson were written to by *The Chemist and Druggist*, but neither could give any information. It rather looks as if the fiction were concocted as an advertisement in the days when the electuary was a proprietary medicine, if it ever was.

The earliest formula traced in the correspondence referred to was given in Gray's Supplement, 1821. This ran:—Pulv. gum. guaiaci, ʒi; pulv. rhei, ʒij; pulv. pot. bitart., 1 oz.; flor. sulph., 2 oz.; one nutmeg, and 1 lb. of honey. Of this, the dose was two tablespoonfuls night and morning. Sometimes pulv. pot. nit. is substituted for pulv. pot. bit.; probably a mistake of a copyist. In other formulas mustard appears instead of nutmeg; perhaps a similar slip for myristica. Treacle occasionally takes the place of honey, and the proportions of the ingredients vary considerably.

The Secretary of the Chelsea Hospital was good enough to take some trouble in reply to my inquiry to endeavour to trace this compound, but only negative results were attained. Dr. Thomas Ligertwood, the oldest living medical officer of the Royal Hospital, was appealed to, but he only knew of the remedy as "a very useful combination," and had never heard the story of Lord Amherst's purchase of the secret. He thought some information might be found in a work on the "Diseases and Infirmities of Old Age" by Dr. Daniel Maclachlan, a former Principal Medical Officer of Chelsea Hospital. That work (dated 1863) contains two allusions to the Chelsea Pensioner, but nothing about its history. Writing of Chronic Rheumatism the author says: —" ... The more stimulating diaphoretics and diuretics prove serviceable. Among these the preparations of guaiacum deserve the confidence they have long enjoyed. The virtue of the powder (*sic*) known as the Chelsea Pensioner is chiefly due to the guaiacum and sulphur it contains." In the section on gout he writes:—"The once famous Portland Powder has for long been abandoned, as has also the almost equally noted Chelsea Pensioner gout powder. One formula for the latter consisted of rhubarb, sulphur, nitre, and gum guaiacum, in equal parts. Fifteen or twenty grains of the powder were taken morning and evening in treacle. Another was powdered bark, ginger, guaiacum, aa ʒi, cream of tartar 1 oz., flowers of sulphur ½ oz., to be made into an electuary with simple syrup. One teaspoonful to be taken three times a day. This is certainly not a bad combination though a nauseous one."

The following formula is given in the "Pharmacopœia Batava recusa cum notis et additamentis Medico-Pharmaceuticis," published by J. F. Niemann, in 1824:—Resin of guaiacum, rhubarb, aa ʒij; supertartrate of potash, 1 oz.; sublimed sulphur, 2 oz.; one nutmeg; despumated honey, 1 lb. It is evident that this "Anti-Rheumatismal Electuary," as Niemann calls it, and the Chelsea Pensioner had a common origin, and as the formula is not to be found in Niemann's previous edition, 1811, it would appear to have come into popularity between that date and 1824. So far it remains doubtful whether its composition is due to an English or a Dutch author.

Citrine Ointment.

An ointment thus named appeared first in the P. L. 1650. It was a compound of coral, limpet shells, quartz, white marble, white lead, and tragacanth incorporated into a basis of hogs' lard, suet, and hens' grease. It was reputed useful for certain skin complaints, freckles, etc. In the P.L. 1678 some of the old ingredients were omitted, sugar of lead was substituted for the white lead and rose water, and frankincense and citron bark were added.

Nitrate of mercury ointment appeared first in the Edinburgh Pharmacopœia of 1722. It was made by dissolving mercury in a sufficient quantity of nitric acid, and adding the solution to melted lard gradually. This was not a satisfactory formula, and it was not until 1787 that anything similar was introduced into the P.L., when 1 oz. of mercury, 2 oz. of nitrous acid, and 1 lb. of lard were combined. This was intended, according to Christison, as an imitation of the well-known golden eye salve, which, however, was, as we know it, an ointment of the red oxide of mercury. Other authorities, Paris Dorvault, Gray, etc., have stated that Singleton's golden eye ointment was an ointment of sulphuret of arsenic, orpiment some say, realgar others. Pliny refers to the use of sandrach (probably realgar) as an application in ophthalmic affections.

Apparently the originator of the P.L. nitrate of mercury ointment was a Dr. Thomas Nettleton of Halifax, Yorkshire. In a pamphlet entitled "On a Safe and Efficacious Medicine in Sore Eyes and Eyelids," by Thomas

Dawson, M.D., of Hackney, printed in 1782, the writer relates that he had heard of a yellow ointment specially good for sore eyes, which fifty years previously had been in the possession of Dr. Thomas Nettleton of Halifax, "whose merit as a man and a physician exceeds all encomium." One day one of Dr. Dawson's patients told him of a yellow ointment she had had from a Dr. Key, of Manchester, who had been a pupil of Dr. Nettleton's. Dr. Dawson wrote to Dr. Key, who at once sent him the recipe, which was as follows:—

Take 1 oz. each of aqua fortis and mercury; dissolve and add the solution to 8 oz. of butter melted. To this add 2 drachms of camphor dissolved in 2 oz. of olive oil.

About the end of the eighteenth century, a citrine ointment, made with an ounce of mercury dissolved in nitric acid and incorporated with a pound of lard, was introduced into the Hotel Dieu Hospital of Paris, and used to cure itch. The formula was adopted in the Dublin Pharmacopœia, 1807.

Cold Cream.

The Unguentum Refrigerans, also called "Ceratum," appeared in the first P.L., the formula being attributed to Galen. Four ounces of white wax were melted in 1 lb. of rose oil (ol. rosarum omphacinum, that is, olive oil in which rose buds 4 oz. to the lb. had been macerated, the maceration being carried out three times, each time with a fresh lot of roses). The melted oil and wax were to be poured frequently from one vessel to another, stirring in a little cold water meanwhile, until the mixture became white. Lastly, it was to be washed with rose water, and a little rose water and rose vinegar were to be added.

Diachylon Plaster.

The original formula for this plaster was compiled by Tiberius Claudius Menecrates, who lived in the reign of the Emperor Tiberius, and was probably his physician. In a Greek inscription discovered at Rome he is described as Physician of the Cæsars, probably Tiberius, Caligula, and Claudius, for he died in the reign of the last named. He wrote a great work on remedies entitled "Autocrator Hologrammatos," literally, "The Emperor, whose words are written in full." Probably the book was dedicated to one of the Emperors, and thus got its first title. The second intimates that the recipes are written out in full so that any reader could understand them; suggesting that the other physicians who wrote such books were in the habit of employing abbreviations.

The formula for diachylon and the directions for compounding it were put into iambic verses by Servilius Damocrates, who lived a little later than Menecrates, and it is in this form that they have been preserved by Galen. Briefly the composition was to incorporate 1 lb. each of the mucilages of fœnugreek, of linseed, and of marshmallow root with 3 lb. of old oil, and 1½ lb. of golden litharge. The mucilages were made by boiling the seeds and root in water. Damocrates concludes his poem with the line (I quote from the Latin translation): "Vocabat ipsum non absurde Dia Chylon."

Mesué wrote at length about this plaster, and devised a much more complicated formula which was named Diachylum Magnum. It contained, besides the mucilages already named, others made from raisins and figs, juices of orris, squill, and dill, œsypus (sheep wool fat), turpentine, rosin, and wax. Subsequent authors also devoted their talents to the further improvement of this famous preparation.

Diachylon meant a preparation of juices, and this plaster received the name of plaster of the mucilages in many pharmacopœias. In 1746 the London College, having dismissed the adjuncts, altered the name of the simple plaster to Emplastrum Commune, but the old term has refused to die. An Emplastrum Commune cum Gummi was also prescribed. This contained galbanum, thus, and turpentine combined with the Emplastrum Commune.

The Menecrates to whom we owe Diachylon is alleged to have written 155 works, and Galen gives a number of his formulas, but no other than Diachylon has survived. He must not be confounded with the perhaps more celebrated Menecrates who was physician to Philip of Macedon. This one was particularly noted for his vanity, which amused the king. Once he wrote a letter to Philip commencing "Menecrates-Jupiter to King Philip, greeting." The king replied, heading his letter, "Philip to Menecrates, Health and Common Sense." Menecrates got himself up to look like Jupiter, and had attendants who were made to figure as Apollo, Æsculapius, and Mercury. Philip gave a banquet in his honour. A separate table was reserved for him, and instead of viands only incense was served to him, while the other guests were gloriously feasted. Menecrates was offended at the joke and left the table in anger. He is credited with having written a Book of Remedies, but it has been lost.

Dover's Powder.

Thomas Dover, to whom we owe "Dover's Powder," practised as a doctor in London in the first half of the eighteenth century. He was born and buried at Barton on the Heath in Warwickshire in 1660. How he got his medical training is not on record, but some time in his youth he lived in the house of Thomas Sydenham, the famous physician, from whom probably he acquired his independent ideas of medical treatment, and possibly the germ of his lack of reverence for the College of Physicians. While living with Sydenham he had small-pox, and forty or fifty years later he described how the doctor treated him. First he was bled to the extent of 22 oz.; then he took an emetic. He only took to his bed when he became blind with the disease. In his bedroom he had no fire, the windows were always kept open, and the bedclothes were only allowed up to his waist. This was in the middle of January. For medicine, Dover says, "he made me take twelve bottles of small beer acidulated with spirit of vitriol every twenty-four hours," and he concludes, "I never lost my senses one moment."

Having resisted both the disease and the treatment, Dover is first heard of in practice in Bristol in 1684. He plodded along there until 1708, when at the age of forty-eight he set out with a privateering party on a voyage round the world. The expedition consisted of two ships, the *Duke* and the *Duchess*. Captain Woodes-Rogers, who has left an account of the voyage, was in chief command, and Dover on the *Duke* was his lieutenant. He must have had previous experience of seafaring life or he would never have been entrusted with the command of a vessel.

The buccaneers were away from England three years, and when they returned they brought with them a Spanish frigate of twenty-one guns, and a quantity of loot. One event of their voyage proved to be of world-famous importance. On February 2, 1709, Dover, on the *Duke*, touched at the island of Juan Fernandez and took on board Alexander Selkirk who had lived alone on the island four years and four months, and whose story was to develop in the skilful hands of Defoe into that of the immortal Robinson Crusoe.

A few months after leaving Juan Fernandez the expedition arrived at Guayaquil in Peru. Having duly sacked the city and stored their plunder in the ships, the sailors slept in the churches, and Dover quaintly relates how annoyed they were by the smell of the Spanish corpses; for plague was raging in the place at the time, and the victims were buried just under the floors with only a plank or two over them. Two days later, at sea, the disease broke out among the crews. They had 180 cases all at the same time, and Dover had four surgeons with him. He ordered them to go round and start bleeding all the patients, and to stop the bleeding when the round had been completely made. About 100 oz. of blood, he says, was taken from each man. Then he gave them spirit of vitriol, and only seven or eight died.

The next we know of Dover is that from 1721 to 1728 he was in practice in Cecil Street, Strand; he returned to Gloucestershire for a few years, then came back to London and practised in Lombard Street, removing in 1736 to Arundel Street, Strand.

He is supposed to have died about 1742. It was in these latter years that he wrote his “Ancient Physician’s Legacy to his Country.” He describes himself on the title-page as Thomas Dover, M.B., and his book as “Being what he has collected in forty-nine years’ Practice, or an account of the several diseases incident to mankind, described in so plain a manner that any person may know the nature of his own disease. Together with the several remedies for each distemper faithfully set down.”

In this work Dover relates a number of wonderful cures he had effected, gives names and addresses of many of his patients, often adding grateful letters from them. He had but limited confidence in the “clan of prejudiced gentlemen,” as he calls the College of Physicians, and he complains vigorously of the extortions of the Apothecaries. Metallic quicksilver was his panacea, and he prescribed it so lavishly that he acquired the title of “the quicksilver doctor.” It forms balsam with the blood, he says. That is why it cures venereal diseases. Other doctors gave it, but in disguise, in the form of Ethiops Mineral generally; which was like using the sword in the scabbard.

His formula for “Diaphoretic Powder” is given in a chapter on gout. It was as follows:—

“Take opium 1 oz.; saltpetre and tartar vitriolated, each 4 oz.; liquorish 1 oz.; ipecacuanha, 1 oz. Put the saltpetre and tartar into a red-hot mortar, stirring till they have done flaming. Then powder them very fine. After that slice in your opium; grind these to a powder, and then mix the other powders with them. Dose, from 40 to 60 or 70 grains in a glass of white wine posset going to bed, covering up warm, and drinking a quart or three pints of the posset while sweating. In two or three hours at furthest the patient will be free from pain, and though before not able to put his foot to the ground, ’tis very much if he cannot walk next day. The remedy may be taken once a week or once a month.”

The dose appears to us in these degenerate days a large one, and Dover states that “some apothecaries have desired their patients to make their wills before they venture upon so large a dose.” But he declares he has given up to 100 grains, and the patient has appeared abroad the next day. The notion of danger, he adds, proceeds entirely from their ignorance, and from the want of knowing those ingredients that are mixed up with it, for they naturally weaken the power of the opium.

Dover’s powder first appeared in the London Pharmacopœia for 1788. Probably it was adopted after the quack Ward had made it famous as a “sweating powder.” Ward died in 1761 and the formulæ for his remedies were published soon after his death.

Unguentum Elemi.

Ointment of elemi was in all the London Pharmacopœias, and was only dropped from the B.P. 1898. In the earlier issues it was called “unguentum or linimentum Arcœi,” because it had been introduced and recommended by Arcœus of Amsterdam in 1574, for healing wounds. A similar ointment was called “Balsamum Arcœi” in the Prussian Pharmacopœia of 1847. The inventor’s formula was to melt together six parts each of gum elemi and turpentine, and add six parts of melted stag’s suet, and two parts of oil of St. John’s wort. Arcœus was a Spaniard by birth, and an eminent authority on the treatment of wounds.

Fowler's Solution of Arsenic.

Thomas Fowler kept an apothecary's shop in York from 1760 to 1774. In the latter year he relinquished trade, and went to Edinburgh to study medicine. Graduating as M.D. in 1778, he settled at Stafford, and was appointed physician to the Infirmary of that town. Later, he returned to York, where he acquired a large practice, and where he died in 1801.

It was in 1786, during his residence at Stafford, that Dr. Fowler published his treatise, entitled "Medical Reports of the Effects of Arsenic in the Cure of Agues, Remitting Fevers, and Periodic Headaches." It was only a small work, but it made Fowler's reputation, and introduced arsenic into the list of recognised remedies. The doctor stated that a certain Patent Ague Drops known as Tasteless Ague and Fever Drops, which had acquired some reputation in this country, had been occasionally tried in the Stafford Infirmary, and had been found efficacious. With the assistance of the apothecary to the Infirmary, a Mr. Hughes ("whose industry, attention, and abilities in his professional line justly merit applause") he had ascertained that these drops were a preparation of arsenic, and he goes on to detail the experiments which led him and Mr. Hughes to devise the following formula as representative of the patent medicine:—

"Recipe arsenici albi in pulverem subtilissimum triti.

"Salis alkalini fixi vegetabilis purificati, singulorum grana sexaginta quatuor.

"Aquæ fontanæ destillatæ, libram dimidiam.

"Immitantur in Ampullam florentinam qua in Balneo Arenæ posita, Aqua lente ebulliat donec Arsenicum perfecte Solutum fierit. Deinde Solutioni frigidæ adde.

"Spiritus Lavendulæ compositum, unciam dimidiam.

"Aquæ fontanæ destillatæ, libram dimidiam, plus vel minus, adeo ut solutionis mensura libra una accurata fiat, vel potius Pondere unciæ quindecim cum dimidia."

Fowler reminds his readers that of course troy weights are intended, and he explains that the spirit of lavender is added merely to give the mixture a medicinal appearance, lest patients entrusted to drop it for themselves might be tempted to use a water-white solution too freely. He also suggests that as arsenic conveys rather alarming ideas, this medicine should be described as “mineral solution.”

It is universally recognised that Fowler introduced the modern medicinal employment of arsenic, but it should in fairness be remembered that he was guided to his discovery by a quack remedy, as lie himself fully acknowledged.

The Liquor Arsenici Chloridi, P.L., was adopted from a formula of Dr. F. de Valangin, a Swiss doctor who qualified in England in 1765. He made a quantity and presented it to the Apothecaries’ Hall, where it was sold for some time under the name of Solvent Mineral.

Friar’s Balsam.

Tinct. Benzoin Co., was a copy of Ward’s Balsam, which itself was only the adaptation of compounds which had been for a long time sold under the names of Friar’s Balsam, Commander’s Balsam, Jesuit’s Drops, Turlington’s Drops, and Traumatic Balsam. It was under the last name that it first appeared in the P.L. of 1746. This was only the Latinised name of Wound Balsam, another old designation of a similar preparation.

It is not known how the still popular name for this preparation, Friar’s Balsam, originated. It is included in the Schedule to the Medicine Stamp Act of 1812, suggesting that at that time it was regarded as a proprietary medicine.

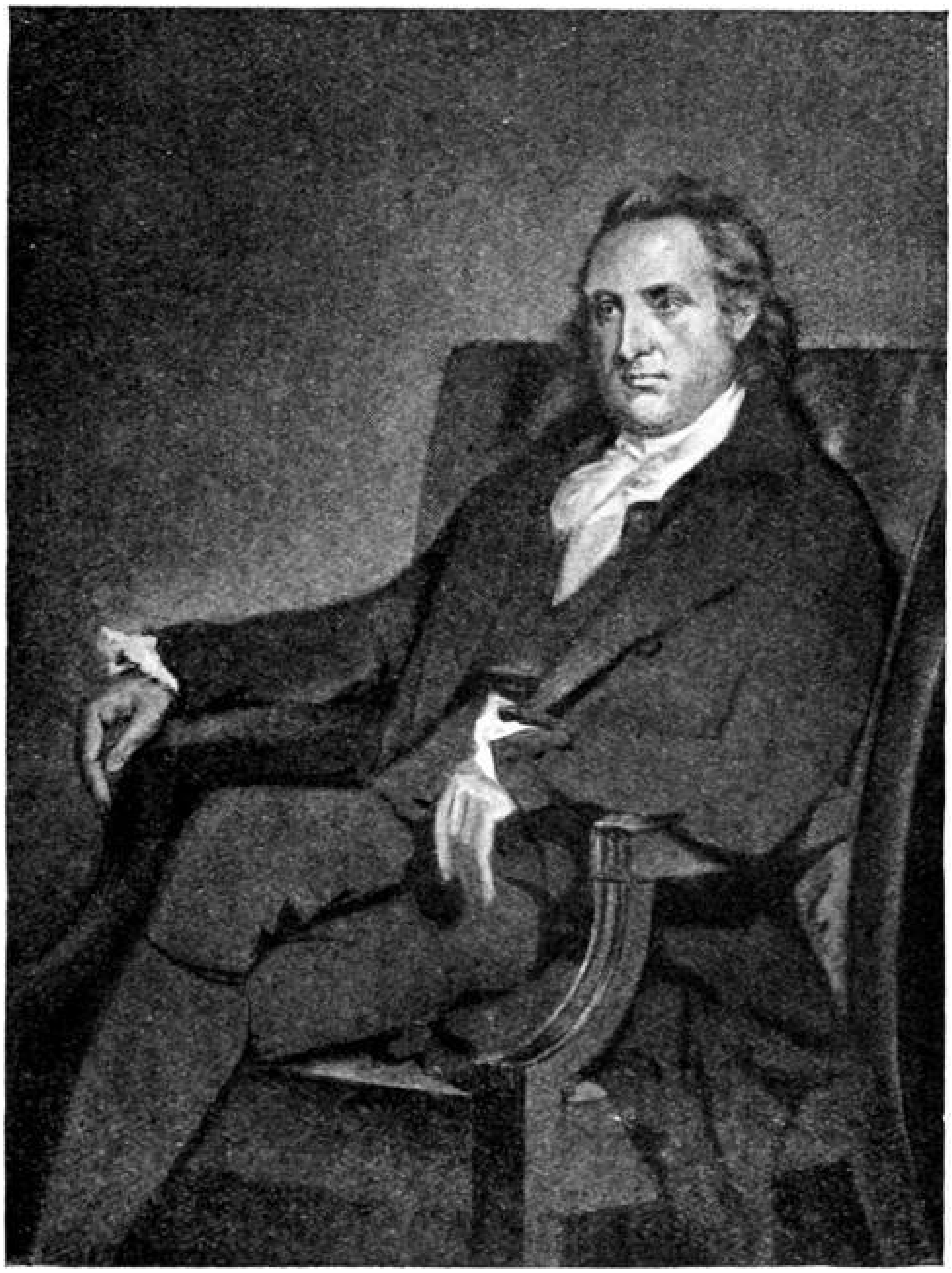
A correspondent of *The Chemist and Druggist* (P. F. R., April 15, 1885) quoted from the *Western Antiquary*, 1884, page 136, the curious item that a Portuguese merchant named Peter de Frias obtained from the Viceroy of Peru, about the year 1581, the fruit of a balm or balsam. It is not an impossible suggestion that Peter de Frias may have been the originator of our Friar’s Balsam. The substitution of benzoin for the balsam of Peru, which was probably the basis of his “wound balsam,” is easily accounted for. Perhaps a more likely explanation of the introduction of Friar’s Balsam into the Medicine Stamp Act is that there was a patent medicine “called the Frier’s Drops,” patented by Robert Grubb on June 13, 1777. It was intended for the cure of the venereal disease, scurvy, rheumatism, and other complaints. It contained calomel, antimony, guaiacum, and balsam of Peru in spirit.

The Baume de Commandeur, which was also called Baume du Commandeur de Permes, and Baume du Chevalier de Saint Victor, seems to have been the original of these benzoinated tinctures, and acquired considerable reputation in France. It was evidently at first a proprietary preparation, but Pomet in 1694 gave a formula for an imitation of it, with the remark that it would cure in eight days any wound by iron or fire, if it were not a mortal one. His formula prescribes benzoin, 3 oz.; dry Peruvian balsam, 1 oz.; storax, 2 oz.; Socotrine aloes, myrrh, olibanum, angelica root, and St. John's wort flowers, of each ½ oz. digested in 2½ lb. of spirit, and strained. The Traumatic Balsam introduced into the P.L. substituted Balsam of Tolu for the Balsam of Peru, and omitted the myrrh, olibanum, angelica, and St. John's wort. This was almost identical with the Tinct. Benzoin Co. of the present B.P.

The simple tincture of benzoin was already popular in this country when the Traumatic Balsam was introduced. It was taken in doses of 20 to 60 drops in asthma, but its more usual employment was as Lac Virginis (1 drachm of the tincture in 4 ounces of water) as an application for the skin.

Gregory's Powder.

The original of the Pulv. Rhei Co. of the British Pharmacopœia was a prescription very frequently given by Dr. James Gregory, of Edinburgh, in his time the most famous physician of that city. He died in 1822. This Dr. Gregory was Professor of Medicine in Edinburgh University, as his father was before him. His son became Professor of Chemistry in the same university. Direct ancestors of these Gregorys had been professors of history, astronomy, and mathematics at Edinburgh, Oxford, and St. Andrews. Within a century and a half the family furnished sixteen professors to British universities, and it is a curious coincidence that the Church of Rome likewise counts sixteen Gregorys among its Popes.

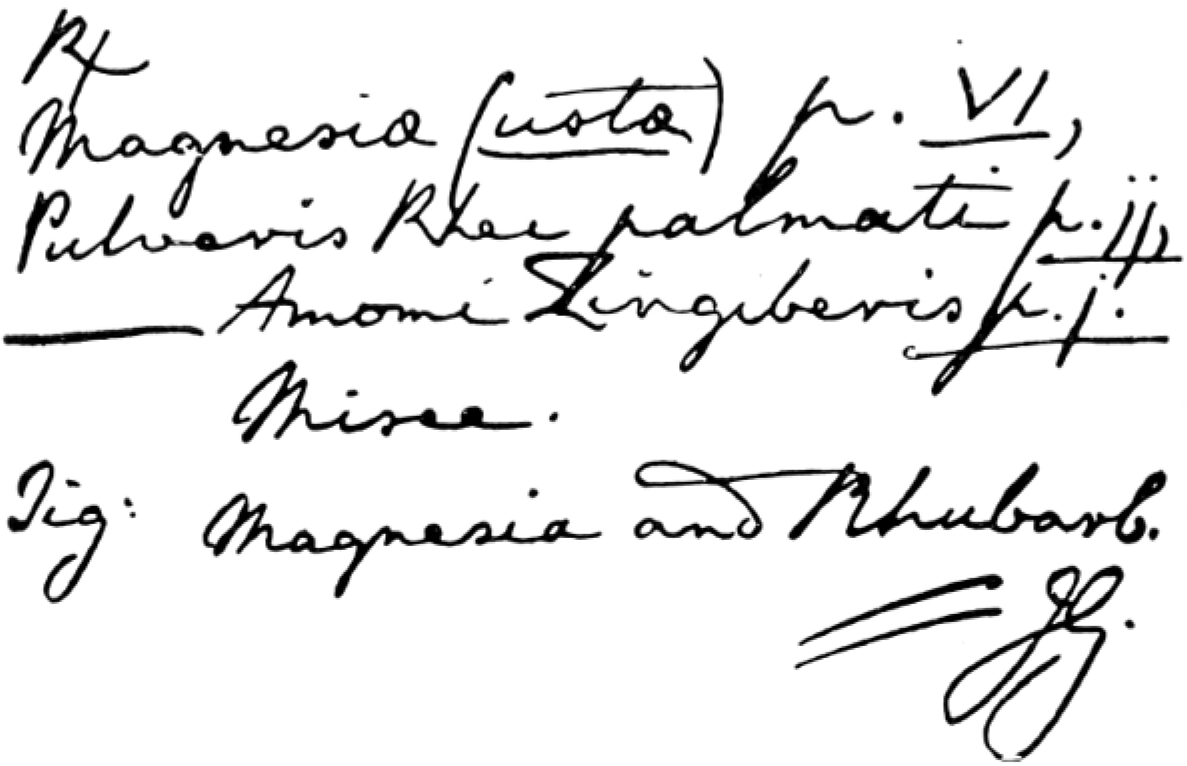


Dr. James Gregory.

Professor of Medicine in Edinburgh University, 1790–1821. Author of *Conspectus Medicinæ Theoreticæ* and inventor of Gregory's Powder.

(From a mezzotint, "after Raeburn," in the British Museum.)

It does not appear that the Gregory of powder fame ever published any special recommendation of his compound. He wrote a "Conspectus Medicinæ Theoreticæ" (1788) but the formula for his powder does not appear in that book. Annexed is a facsimile of one of Dr. Gregory's prescriptions for his powder. He gave this prescription very frequently, but occasionally varied the proportion of the ingredients.


℞
Magnesiæ (ustæ) p. VI,
Pulveris Rhei palmati p. ij,
— Amomi Zingiberis p. j.
Misce.
Sig: Magnesia and Rhubarb.
J. G.

FACSIMILE OF DR. GREGORY'S PRESCRIPTION.

HIERA PICRA.

A medicine with this familiar name can be bought in any chemist's shop in Europe or America to-day, just as it could in Damascus a thousand, or in Rome and Alexandria two thousand years ago. Probably it is the oldest pharmaceutical compound still in existence. Through all the centuries the hiera picra known to the public has been a preparation of aloes. The adjuncts have varied but aloes has always been the essential ingredient, with one celebrated exception.

The origin of this medicine is variously stated by medical historians. The common theory is that it first acquired fame as a remedy employed in one or other of the Æsculapian Temples. This may have been the case, but there is no evidence in support of the suggestion. It is possible that the name may have suggested the notion, and the drug vendors of Rome would certainly not discourage the fancy.

Before the time of Julius Cæsar there were no physicians in Rome. Greek practitioners of the minor arts of medicine, such as bath-keepers, corn-cutters, tooth-drawers, and herbalists crowded into the great city as it became rich, and opened shops which were known as "medicinas," and it is likely that most of these brought with them a more or less famous "hiera," claiming that it had been compounded from a genuine Temple formula.

Leclerc, an excellent authority on all matters concerning ancient medicine, attributes the first Hiera to Themison of Laodicea, who practised in Rome about 50 B.C., and who is reputed to have been the first physician to make use of leeches. The Hiera of Themison was composed of 100 drachms of aloes, with 1 oz. each of mastic, saffron, Indian nard, carpobalsamum, and asarum.

The Hiera of Galen, which was modified from that of Archigenes, was originally in the following form:—

Socotrine aloes, 100; cinnamon, spikenard, xylobalsamum, mastic, asarum, and saffron, of each 6; honey to make an electuary. In the P.L. this was ordered to be kept in the form of species, and was principally used to make a tincture which was called tinctura sacra. In the 1721 edition the mastic and the spikenard were omitted, cardamom seeds being substituted for the latter, and some cochineal was added with a view to colouring the tincture. In 1746 hiera picra became simply a mixture of aloes and canella, and as such it was retained in the following edition (1788), but under the title of Pulv. Aloeticus, which in the Index is given as "olim Hiera Picra." This was the latest reference to Hiera Picra as such in the London Pharmacopœia. The P.L. of 1788 gave also a Pulv. Aloeticus c. Guaiaco, which consisted of 1½ oz. of Socotrine aloes, 1 oz. of powdered guaiacum, and ½ oz. of aromatic powder (afterwards called Pulv. Cinnamomi Co., and compounded of cinnamon, cardamoms, ginger, and long pepper). The canella mixture did not appear again, but that with guaiacum was repeated in all the subsequent London Pharmacopœias including the last in 1851, but was dropped from the British Pharmacopœias.

Pil. Rufi, our Myrrh and Aloes pill, was originally a Hiera invented by Rufus of Ephesus, who lived in the reign of the Emperor Trajan. The Hiera was made into pills by the Arabs, and were for a long time known as Pilulæ Pestilentiales, which was the name Avicenna gave them. In the early Edinburgh Pharmacopœias they were called Pilulæ Communes.

Scribonius Largus, physician to the Emperor Tiberius, relates (A.D. 52) that one of these noted hieras, the Hiera Pachii, was much sought after, and that large sums had been offered for the formula. When Pachius died at Antioch the Emperor had his library searched, and the true recipe for the famous medicine was there found in a book which Pachius had prepared and had dedicated to the Emperor. Tiberius handed the formula to Scribonius with instructions for its publication. The formula given by Scribonius, which it will be noted contained no aloes, was as follows:—Colocynth, agaric, germander, white horehound, Arabian stœches (a sort of lavender), of each ʒx; opoponax, sagapenum, parsley seeds, round birthwort root, white pepper, of each ʒv; spikenard, cinnamon, myrrh, and saffron, of each ʒiv; despumated honey, 3 lb. 3 oz. 5 drachms, to make an electuary.

It is not necessary to describe the other hieras devised by later authorities, but it may be noted that the Hiera Tralliani compounded by Alexander of Tralles (about 550 A.D.) contained scammony, and that he advises concerning it that the quantity of scammony shall not be increased, as it appears some were inclined to do, not knowing that thereby they make it useless. For he says it is not the intention that the medicine should be carried immediately through the system. It should be detained in the body and conveyed to the remote parts so as to correct the various humours, open the passages, remove the obstructions of the nerves, and make way for the motion of the spirits. This was the formula given in the P.L. 1721 under the name of Hiera Diacolocynthidis, but our present-day hiera picra has descended from the Hiera Simplex of Galen. The old dispensatories up to the eighteenth century give a liberal choice of Hieras, among which were the Hiera Simplex Galeni cum Agarice, Hiera Logadii, Hiera Antiochi, Hiera Archigenes, Hiera Tralliani, Hiera Rufi, Hiera Justi, Hiera Constantini, and others. Originally these were all electuaries made with honey. It became the practice, however, to keep them in the form of "species," and ultimately electuaries went out of fashion altogether.

Laudanum.

Paracelsus probably invented the name of laudanum, and seems to have called several medicines by that term. In one place he expressly states that his laudanum was made from gold leaf and unperforated pearls; in other places he seems to mean red precipitate, and undoubtedly opium or a compound of it was sometimes intended. Crollius gives a formula for a pill mass, which he designates the laudanum of Paracelsus, which contained one-fourth of its weight of opium, to which were added henbane juice, mummy, salts of pearls and corals, the bone of the heart of a stag, bezoar stone, amber, musk, unicorn, and some species, with a few drops of many of the essential oils. The Anodynum Specificum of Paracelsus was a product obtained by first digesting opium, 4, in a mixture of orange and lemon juices, 180, with distilled frogs' sperm water, to which cinnamon, 4, cloves, 45, ambergris, 4, and saffron, 45, were added. This mixture was digested for a month, and after pressing and straining, coral, magistery of pearl, and quintessence of gold, of each 2, were added, together with the salt extracted from the marc.

The laudanum of the early London Pharmacopœias was a pill mass made as follows:—Thebaic opium extracted by spirit of wine, ℨi.; saffron, similarly extracted, ℨiss; castorum, ℨi; combined with ℨss. of species of diambræ made into a tincture with spirit of wine; to these might be added, ex-gratia, ambergris and musk, of each 6 gr., and oil of nutmeg 10 drops. Evaporate the moisture and leave the mass.

One would think that the name laudanum was an echo of laudandum, and that has been the usual opinion. But Professor Skeat is confident that it is a variation of ladanum, which, he says, was a stomachic cordial made and named from gum labdanum, which had been in medical use for centuries. This, of course, is possible, but it must be remembered that Paracelsus was untrammelled by any etymological rules in his invented words, and that the one unlikely thing for him to do would have been to adopt with a slight modification the name of a remedy then in use, if, indeed, a preparation of labdanum was at that time popular, or even known at all in Germany in his time.[2] Adam of Bodenstein, son of the theologian Carolstadt, who wrote both for and against Luther's doctrines, wrote a treatise in which he professed to explain all the mysterious terms used by Paracelsus. Laudanum, he says, is from *a laude*, and was a quintessence of mercury and not an opiate.

Sydenham's Laudanum is the preparation of opium which attained the highest popularity. It has always been the principal liquid preparation of the drug in continental practice, and formulas for it more or less corresponding with the original are in all the principal Pharmacopœias except the British. It was omitted from the P.L. in 1746, or rather a very similar preparation named Tinctura Thebaiaca was substituted for it. Sydenham's formula, which was given incidentally in his description of the dysentery of 1669–72, prescribed strained opium, 2 oz., saffron 1 oz., cinnamon and cloves of each 1 drachm, and Canary wine, 1 pint.

"I do not think this preparation has more virtue than the solid laudanum of the shops," he wrote; "but I prefer it before that for its more commodious form, and by reason of the greater certainty of the dose, for it may be dropped into wine or any distilled water, or into any other liquor."

This passage is quoted from Pechey's translation of Sydenham's works. The allusion to "the solid laudanum of the shops" confirms the opinion that Sydenham's was the first liquid preparation generally designated laudanum. Among the Sloane manuscripts in the British Museum is included what is described as "The Commonplace Book of an Apothecary at Great Dunmow," which contains several more or less similar recipes for laudanum. The book is dated 1644–5. The most elaborate formula is headed "Laudanum Josephi Michælis," and lengthy directions for making this are given. The ingredients were opium, extract of henbane, species diambræ (a compound of most of the known spices), pearls, coral, amber, musk, mummy, cloves, and oil of cloves. Some of these were to be extracted with spirit of wine, and the spirituous extracts were to be distilled. Ultimately the whole was to be set aside to ferment for three months. The dose was stated to be 4 or 5 grains at bedtime.

Rousseau's laudanum, which also became famous among opium preparations, differed from others in being a fermented compound. It was made by dissolving 12 oz. of honey in 3 lb. of warm water, and setting the mixture in a warm place. When it began to ferment, 4 oz. of opium mixed with 12 oz. of water were added, and the fermentation was allowed to continue at a moderate temperature for a month. After straining, the liquid was evaporated to 10 oz., and 4½ oz. of alcohol were added.

Rousseau was a Capuchin monk and was destined for mission work in Asia. Sent from Rome to Paris to study medicine so that he might be better fitted for his life's work, he carried a letter of introduction to Colbert, the first minister of Louis XIV. Rooms were provided for him in the Louvre, and there before long he set up a laboratory and began to prepare and sell medicines. The Capucin of the Louvre became the fashionable quack, and Louis ordered the Faculty of Medicine to confer on him a degree. The life was so agreeable that, when orders came from Rome that he was to proceed on his mission, Rousseau refused, and, having transferred his allegiance to the order of Cluny, he continued his medical practice in Paris. Falling ill he refused medical aid, treated himself with his own compounds, and died. After his death his brother published his "Remédes et Secréts Eprouvés" (1697).

Black Drop was the name of a celebrated proprietary medicine very popular from the first half of the eighteenth, until the early part of the nineteenth century. Its inventor was one Edward Runstall of Bishop Auckland in the county of Durham, but it also came to be known as the Lancaster or the Quaker's Black Drop. A formula for it was found by a Dr. Armstrong among the papers of a relative of the proprietor, and was published in a treatise on fevers in the early part of the nineteenth century. The recipe was as follows:—Opium, ½ lb.; good verjuice (the juice of the wild crab), 4 pints; nutmegs, 1½ oz.; saffron, ½ oz. Boil to a proper consistence, set in a warm place, add two spoonfuls of yeast, set in a warm place for six or eight weeks, then in the open air until it becomes of the consistence of syrup. Decant, filter, and bottle, putting a little sugar into each bottle.

This preparation was three times the strength of laudanum. The acetum opii of the Edinburgh and Dublin Pharmacopœias was intended as a substitute, but closer approximations to the original formula were given in the Hamburg Codex of 1845 and in the U.S. Pharmacopœia of 1851. The growing favour with which morphine was regarded gradually destroyed the popularity of the Black Drop.

has much fallen from its earlier glories. In the P.L., 1721, it was made with French brandy and twenty-seven other ingredients, including besides lavender, sage, rosemary, betony, borage, lilies of the valley, cowslips, balm, orange flowers, bay berries, cinnamon, mace, nutmegs, cardamoms, cubebs, aloes wood, ambergris, saffron, musk roses, and a few other less familiar flowers or cordials. The preparation was known as Palsy Drops, but I am not sure whether the official compound acquired this title, or whether it was an imitation of a tincture previously known as such.

LENITIVE ELECTUARY.

The formula prescribed in the first London Pharmacopœia was as follows:—Raisins (stoned), polypody of the oak, Eastern senna, of each 2 oz.; herb mercury, 1½ handful; jujubes and sebestens, of each 20; maidenhair, violets, and cleaned barley, of each 1 handful; prunes (stoned), tamarinds, of each 6 drachms; liquorice, ½ oz.

These drugs were to be boiled in 10 lb. of water to one-third of its volume, and to the strained liquor were to be added pulp of cassia fistula, tamarinds, prunes, sugar of violets, of each 6 oz.; sugar, 2 lb.; and at last 1½ oz. of powdered senna was to be incorporated to each pound of the electuary.

In the Pharmacopœia of 1650 powdered aniseed, 2 drachms to each pound of the electuary, was added in order to correct the action of the senna.

In 1721 figs (20) took the place of the jujubes and sebestens; and powdered coriander seeds were substituted for the aniseed.

In the Pharmacopœia of 1746 the preparation was much simplified, the raisins, polypody, herb mercury, maidenhair, violets, and barley, being rejected. The formula then adopted was very nearly the same as the one now prescribed, but the name of the compound was changed in 1851 to Confection of Senna.

As in the case of most other medicines, the dose of this compound has been gradually reduced. There was more senna in proportion to the finished product in the old formulas than in the modern ones; but the dose was stated by Culpepper to be "one ounce for a man of reasonable strength." Later a piece the size of a walnut was recommended; now the official dose is 1 to 2 drachms.

For a long time this preparation was grossly adulterated. "I understand," says Paris, "that a considerable quantity is manufactured in Staffordshire in which unsound or spoilt apples are an ingredient; that jalap blackened with walnut liquor is frequently substituted for pulp of cassia; and that the great bulk of what is sold in London is little else than prunes, figs, and jalap."

Compound Liquorice Powder.

Although this popular medicine was only made official by being adopted in the B. P. Additions, 1874, it had already acquired reputation as a pleasant laxative in household medicine, and had been familiar in German pharmacy for the better part of a century. It first appeared in the Prussian Pharmacopœia in 1799, and had been devised by a noted physician of Berlin, Dr. E. G. Kurella, who died in the year named. He called the mixture Pectoral Powder, and he made an electuary from similar ingredients.

The Prussian powder looks like a modification of a compound senna powder included in the first London Pharmacopœia, 1618. This contained senna, liquorice, caraway, fennel, cumin, spikenard, cinnamon, galangal, and gromwell seeds. Its "first contriver" (says Quincy) was Isaac Hollandicus.

Opodeldoc.

So far as can be traced Paracelsus first used the term opodeldoc (or as it is generally found in his works, opodelloch or opodeltoch). If he invented the word it is probable that he did not derive it from any etymological elements. Various suggestions have been made from time to time in explanation of the term, but without any sound basis. The most ingenious one is given by Hermann Peters in his "Pictorial History of Ancient Pharmacy." He derives it from the first syllabic of opoponax, the second syllable of bedellium, and the third syllable of aristolochia root. These were the principal ingredients of the old opodeldoc plaster as it appeared in the last Nuremburg edition of the "Dispensatory of Valerius Cordus."

In some dictionaries Mindererus is credited with the invention of the word, but incorrectly. He uses it, but expressly attributes it to Paracelsus. In his "Medicina Militaris," for example, he advises the army doctor to "be provided with a good plaister for wounds made by thrusting (spear-wounds) such as are the opodeldoc of Theophrastus." Schröder, another medical author of about the same date (1600) also refers to the "oppodeldoch plaister of Paracelsus." Paracelsus only uses the term opodeldoc for plasters, and for these he does not give a specific formula. One of his annotators, Felix Wurtz, however, states that the following was the method of preparing the great opodeldoch plaster which Paracelsus was in the habit of using. Its formula was as follows:—

> Galbanum, opoponax, of each 3 oz.; ammoniacum, bdellium, of each 1 oz. Macerate for eight days in distilled vinegar and slowly evaporate the solution to the consistence of honey. Then boil together, litharge in fine powder, ½ lb., with 1½ lb. of oil, stirring until the compound acquires the colour of bay. Add 1 lb. of wax, and when melted mix with the solution the gums above mentioned, and soon after add 3 oz. of oil of laurinus. Stir all these diligently until they are perfectly mixed, then remove from the fire and work in the following powders, all finely powdered:—
>
> Crocus martial, mummy, prepared magnet, magistery of white coral, and magistery of red coral, of each ½ oz.; calamine, myrrh, frankincense, mastich, aristolochia root, of each 2 oz. Stir these gradually with the liquefied plaster.
>
> Separately mix 1 drachm of powdered amber, 1 drachm of oil of laurinus, and ½ oz. of turpentine, and add to them 1 drachm of camphor and ½ drachm of saffron. Add this mixture to the plaster, and when perfectly blended form into magdaleons (rolls). These may be slightly softened with oil of St. John's wort.

The author explains that this plaster will heal all wounds and all ordinary ulcers without the formation of pus; but for rodent ulcers he recommends the addition of 1 drachm of the following mixture of powders to each ½ oz. of plaster:—Crocus of antimony, vitriol of calcined rubies, and red precipitate; equal parts worked in with a little oil of turpentine. Other forms were given by different authors, but this was the one which was adopted in the P.L., 1721.

Just when the name was transferred from a plaster to the liquid soap liniment cannot be traced; it was applied to an ointment on the way. There is a formula for an Unguentum Opodeldoch in the first Edinburgh Pharmacopœia, 1722, as follows:—

> "Rad. angelicæ, aristolochiæ longæ, imperatoriæ, aa 2 oz.;
>
> "Fol. ocimi (basil), origani, salviæ, serpylli,

“Flor anthos, lavandulæ, aa 1½ oz.;

“Bacc. juniper, lauri, sem. cummini, aa 2 oz.; castorei, 1 oz.

“Affunde Spirit. Vini Rect. congium unum. Digere frigide per triduum in vaso clauso; tandem humitatur in B.M. tepidum per horas aliquot. Colatura expressæ adde

“Camphoræ 1 oz., saponis Venet. minutim incisi, lbii.

“Digere rursus in vase circularorio juncturis lutatis, leni calore B.M. donec coeant in unguentum.”

Steer’s opodeldoc was similar to this compound, but with some ammonia added. It appeared about the middle of the eighteenth century, and foreign dispensatories state that it was the patent of an English doctor. I have not been able to trace either the patent or the doctor. Steer’s opodeldoc was evidently the model imitated in most of the foreign pharmacopœias.

Paregoric.

Paregoric Elixir originated with Le Mort, Professor of Chemistry at the University of Leyden from 1702 till 1718, when he died and was succeeded by Boerhaave. A modification of Le Mort’s formula was given in the P.L., 1721, as Elixir Asthmaticum, thus:—Honey and liquorice root, of each 4 oz.; flowers of benjamin and opium, of each 1 drachm; camphor, 2 scruples; oil of aniseed, ½ drachm; salt of tartar, 1 oz.; spirit of wine, 2 lb. Quincy (1724) says, “there is not any composition of our shops to be compared to it in the intention in which it is ordered.” He explains that opium procures a truce with the cough, and so provides a better opportunity for the other ingredients to rarefy and thin the viscid cohesions in the vessels, and fit them for circulation and secretion. In the P.L., 1746, the honey, liquorice, and salt of tartar were omitted, and the name of the preparation was changed to Elixir Paregoricum. The Edinburgh Pharmacopœia of 1756 left out the honey, liquorice, and salt of tartar, substituted saffron for camphor, and ammoniated the spirit. The P.E. also adopted the name of Paregoric. In the P.L., 1788, the official name became Tinct. Opii Camphorata, and in 1851, Tinct. Camphoræ Co. A similar formula appears in most foreign Pharmacopœias. In the German Pharmacopœia and in some others it is called Tinct. Opii Benzoica.

Paregoric, that is, soothing, remedies were frequently spoken of before the adjective became specific. Leclerc, dealing with the later Greek and Roman remedies, states that preparations into which poppy juice or opium entered as an essential ingredient, whether they were pills or liquids, were called anodyna or paregorica. Bishop Berkeley said of his tar water that it was "both paregoric and cordial." The word was derived from a Greek combination originally meaning to speak in an assembly, but it acquired the secondary sense of speaking words of consolation.

Pil. Cochia.

Pil. Cochia originated with the Greco-Roman physicians, from Galen onwards, and all the formulas for it associate aloes with a more drastic purgative such as colocynth, which is the usual ingredient. The term, however, did not come into use until about the seventh century, and according to some authorities it was first formally adopted by Rhazes, the Arab. The predecessors of our pills were called "katapotia," which meant things to be swallowed, and the earlier prescribers directed katapotia of such a size. Celsus, for example, orders katapotia of the size of an almond, of an Egyptian bean, and so on. Subsequently as patients became more fastidious they were humoured by the doctors, and katapotia of the size of a coccus, which was a lentil berry, were prescribed. Coccion meant a diminutive coccus, and as the pill of aloes and colocynth was frequently prescribed in this way the term came to distinguish those pills particularly. Paul of Ægina's formula (sixth century) ordered aloes and colocynth pulp, and extract of wormwood, of each one part, with scammony two parts. To be made into pills of the size of a coccus. Eleven were to be taken for a dose. The early London Pharmacopœias contained formulas for pilulæ cocciæ majores, from Rhazes, and pilulæ cocciæ minores, from Galen. Only the latter survived. In the P.L., 1746, the name of Pilulæ cocciæ minores was changed to Pilulæ ex Colocynthide cum Aloe, and the formula ordered Socotrine aloes and scammony, of each 2 oz.; pulp of colocynth 1 oz.; oil of cloves, 2 drachms.

Plummer's Pills.

Pil. Calomel. Co. originated from a formula devised by Dr. Andrew Plummer, Professor of Chemistry in the University of Edinburgh in the middle of the eighteenth century. Dr. Plummer first published his formula in the "Edinburgh Medical Essays," 1751. It was only a slight modification of the Pilulæ Æthiopicæ which were already official in the Edinburgh Pharmacopœia. These were originally a combination of Ethiops Mineral with the golden sulphide of antimony, but the Edinburgh College had substituted calomel for the former.

Ammoniated Tincture of Quinine.

Under this name Mr. Joseph Ince recorded in the *Pharm. Journ.*, June 13th, 1874, that a preparation was made and called by this name which was a solution of 1 grain of sulphate of quinine in one drachm of compound spirit of ammonia. This did not meet with general approval, and in 1853 Mr. Bastick proposed an Ammoniated Solution of Quinine made by dissolving 32 grains of sulphate of quinine in 3½ ounces of proof spirit and ½ ounce of solution of ammonia. The present B.P. tincture contains less ammonia, and alcohol is employed instead of proof spirit.

Compound Soap Pills.

Pil. Sapon. Co., formerly official as Pil. Sapon. c Opio, Pil. Opii, Pil. ex Opio, and when first authorised in the P.L., 1746, Pil. Saponacea, was adapted from a famous nostrum long sold as Matthews's Pills, and as Starkey's Pills. Starkey, a qualified physician, was understood to have devised the process, and Matthews was the vendor in whose name they were sold. But a little before his death in 1665 Starkey told Dr. George Wilson that the formula he had sold to Matthews was not his genuine and best process. In both, however, the characteristic ingredient was "soap of tartar," which it was claimed added an aperient quality to the opium which made it safe to give in asthmas and other complaints when opium alone was objectionable. The soap of tartar was made by melting together in a crucible equal parts of cream of tartar and saltpetre, the compound being afterwards crystallised and powdered, and with it was incorporated 4 oz. of turpentine to each pound of the resulting salt. Matthews's Pills were made from 4 oz. each of extract of opium, black hellebore, soap of tartar, and liquorice, with 1 oz. of saffron. Starkey's deathbed formula ordered 4 oz. of extract of opium, 2 oz. each of nutmeg and mineral bezoar (calx of antimony), saffron and snake root, of each 1 oz., soap of tartar 8 oz., oil of sassafras ½ oz., tincture of antimony, 2 oz. These pills were also known as pilulæ pacificæ.

Decoctions of Sarsaparilla.

Sarsaparilla, guaiacum, sassafras, and mezereon enjoyed fitful periods of fame in the sixteenth, seventeenth and eighteenth centuries, especially for the treatment of syphilis. From the time of their introduction the Paracelsists denounced these remedies, and Paracelsus himself was especially sarcastic about "the wooden doctors," as he called those who relied on these woods. Still they were employed to an immense extent. A number of remedies were made from them, generally from a combination of them. One of these called the Lisbon Diet Drink became very popular in the eighteenth century. This was taken not only in syphilitic cases, but as an antirheumatic and generally purifying medicine. It was said to contain antimony, and the following was reputed to be a correct imitation of it:—Sarsaparilla, 90, red sandal, 90, yellow sandal, 90, rose root, 30, guaiacum wood, 30, sassafras, 30, mezereon bark, 15, sulphide of antimony, 60, boiling water, 3600. Infuse twelve hours and boil down to half, adding near the end of the boiling fifteen parts of liquorice. An English Dr. Leake wrote a book about this decoction in 1787, describing what he had seen of its good effects in the cure of venereal diseases, scurvy, and other stubborn chronic complaints. He had been to Lisbon, and intimated that he had obtained the correct formula, but he did not give it. He had, however, for some time made it, and would supply it in a concentrated form.

A compound decoction of sarsaparilla was introduced into the London Pharmacopœia of 1788, and the Liquor Sarsæ Co. Conc. of the B.P. is the direct descendant of that preparation.

Sirop de Cuisinier has long been a popular preparation of sarsaparilla in France, and has been officially recognised by the Codex for a century. A compound syrup of sarsaparilla was introduced into the United States Pharmacopœia in 1820 expressly as an imitation of the French syrup. The original Sirop de Cuisinier was evidently a proprietary article, but I have not been able to trace its history. The Codex formula prescribes sarsaparilla, with flowers of borage and white roses, senna, and aniseed, made into a syrup with honey, sugar, and water. The U.S.P. substituted liquorice for the borage. It has often been employed as a vehicle for corrosive sublimate, but a number of experiments have shown that unless this mixture is quite fresh the sublimate will be reduced to calomel.

Seidlitz Powders

are a well known misnomer. Fr. Hoffmann discovered the Seidlitz spring in 1724, and found that it owed its medicinal effect to sulphate of magnesia with some sulphate of soda. Seidlitz or Sedlitz is a small town near Seidschutz in northern Bohemia. There is evidence that at one time sulphate of magnesia was obtained commercially from this spring as it was from the Epsom water, and in this country then, and in some Continental countries still, Seidlitz salt was and is a synonym for sulphate of magnesia. In Christison's Dispensatory it was suggested that the name as applied to the powders which have so long been known in Great Britain was a corruption of Seignette's powders. Other writers suggested that the name may have resulted from a confusion between Seidlitz and Selters. The most probable explanation, however, was given in *The Chemist and Druggist* of February 23 and March 2, 1901, from which it appeared that Thomas Field Savory, of Bond Street, London, took out a patent in 1815 for "the combination of a neutral salt or powder which possesses all the properties of the medicinal spring in Germany under the name of the Seidlitz powders." The specification was for the production of three powders, namely, (1) tartrated soda, (2) bicarbonate of soda, and (3) tartaric acid, but these chemicals were not designated by their usual names, but old-fashioned methods of producing them were set forth. Then it was stated that ʒij of No. 1, ℈ij of No. 2, and ℈ij of No. 3 were to be taken and mixed in the manner so familiar to us. In 1823 Mr. Savory brought an action against Messrs. Price & Son, of 4, Leadenhall Street, for alleged infringement of his patent, which, however, the Court held to be invalid in consequence of the elaborate directions in the specification for the production of the several ingredients, all of which were chemicals sold in all chemists' shops. At the same trial it seems to have been admitted that the combination was both new and useful. There is no record of any objection to the title.

In 1778 Bergmann published a treatise on artificial mineral waters, giving analyses of the most popular, and recommending the use of the factitious waters as preferable to the natural ones. About the same time a

French pharmacien, named Vanel, introduced a powder with which to make the favourite Eau de Seltz, or Selters water. Apparently the salts for making mineral waters acquired a certain degree of popularity, and it is likely that Seidlitz salt was among them. Nothing would make this palatable, and Mr. Savory’s idea of substituting a pleasant draught for a nauseous one was at least a commercial success.

Turner’s Cerate.

Daniel Turner, M.D., the inventor of Turner’s Cerate, which appeared in several Pharmacopœias as Ceratum Calaminæ, was at first a surgeon in London, but was admitted a Licentiate of the College of Physicians in 1711, and practised in Devonshire Square, Bishopsgate. In William Munk’s Roll of the Royal College of Physicians an opinion of him is quoted that he was too fond of displaying his talents upon paper; the result being that he published many volumes which are now forgotten. (A commentary which might be made on most other authors.) It is also said of him that his cases were not stated in the most delicate terms, nor was politeness among his excellences. As several of his works were about syphilis it may be that his style was merely perspicuous. He wrote comments on Dover’s “Ancient Physician” and on Mr. Ward’s Pill and Drop. His biographer, however, quotes from him with approval a pious exhortation to physicians not to be ashamed to avow their religious principles even if they kept their politics to themselves. “It can be no disgrace,” he wrote, “for a physician who owns himself to be no more than Nature’s minister to acknowledge himself also the servant of Nature’s Master.”

Turner’s original formula for his Ceratum de Lapide Calaminari was to melt together 3½ lb. of freshly made unsalted butter, 3½ lb. of the best yellow wax, and 4 lb. of pure and newly-prepared olive oil. These when melted to be strained through a linen cloth, and while cooling, 3 lb. 10 oz. of the best calamine stone, “sufficiently triturated and passed through a Sierce,” to be sprinkled into the mixture with constant stirring till it sets.

Turner’s comments on this cerate are worth quoting, because they incidentally illustrate the pharmacy of the period. He says:—

“As I have had ample experience of this cerate, I may be allow’d, I hope, to judge of its singular properties and good effects in all cutaneous ulcerations and excoriations either from scalding, burning, or fretting of the said parts by means of salt, acrid, or sharp humours; upon which accounts, not straining a tittle beyond its deserved euology, I am bold to affirm it will do more in all these superficial hurts of the body than either Unguentum Tutiae, Diapompholyx, Nutritum, Desiccativum Rubrum, Rosatum, or all the epuletic medicines now in use; and for which cause I can, for the public benefit, sincerely recommend it to all the professors of the art; and do wish that the Apothecaries would keep it made up in their shops, to deliver, at a suitable price, to indigent or poor people, instead of their ridiculous Locatellus's Balsam, and other improper medicines which they call for ignorantly to heal their skin-deep maladies. I know the medicine has been imitated by several, and I have seen somewhat like it in some gentlemen's salvatories; but I know not more than two persons I ever communicated it to, as I was wont to prepare it for my own use. The medicine thus prepared is of a good consistence and a true cerate, serving both for pledget or plaister, neither sticking troublesomely, nor running off or about by the heat of the parts; but keeping its body and performing things incredible. Whoever thinks fit to take it into practice will never repent it, nor perhaps (when he has experienced it as I have done) think I have said too much in its Commendation. This is the medicine I have so often taken notice of, which, that I might contribute my mite to the Surgeon's Treasure of Medicine, I here have publish'd, and leave it to take its fate."

The other preparations to which Dr. Turner refers as being at that time in public demand may be briefly noted. Tutty was another impure oxide of zinc generally containing some oxide of lead or copper. It was obtained from the flues of smelting furnaces where zinc ores were purified. Tutty was so called from an Arabic or Persian name given to zinc, or to a zinc and tin bronze imported from China and used as a gong metal by the Chinese. The tutty ointment was properly made up with viper's fat. Pompholyx was one of the names given to oxide of zinc prepared by combustion. It was a Greek word meaning a bubble in melted metal, from pomphos, a blister. Unguentum Diapompholyx contained besides the flowers of zinc, white lead, the juice of nightshade berries, and frankincense. Unguentum Nutritum was an acetate of lead ointment. Unguentum Desiccativum Rubrum was compounded from litharge, bole armeniac, calamine, and camphor. Unguentum Rosatum was similar to cold cream.

XXI

NOTED NOSTRUMS

> From powerful causes spring the empiric's gains,
> Man's love of life, his weakness, and his pains;
> These first induce him the vile trash to try,
> Then lend his name that other men may buy.
>
> Crabbe:—*The Borough*.

Patent Medicines.

In the early days of English commerce monopolies were granted by the sovereigns at their own pleasure, and often for their personal profit. Queen Elizabeth so largely abused her power in this direction that towards the end of her reign the discontent of her subjects compelled her to promise she would offend no more: and her successor, James I, gave a similar undertaking. The abuse, however, was continued until the Statute of Monopolies, passed in 1624, regulated all such grants, placing the power in the hands of Parliament, and limiting the period of privilege to fourteen years.

For the first century or thereabout of the administration of this Act, specifications of processes or formulas were not a condition of the patent. The idea was the introduction into the country of new industries, and it was supposed that the artificers who would have to be employed in any such industries would certainly acquire such necessary skill and knowledge about any new manufacture as would prevent any perpetuation of the monopoly. It was during the reign of Queen Anne that the law officers began to require that specifications should be filed before letters patent were issued. But the condition was not by any means uniformly or intelligently insisted upon, as will be seen immediately in the case of certain patented medicines.

The term "patent medicines," as now popularly used, means generally secret medicines, and the meaning is therefore in exact contradiction to the expression. Truthfully to declare the composition of many of these proprietary compounds would ruin their sale. Not that the ingredients are often improper or injurious; this rarely occurs; but because the success of these remedies depends in most instances rather on the mystery with which the makers can surround them than on their exceptional merit.

But some old medicines which became popular, including a few the reputation of which lives to this day, were actually patented. The first compound medicine for which a patent was granted under the Act of 1624 was No. 388, and was dated October 22, 1711. It was granted to Timothy Byfield for his sal oleosum volatile, "which by abundant experience hath been found very helpfull and beneficiall as well in uses medicinall as others." No particulars of the ingredients or method of manufacture are given.

Stoughton's "great cordial elixir" comes next, in 1712, and there is nothing more in the proprietary medicine line until 1722, when a patent for Robert Eaton's Styptick medicine appears. In that year a curious patent was granted to George Sinclair for "raising and cultivating the plants which are commonly called or do produce the balsam of tolu, Peru, and capair, dragon's blood, coloquintida, scamony, rhubarb, jalap, ipecacuanha (and others named), and curing the insect commonly called cochenele and cultivating the plant which they feed and live upon." No particulars of the inventor's ideas are given.

Benjamin Okell's patent for Dr. Bateman's pectoral drops, stated to act by moderate sweat and urine, and to be useful in rheumatism, afflictions of the stone, gravel, agues, and hysterics, was dated March 31, 1726, and was granted to him in recognition of the long study, application, and great expense he had been put to in finding out this remedy and bringing it to perfection. He furnished no particulars. Bateman's drops probably always depended on opium for its efficacy, and in time various formulas for a medicine under that name for coughs came to be adopted. In 1833 the Philadelphia College of Pharmacy published the following formula "to represent Bateman's Pectoral Drops because of its general use, and to secure uniformity." They said the preparation was then being sold in strengths varying from 7½ to 100 grains to the pint. The formula prescribed was: Diluted alcohol, 4 gallons; red sanders, rasped, 2 oz. Digest for 24 hours, filter, add opium in powder 2 oz., catechu in powder 2 oz., camphor 2 oz., oil of anise ½ oz. Digest for ten days.

The patent for John Hooper's Female Pills, granted in 1743 to John Hooper, apothecary and man midwife of Reading, contains a copy of an affidavit made by the patentee, who, being "obliged to give under his hand and seal a particular description of his invention," came before the King in Chancery, and satisfied the royal representative with a specification declaring that his medicine was "compounded as followeth:—Of the best purging stomatick and anti-hysterick ingredients, duly proportioned and made into a powder, and beat into a mass for pills with sufficient quantity of a strong infusion of the above-mentioned ingredients; and when the same is made into pills about the bigness of a small pea, two or three are to be given to persons from 7 years of age to 15, and three or four from 15 years of age to 70 every other night." Hooper must have been a humorist.

Betton's British oils "for the cure of rheumatic and scorbutic and other cases" had been patented in 1742. The oil was "extracted from the black, pitchy, flinty roch or rock lying immediately over the coal in coal mines." This was reduced to powder and then subjected to heat in a closed furnace, by which means the oil was obtained.

The patent for Dr. James's fever powder (1747) is referred to at length elsewhere. It is agreed that the preparation could not be produced by the process detailed; but, according to Lord Mansfield, it was also defective in another respect. In a judgment given by that eminent authority in 1778 (in the case of Liardet v. Johnson) he illustrated an argument he was using by a reference to Dr. James's patent, "in the specification of which," he said, "he has mentioned the articles only of which those powders were composed, and omitted the proportion or quantity." Consequently Lord Mansfield added, "Dr. James never durst bring an action for infringement, and it was certainly wise in him not to do so, for no patent could stand on such a specification." His lordship went on to enlarge on the extreme importance of exact quantities in the exact formulas for medicines.

Dr. James also patented his "analeptic pills" in 1774. They were to be compounded of equal parts of pil. rufi, gum ammoniacum, and his own fever powder. The two first named ingredients were to be "placed in a large cave underground furnished with the conductors of electrical fire" by which they were to be dissolved. The powder was then to be added and the pills to be made up with gum arabic.

In the second half of the eighteenth century the patents for compounded medicines become more numerous, but they are generally of no present interest. The names of a very few have come down to our day. Ann Pike's itch ointment (patented 1760) may be noticed. To prepare this, pomatum and calomel were first mixed and allowed to stand several days; another ointment was made with hogs' lard and Jesuit's bark, and this was likewise set aside for a few days. These two ointments were then blended together, mercury added to them, and the mass stirred daily for some time. Two other ointments were also made and combined like the others, the ingredients of these being deer suet, turbith mineral, lard, powdered tutty, flowers of brimstone, and wood soot.

In 1777 Robert Grubb patented a medicine called the Frier's Drops, "for the cure of the venereal disease, scurvy, rheumatism, stranguary and gleets." It contained calomel, antimony, guaiacum wood, balsam of Peru, hemlock, sugar candy, oil of sassafras, tartaric acid, and gum arabic, with spirit of wine. The particular interest of this is the name which may have been the original of the Friar's Balsam named in the Medicine Stamp Act. The Friar's Balsam known to us cannot be traced as a proprietary medicine.

Gale's Spa Elixir, patented 1782, is notable as a specimen of condensed information. Its composition is thus described:—"R. fer. q.l.; cor, anima., sp.vin. esse.tinc. anima: super:aq: nat:, sp.sal: q.s.; dissolve, digest, correct, evaporate, and extract the elixir S.A." The abbreviated terms and the punctuation are copied from the specification.

Nathaniel Godbold's Vegetable Balsam was patented in 1785, Spilsbury's Anti-scorbutic Drops in 1792, Ching's Worm Lozenges in 1796, and Innocenza della Lena winds up the century with a formula conceived quite on the lines of the pharmacy then departing. It was for "A certain medicine called flogistical and fixed earth of Mars or powder of Mars." It is not stated what the medicine was for, but its preparation was awe-inspiring. Mineral earth of iron, copper, crude antimony, mineral salt, and urine were digested for a considerable time in an unvarnished vessel, hermetically sealed, deep down in the earth. Subsequently the mixture was exposed to the rays of the sun for a period, more urine was added, and the interment and the exposure were several times repeated.

Roche's Embrocation for whooping-cough, patented in 1803, was declared to be compounded of oil of elder, rose leaves, chamomile flowers, oil of caraway, oil of rosemary, cochineal, and alkanet root. This remedy is still popular, but it is understood to have a composition very different from that specified.

Perkins's Metallic Tractors were patented on March 10th, 1798. Benjamin Douglas Perkins claimed to have discovered "an art of relieving and curing a variety of aches, pains, and diseases in the human body, by drawing over the parts affected or those contiguous thereto, in certain directions, various pointed metals, which from the affinity they have with the offending matter," or from some other cause, "extract, or draw out the same, and thus cure the patient." The metals used were combinations of copper, zinc, and gold; or of iron, silver, and platinum. The tractors were invented by Elisha Perkins, the father of Benjamin, who died at New York in 1799. The tractors were united together like a pair of compasses, and one of the arms was obtuse and the other pointed. They professed to apply galvanic action to the relief and cure of pain and disease. Galvani's report of his experiments was only published about 1790, and not much earlier Mesmer's animal magnetism had excited marvellous interest in Paris. Perkins's Tractors had an enormous popularity for a time in England and in Denmark, but nowhere else to any extent. Two Bath doctors, named Falconer and Haygarth, professed to get as good results with tractors made of wood, many patients of the Bath Hospital declaring that these promptly relieved their pains. From these experiments it was argued that the alleged cures were entirely due to the imagination of the sufferers.

After 1800 medicinal compounds are only rarely patented. Of those known to the present generation, Ford's Balsam of Horehound appears in 1816, Savory's Seidlitz Powders were protected in 1815, Ridge's Food, 1862, and Page Woodcock's Wind Pills, 1852. A patent was taken in 1853 by Sir James Murray for aerating cod-liver oil with carbonic acid gas, and William Brockedon's patent for compressing drugs and blacklead, which has borne fruit a thousandfold in these later days, was granted in 1843.

Anderson's Scots Pills.

These pills acquired extraordinary popularity, particularly in Scotland and France, and to some extent in other countries, including England. Either these pills or Singleton's Eye Ointment is the proprietary remedy still sold in this country with the longest history. It is claimed that the ointment was invented some forty years earlier than the pills, but it must be admitted that the records of the latter, especially in their early days, are more exactly authenticated.

Patrick Anderson, M.D.

Dr. Patrick Anderson was a Scotch physician of considerable reputation in London in the Stuart period. He is described on some of his books as Physician to Charles I. In 1635 he published a treatise entitled as follows:—"Grana Angelica; hoc est pilularum hujus nominis insignis utilitas; quibus etiam accesserunt alia quaedam pancula de durioris alvi incommodis propter materiam cognitionem, ac vice supplementi in fine adjuncta." He stated that he had obtained the formula for these pills in Venice. After his death they were sold in Edinburgh by his daughter Miss Katherine Anderson, and she by a deed registered in the Commissary Court books of Edinburgh, the 16th December, 1686, declared that she had communicated the secret to Thomas Weir, surgeon, in Edinburgh, "and to no other person."

To Dr. Weir letters patent for the pills were granted by King James II, 1687, with letters of Certification, &c., by King William and Queen Mary, 1694; and Testification by the Town Council of Edinburgh, 1694. From Dr. Weir by regular succession and assignation, the secret was conveyed to his widow, 1711; thence to their son Alex. Weir, 1715; then to Lilias Weir, his sister, 1726; by her to Dr. Thomas Irving, her nephew, 1770; then to his widow, Mrs. Irving, 1797; by her to her son, James Irving, 1814, but the old lady appears to have retained an interest in them until her death in 1837, at the age of 99. During her life, and probably before and after, the "shop" where the pills were made and sold was on the second floor of a house in the Lawn Market opposite the site of the West Bow, a steep street which led down to the Grassmarket. The house still remains, the date 1690 being carved on the lintel. After certain assignations and trusteeships the property came into the hands of a Mr. J. Rodger who sold his rights to Messrs. Raimes, Blanshard & Co. in 1876. They and their successors, Raimes, Clark & Co., Limited, have been the proprietors since the date mentioned, and they inform me that there is still a small demand for them.

Formulas for "Anderson's Scots Pills" will be found in all the manuals of pharmacy published in Europe and America, but they differ considerably. Paris in "Pharmacologia" said they were a compound of aloes and jalap with oil of anise; the French Codex which adopted them, or at least the name, compounded them of aloes and gamboge with oil of anise; Niemann, whose formulary had a quasi-official sanction in Holland early in the nineteenth century gave a much more complicated recipe, adding to the aloes both jalap and gamboge, together with sulphur, burnt ivory, liquorice powder, and soap. “Pharmaceutical Formulas” states that they are well represented by Pil Aloes et Myrrhæ B.P., “which (saving excipient) contains the same ingredients as those mentioned in a copy of the original document deposited in the Rolls House.”

Anodyne Necklaces.

Anodyne necklaces were perhaps the most extensively advertised of the quack remedies of the eighteenth century. The introduction of them is generally attributed to one of the Chamberlen family, well known in medical history as the inventors of the modern midwifery forceps.

In a collection of quack advertisements in the British Museum, all published in the last half of the seventeenth century, there is a handbill issued by Major John Coke, “a licensed physician and one of his Majesty’s Chymists” advertising miraculous necklaces for children breeding teeth “preventing (by God’s assistance) feavers, convulsions, ruptures, chincough, ricketts, and such attendant distempers.” These are 5*s.* each. A number of titled people whose children have used these necklaces are named. A correspondent of *Notes and Queries* (Mr. J. Elliot Hodgkin, 6th Ser., Vol. IX.) quotes a reference to anodyne necklaces from a pamphlet published in 1717 dedicated to Dr. Chamberlen and the Royal Society, evidently an advertisement which it may not be too uncharitable to suppose was written by Chamberlen himself. But another correspondent of the same journal (6th Ser., Vol. X.) quotes from Smith’s “Book for a Rainy Day” another reference to the necklaces in which they are alluded to as Mr. Burchell’s, and are said to be “so strongly recommended by two eminent physicians, Dr. Tanner, the inventor, and Dr. Chamberlain,” to whom he had communicated the prescription. The necklaces were composed of artificially prepared beads, small like barleycorns, and they were sold at 5*s.* each. The beads were often made of peony wood, a substance which Oribasius (fourth and fifth centuries) recommended to be hung round the neck for the cure of epilepsy. They were especially recommended for children cutting teeth, and for pregnant women. No doubt they served like any other hard substance to help in the former trouble to open the gums, but the idea suggested was that they gave out a certain vapour or effluvium which reduced the feverish condition.

“May I die by an anodyne necklace,” is an expression used by one of the characters in “The Vicar of Wakefield” (Ch. XX.). In a comment on this allusion by the eminent authority on the eighteenth century, Mr. Austin Dobson, it was explained that hanging was there euphemistically referred to. Mr. Dobson’s mistake was pointed out in *Notes and Queries*, and he acknowledged it.

The Collier de Morand was a neckband sold for goitre. It was made of carded cotton on which was sprinkled a powder consisting of equal parts of sal ammoniac, common salt, and burnt sponge. Paracelsus recommended that coral should be worn round the necks of children to preserve them from the effects of sorcery.

Daffy’s Elixir.

The Rev. Thomas Daffy, who invented the Elixir Salutis with which his name has been associated for about 250 years, was rector of Redmile in Leicestershire from 1660 to 1680. He had been appointed rector of Harby in the same county in Cromwell’s time, but the Countess of Rutland, who presumably “sat under” him, was a lady of evangelical ideas, and the Rev. Thomas was apparently of a “high” tendency, for according to Nichols’s “History of Leicestershire,” “he was removed from that better living to this worse one to satisfy the spleen of the Countess of Rutland, a puritanical lady who had conceived a feeling against him for being a man of other principles.” Just when he invented his elixir does not appear, but it is to be hoped that the profits from it made up for the sacrifice he had to make in consequence of his “other principles.” It is clear from the references to the medicine which are found in general literature and from the fact that it was imitated in the Pharmacopœia (under the formula for Tinctura Sennæ Co.) that it acquired considerable popularity. The following advertisement from the *Post Boy* of January 1, 1707, tells most of what is known about the elixir:—

> Daffye’s famous Elixir Salutis, prepared by Catherine Daffye, daughter of Mr. Thomas Daffye, late rector of Redmile in the vale of Belvoir, who imparted it to his kinsman, Mr. Anthony Daffye, who published the same to the benefit of the community and to his own advantage. The original receipt is now in my possession left to me by my father. My own brother, Mr. Daniel Daffye, apothecary in Nottingham, made this Elixir from the said receipt and sold it there during his life. Those who know it will believe what I declare; and those who do not may be

> convinced that I am no counterfeit by the colour, taste, smell, and operation of my Elixir. To be had at the Hand and Pen, Maiden Lane, Covent Garden.

Catherine Daffy was not a clever advertiser, for her announcement seems calculated to assist Anthony Daffy's preparation as much as her own, and it is likely that this was not her intention. Such little evidence as exists goes to show that it was Anthony's and not Catherine's Elixir that maintained the fame which had been won.

Daffy's Elixir is still made by Sutton & Co., of 76 Chiswell Street, the successors to Dicey & Co., of Bow Church Yard, who were themselves successors to Benjamin Okell, who was carrying on the business in 1727, but when or from whom, or for what consideration the property was transferred to them from the Daffy family, is not known. The old-fashioned handbills wrapped round the bottles state that the Elixir was "much recommended to the public by Dr. King, Physician to King Charles II, and the late learned and ingenious Dr. Radcliffe." Unhappily, however, "a low set of mercenary vendors" have been making imitations of this "noble and generous Elixir," using "foul and ordinary spirits instead of clean and pure brandy, and base and damaged drugs," of which none could be guilty "but such as never feel for any but themselves."

Baume de Fioraventi.

This medicine still figures in the French Codex and in other continental Pharmacopœias. It is an alcoholic tincture of canella, cloves, nutmegs, ginger, and other spices, with bay berries, to which are added amber, galbanum, myrrh, aloes, elemi, and other resins, and one-sixth by volume of turpentine. After digestion this mixture is distilled to a yield of about two-thirds of the original bulk. The balm was formerly given in doses of 5 or 6 drops in kidney disorders, but it is now only used externally in rheumatism and for chilblains, and for strengthening the sight. For the last-named purpose the hand is wetted with the balm and held before the eyes.

Fioraventi was a famous Italian quack in the latter half of the seventeenth century. He practised in Naples, Rome, Venice, Milan, and Florence, and was specially honoured in his native city of Bologna, where he was made a Doctor, a Chevalier, and a Count; titles of which he made the utmost use. He published numerous works on medicine, devised various "Nostra," and pretended to give the exact formulas for these, but they were always so complicated that no doubt the rich clients whose patronage Fioraventi cultivated would prefer to buy the remedies ready compounded. His medical advice though crammed with bombast was generally sensible, but in all cases he recommended one or another of "our" remedies. These included "our Balm Artificiall" (the compound just referred to), "our Electuaria Anglico," "our Sirrup Solutivo," "our Lignum Sanctum," "our Oleum Benedictum," and so forth. Above all Fioraventi made play with his "Petra Philosophale." Philosophers had long disputed, he says, whether it was possible to produce a medicine which would cure all diseases. There was no longer any occasion for dispute; the discovery of "our Petra Philosophale" was conclusive. The directions for making this remedy were very complicated, and of course it was essential that they should be followed minutely. Briefly, the process was to take so much "Sal Niter, Roche Allum, and Roman Vitrioll" (I take the names from an old English translation), "add some Sal Gemmæ, and distil. Then mix Mercury, Sope, Quick Lime, and Common Ashes, sublime off the Mercury, and add it to the first distillate. To the mixture add so much steel, iron, and gold, dry the compound to a stone, which 'keep as a precious Jewell' in a closed glass vessel."

Why Fioraventi should have troubled to invent any other remedies after this, or why his patients should have been called upon to buy any others, is not explained.

Baume Tranquille

was originally made by the Capucin monk, Aignan, whose religious name was Father Tranquille. The Capucins of the Louvre were noted in the seventeenth century for their medical skill, and Father Tranquille was one of them. Twenty herbs were used in compounding this balsam, among them poppy, tobacco, lavender, and rue. These were infused in oil. "The Baume may be made still more effective," writes Père Rousseau, who was a fellow monk with Father Tranquille, "by adding as many large live frogs as there are pounds of oil. These are to be boiled in the oil until they are almost burnt. Their juice and fat combine with the oil and greatly augment the excellence of the remedy." Mme. de Sévigné, writing to her daughter, December 15, 1684, says, "I am sending you the most precious treasure I have: my half bottle of Baume Tranquille. I could not send a full bottle; the Capucins have no more."

Baume de Vie.

Baume de Vie, which is represented by Decoct. Aloes Co., B.P., was first sold by a French apothecary named Le Lievre, of the Rue de la Seine, Paris. A second edition of his book recommending it is dated 1760. He describes himself as "le sieur Lelievre apothicaire, distillateur du Roi." He says of it that it gently evacuates the heterogeneous humours, restores and fortifies the stomach, reanimates the system without causing any fever or other inconvenience, preserves the humid radical (a fluid supposed to be the principle of life and the generator of vigour), makes the blood circulate, absorbs from it all acids and renders them balsamic, and counteracts debility. He also advises its use for horses, cattle, and dogs. Le Lievre's formula, as given by Cadet de Gassicourt, was as follows:—

Socotrine aloes, treacle, of each 1 oz.; gentian, ½ oz.; rhubarb, 6 drachms; saffron, agaric, zedoary, myrrh, of each 2 drachms; sugar, 4 oz.; proof spirit, 2 lb.

Dutch Drops.

Haarlem Oil or Dutch Drops have been made in Haarlem since the year 1672, when they were invented by one Claas Tilly, and they are still manufactured in Haarlem by a person who claims to be a direct descendant of the inventor. The preparation is stated in Paris's "Pharmacologia" to have as a base the residue left in the still after the redistillation of turpentine; a red, thick, resinous matter, sometimes called balsam of turpentine. But the same author adds that a preparation often sold as Dutch Drops is a mixture of oil of turpentine, tincture of guaiacum, and spirit of nitre, with oils of amber and cloves. Dutch Drops are asked for all over the world and are known to old-fashioned people as "Medicamentum." In remote places they are kept in the house and a few drops taken occasionally as a preventive of disease.

Godfrey's Cordial.

The following advertisement which is taken from Reed's *Weekly Journal*, February 22, 1722, throws light on the origin of the still popular "Godfrey."

> To all retailers and others. The general cordial formerly sold by Mr. Thomas Godfrey, of Hunsdon, in Hertfordshire, deceas'd, is now prepar'd according to a receipt written by his own hand, and by him given to my wife, his relation, is now sold by me Tho. Humphreys of Ware, in the said county, Surgeon, or at John Humphreys, at the Head and Sheers in Jewin Street, near Cripplegate, London. Also may be furnished with Arcanums and Vomits, and will be allowed the same for selling as formerly.

Godfrey's Cordial was named in the Medicine Stamp Act of 1812, and was no doubt a proprietary medicine at that time. It now appears to be made by anyone who chooses to make it. In Paris's "Pharmacologia," (8th edition, 1833) the following receipt which he says was obtained from a "wholesale druggist who makes and sells many hundred dozens a year," was printed:—

"Infuse 9 oz. of sassafras; 1 oz. each of carraway, coriander, and anise seeds, in 6 pints of water. Simmer down to 4 pints. When cold add 3 oz. of tincture of opium."

In 1833 the Philadelphia College of Pharmacy adopted the subjoined formula for Godfrey's Cordial in order to ensure uniformity:—

"Tinct. Opii, 1½ pint; molasses, from the sugar refiners, 16 pints; alcohol, 2 pints; water, 26 pints; carbonate of potash, 2½ oz.; oil of sassafras, 4 drachms."

Eau des Carmes.

Eau de Melisse des Carmes, an aromatic spirit, recommended as a cordial for internal administration, and to bathe the temples, was first compounded in the pharmacy of the Barefooted Carmelites, near the Palace of the Luxembourg in the Faubourg St. Germain in 1611. In the course of the century the preparation became a valuable property, and though its composition was kept secret by the monks, formulas innumerable were published. Richelieu, Elizabeth of Bavaria, mother of the Regent during Louis XIV's minority, and later, Voltaire, "reclaimed" it. Patents authorising the monks to carry on the manufacture and sale were granted by Louis XIV, Louis XV, and Louis XVI, but when the last was applied for in 1780, the

College of Pharmacy opposed it, but withdrew their opposition for the consideration of £40 a year which the monks agreed to pay them. In 1791 when the monastic orders were suppressed and their property confiscated, forty-five Carmelites of the Monastery of the Vaugirard formed themselves into a commercial company to manufacture and sell the Eau des Carmes. Their deed of association provided that the property should remain in the hands of the forty-five down to the last survivor. This one was a certain Brother Paradise, who took as a partner a M. Royer and died in 1831 on the premises in the Rue Taranne where the company had been constituted. M. Royer died a few years later, and his widow married a M. Boyer in 1840 who wrote a "Monographie Historique," which it is believed was edited for him by Alexander Dumas.

The following formula for a preparation resembling the Eau des Carmes was published by Baumé after many experiments, and was adopted by the compilers of the Codex:—

"Balm, in flower, freshly gathered, and freed from the stalks, 2 lbs.; lemon peel, fresh, 4 oz.; coriander seeds, 8 oz.; nutmegs, cloves, cinnamon, each bruised, 2 oz.; angelica roots, dried, 1 oz.; spirit of wine, highly rectified, 10 pints."

Goddard's Drops.

The original formula for these is given as follows by Dr. William Salmon in his edition of "Bate's Dispensatory":—

> R. Humane Bones or rather scales, well dryed, break them into bits, and put them into a retort, and join thereto a large Receiver which lute well; and distil first with a gentle Fire, then with a stronger, increasing the fire gradatim; so will you have in the Recipient a Flegm, Spirit, Oyl, and Volatile Salt. Shake the Receiver to loosen the Volatile Salt from the sides, then close your Receiver and set it in the earth to digest for three months, after that digest it in a gentle heat fourteen days, then separate the Oyl which keep for use.

Salmon says they that please may make it according to the prescription, but he gives an alternative formula which was "to rectify the Oyl from the Flegm, then to grind the Volatile Salt with the Oyl, and so by a long digestion to join them together." Salmon also tells us that if these drops are distilled from the bones of the skull they are good for apoplexy, vertigo, megrims, &c., but "if you want it for gout of any particular limb it is better to make it from the bones of that limb. The dose is 6 to 12 drops, but it has an evil scent." You can, however, correct that, and "Elixirate" the preparation, bringing it "even to a Fragrancy" if you add so much Spirit of Nitre as will dissolve the oil, and then mix it with four times its weight of spirit of wine. Then you should give 20 to 60 drops in a glass of Canary. "So you will have a medicine beyond all comparison ten times exceeding the other in worth and efficacy."

Who was the inventor of this medicine? Salmon says, "The author of this Recipe was not that Goddard whose Recipes and Prescriptions are scattered up and down in several places of this book, but the famous W. Goddard, a great Philosopher and Physician who deserved well of the World in his Day and Time, and who has even in this Remedy left himself an Immortal name. And this is the true Medicine which was purchased of the Doctor by King Charles the Second, so much famed through the whole kingdom, and for which he gave him, as it is reported, fifteen hundred pounds sterling." Other statements say that Charles bought the formula for £5,000 or £6,000.

Salmon had lived in the reign of Charles II, and may be expected to have been correct in regard to such a recent event. But in the Roll of the Royal College of Physicians by William Munk, M.D., published by the College in 1878 I find the invention of these drops attributed to Jonathan Goddard, M.D., a person of some historical fame, due to a large extent to his association with Oliver Cromwell, whom he accompanied as first physician to his army through his Irish and Scotch campaigns. Cromwell made him Warden of Merton College, Oxford, and in other ways showed his confidence in him. In the Little Parliament which succeeded the Long Parliament Dr. Goddard was the sole representative of the University of Oxford, and became a member of the Council of State. With this record it is not surprising that the doctor did not become a favourite with Charles II. when that monarch returned to London. Dr. Goddard was removed from his Wardenship, but subsequently became Professor of Physic at Gresham College, London, and it was there that he and a few other scientific associates founded the Royal Society. It is difficult to believe that he was the inventor of the drops of which Salmon writes; and it is impossible to accept the statement that he offered, or that the King agreed to purchase, the secret of their composition from him.

Dr. Munk, however, states that "Dr. Goddard was a good practical chemist and the inventor of certain volatile drops, the Guttæ Goddardianæ vel Anglicanæ, as they were termed on the Continent, long in great repute and commended by Sydenham, who gave them a preference over all other volatile spirits whatsoever for 'energetically and efficaciously attaining the end for which they are applied.'"

There was a Dr. William Goddard admitted a Fellow of the College in 1634 of whom Dr. Munk records that "on the 23rd of November, 1649, having been contumacious and refusing to attend at his place in the College, though repeatedly summoned by the President, he was, by a vote of his colleagues, dismissed from his fellowship: *Decrete Collegii, in Collegii societale locum amisit.*" Dr. Goddard carried the matter into the Court of King's Bench, but was defeated.

This was most likely Salmon's W. Goddard, and seems more like the genuine Goddard of the Drops fame. Contumaciousness was sometimes a synonym for exploiting a quack remedy.

In Dr. Martin Lister's "Journey to Paris," 1698, that rather garrulous York doctor states that while he was in Paris (in company with some members of a diplomatic party) he was sent for by the Prince de Conti to see his son, and was requested to bring with him some of the late King Charles's drops. The doctor replied that he had nothing with him, and could only prescribe such medicines as would be found in any of their shops. It was the drops, however, that the Prince wanted and not the extempore invention of this comparatively unknown practitioner. For apparently the attendance of Dr. Lister was excused, and he makes the reflection, after intimating that the young prince died, "It is evident that there is as false a notion of physic in this country as with us, and that it is here also thought a knack more than a science or method; accordingly little toys, the bijoux of quacks are mightily in request." Dr. George Henning who edited Dr. Lister's narrative states that these drops were made from raw silk which "yields an incredible quantity of volatile salt and the finest spirit I ever tasted." He adds that raw silk is indeed nothing but a dry jelly of the insect kind, and therefore it must be very cordial and stomachic.

EAU MEDICINALE D'HUSSON.—COLCHICUM.

The medicinal use of colchicum preparations for gout is comparatively recent and the knowledge of its value for that purpose is undoubtedly due to its success in a secret proprietary remedy. The authors of “Pharmacographia” give some interesting historical notes on *Colchicum autumnale*, L., or meadow saffron, which show how general was the belief in its deleterious qualities in both classical and mediæval times. Dioscorides alludes to the poisonous properties of Kolchikon, which he says grew in Messenia and Kolchis. Pliny and Galen likewise allude to colchicum as a poison. Pliny recommends milk as an antidote.

Hermodactylus is recommended for gout in the writings of Alexander of Tralles, and Paul Egineta (sixth and seventh centuries), and the Arab doctors, Avicenna, Serapion, and Mesué, describe a similar remedy under the name of Surengian. It is also recommended by Ambrose Paré, Sylvius (de la Boe), and other authorities in the sixteenth and seventeenth centuries; but Tragus (1552) warns his readers against its use for gout, for which he says it is recommended in Arab writings. Grevin (1568) observes “ce poison est ennemy de l’homme en tout et par tout.” Lyte, translating Dodoens (1578), says “Medow or wilde saffron is corrupt and venomous, therefore not used in medicine.” Gerard declares the roots of “Mede Saffron” to be “very hurtfull to the stomacke.”

Evidently some species of colchicum (Planchon thinks *C. variegatum*, L., but Hanbury does not agree) was used in ancient medicine under the name of Hermodactylus. Linnæus knew hermodactyls brought from India and attributed them to *Iris tuberosa*. Royle says they are sold in the bazaars of northern India under the name of Surinjan, but he thought they were brought from the shores of the Red Sea via Bombay. And notwithstanding the unfavourable opinions just quoted, Radix Colchici and Hermodactylus appear among the simples of the London Pharmacopœias of 1618 and 1639. They are then omitted, but Colchicum reappears in the edition of 1788. This was in consequence of the strong recommendation of Stoerck of Vienna, a practitioner and medical teacher who had a passion for experimenting with discredited remedies. Stoerck’s report, published in 1763, showed that the medicine was a powerful and a dangerous one; but it was a most potent diuretic, and he had administered it with success in dropsical cases in the Vienna Hospital. He recommended particularly a colchitic oxymel. He reports favourably on it as a remedy for asthma and in mucous catarrh, but does not suggest it as a remedy for gout.

In the early part of the eighteenth century the bulbs of colchicum were frequently recommended by physicians of repute to be carried in the pocket or worn round the neck as an amulet.

In the latter part of the eighteenth century a French proprietary article called D'Husson's Eau Medicinale became popular. Its inventor was an army officer, and it is not known how he acquired his medical knowledge. I have no information as to the price at which the Eau Medicinale was sold in France; but from some interesting communications to the *Pharmaceutical Journal* published in 1852 from medical men, Thomas Bushell, of 117, Crawford Street, Portman Square, and George Wallis, M.D., many details have been collected, among them being the statement made by Mr. Bushell that the proprietors of the Eau Medicinale were a firm of foreign perfumers in Bond Street; that they told him the sale had at that time (1852) quite died out; that four or five years previously they had sold a few bottles at 9*s.* 6*d.* each, but that when it was in demand the price was 22*s.* a bottle. The bottles each contained 2 fluid drachms, and the dose was 1 drachm, to be repeated if necessary in four to six hours.

According to Pereira, Cadet and Parmentier had endeavoured to ascertain the composition of this medicine in 1782; but they only arrived at the conclusion that it contained no metallic or mineral substance, and that it was a vinous infusion of some bitter plant. Alyon, another French inquirer, had guessed gratiola; an English doctor (Moore) had diagnosed that it was a vinous infusion of white hellebore with laudanum. Mr. Bushell, quoting from some references to the medicine in the *Edinburgh Medical and Surgical Journal* of 1810, relates the experience of a Dr. Edwin Godden Jones, who had come to know of D'Husson's remedy while on the Continent with a gentleman who was a great sufferer from gout, and who had derived much benefit from the nostrum. The Edinburgh journal also mentioned that Sir Joseph Banks, the President of the Royal Society, having experienced the most extraordinary deliverance from his arch-enemy, made D'Husson's preparation his pocket companion. Attempts to discover the secret of the mixture still resulted unsatisfactorily. Rhododendron, chrysanthemum, digitalis, tobacco, and elaterium were among the new guesses made. In 1814, however, a Mr. Want published a statement in the

Medical and Physical Journal indicating that colchicum was the basis of D'Husson's remedy. Mr. Bushell states that Want had previously made known his discovery in a popular journal entitled *The Monthly*. There are three stories of the means by which he came by his information. He himself said he got the first hint from Alexander of Tralles, who recommended a remedy "Hermodactylon" for the cure of gout, and that the Hermodactylus from which that was compounded corresponded with colchicum. Dr. Wallis, of Bristol, however, "in justice to a departed friend," wrote that Want had derived his knowledge entirely from Mr. C. T. Haden, when the latter was a medical officer of the Brompton Dispensary. Dr. Wallis says that in 1811 Mr. Haden was practising in Derby with his father, an eminent surgeon of that town. They had a patient who was anxious to try the Eau Medicinale. The younger Haden examined the stuff and came to the conclusion that it was made from colchicum, with which he had some acquaintance through having made the oxymel. After many experiments he was convinced of the accuracy of his opinion. Soon after Mr. Haden left Derby and settled in Sloane Street, where he commenced the publication of the *Medical Intelligencer*, the predecessor of the *Lancet*. At the Brompton Dispensary he introduced colchicum in the treatment of gout. Dr. Wallis alludes to the annoyance caused to his friend by what he characterises as literary petty larceny, forestalling his own communication on the subject.

The third story told by Mr. Bushell is the most curious of the three. He was apprenticed near Covent Garden two or three years after Mr. Want had published his discovery, and frequently went to Mr. Grimley, a herbalist, in the Garden, to buy medicinal herbs. Mr. Grimley, he said, told him that Want had "discovered" the colchicum secret in this wise:—His wife's father having a bad attack of gout, a nursemaid in Mrs. Want's service told them that she once lived with a little French gentleman who made a famous medicine for gout called "Eau Medicinale." He kept his materials very secret, but this promising young detective had managed to secure a piece of the principal ingredient used, which she then gave to Want. Want took it to Grimley, and between them they made out what it was. Grimley further said that he had been in the habit of selling quantities of colchicum to a little Frenchman who used to come in a hackney coach and take with him 1 to 1½ cwt. at a time.

Want's tincture was made from 1 part of the fresh bulb of the colchicum autumnale and 2 parts of alcohol 36°; dose 5 or 6 drops in a tablespoonful of water. Sir Everard Home, who studied colchicum preparations with much care, preferred a wine made from the corms; and he believed that he had succeeded in removing the deleterious constituents of the medicine by filtering out a deposit which formed after a few days of maceration. Williams and Haden advocated the employment of the seeds. Copland, Bushell, and Frost advised the flowers.

Drying the corms was found to reduce considerably their medicinal and poisonous effects. Prosper Alpin states that the Egyptian women of his time were in the habit of taking as many as ten bulbs of some hermodactyl after roasting them like chestnuts at bedtime. They believed they produced the embonpoint which was regarded as a female attraction.

JAMES'S POWDER.

The antimonial preparation which attained the most permanent popularity was Dr. James's Fever Powders. The inventor, Dr. Robert James, was a life-long friend of Dr. Johnson. The two went to school together at Lichfield, in which town James at one time practised. He was also in practice in Sheffield and Birmingham before he came to London. He first settled in Southampton Street, Covent Garden, but removed later to Craven Street, Strand. He was a man of considerable attainments, and is described as cordial, impetuous, improvident, but thoroughly loved by his associates. He was the author of a massive Dictionary of Medicine, and Dr. Johnson said of him: "No man brought more mind to his profession." Dr. Munk, in his "Roll of the College of Physicians," adds to this, however: "But he tarnished the fair fame he might otherwise have attained by patenting his powder and falsifying the specification." Dr. James died in 1776 at the age of 73.

Dr. James.

The patent for his fever powder was taken out in 1747. It is on record that Johnson introduced him to John Newbery, a noted bookseller of the time, who had a shop at the corner of St. Paul's Churchyard and Ludgate Hill. Newbery became the agent and part proprietor of the medicine. It is still owned and prepared by the direct descendants of John Newbery, who carry on business in Charterhouse Square.

The specification of the patent directs to "Take antimony, calcine it with a continual protracted heat in a flat unglazed earthen vessel, adding to it from time to time a sufficient quantity of any animal oil and salt well dephlegmated; then boil it in melted nitre for a considerable time, and separate the powder from the nitre by dissolving it in water." The doctor adds to his specification a process for a mercurial pill with antimony, made by amalgamating equal parts of martial regulus of antimony with "pure silver" (*sic*), adding a proportionable quantity of sal ammoniac, then distilling off the mercury and using it again. This performance was to be repeated nine or ten times, the mercury being at last dissolved in spirits of nitre (nitric acid), distilled to dryness, the caput mortuum calcined till it was of a golden colour, and this powder, after spirits of wine had been burnt upon it, was ready to be made into pills. Dr. James gave the moderate dose of the antimonial powder at 30 grains, and that of the mercurial at 1 grain.

Paris says that James "usually combined his antimonial powder with some mercurial, and always followed it up with large doses of bark." He suggests that the adjuncts largely accounted for the success of the medicine.

The fever powder acquired great fame in James's lifetime, and after his death imitations were numerous. One of these is of interest because of an advertisement against it written by Dr. Johnson. The man who ventured to imitate the genuine product was named Hawes, and he had once been in the employment of Dr. James. He professed that he had learned how to make the powder during his service, but Dr. James signed an affidavit against his pretensions a short time before his death. Later Hawes asserted that when the doctor made that affidavit he was not in the possession of his mental faculties. To this Francis Newbery replied by an advertisement quoting affidavits by many of James's patients and acquaintances. A paragraph was appended which Newbery himself stated was written by Dr. Johnson, and as a section of literature rather foreign to the famous author, it seems worthy of reproduction. It ran thus:—

> "The public will now be fully enabled to judge of Mr. Hawes's pretensions to the knowledge of this medicine; and they will determine what degree of credit they ought to pay to the assertions of a man who has made so daring an attempt to impose upon their understanding; who in contradiction to Dr. James's deposition has represented himself as possessing a secret with which he was never entrusted, and as having performed operations at which he was never present; and who, to invalidate the Doctor's testimony, has declared him to be reduced to fatuity at a time when the vigour of his mind was known and acknowledged by the physician and surgeon who

> attended him, and by patients of the highest rank who continued to entrust him with health and life.”

In 1774 Dr. James patented an “analeptic pill.” It was composed of his own fever powder with pil. rufi and gum ammoniacum, the last two ingredients to be dissolved in an underground cave furnished with the conductors of electric fire.

The first official substitute for James’s powder was introduced into the London Pharmacopœia of 1787. The formula was devised by a Dr. Higgins, and the experiments were made in the laboratory of the Society of Apothecaries. It was composed of equal parts of tersulphuret of antimony and hartshorn shavings. This was found to be stronger than the original, and further experiments were made for the College by Dr. Pearson, who reported in 1791 that James’s powder consisted of about equal parts of oxide of antimony and phosphate of lime. The formulas in the London Pharmacopœias of 1809 and 1824 were consequently reduced in strength, one part of the antimonial salt with two parts of horn shavings being substituted. The ingredients were heated to redness in a crucible and afterwards powdered. For the Pharmacopœia of 1851, Mr. Richard Phillips experimented, and mainly confirmed Dr. Pearson’s results. The formula remained as in 1824. Meanwhile the Edinburgh Pharmacopœia continued to adopt the stronger combination, while the Dublin Pharmacopœia prescribed a different preparation altogether, tartarised antimony and phosphate of soda solutions being mixed, and a precipitate consisting of teroxide of antimony and phosphate of lime being produced by precipitation by the addition of a solution of chloride of calcium and ammonia. This was a modification of a process advocated by Chevenix in a paper published in *Phil. Trans.*, 1801. His process was recommended by Abernethy and many other of the leading practitioners of his time. In the British Pharmacopœias the simple formula of one part of antimonious oxide and two parts of calcium phosphate has been adopted. The name of Dr. James’s Powder as a synonym has now been dropped.

It has been suspected that Dr. James did not actually invent the powder, but adopted it from an Italian recipe which was certainly popular when he introduced it. In Colborne’s “English Dispensatory,” published in 1756, directions are given for making Mr. Lisle’s Powder for Fevers, sent to the author, he says, by a friend in Italy. Hartshorn shavings are to be boiled in a large quantity of water for six hours; the water is then to be strained off, the hartshorn to be dried by a slow fire, and finely powdered. Equal weights of this and of diaphoretic antimony are to be heated in a crucible, stirring all the time with a long iron, for eight hours or as long as it smokes. This powder is said to have been in great reputation for some years, having been successful in cases when hardly any hope seemed left. Twenty grains is indicated as a moderate dose at not less than six hours' interval, and it is noted that the first and second doses often cause vomiting.

Whether this was the original of James's invention or not it may be presumed that the formula was a guide to those doctors and chemists who were busying themselves with the analysis of his powder. Another claim of precedence was made by a patent medicine dealer of London named William Baker, who alleged that Dr. James's process was an infringement of a patent or at least a copy of a formula invented by a German named Schwanberg.

Medical opinion has varied concerning the relative merits of the proprietary medicine and its official imitation. Christison in his Dispensatory (1842) expresses an opinion which was very generally held at least in his time when he says, "No one can deny that the antimonial powder of the Pharmacopœias is an irregular preparation inferior in activity as well as certainty to the nostrum sold by Dr. James's representatives." Some dispensers will recollect that up to recent years it was not at all unusual for prescribers specially to order "Pulvis Jacobi Vera."

That Dr. James was a man of great ability and industry is testified by his great Dictionary and also by his "Pharmacopœia Universalis or New English Dispensatory." The latter is a most valuable guide to the Pharmacy of the eighteenth century, and is not only full in its information but particularly advanced in much of its criticism.

It may be of interest to add that the famous novelist G. P. R. James was a grandson of the Doctor.

St. John Long's Liniment.

John St. John Long after he became famous was always reticent about his origin; but it was believed that he was the son of a basket maker, some said of the name of Driscoll, that he was born in or near Doneraile, and in his youth assisted his father: that later, being possessed of some artistic talent, he practised as a portrait painter in Dublin and afterwards in Limerick. An advertisement appeared in a Limerick paper of Feb. 10, 1821, which was as follows:—

> "Mr. John St. John Long, Historical and Portrait Painter; the only pupil of Daniel Richardson, Esq., late of Dublin, proposes during his stay in Limerick to take portraits from Italian Head to whole length; any person desirous of getting theirs done in historical, hunting, shooting, fishing, or any other character; or their family grouped in one or two paintings from life-size to miniature, so as to make an historical subject, choosing one from history," &c.

The advertisement went on to announce that specimens might be seen at his (the artist's) residence, 116, George's St. He was also willing to take views in the country, and would give instructions "to a limited number of pupils of respectability." He succeeded fairly well in Limerick, but evidently not well enough to satisfy his ambition.

JOHN ST. JOHN LONG.
(From a print in the British Museum.)

He is next found in London, where he got some employment from Sir Thomas Lawrence, assisting him in his studio; was elected a member of the Royal Society of Literature, also of the Royal Asiatic Society. One of his occupations was to colour anatomical drawings for the professors and pupils of one of the minor surgical schools of London. This perhaps suggested the opening of his brilliant career as an unqualified doctor.

His treatment consisted of the application of a liniment, and the inhalation of a vapour. The liniment had the extraordinary virtue of selecting between sound and unsound tissues. If the part to which it was applied was healthy no effect would be produced; but if there were seeds of disease beneath the surface the liniment might be relied upon to draw out the virus which could then be easily disposed of; thus tubercles on the lungs were extracted and the disease cured. Consumption was the principal disease which Long professed to treat; but gout, rheumatism, palsy, liver disorders, and other frequent complaints were dealt with by him. He was a handsome Irishman with fascinating manners, and the gift of inducing confidence. His consulting rooms in Harley Street were crowded, chiefly by ladies, from 8 a.m. to 4 p.m., and all the day patients were seated round a piece of furniture which looked like a piano but from which a number of tubes extruded supplied with mouth pieces from which they were inhaling or smoking the medicated vapour. Hopeless cases he declined; those which he preferred were those which were in the imaginary stage.

At the height of his popularity St. John Long was making an income of over £13,000 a year (*Gent. Mag.* 1843). That was in 1829. The next year, 1830, he was tried for manslaughter, a young Irish lady, Miss Catherine Cushin, having died after, and it was alleged in consequence of, his treatment. A number of aristocratic patients gave evidence in his favour, and Mr. Justice Park, who tried him, summed up strongly on his behalf. But the jury found him guilty, and he was sentenced to pay a fine of £250 or to be imprisoned until the money was paid. Long ostentatiously produced a roll of notes, counted out the amount, and then drove off from the court in the Marquis of Sligo’s carriage. Next year a coroner’s jury returned another verdict of manslaughter against him in connection with the death of a Mrs. Lloyd. He was again tried but on this occasion was acquitted. Strong articles against him appeared in many of the principal newspapers, but his aristocratic clients as a rule remained faithful to him. He published a book in defence of his system and included in it a number of extraordinary testimonials, together with a series of smart attacks on the medical profession. He retained his popularity to the last; but it was not to be for long. He was attacked by the disease over which he had claimed to exercise so much power, and he died from consumption in 1837 in the 37th year of his age. A graceful monument was erected in Kensal Green Cemetery to his memory by his patients and admirers "to show how much its inhabitant was respected by those who knew his worth, and the benefits derived from his remedial discovery." His estate became the subject of a lengthy litigation, the principal claimant being an elderly woman of evidently humble surroundings, who, it was proved, was his lawful wife. He had married her when a lad, but had afterwards induced her to agree to an amicable separation. It was then remembered how steadfastly the charlatan had resisted the blandishments of his society friends, many of whom in very high circles had shown their infatuation with the attractive Irishman.

The formula and good will in the liniment were ultimately sold for ten thousand pounds, but it does not seem to have retained its popularity after the personality of its inventor had been removed. Nevertheless it possessed certain properties which were thought by some of its users to be little short of miraculous. For example, when applied to the skin the particular part where the pain was most severe would develop redness quicker than the other parts. In the course of a little time, the rubbing being continued, a fluid varying in colour according, as was believed, to the nature of the illness, would ooze from the skin, though the cuticle remained unbroken. Lastly, the treatment being still continued, the part affected would gradually resume its healthy appearance. In the *Lancet* of June 23, 1838, may be found the report of a meeting of the "Medico-Botanic Society," held on the 13th of that month, at which Dr. Macreight communicated the result of an investigation into the composition of this famous liniment, an imitation of which had been made by himself and Mr. Fownes, the well-known chemist. The explanation of the analysis was accompanied by a good many disparaging comments on Long, and suggestions that there was nothing very wonderful about his liniment after all. The formula which Dr. Macreight and Mr. Fownes devised for a liniment which they said corresponded exactly with the quack compound was as follows:—

Yolk of one egg; pure oil of turpentine, 1½ oz.; strong acetic acid, 1 oz.; distilled water, 3 oz.

Dr. Macreight notices one of St. John Long's recommendations to apply a cabbage leaf to the skin when the discharge had been obtained, and remarks "this in many respects is superior to a common cataplasm, which is clumsy and dries up rapidly; but of course no regular practitioner would employ cabbage leaves while the simple and elegant contrivance, lint covered with oiled silk, was within his reach.” Perhaps if a medical man had constructed the cabbage leaf, it might have been also regarded as “a simple and elegant contrivance.”

Seignette’s Salts.

(Soda Tartarata, Sodii potassio-tartras, Rochelle salts, Sel de Seignette, Sal polychrestum Seignette.)

Peter Seignette was an apothecary at Rochelle in the later half of the seventeenth century. He had at least a local scientific reputation, and a paper of his describing certain remarkable natural products of his locality was printed in the “Transactions” of the Academy of Sciences of Paris. A little before 1672 Seignette was making some soluble tartar (tartrate of potash), and inadvertently used carbonate of soda with the cream of tartar instead of carbonate of potash. At that time the distinction between the fixed alkalies had not been discovered. The product was a salt different from that which he had expected, and Seignette was ready to believe that he had made a valuable discovery. He ascertained that his new salt had laxative properties, he called it Sal Polychrestum, and advertised it by means of prospectuses, or handbills. From one of these it appears that he sold it at “20 sols la prise,” say 10*d.* for a dose. Each dose was sold in an envelope on which appeared the design of a goose. One of the prospectuses states that Seignette’s salt was sold in Paris by Lemery, but another refers customers to the “Messieurs Seignette, at present at Paris, lodging on the Quay de le Megisserie.”

Peter Seignette died in 1716, and his son continued to sell the powder. Many attempts to analyse it were made by pharmacists, but it remained a secret until 1731 in which year both Boulduc and Geoffroi, both noted pharmaciens of Paris, solved the problem. Boulduc’s paper on the subject was published in the Memoirs of the Academy of Sciences, Paris, and Geoffroi sent his account to Sir Hans Sloane of London and it was published in the “Philosophical Transactions,” (436, p. 37).

Sal Polychrestum (salt of many virtues) was a name which had been adopted a few years before Seignette made his, by Christopher Glaser, apothecary to Louis XIV. and the Duke of Orleans. Seignette's salt pushed Glaser's out of popularity to some extent, so that the latter is generally designated Sal Polychrestum Glaseri in the old books. Glaser made his preparation by mixing nitre and sulphur in equal proportions, then putting the mixture, a spoonful at a time, into a red-hot crucible. The powder would deflagrate, and the next spoonful was not to be added until the flame of the first had gone out. The mixture was kept in fusion for four or five hours, and after cooling was dissolved, the solution filtered and evaporated to dryness. Sulphate of potash with perhaps a little free sulphur was produced, and this has long represented Glaser's Sal Polychrestum or Sal de Duobus, as it was also called.

Seignette's salt was first admitted into the London Pharmacopœia of 1788 under the name of Natron Tartarizatum which was altered in 1809 to Soda Tartarizata.

Singleton's Golden Eye Ointment.

An allusion to this renowned proprietary preparation will be found under Citrine Ointment, this Vol., page 126, in connection with the several discordant guesses as to its composition which have been published by eminent authorities. The ointment is mentioned in this section also because of its long history. According to the statement published by its present proprietor it is the oldest proprietary remedy still sold in this country. The present proprietor, Mr. Stephen Green, inherited it from his grandfather of the same name who died in 1874. He acquired the property by marrying (in 1825) Selina Folgham, who brought to him one-fifth share in the rights as a part of her marriage settlement, and after her death in 1831 the elder Stephen Green bought up the shares of other relatives. This Selina Folgham was a daughter of another Selina Folgham, *née* Singleton, granddaughter of Thomas Singleton who died in 1779, and whose tomb, I understand, may still be seen in Lambeth churchyard. This Thomas Singleton was the first of the Singletons. Before his time the ointment appears to have been known as "Dr. Johnson's Golden Ointment," and the present owners claim that it was first made by a "Dr. Johnson" in 1596, and that it was left by him to a certain George Hind whose great-granddaughter married the Thomas Singleton already mentioned.

Mrs. Stephens's Cure for Stone.

Perhaps the most notable recognition of a nostrum in English history was the Act of Parliament passed in 1739 entitled "An Act for providing a reward to Joanna Stephens upon a proper discovery to be made by her for the use of the publick of the Medicines prepared by her for the Cure of the Stone."

Mrs. Stephens was a widow and professed to have received the recipe from her late husband. A number of persons in the higher classes of society had been cured, or believed they had been, by taking her remedy, and in the year 1738 a movement was started to buy the formula from her for the benefit of the public. This was specially advocated in the *Gentleman's Magazine*, and the lady being approached expressed her willingness to sell the recipe for £5,000. An account was opened at Drummond's Bank, and £500 was subscribed in the first few days. Dr. David Hartley, of Bath, was the chief organiser of the fund, and the Bishop of Bath and Wells, the Principal of Brasenose College, Oxford, and other responsible persons wrote letters testifying their knowledge of the good effects produced by Mrs. Stephens's treatment. Hartley published an account of "Ten Cases of Persons who have taken Mrs. Stephens's Medicines for Stone." When Hartley died Warburton in his letters referred to him as "a philanthropic visionary, a martyr to Mrs. Stephens's medicine." It is said in some accounts that Horace Walpole was one of Mrs. Stephens's cures.

The subscription list was kept going until the end of the year, and though it included dukes, earls, bishops, and several doctors of medicine, only a total of £1,356 3*s.* was promised. Evidently some strong influence was therefore brought to bear on the Government, for early in the next year the Act referred to was passed and the trustees named in the Act being satisfied that Mrs. Stephens had made the full discovery required, the £5,000 was duly paid to her.

Mrs. Stephens's "full discovery" was published in the *London Gazette* of June 19, 1739. It was very full indeed. Omitting superfluous details it ran as follows:—

"My medicines consist of a powder, decoction and pills. The powder is made by first taking hens' egg-shells, cleaning and drying them, crushing them up in the hands, and putting them into a three-pint crucible, lightly, so that they will fill about three-fourths of its capacity. Cover the crucible with a tile and place it in the midst of a strong, clear fire, above and below. Keep the crucible in the fire until the egg-shells are calcined to a greyish-white, and have acquired an acrid, salt taste. This will need eight hours at least. The calcined shells are to be kept in a dry, clean, open earthenware pan, about three parts filled, in a dry room for two months exactly. They will then have become of a milder taste and the part which is sufficiently calcined will be in a powder of such fineness that it will pass through a hair sieve, which has to be done.

"In like manner take garden snails with their shells, cleaned from dirt, put them in a crucible whole, put the crucible in the fire as before, and keep it there until the snails have done smoaking, which will be about one hour. They are then to be rubbed to a fine powder in a mortar, the two powders are to be mixed, sifted through a cypress sieve, bottled in close-stopped bottles, and kept in a dry place for use."

"I have generally added a small quantity of Swines-Cresses, burnt to a blackness and rubbed fine, but this was only with a view to disguise it," adds the lady, conscientiously.

"The egg-shells may be prepared at any time of the year, but it is best to do them in summer. The snails ought only to be prepared in May, June, July, or August, and I esteem those best which are done in the first of those months."

The decoction was made by beating 4½ oz. of best alicant soap in a mortar with a large spoonful of Swines-Cresses burnt to blackness, and as much honey as would make the whole of the consistence of a paste. Make this into a ball. This ball was to be sliced and boiled for half an hour in two quarts of soft water, with 1 oz. each of chamomile flowers, sweet fennel, parsley, and burdock leaves. The boiled liquid to be strained and sweetened with honey.

The pills were to be made of equal quantities by measure of snails calcined as before, wild carrot seeds, burdock seeds, ashen-keys, hips and haws, all burnt to blackness, "or which is the same thing, till they have done smoaking." The mixed powders to be passed through a cypress sieve, and a large spoonful or 4 oz. of best alicant soap, and a sufficiency of honey added to make pills; each ounce of the mass to be divided into sixty pills.

One dram (avoirdupois) of the powder was to be taken three times a day in a large teacupful of white wine, cyder, or small punch, and half a pint of the decoction had to be drunk after each dose. If the medicine caused much pain an opiate was to be given. The bowels were to be kept regular with lenitive electuary or some other laxative. The pills were to be given in fits of gravel or suppression of urine, five every hour; or ten or fifteen might be taken daily to prevent formation of gravel stones in constitutions subject to breed them.

Salt meats, red wine, and milk were to be avoided. The patient was to take as few liquids as possible, and to have but little exercise. The object aimed at was that the urine might be impregnated with the medicine, which would then dissolve the calcareous deposits.

Mrs. Stephens died in 1774. The publication of her formula undoubtedly stimulated investigation into the employment of alkaline medicines in the treatment of stone, but her "cases" were not substantiated by later evidence. One in particular was that of a man who was experimented on while the proposal to buy the recipe was under consideration. He was unquestionably suffering from stone, and he soon improved and in time seemed to be quite cured after taking the remedies. After his death examination showed that the stone was still in his bladder; but it had made for itself a little sac in which it was so tightly embedded that it never caused any inconvenience.

Pereira, summing up the evidence in regard to the Stephens' treatment, says it cannot be doubted that many patients obtained relief from the remedies, "but no cure was effected; that is, no calculus was dissolved. For in the bladder of each of the four persons whose cure was certified by the trustees the stone was found after their death." I have not traced the report of the four cases; only of the one referred to above.

Earl of Rochester as Quack.

The witty but profligate Earl of Rochester, well known in history as the boon companion of Charles II, especially in his debaucheries, frequently gave offence to that monarch by his impudence or his sarcasms. His best known epigram is that referring to

Our Sovereign Lord the King
Whose word no man relies on
Who never said a foolish thing
And never did a wise one.

On several occasions Rochester was ordered to leave the Court, but Charles always sent for him to come back again. In one of these absences it is recorded that he took lodgings in Tower Street under the name of Alexander Bindo and practised for a time as a quack doctor. It is believed that he had a stall on Tower Hill on which he spread an assortment of remedies and cosmetics, and that he especially cultivated the patronage of women, to whom he gave advice. This must have been about the year 1677. In a book published in 1710, giving the poetical works and speeches of Sir Charles Sedley by Captain Ayloff, is printed a copy of what purports to be one of Rochester's harangues on Tower Hill. No evidence of its authenticity is offered, and as the Earl was undoubtedly gifted with a glib tongue and plenty of talent it would seem unlikely that he would trouble himself to write out, or if he did write it, to preserve such rubbish. The "Dictionary of National Biography," however, alludes to it without questioning its genuineness, but does not quote any part of it. The following specimens of the Earl's alleged patter are quoted from an old part of *Notes and Queries*:—

"I am the famed Paracelsus of the age, by name Segnior Doloso Euprontorio, son of that wonder-working Chymist lately deceased in Alsatia and famed through all Europe, Asia, Africa, and America; from the oriental exaltation of Titan to his occidental declination, who in pity to his own dear self and other mortals has by the prayers and solicitations of divers Kings, Emperors, Princes, Lords, Gentlemen, and other Personages been prevailed with to oblige the world with notice to all persons, young and old, lame and blind, that they may know where to repair for their speedy cure in all Cephalgies, Orantalgies, Paralitical Paroxysms, Rheumatisms, Gout, Fevers, Fractures, Dislocations, and all other Distempers incident to the human Body, external or internal, acute or chronic, curable or incurable.

"My medicines are the Quintessence of Pharmaceutical Energy; the Cures I have done are beyond the art of the whole World.

“I have an excellent hypontical, captical, odoriferous, carminative, renovative, stiptical, corroboratory Balsam of Balsams, made of dead men’s fat, rosin, and goose grease. It is the true Pharmacopœia of Hermes Trismegistus, the true Pentemagogon of the triple kingdom, which works seven several ways, and is seven years preparing, which being exactly completed secundem artem by Fermentations, Solutions, Sublimations, Putrefactions, Rectifications, and Quidlibelifications in Balnea Mariæ in the Crucible, becomes Nature’s Palladium, Health’s Magazine. One drachm of which is worth a Bushel of March dust. For if any of you chance to have your heads cut off or your brains beat out, ten drops of this seasonably applied will recall the fleeting spirits reigning through the deposed Archeus, and in six minutes will restore the departed Life to its pristine vigour with all its functions, vital, rational and animal.”

The quack goes on to recount some of his cures. Among them were the god-mother of Prester John of a stupendous Dolor in her Os Sacrum; the Empress of Boolampoo of a Cramp she got in her tongue by eating Pork and buttered parsnips; an Alderman of Grand Cairo of a scarlet burning raging fever of which he died; the Emperor of Morocco, who lay seven years sick of the plague and was cured in 42 minutes so that he danced the Saraband, Flip-flap, and Somerset.

The orator announced that he was to be found at the Golden Ball in Fop Alley whenever he was not on Tower Hill; for he had devoted himself wholly to serve the Public.

Warburg’s Tincture.

Dr. Carl Warburg, an Austrian doctor, compounded a tincture some seventy years ago which soon acquired an extraordinary reputation in the treatment of agues and malarial fevers. Although its formula was not disclosed, the Austrian Ministry of Health about 1848 put it on the list of medicines which had to be stocked by all pharmacists, fixed the maximum price at which it should be sold to the public at 2 fl. 30 kr. (about 5s.), and established a central depot in Vienna for its manufacture, paying Dr. Warburg a salary for overseeing its preparation. A little later a medical commission was appointed to examine the tincture and draw up a formula for it. The commissioners formed themselves into three sections, and each section made an independent analysis. All agreed that the tincture was an alcoholic preparation of quinine, aloes, camphor, and saffron; zedoary root and angelica were guessed at by two of the sections, and rhubarb by one. The formula adopted was Hepatic aloes, and zedoary root, of each 1 drachm; Angelica root, and camphor, of each 2 grains; Saffron, 3 grains, spirit of wine, 3 ounces. Dissolve, filter, and add 30 grains of sulphate of quinine.

The publication of this formula did not apparently interfere with the sale of the proprietary article, which might have continued if the inventor had not been persuaded to surrender his secret.

About the middle of the century Warburg's Tincture had acquired great reputation in India. Lt.-General Sir Mark Cubbon K.C.B., Commissioner of the Mysore province, seems to have first made it known. At his own expense he supplied 1,500 bottles to the medical officers of his commission. Subsequently remarkable evidence was given before a Royal Commission, appointed to inquire into the health of the Indian Army, by Major-General Cottin R.E., who stated that many great engineering works carried on in "deadly jungles" had been brought to a successful issue mainly through the protection afforded to the workmen by this tincture. In an article published in the *Lancet*, November 15, 1875, Professor W. C. Maclean, Inspector General of the Army, gave still more striking testimony. He said he had treated remittent fevers of every degree of severity contracted in India, China, and the Gold Coast, and had never known quinine when given alone act in the characteristic manner of this tincture. A dose of 9½ grains of quinine in Warburg's Tincture would often not only arrest the exacerbation of the fever but would frequently prevent its recurrence. He had never known quinine have that effect. In the same article Professor Maclean published the formula for the tincture which Dr. Warburg had confided to him on the advice of his friends. It was as follows:—Socotrine aloes 1 lb.; East India rhubarb, angelica seeds, confectio Damocratis, of each, 4 oz.; elecampane, fennel seed, saffron, prepared chalk, of each 2 oz.; gentian root, zedoary root, cubebs, picked myrrh, camphor, larch agaric, of each 1 oz. Digest these ingredients in 500 ounces of proof spirit in a water bath for 12 hours, express, and add 10 oz. of sulphate of quinine. Replace the mixture in the water bath till the quinine is dissolved, and filter.

The tincture was supplied in 1 oz. bottles, and ½ oz. was given for a dose after the bowels had been evacuated. The other ½ oz. was given 3 hours after.

Three years later Professor Maclean wrote to the *Times* stating that Dr. Carl Warburg was living in England in poverty. The large fortune he had made from his tincture at one time had disappeared, and the publication of his formula had resulted in the loss of his income. He asked that the Indian Government would make some provision for him in return for the publication of his valuable secret. The India Office made a grant of £200 to Dr. Warburg in 1882, but in June, 1890, the Hon. Sydney Holland wrote to *The Chemist and Druggist* appealing for further assistance. The old man was then 86 and Mr. Holland and Professor Maclean had collected enough to provide him with 15s. a week for the rest of his life. This was the last heard of the old gentleman, and his case may be remembered as a caution to over-scrupulous inventors of remedies.

Ward's Remedies.

Joshua Ward, who was born in 1685 and died in 1761, was one of the most notorious and successful of English quacks. In Gray's "Supplement" and in Paris's "Pharmacologia" he is said to have been a footman and to have obtained his recipes from some monks while travelling on the Continent with his master. This story is not corroborated by contemporary accounts, nor is it adopted by the "Dictionary of National Biography."[3] From these sources it appears that Ward came of a good family, and in early life was associated with his brother William in the business of a drysalter in Thames Street, London.

In 1717 he was returned to Parliament as member for Marlborough; but there was either fraud or mistake about this return, for a Committee appointed to investigate it reported that not a single vote had been given for Ward. He was consequently unseated and the other candidate for whom a few votes had been cast got the seat.

Joshua Ward, Originator of Ward's Paste.
(From a print in the British Museum.)

Apparently Ward had got into some political trouble; the "Dictionary of National Biography" suggests that it was in connection with the Jacobite rising in 1715. He had escaped to France before the Parliamentary inquiry, and in Paris he commenced the sale of the pills and drops which he afterwards made so famous in London. Ward had evidently not finished sowing his political wild oats, for he somehow became obnoxious to the French Government, and was only saved from a sojourn in the Bastille through the intervention of his friend, John Page, M.P. In 1733 he obtained a pardon from George II. and returned to England.

Wards pharmacopœia became a rather extensive one. His pills and drops were the principal medicines he concocted; both were strong antimonial preparations. The pills were composed of glass of antimony (an oxysulphide of the metal), 4 parts, mixed with 1 part of dragon's blood. This combination was made into 1½ grain pills. The combination of antimony with a resinous substance had been adopted in several earlier preparations, mastic being generally preferred. The resin was supposed to "blunt" the action of the antimony. The drops were made by dissolving ½ oz. of glass of antimony in 1 quart of Malaga wine. These powerful medicines were no doubt effective in many cases. Both cures and casualties were likely enough to result from them. These were the medicines which Ward first made famous in Paris, and with which he started his career in London.

Ward made besides a "white drop" which was an ammoniated solution of nitrate of mercury; two sweating powders, one of which was simply "Dover's," but with some liquorice powder added; the other was the same with the addition of white hellebore. His paste for fistula and piles was the original of our Conf. Piper. Nig. His "liquid sweat" was a wine of opium with saffron, cinnamon, and salt of tartar; his "dropsy purging powder" was jalap, cream of tartar and orris powder in equal proportions; later the orris was dropped and a small quantity of bole armeniac was substituted, and his essence for the headache appeared later in the Pharmacopœia as compound camphor liniment.

By advertisements of various kinds, and by a number of startling cures, Ward attained astonishing success. George II. had unbounded faith in him. At his first interview with the King the latter had a dislocated thumb. Ward gave it a sharp wrench which incited some strong German from the monarch, but which put the thumb right. Subsequently George provided the quack with a room in his almonry at Whitehall, and paid him to treat poor people there. Ward bought besides three houses at Pimlico and converted them into a hospital where his remedies were administered, highborn ladies assisting in the conduct of this charity. His patients included Lord

Chesterfield, Gibbon the historian, and Fielding the novelist, as well as a large number of titled persons of less permanent fame, and when he brought an action for libel against the *Grub Street Journal* (which, however, he failed in) Reynolds, the Lord Chief Baron, and Horace Walpole were among his witnesses. In 1748 a Bill was introduced into Parliament to restrict the practice of medicine, and it contained a clause specially exempting Ward by name from its penalties.

Naturally the qualified members of the medical profession were irritated at the amazing prosperity of this charlatan. Queen Caroline, it was said, once asked General Churchill if it was true that Ward's medicines had made a man mad. "Yes, Madam," Churchill replied, "Mead." Dr. Richard Mead was the King's physician.

Ward retained his fame to the end of his life, and the King's liberality made it possible to publish a collection of his recipes which his old friend John Page compiled after his death. But George's tenderness to the memory of the great physic-monger did not go to the extent of fulfilling the desire expressed in his will, that he should be buried in Westminster Abbey, in front of the altar, or as near thereto as possible.

The story of Ward's treatment of George II.'s thumb is thus told by Dr. George Henning in a note to Dr. Martin Listers "Journey to Paris" (this Vol., page 181): "George II being afflicted with a violent pain of the thumb which had baffled the skill of the faculty, sent for the noted Dr. Joshua Ward; who, having ascertained the nature of the complaint before he was admitted, provided himself with a suitable nostrum which he concealed in the hollow of his hand. On being introduced he requested permission to examine the affected part, and gave it so sudden a wrench that the King cursed him and kicked his shins. Ward bore this very patiently and when the King was cool respectfully asked him to move his thumb, which he did easily and found the pain gone." In reply to the King's offer to do something for him Ward diplomatically replied that the pleasure of serving his Majesty was quite sufficient reward, but he would be grateful if the King would do something for a nephew. The nephew was made an ensign in the Guards and Ward himself was presented with a carriage and pair of horses.

In the *Daily Advertiser* of June 10th, 1736, a report is published of an attendance at the court at Kensington by the Queen's appointment of Joshua Ward, Esq., with eight or ten persons who in extraordinary cases had received great benefit by taking his remedies. Her Majesty was accompanied by three surgeons and several persons of quality, the patients were examined, money was distributed to them, and Mr. Ward was congratulated on his success.

In Lord John Hervey's "Memoirs of the Reign of George II" that eminent courtier (Pope's "Lord Fanny") relates that he gave Ward's Pills to the Princess Caroline for rheumatic pains, and he remarks of them "an excellent medicine not only in rheumatics, but in several cases, which for being so all the physicians and surgeons endeavoured to decry."

Ward is referred to in the newspapers of the day as "Spot Ward." The nickname was acquired in consequence of a claret mark on one side of his face. Pope refers to him in the lines:

> Of late, without the least pretence to skill,
> Ward's grown a famed physician by a pill.

Ward bequeathed his book of secret formulas to his faithful friend and helper in his earlier troubles, John Page, M.P. Mr. Page was a wealthy man, and he decided to publish the recipes of those remedies which were most esteemed for "the noblest of all purposes, the common good of mankind." So he states in introducing the pamphlet. But a difficulty occurred in respect of these formulas. They did not in all cases represent the medicines which the public had become accustomed to. They had been made for Ward by a Mr. John White, a manufacturing chemist of Twickenham, and a Mr. F. J. D'Osterman, who was probably an apothecary, and those two manufacturers alone knew the exact modifications which had been made in the preparations. In these circumstances the King (George II) consented in his "most benevolent disposition and extensive bounty" to make ample provision for these chemists. Whereupon the "Book of Secrets" was published. A depot for selling them was established, and a moderate tariff fixed at which those compounded by the chemists already named could be obtained, though, of course, anybody was at liberty to make similar preparations. Mr. Page provided that profits after paying expenses should be divided between an Orphan Asylum and a Magdalen Institution.

The following are the recipes for the fistula or pile paste and for the headache essence, both of which, being adopted in the Pharmacopœia, have some historic interest:—

Paste for the Fistula: Elecampane root, 1 lb.; fennel seeds, 3 lb.; black pepper, 1 lb. All in fine powder, mixed and sifted. Melt together 2 lb. each of honey and white sugar, and when this mixture is cool knead into it the prescribed powders. The dose was a piece the size of a nutmeg, to be taken morning, noon, and night, followed by a glass of water or white wine.

Essence for the Headache, etc.: French spirit of wine, 2 lb.; Roch alum in fine powder, 2 oz.; camphor, cut small, 4 oz.; essence of lemon, ½ oz.; strongest volatile spirit of sal ammoniac, 4 oz. A little of this essence was to be rubbed on the hand, and the hand was to be held hard to the part affected until it was dry. Ward told Mr. Page that it was this application which had cured George II's thumb.

In a lecture on Hæmorrhoids delivered by Sir Benjamin Brodie at St. Georges Hospital, and reported in the *London Medical Gazette*, February 3, 1835, that eminent practitioner stated that he had often found the Confectio Piperis Co. ("similar to what was once very celebrated as Ward's Paste") successful when other simple expedients failed. He said it was rather disagreeable to take, tasted like a coarse gingerbread, and must be persevered in for a considerable time. He stated that one of the worst cases he ever knew was that of a lady who had consulted him, and he did not think it possible to cure her without an operation. She, however, was obliged to go into the country at the time, and as the operation must be delayed for a month at least, he recommended her to try Ward's Paste meanwhile. She came back to him six or eight weeks later quite cured. He thought the remedy acted by passing into the colon and, becoming blended with the faeces, served as a local application.

The Whitworth Doctors

are almost forgotten now, but a century ago they were famous all over England. The Whitworth red bottle and the Whitworth drops are still more or less popular reminiscences of their pharmacy. The former was an embrocation, and the second an antispasmodic tincture. Both contained oil of thyme. Formulas are given in “Pharmaceutical Formulas,” published at 42, Cannon Street.

The founder of the family of the Whitworth Doctors was John Taylor, originally a farrier, of Whitworth, then a village about three miles from Rochdale. He died in 1802 at the age of sixty-two. John Taylor had a younger brother and two sons, and the younger brother also had sons, all of whom practised surgery. A third and even a fourth generation of surgeons, some of whom were fully qualified, likewise practised at Whitworth, and the last of the race died in 1876.

The original brothers Taylor were both farriers, but they became famous for their treatment of human patients. Their methods were of the most vigorous character. They were in the habit of buying a ton of Glauber’s salts from their wholesale druggists, Ewbank and Wallis, of York, and they dispensed it to those who sought their medical advice with no niggard hands, and without any formality of weighing. The two brothers provided free bleeding for poor patients every Sunday morning, and something like a hundred victims attended for this operation.

John Taylor (the original “Doctor”) never discontinued his treatment of horse complaints, and was believed to have taken more pride and pleasure in his veterinary work than in his dealings with humans. But the latter flocked to him from all parts of the country. Cancers, improperly set fractures, and deformities were his specialities, but his practice gradually extended to all kinds of ills. A crowd of rich and poor patients had to find lodgings somehow in the village, for they sometimes had to stay for weeks there. Fifty at a time could be seated in the long room where John treated them. They came in at one end of the room and went out at the other, and no one, no matter what his rank, was allowed to have the slightest preference. Eighteen-pence a week for medicine and treatment was the charge to all, and those who could not afford that fee were never asked for it. A lord drove up in his carriage one day, and the powdered footman was sent to ask John Taylor to “wait upon his lordship.” “Tell the man he must come in here and take his turn like the rest, if he wants me to wait on him,” said John; and “the man” had to do so. It is recorded that he left Whitworth cured.

The other doctors used to tell of Taylor's failures; but as his cases were mostly those which they had pronounced incurable, it is not astonishing if he did not always succeed. But he effected many notable cures. A lady with a cancer in the breast who had been given up by her own doctors came from a hundred miles away to Whitworth. John examined the breast, and then said, "What art thou come here for, woman?" "To be cured, of course," she answered. "Not all the doctors in England can cure thee," he said sternly; "thou must go home and die." "I shall not go home," said the lady, "till you have tried your hand on me. I can bear any pain you inflict, and I can only die at last." "Thou art a brave lass," said John; "I will try, and God prosper us." The lady stayed at Whitworth six months, and went home cured. She lived thirty years longer.

This lady was well known to William Howitt, a Quaker and popular writer in the first half of the nineteenth century. In an article he wrote in Tait's *Edinburgh Magazine*, 1839, Mr. Howitt relates recollections of a visit he had paid to Whitworth some twenty years previously, and from that visit, and from the conversations he had had with the lady just referred to, he had gathered the particulars which he gave in his article.

While under the care of Doctor John at Whitworth the lady told Mr. Howitt how she occupied herself in assisting "Mrs. George," old John's daughter-in-law, to prepare the medicines. Glauber's salts were principally relied upon for internal administration. A caustic known as "keen" was used for eradicating cancers; a black salve made up into sticks; a snuff made from asarabacca leaves which he grew in his garden; blisters; and the Red Bottle, made up the medicinal armoury. The last is made still in Lancashire, thus: Camphor, 6; oil of origanum, 6; Anchusa root, 1; methylated spirit, 80.

The lady's account of the preparation of the salve was that they used to boil a kettleful of ingredients, and then they would mop the kitchen floor. While it was wet they would pour the salve on it, and then scraping it up they would roll it into sticks with their fingers, and cut it into little pieces.

Howitt also describes seeing James Taylor, the head of the family, when he visited Whitworth, making his pills. In an old hat slung in front of him by a cord round his neck was his pill mass. Thus armed, he would walk up and down in front of his house nipping off bits of the mass and rolling them into pills with his fingers as he walked.

In his later years John Taylor sometimes visited patients in distant places. Once he went to attend a duchess at Cheltenham. She had an abscess which he opened and so relieved her at once. George III was staying at Cheltenham at the time, and heard of this skilful man. Later he sent for him to come to London to treat the Princess Elizabeth, who had pains in her head with fits of stupor. John is said to have cured her with his snuff. Having prescribed this and provided the patient with some, John Taylor turned to Queen Charlotte, who with her other daughters was in the room, and patting her on the back, said: “Well, thou art a farrantly (good-looking) woman to be the mother of all these straight-backed lasses.” “Ah, Mr. Taylor,” said the Queen, “I was once as straight-backed as any of them.” John’s son James was fond of telling this story.

Thurlow, Bishop of Durham, brother of Lord Chancellor Thurlow, was one of his patients, and John was once sent for to London to attend him. More than one eminent physician was in the room when Taylor arrived. “I won’t say a word till Jack Hunter is here,” said Dr. John; “he is the only man among you who knows anything.” Jack Hunter was the famous anatomist. When he was present, Taylor proceeded to examine the Bishop, and was applying some ointment from a box he had with him. “What’s that made of?” asked Hunter. “No, Jack, that’s not a fair question,” was Taylor’s reply. “I’ll send you as much of it as you like, but I won’t tell you what it’s made of.”

XXII

POISONS IN HISTORY

> "To give an exact and particular account of the Nature and Manner of acting of Poisons is no easy matter; but to Discourse more intelligibly of them than authors have hitherto done, not very difficult."
>
> (From Dr. Richard Mead's Preface to his "Essays on Poisons," 1702.)

It has been shown elsewhere (Vol. I., page 52) how intimate was the connection between ancient pharmacy and poisoning. In Greek the terms came to be almost synonymous, and there is an echo of the same association of ideas in the words Poison and Potion, which a few centuries ago were used in English without much distinction.

The priests of Egypt, the Æsculapians of Greece, and perhaps still more the herbalists of that country and of Italy, necessarily learnt many things from their studies of medicinal plants. They found herbs which would cause sleep, furnish dreams, and confuse the brain. They professed and perhaps believed in their ability to accomplish far more with their philtres than the vegetable world was capable of, but the common people had no means of checking their claims, and such science as there was tended to support them. In the palaces of kings, in the tents of generals, and in all the high places where intrigues, jealousies, and enmities found their fullest scope, pharmaceutical skill was much sought after; in some cases to dispose of rivals, but more usually to counteract the murderous schemes which in those times constituted so large a portion of statecraft. There was nothing the brave men of old dreaded so much as secret poisoning. It is impossible to say how far this crime was practised. Suspicion and terror may have exaggerated its records, but on the other hand it is equally possible that thousands of deaths may have occurred from poisons which were not attributed to that cause.

Hecate and her daughters Medea and Circe figured prominently in Greek legends as inventors and discoverers of poisons. The magic arts for which they were all famous were closely associated with deadly drugs. They were supposed to live in the island of Colchis, the name of which still recalls a vegetable which for many centuries retained the reputation of possessing the most venomous properties. Colchicum was discovered by Medea, but to Hecate is attributed the earliest use of aconite.

Kings studied pharmacy and invented antidotes. Orpheus, the physician and poet, who preceded Æsculapius, wrote a poem on precious stones, in which he relates that Theodomas, son of Priam, King of Troy, had learned how to administer these as antidotes to poisons. The marvellous properties of the antidote invented by Mithridates, King of Pontus, is one of the commonplaces of medical history. Down to the seventeenth century theriaca, emeralds, and bezoar stones were the antidotes to all poisons recognised by the faculty.

Biblical Poisons.

No case of poisoning either suicidal, murderous, or accidental, is alluded to in the Bible, unless we regard the story of the wild gourds (2 Kings, ch. iv, v. 39) as coming within the last description. The suicide by poison of Ptolemeus Macron is mentioned in 2 Maccabees, ch. x, v. 13, but though this was a frequent practice among the Greeks and Romans when the New Testament was written, no allusion to it is found in the sacred writings. It may be that the apostles who include "pharmakeia" among the crimes of the heathen had in mind the degradation of the art to homicidal purposes, but it is more likely that they only intended to denounce its application to the service of lust or its consequences.

The word Rosh occurs eleven times in the Old Testament, and is usually rendered gall, often in association with wormwood. In two instances, however (Hosea, ch. x, v. 4, and Amos, ch. vi. v. 12), it is translated hemlock in the authorised version, and this is retained in the revised version for the passage in Hosea. Apparently the word was a generic one for pernicious or nauseous weeds; but as Rosh also means head some commentators have thought that the poppy was intended.

The word translated poison in Deut. ch. xxxii, v. 24, Job, ch. vi, v. 4, Psalms, lviii, v. 4, and cxl, v. 3, is Chemah, and always means something burning. It is often used to indicate fierce anger. The verse mentioned in Job is obviously a reference to the very ancient practice of dipping arrows into some poison, an application of pharmacy from which we derive our term toxicology.

Poisoning in Rome.

Livy tells the story of the earliest of the poison leagues. He is dependent on older historians for his facts, as the alleged events happened some three centuries before he wrote; about the year 330 B.C. in fact. A number of patricians died one after the other, their illnesses presenting similar symptoms, but the causes of these could not be traced. At last, however, a female slave gave information to the Ediles of a group of twenty Roman ladies of the highest position who, she said, occupied themselves in concocting poisons, and administering them to their husbands or others who had become inconvenient to them. The confederacy was directed by two women named Cornelia and Sergia, and although Livy says 20, some accounts give the number of the conspiratresses as 170, while others total it at 366. Cornelia and Sergia were brought before the magistrates, and indignantly denied that they had done more than prepare wholesome beverages and medicines. On this the slave, whose own life was in jeopardy, demanded that they should themselves be required to take some of these compounds. They were granted permission to consult with their associates before doing this, and in the interval they all poisoned themselves. Livy states that this story is not told by all the contemporary narrators.

Later Roman history leaves little doubt that poisoning became a profession, or rather was frequently associated with the pharmacy of the period, as it had been in Greece. Theophrastus, who wrote about 300 B.C., alludes to a poison prepared from aconite which could be so administered as to take effect at a defined future time, three months, six months, a year, or longer after it was taken, the victim gradually growing weaker. It was perhaps in consequence of this belief that the possession or cultivation of aconite was made a capital offence. Pliny states that Calpurnia Bastia, one of the Catiline conspirators, was poisoned by aconite.

Locusta was one of the noted poison compounders of the Roman empire. She had been condemned to death in the reign of Claudius, but probably by the influence of the Empress Agrippina, she was pardoned and was employed by that infamous woman. Claudius was getting on in years, and was showing more affection for his own son Britannicus than for his stepson Nero, whom at the solicitation of Agrippina he had adopted and made his heir. The empress therefore resolved to get rid of Claudius, but she was afraid to use a suddenly acting agent, and Locusta was ordered to compound something which should produce a fatal effect, but not immediately. It was to be so compounded that it would destroy the emperor's reason lest in the course of his proposed illness he should take measures to supplant Nero by Britannicus. Locusta had to pretend to be able to fulfil this commission, and the poison she prepared was mixed in a dish of mushrooms. Claudius having eaten some of these was soon taken ill and had to be carried from the table, but as this was what usually occurred at his dinner not much notice was taken of the event. His physician gave him an emetic, and he was in a fair way to recover, but Agrippina, frightened at the possible exposure, employed another minion to apply more of Locusta's poison on a feather to his throat, under the pretence of making him vomit more. He soon died. Tacitus and Suetonius relate how Nero used Locusta later to help him rid himself of Britannicus, and also of his old tutor Burrhus, who had wearied him with his remonstrances. Locusta was executed in the reign of Galba A.D. 68.

Among other famous Romans believed to have perished by poison were Germanicus and Drusus. Caligula ordered a deadly ointment to be given to an impolitic gladiator named Columbus, who had unwisely worsted the emperor with the fencing foils, to be applied to his wounds. The poor wretch died in consequence. These are only samples of Roman poisonings.

Poisons in Ancient Times.

The poisons known to the ancients cannot be with certainty identified. The one to which the power of philtres was principally attributed was mandragora, which was said to produce various hallucinations and temporary madness. It is most likely, however, that in many of the cases where this drug is named the poison actually used was belladonna root. Hannibal, fighting against a large army of African rebels, simulated retreat, but left on the field of battle a quantity of vases of wine in which "mandragora" had been infused. The savages drank the wine, which reduced them to a condition of stupor. Then the Carthaginian hero returned and gained an easy victory over his helpless foes. Henbane seeds infused in wine made the head light, and gave the impression of having travelled through the air. Stramonium, dulcamara, hellebore, opium, Indian hemp, vervain, mezereon, and many other drugs, were in the stock-in-trade of the philtre mongers and conjurers, and the legends related by Pliny and others about the properties possessed by these herbs are sometimes nonsense, but are too often based on their real powers.

There was a ranunculus which grew in Sardinia, which was credited with the power of promoting gaiety. It was called the *Herba Sardonica*. It occasioned spasmodic contraction of the muscles of the face and so simulated a laugh. Hence our expression "sardonic grin." The employment of haschish by the Saracen warriors to make themselves fierce and reckless in battle is not a mere legend. The sect who introduced it in the armies of Islam were called hashashin, the origin of our word "assassins." The reputation of the myrtle as an invigorator of the brain, and its consequent adoption by poets as a garland round their brows, is a sample of a more innocent tradition.

Several of the Greek and Roman medical authors, Galen among others, profess a cautious reticence in regard to poisons. But there is a treatise in existence in verse, by Nicandor, which gives such toxological knowledge as was familiar to the men of science of the second century before the Christian era. Among venomous animals were included salamanders, leeches, toads, cantharides, and the sea-hare (*Lepus marinus*). The blood of bulls (probably putrefied) was a poison in use by the Athenians. The honey of Heracleus had a certain fame, for it was alleged that the soldiers of Xenophon having regaled themselves with this luxury were all so intoxicated with it that the whole army lay on the field as if they were dead. Next day all recovered. It is supposed to have been a honey extracted from narcotic flowers.

The vegetable poisons known to the ancients have mostly been named. But cherry laurel, elaterium, certain fungi, and smilax, probably our mezereon, should be added. The mineral poisons in more or less use were arsenic, in the form of orpiment and realgar, cinnabar, and metallic mercury, which was reputed to be poisonous. Nicandor alludes to litharge, ceruse, and gypsum. By the last he may have meant quicklime. Berthelot translated from Olympiodorus (sixth century) the description of a process for making white arsenic from the sulphide. The product was called "alum, white and compact." The animal kingdom furnished the Romans with at least one famous poison which they extracted from the *Lepidus marinus* (in the

Linnean system, *Aplysia depilans*) which they knew as the sea-horse. According to Philostratus it was by this poison that Domitian removed Titus.

Poisonings in the Middle Ages.

The belief in the skill of the compounders of philtres and mysterious charms grew rather than diminished in the Middle Ages and as alchemy developed. In Sir Walter Scott's "Talisman," the tale of the Crusades, the western physician says, "The oily Saracens are curious in the art of poisons, and can so temper them that they shall be weeks in acting upon the party, during which time the perpetrator has leisure to escape. They can impregnate cloth and leather, nay, even paper and parchment, with the most vile and subtle venoms."

Official records of the trial of a minstrel named Wondreton in Paris, in 1384, give a copy of instructions alleged to have been given to the accused by Charles the Bad, King of Navarre, who had employed this Wondreton to poison the then King of France, Charles VI, his brother, two uncles, and several dukes. The scheme was extraordinarily crude, although Charles the Bad was reputed to be an adept in alchemy. The minstrel was to buy "arsenic sublimat" from the hotels of the apothecaries in Pampeluna, Bordeaux, Bayonne, and other towns through which he would pass. He was to powder this, and get into the kitchens of the eminent persons who were to be his victims, and then, when he could do it with safety, he was to sprinkle some of the powder in the soups and meats served to the masters. Wondreton was arrested before he had done any mischief, and was executed.

King John of England is alleged to have caused Maud Fitzwalter to be killed in the Tower by a poisoned egg because she would not yield to his illicit passion.

The sorcery practised so largely in the Middle Ages must have frequently developed into poisoning. The philtres were to a large extent the same as those which the Romans had used. Opium, belladonna, datura, *Cannabis Indica*, and arsenic were capable of producing astonishing effects, and there was but little chance of detection except the chance which was just as likely to result in the conviction of an innocent as a guilty person. Poisons, or at least the terror of them, played a considerable part in the history of Italy in the fifteenth and sixteenth centuries, and the country acquired the nickname of Venenosa Italia. Even earlier the famous Venetian “Council of Ten” was believed to have made a systematic business of assassination by poison. It employed experts and had a regular tariff—so much for a king, so much for a duke and downwards, which was allowed, plus expenses. The crime having been accomplished, the books of the Council recorded the fee, and the single word “factum” was added. The Medicis and the Borgias, and other of the great aristocrats of the nation are supposed to have kept skilled poisoners in their pay. Giambaptista Porta, Mercurialis, and other scientific men wrote treatises on toxicology as it was understood at the period, coloured with exaggerated fancies such as would impress the common public, and tempt the criminally inclined. Porta, for example, describes the “magic unction” which witches were believed to employ. It was this which gave them power to fly through the air. He attributes this virtue to belladonna. With dulcamara they made a drugged cheese which they gave to travellers, and which had the effect of inducing the victims to fancy themselves beasts of burden. In this condition the adepts could set them to any work they wanted done, and, this performed, they gave them an antidote which restored them to their proper senses.

Credulity in regard to Poisons.

Terror of poisons became epidemic in many countries, and eager credulity welcomed any alleged antidote. Ambrose Paré relates an incident in which he was an actor. He, a Protestant, was principal physician to Charles IX, the wretched author of the Massacre of St. Bartholomew. His story of the experiment which that king had made with a bezoar stone is related on page 18. There was also an Archduke Ferdinand of Austria who in the same century invented an antidote to poisons. It was composed of sapphire, hyacinth, emerald, ruby, and garnet. He also, according to Matthiolus, tried an experiment similar to the one narrated by Paré. A Bohemian, condemned to be hanged, was given 2 grains of arsenic. In four hours he had become livid, prostrate, and apparently dying. He was given a dose of Ferdinand’s powder in a glass of white wine, and recovered. Matthiolus also states that Pope Clement VII made such experiments on condemned criminals.

In the reign of Henry VIII of England in 1530 an Act was passed making the crime of poisoning punishable by boiling alive. This was enacted in consequence of several deaths believed to have been due to poisons which had occurred in the household of the Bishop of Rochester. In 1542 it is recorded in the chronicles of the time that a young woman named Margaret Davie was "boyled alive in Smithfield" for having poisoned persons in three houses in which she had lived. The savage punishment was reduced to hanging in 1547 in the reign of Edward VI. In Queen Elizabeth's reign in 1598 two men were hanged on a charge of having placed poison in her saddle.

Italian poisoners are alleged to have found abundant employment in France. Catherine de Medici took with her to Paris her astrologer, Cosmo Ruggieri, and the people believed that he was responsible for the death of Charles IX. The ambitious queen has found many defenders, but the fiend capable of planning the massacre of St. Bartholomew may support a few extra crimes. Exili went to Paris in the next century with the reputation of having poisoned 150 persons in Rome. Michelet says this miscreant had been in the employment of Marie Olympia, Queen of Rome under Innocent X, and implies that it was on her account that he exercised his chemical skill. He had also been in the service of Queen Christina of Sweden, but this employment was apparently not a criminal one. The latter queen had only engaged Exili to instruct her in alchemy. It was from this teacher that the famous poisoners of Paris were alleged to have learned their arts. It is not possible, however, to ascertain the limits of exaggeration in the accounts which gossiping chroniclers give of that epoch. Royal edicts were issued forbidding "all sorts of sorcery or magic, divinations, philtres, invocations of demons, drinks to win love, enchantments to trouble the air or excite hail or tempests, to destroy the fruits of the earth or the milk of beasts, mathematics [which meant astrology], auguries, and interpretations of dreams." But though the practice of the "diabolic arts" was punishable by death, it flourished abundantly, but it is not necessary to accept the estimate of a diarist named L'Estoile, who, describing the execution of a witch named La Miraille in 1587, stated that the number of such persons in Paris at that date exceeded thirty thousand.

Perfumery and the publication of almanacks were businesses which covered many of the malfeasances struck at in the edict just quoted, and no doubt there was a widespread belief in the miraculous toxicological skill of the fortune tellers, who naturally wished their predictions to be verified. “Tasters” were employed in the houses of the wealthy, dishes of “electron” which it was believed would tarnish if poisons were placed on them, and Venetian glass, which was warranted to fly into atoms if the wine poured into it had been contaminated, were in frequent use. As Rogers has written

> Brave men trembled if a hand held out
> A nosegay or a letter, while the great
> Drank only from the Venice glass that broke,
> That shivered, scattering round it as in scorn
> If aught malignant, aught of thine was there,
> Cruel Tophana.

But probably nine-tenths of the crimes suspected were the mere result of the disordered fancies of the age. Knowing as we do on what frivolous evidence women were condemned as witches, it is permissible to be sceptical in regard to the testimony received by the frightened judges when one of these notorious criminals came before them. Nor are the alleged confessions of the women themselves necessarily conclusive. The so-called witches often supplied details of their negotiations with Satan, and of their Sabbatic excursions; and hysterical women in all ages have been addicted to the relation of fictitious narratives circumstantially describing both their vicious and their virtuous exploits. The rapid putrefaction of a corpse was considered to be sufficient evidence that the cause of death had been poison, though it is likely that the poisons then in use would have tended to preserve the body.

The Marchioness of Brinvilliers

was one of the most interesting of the historic poisoners. She was the daughter of the civil lieutenant of Paris, Dreux d’Aubray, and her career as a criminal coincides with the early years of Louis XIV’s reign. She is described as elegant, “petite,” sweet in her disposition, and modest in her demeanour. According to her own confessions, produced at her trial, sometimes admitted, and sometimes denied by her (and characterised by Michelet as confused and impossible, and probably composed under the influence of fever), she commenced her career of crime at the age of 7 years by incestuous intercourse with her brother. She accused herself also of arson. She married the Marquis de Brinvilliers when she was about 20, and after helping him to dissipate their joint fortune, she obtained an order of separation as far as property was concerned, but continued to live with him as well as with his intimate friend, a sinister person who called himself Ste. Croix, and professed to have been a cavalry officer. His real name was Godin, and Michelet, who investigated all the court documents dealing with the case, makes him apparently the agent, and ultimately the victim, of an arch-fiend of the name of Penautier, a cleric who at least profited largely by the sudden deaths of various persons. He describes Ste. Croix as a person of austere manners and as the author of some ascetic books. Penautier was never formally accused, and it is not easy to disentangle the intrigues associated with the case. Whatever these may have been, Madame's father, disgusted with the scandal created, got Ste. Croix placed in the Bastille. There it is alleged he met with the notorious Italian poisoner, Exili, and learned from him a number of poison secrets, though it is doubtful if the art was a new one to him. Perhaps Penautier got him released; anyhow he went in to the Bastille poor, and came out rich. He married and set up a fine establishment. But he still continued his liaison with the marchioness. During his imprisonment that lady had occupied herself in visiting and consoling patients in the hospitals. Now, according to the usual story, she made use of them by giving them poisoned confectionery, and watching the effects, merely for practice. Then she began to dose her father. His illness lasted eight months, his murderess nursing him tenderly meanwhile. Two brothers were also victims, and then she planned the death of her husband, but according to Mme. de Sévigné her accomplice, Ste. Croix, saved him by providing an antidote. The marquis lived to see his wife punished, but was one of those who exerted himself to get a pardon for her. Ste. Croix next died suddenly, in consequence, it is said, of his accidentally dropping a glass mask which he wore when compounding his poisons. This story, says Michelet, is a fable. A case of poisons in packets was found in his rooms, each neatly labelled with its effects. These, it was alleged, were addressed to the marchioness, who managed to escape to England, Penautier giving her letters of credit, says Michelet. Michelet says the packets of poison were addressed to Penautier. The marchioness was soon after taken at a convent at Liège by a detective who, pretending to be an Abbé, made love to her and induced her to go for a walk with him, when lie handed her over to his men, who took her to Paris. She was tortured (only formally, says Michelet), convicted, marched to Notre Dame with a rope round her neck to make the "amende honorable," then decapitated, and her body burned.

One of the witnesses at her trial declared that the marchioness once showed her a little box containing some white stuff, and said there were a number of successions in that little parcel. The witness said she was the daughter of an apothecary and recognised that the substance shown her was sublimate.

It has been discussed by experts whether the poison on which Ste. Croix and his mistress chiefly relied was arsenic or sublimate. Most likely it was arsenic. A certain Guy Simon, an apothecary, was employed to experiment with it, and to discover its composition if possible. His report is worth quoting at some length as an illustration of the condition of toxicological science at that period, and incidentally of the simple faith in the almost miraculous powers of the poisoners which evidently possessed all classes at that time.

According to Chapuis ("Traité de Toxicologie"), Simon at first dropped a little of the liquor in the phials on oil of tartar and sea water, but nothing was precipitated. Then he digested some of it in a mattrass on a sand-bath, but on distilling it no substance of acid or acrid taste was yielded, and no fixed salts were left. Having poisoned a pigeon, a dog, and a fowl with the liquid, he could only discover on opening the dead bodies a little clotted blood in the ventricule of the heart. Some of the powder deposited by the liquid was given to a cat which vomited for half an hour and then died.

Simon explains that poisons generally sink to the bottom of water, and when tested by fire the innocent part is dissipated and only the acrid and piquant principle remains. But this poison of Ste. Croix's, floated on water, and tried by fire, left only something sweet and innocent. It in fact ruled the elements, and killed animals without leaving any trace. Utterly baffled, the expert concludes: "It is a terrible, diabolic, intangible (*insaissable*) poison."

Tofana.

About the same time the woman Tofana was selling her Aquetta di Napoli in Italy, but she was not brought to justice until 1709, when she confessed to the Pope and the Emperor Charles VI that her drops contained arsenic, and that by them she had caused the deaths of more than six hundred persons. The Emperor repeated her story to his physician, Garelli, by whom it was communicated to Hoffmann, who published it in his "Rational Medicine." She preferred to prepare her drops by rubbing arsenic into the broken joints of a hog just killed and then collecting the juice. Tofana took refuge in a convent and lived for some twenty years after her condemnation. A letter from the English Secretary of State to the Commissioners of Customs, dated July 29, 1717, is on record, cautioning them against admitting a liqueur called Aqua Tufania from Italy, as accounts of its dangerous character had been received from the British envoys at Naples and Genoa.

The Chambre Ardente.

After the execution of the Marchioness of Brinvilliers, secret poisoning, far from being suppressed, appears to have become almost fashionable. The Government at least pretended to believe in widespread conspiracies. It may have been a political trick, as has been alleged, to get rid of some inconvenient opponents; but, however this may have been, a special commission was appointed by the French Government to inquire into the truth of certain rumours, and this commission acquired the title of the Chambre de Poisons, or Chambre Ardente. Louis XIV consented to the institution of this special court on learning that the notorious Ste. Croix, the coadjutor of Mme. de Brinvilliers, had at one time nearly secured the position of maître d'hôtel in his palace at Versailles. It principally concerned itself with the revelations made by two women who called themselves La Voisin and La Vigoureux, who with an unfrocked priest, who had assumed the name of Le Sage, had carried on a fortune-telling business of enormous extent in the city. They claimed the power of exhibiting the devil to their clients, and it was charged against them that they had sold a powder of succession to those who would pay for it. Many highly connected aristocrats were implicated, and some faced the commission while others left the country rather than expose themselves to the shame of exposure. La Voisin had kept records of her business, but those which were produced displayed rather the ridiculous than the criminal side of the conspiracy. The Duchesse de Foix had come to her for bosoms; Madame de Varsi wanted hips. Others had paid her fancy prices for petitions written with a special ink guaranteed to make them loved by the king. La Voisin was extremely insolent to her judges, and apparently she and her accomplices were all sentenced to be burned. According to Voltaire the sentence was executed in the case of all of them; but the account given by Madame de Sévigné, and by historians who lived nearer the period, go to show that the death punishment was only inflicted on La Voisin.

Negro Cæsar's Antidote.

In Prestwich's "Dissertation on Poisons" (1775) an extract is given from the "Carolina Gazette" of May 9, 1750 stating that the General Assembly, the governing body of the colony, had authorised the publication of "Negro Cæsar's Cure for Poison." The General Assembly had purchased Negro Cæsar's freedom, and granted him £100 a year for life as the price of this formula. It consisted of roots of plantain and wild horehound (? of each) 3 oz. boiled together in two quarts of water down to 1 quart and strained. Of this the patient was to drink one-third every morning fasting for three consecutive mornings. Certain conditions of diet were laid down, and it was quaintly added that if after the three days' treatment no benefit had resulted it was "a sign that the patient has either not been poisoned, or has been by such poison as Cæsar's antidote will not remedy."

Arsenic Eating.

About the middle of the 19th century some discussion took place in various popular and medical journals in reference to the alleged practice of eating arsenic in Styria and the neighbouring countries. Drs. Christison, Swaine Taylor, and Pereira were somewhat more than sceptical, but several doctors and others wrote confirming the statements from their personal knowledge. One of the most notable testimonies was contributed by Dr. Craig Maclagan of Edinburgh in the "Edinburgh Medical Journal" (1865). Dr. Maclagan had visited Styria and had introductions to several doctors in that country who had reported cases known to them. Two men were brought to Dr. Maclagan at the village of Liegist in Middle Styria, and in his presence took, one about 4½ and the other 6 grains of white arsenic. Dr. Maclagan brought home some of the substance which the Styrian doctor had given to these men, and on testing it found it to be genuine white arsenic. He also brought back some samples of the urine voided by the men some time after eating the arsenic, and found in it distinct evidence of the presence of the poison. The arsenic was taken by the men on a piece of bread, and in one case was washed down with a draught of water. How extensive was the habit, Dr. Maclagan could not say. The peasants called it Hydrach or Huttereich; the correct word was said to be hutten-rauch, furnace smoke. One of the men took his dose about twice a week, the other generally once a week. They had of course begun with doses of less than a grain. It was understood to be a tonic and stimulant, and to aid the respiration in climbing. It was also believed to promote sexual desire. Having acquired the habit the occasional dose was much missed if omitted for long.

IMMUNITY.

The modern employment of serums in the treatment of zymotic diseases goes a long way towards explaining the fact of the immunity of individuals in respect to bacterial poisons. But the possibility of immunity against such poisons as arsenic, opium, or serpent venom appears to rest on a different basis. In 1896 Professor (now Sir) Thomas R. Fraser, M.D., F.R.S., reported to the Royal Institution a long investigation dealing with the alleged resistant power of certain tribes or sects in India, Africa, &c., who can suffer the bites of unquestionably venomous snakes without becoming seriously affected. After quoting numerous reports from old and recent works showing that this immunity is an actual fact, Professor Fraser described a long series of experiments extending over many years with venom which he had obtained from India, America, Africa, and Australia. The venom, he stated, is a complex substance and is not a ferment. Ascertaining the minimum lethal dose for each animal he experimented on frogs, cats, rabbits, guinea pigs, and other animals, and beginning with one-tenth, one-fifth, or one-half of that dose, and gradually increasing it, he found it possible to administer four or five times, and in the case of rabbits up to even fifty times the lethal dose. From the immunised animal a serum was prepared which was antidotal in very minute quantities if mixed with the venom, but if administered separately by hypodermic injection, though at the same moment with the venom, some twelve and a half times as much was found to be necessary, and it was estimated for a normal bite of an average man no less than 11½ ounces would have to be administered hypodermically soon after the bite to prevent probably a fatal result. The most interesting observation was that the poison taken into the stomach was almost innocuous, and yet exercised a protective effect. In many of the narratives given by travellers describing the feats of the snake charmers it has been related that they will squeeze the venom from the serpent's mouth and swallow it. This would evidently be one of their methods of rendering themselves proof against the poison when injected by a bite. Professor Fraser's paper is published in full in "Nature" April 16 and 23, 1896. The author gives his reasons for believing that the action of the antidote is chemical.

Modern Toxicology.

Systematic and scientific investigation of alleged poisoning was scarcely known before the end of the eighteenth or the beginning of the nineteenth centuries. The advance of chemical and physiological knowledge, however, was soon applied to the more certain detection of the criminal use of toxic agents. Orfila's "Traité de Toxicologie," published in 1814, the result of a multitude of experiments, was the work which led the way in the establishment of exact tests. Dr. Swaine Taylor in England, Sir Robert Christison in Scotland, Casper in Germany, and a host of other medical chemists pursued the subject, and gradually toxicology reached an assured position. How slow was this attainment may be gathered from the testimony of an expert in a French murder trial in 1823 that globules of fatty mutton had been mistaken for white arsenic.

To Marsh's arsenic test, made known in 1836, may be traced the practical fall of the poison which for so many centuries had reigned supreme among the deadly agents employed by the most cowardly but most dreaded of the tribe of assassins. The power of proving the presence of the metal which was afforded by the method then set forth brought out the chemical expert, and led to angry controversies. The skilled experimenter was apt to be very confident of his results, and naturally others who claimed to be as skilful as himself disputed his conclusions. Theories of the almost universal diffusion of arsenic were vigorously maintained, and on one occasion in France, in 1839, when Orfila had demonstrated the presence of arsenic extracted from the organs of the person supposed to have been poisoned, Raspail undertook to extract as much from the judge's armchair.

Meantime the resources of the poisoners had been vastly extended by the discovery of the alkaloids. Many of these substances possessed extreme toxic power, and the invention of the means of detecting them was necessarily a gradual process. It was attained, though; and it may be asserted that at present either by chemical or physiological tests the recognition of the administration of any of the dangerous alkaloids is as certain as is that of the metallic poisons.

About the year 1870 a new complication occurred when an Italian chemist named Dr. Selmi proved that putrefactive animal matter and certain bacteria yielded alkaloidal products, often poisonous, to which the name of ptomaines was given. Selmi was engaged as an expert in the investigation of a case in which it was suspected that an individual had been poisoned. A product was obtained, apparently an alkaloid, but which Selmi could not identify with any known vegetable substance. He came to the conclusion that it was of animal origin, and after a long series of experiments he proved his theory. Several eminent toxicologists at first asserted that ptomaines could be distinguished from vegetable alkaloids by the property of yielding Prussian blue with ferric salts. This test, however, proved fallacious as several series of vegetable alkaloids, notably the pyridic and the allylic, gave the same reaction. The distinction between animal and vegetable alkaloids is a delicate one, and has to be established by an accumulation of chemical evidence.

Leucomaines, which are also alkaloidal products, are distinguished from ptomaines by being formed in the body from living tissues, as a result of their activity. These were first separated by Armand Gautier in 1886. Their constitution is more complex than is that of the ptomaines, but they are not generally of a poisonous character.

XXIII

PHARMACY IN THE NINETEENTH CENTURY

> "The advance in every section of chemistry during this century (the 19th), and especially during the latter half of it, has literally been by leaps and bounds. Although practically a creation of our own time, no branch has been more fruitful in result, in suggestion, or in possibility, than that of organic analysis."
>
> (Sir Thomas E. Thorpe:—"Essays in Historical Chemistry," 1894.)

Three great achievements characterise the pharmacy of the nineteenth century, namely, the discovery of alkaloids in its early years, of anæsthetics in the middle period, and of synthetic organic products in its later years.

ALKALOIDS.

The alkaloids extracted from vegetables are the ideal quintessences which the alchemical pharmacists of the sixteenth and seventeenth centuries sought so eagerly to obtain. Their characteristic property is that they are basic, that is, that definite salts can be formed from them by combination with acids. They all contain nitrogen, and have an alkaline reaction.

Of all the popular vegetable drugs opium was the one more than any other tortured to yield up its essence. The early laudanums and extracts of opium aimed at this result, and preparations, such as the Magisterium Opii of Ludovici of Weimar (born about 1625, and author of "Dissertations on Pharmacy"), were used in the belief that the quintessence had been in some degree secured. Robert Boyle experimented with opium with the object of extracting its essential principle. The process he adopted was first to treat the drug with calcined tartar (salt of tartar), and then extract with spirit of wine. By this means he obtained a solution which would be principally one of morphine.

In 1803 a French manufacturing chemist, working on an idea suggested by Vauquelin, produced a crystallisable salt which was at first supposed to be the active ingredient of opium. Experiments on animals seemed to confirm this opinion, and the salt of opium, or "sel narcotique de Derosne," was believed to have solved the long-standing problem. The product was described in the "Annales de Chimie" of February, 1804. It was the substance now known as narcotine. Sertürner regarded it as meconate of morphium, a misapprehension which was corrected by Robiquet.

In December, 1804, Seguin, a chemist who had been a demonstrator under Fourcroy, and who subsequently got into trouble with Napoleon’s Government on charges of having enriched himself out of drug supplies to the Republican armies, read a paper to the Institute in which he described a process which would yield morphine. For some unexplained reason that paper was not published until 1814. Meanwhile Friedrich Wilhelm Adam Sertürner, a pharmacist of Eimbeck, in Hanover, had been working on Derosne’s salt, and had investigated more accurately than anyone before him the composition of opium. His first report was published in 1806, and in that he announced the discovery of “opium-säure” (opium acid), but in 1816 he named this product “meconic acid,” and explained how it was combined with an alkaline base which he called “Morphium.” He described this as analogous to ammonia, and prepared several salts from it. He came near to losing his life in the course of his experiments as, misled by the comparative harmlessness of Derosne’s salt, he had ventured on dangerous doses of his own product. Consequently he was able to determine very accurately the therapeutics of morphine at the same time that he announced its discovery.

“I flatter myself,” wrote Sertürner in 1816, “that chemists and physicians will find that my observations have explained to a considerable extent the constitution of opium, and that I have enriched chemistry with a new acid (meconic) and with a new alkaline base (morphium), a remarkable substance which shows much analogy with ammonia.”

Sertürner’s discovery excited much interest and emulation, and its importance was fully endorsed when, in 1831, the French Institute awarded to him a prize of 2,000 francs “for having opened the way to important medical discoveries by his isolation of morphine and his exposition of its character.”

Before Sertürner had definitely established the nature of alkaloids, Vauquelin had separated from tobacco a substance which he regarded as its active principle, and which was undoubtedly an impure nicotine. This was in 1809. The alkaloidal character of this extract was not, however, recognised until 1828, when Posselt and Reimann produced it in a pure form.

Vauquelin had in 1812 extracted daphnine from mezereon root, and in describing his experiments had alluded to its alkaline character. For this reason the credit of having been the first to have discovered an organic alkali has been attributed to him; and when in 1818 Pelletier and Caventou discovered an alkaloid in St. Ignatius's beans, to which they gave the name of strychnine, they stated that it had been their original intention to designate the substance Vauqueline in honour of the celebrated chemist who had first established the existence of an organic alkali. It had, however, been pointed out to them by distinguished members of the Academy that it would have been a doubtful compliment to associate such an honoured name as that of Vauquelin with such an evil (*malfaisant*) substance as this new product.

A number of chemists narrowly missed the discovery of quinine. As early as 1746 Count Claude de la Garaye obtained from cinchona bark a crystalline salt which he termed sel essentiel de quinquina. Two other French chemists, Buquet and Cornette, subsequently introduced another sel essentiel de quinquina. Both these products were simply kinate of lime. A Swedish physician named Westerling announced in 1782 that he had discovered the active principle of cinchona, and he gave it the designation of vis coriaria. His product was in fact cinchotannic acid. Seguin perhaps made the worst mistake of all the investigators in coming to the conclusion that what was precipitated by tannin was the essence of cinchona from a medicinal point of view, and he actually recommended that gelatin should be substituted for cinchona in cases when price was an object. Fourcroy made several attempts to ascertain the true chemical constitution of the bark. In 1790 he separated a resinous principle, mixed with some colouring matter, since called cinchonic red. This he at first supposed was the essential medical constituent of the bark. Vauquelin later adopted this erroneous theory, and so missed his way. In 1792 Fourcroy got nearer to the truth when he observed incidentally that the water in which the bark had been macerated turned litmus paper green; and he also remarked that lime water caused a greenish precipitate in the infusion. He did not pursue the investigation, but his comment on what he had stated is noteworthy. "These researches," he said, "will no doubt lead to the discovery one day of an antiperiodic febrifuge, which once known may be extracted from various vegetables.” Berthollet followed on Fourcroy’s lines, but came to the conclusion that the precipitate which lime water gave with decoctions of cinchona was magnesia, which he believed was a constituent of the bark in combination with hydrochloric acid.

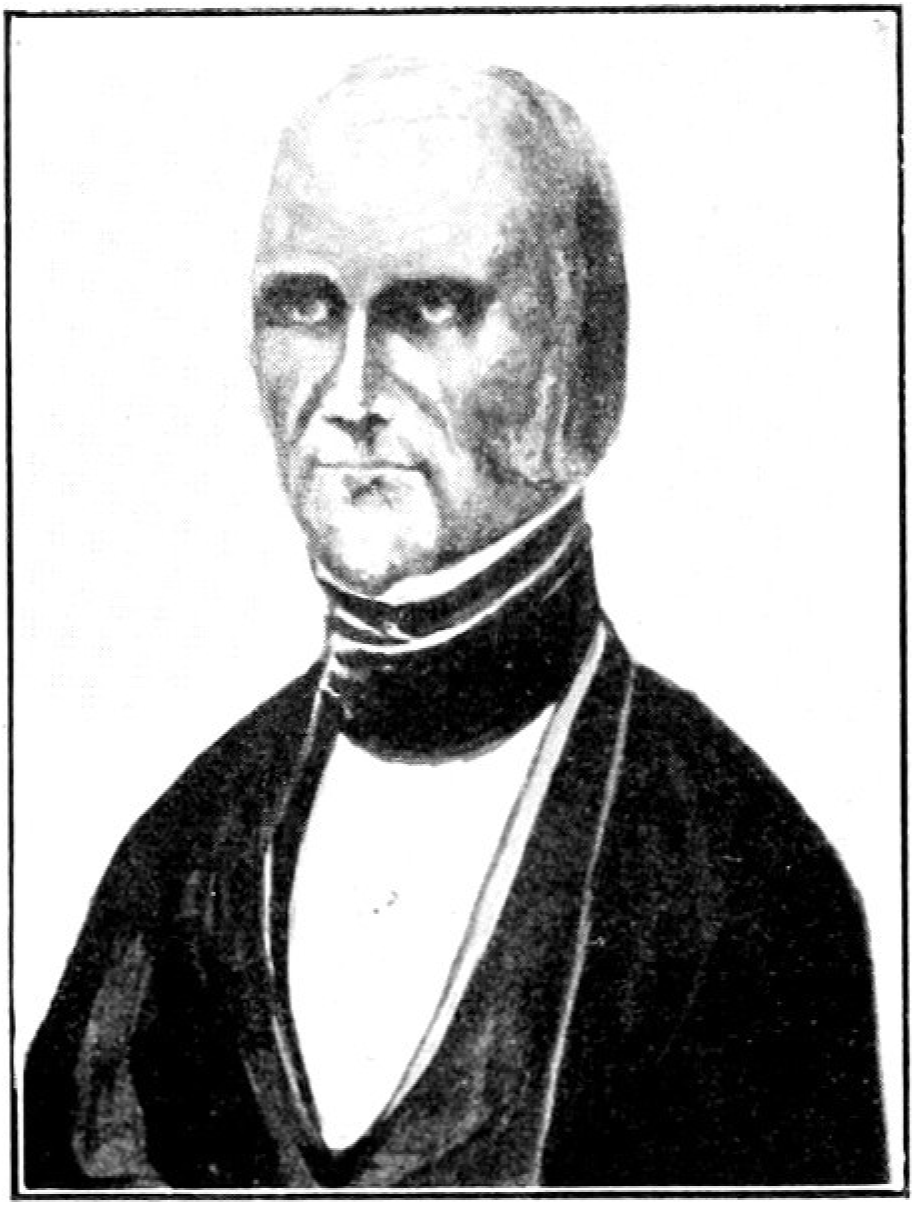
In 1811 Gomez, of Lisbon, described a crystalline substance which Dr. Duncan, of Edinburgh, had obtained from certain species of cinchona, and gave to this product the name of cinchonine. Lambert later prepared it in a state of considerable purity. But neither of these chemists suspected its alkaline nature. In 1820 Pelletier and Caventou studied the whole chemistry of cinchona and succeeded in showing that the cinchonine of Gomez was a mixture of two alkaloids, to the second of which they gave the name of quinine. Quinidine was isolated by Henry and Delondre in 1833, and cinchonidine by Winckler in 1844, but the name of the latter was given by Pasteur in 1853. Pasteur also produced the alkaloidal derivatives cinchonicine and quinicine.

Robiquet had the idea that as the coffee plant belongs to the same family of plants as the cinchonas it might be possible to find quinine in coffee. In searching for it he isolated caffeine. This was in 1821. In 1827 Oudry found an alkaloid in tea and called it theine. Jobst and Mulder in 1838 proved that these alkaloids are identical. It is now recognised that the alkaloids of cocoa, of guarana, and of Paraguay tea are all the same substance, or closely related.

Pelletier and Caventou isolated strychnine from the St. Ignatius beans in 1818, and brucine from false angostura bark (*Brucæa anti-dysenterica*) in 1819; in the same years they obtained veratrine from cevadilla seeds and white hellebore root; but it would appear that in their investigation of cevadilla seeds, which was the first to yield the alkaloid, they were preceded by a very short time by Meissner. Pelletier and Magendie produced emetine from ipecacuanha in 1817, and Pelletier alone is credited with narceine in 1832. Codeine was discovered by Robiquet in 1821 when he was examining a new process for obtaining morphine which had been suggested by Dr. William Gregory, of Edinburgh. Belladonna had been studied by Vauquelin and many chemists after him, but it was not until 1833 that atropine in a state of purity was isolated from it. This was accomplished simultaneously by Geiger and Hess, two German chemists, and by Mein, a German pharmacist.

ANÆSTHETICS.

The greatest triumph achieved in any department of medicine, and worthy, perhaps, to be described as almost, if not quite, the most beneficent discovery in the world's history, is that of the successful employment of anæsthetics. This great glory belongs to the nineteenth century. Indian hemp had been employed for centuries in the East, mandragora had a classical reputation, and from time to time the possibilities of hypnotism had been expounded by one or another of its professors. But it is only within the past sixty years that the terrible anxiety and suffering associated with surgical operations have been so far mitigated as largely to increase the prospects of success, and to annihilate the pain. To Sir Humphry Davy is due the credit of first suggesting the line of advance towards this precious goal by describing his experiences of the inhalation of nitrous oxide gas which he found had the effect of relieving toothache and other pains; "uneasiness swallowed up for a few minutes by pleasure," were his own words; and he foresaw the possibility of this agent being employed as an inhalation "in such surgical operations as involved no great effusion of blood." That was in the year 1800. About 1830 Faraday observed and noted the effect of ether on the nervous system, which he stated was similar to that of nitrous oxide gas.



HORACE WELLS.

The possibility of painless operations began to be imagined about this time, but not much serious experimental work seems to have been attempted. In 1842, Dr. Long, of Athens, Georgia, U.S.A., claimed to have removed a tumour from a patient under the influence of ether, and about the same time Dr. Jackson, of Boston, U.S.A., also professed to have carried out successfully a similar operation. These experiments have not been rigorously established, but there is no question about the authenticity of the next. Horace Wells, a dentist of Hartford, Connecticut, U.S.A., suffering from toothache, resolved to experiment on himself. He induced a colleague named Rigg to draw a molar while he was under the influence of nitrous oxide gas, and did not feel the pain of the extraction. This was in 1844. Wells then, in association with another dentist, named William Thomas Green Morton, started to demonstrate the discovery publicly. The first exhibition was an ignominious failure, and the two pioneers were derided as impostors. Wells suffered so severely from his disappointment on this occasion that he died insane a few years later. Morton, however, continued his investigations, and he and the Dr. Jackson already mentioned worked together on ether, and assured themselves of its anæsthetic powers by experiments on animals. Morton then inhaled it himself on September 30, 1846, and awoke from deep unconsciousness a few minutes later, convinced of the reality of his discovery. Just then a patient rang the bell. It was towards evening, but the visitor was shown into the surgery. He was in agony with the toothache, and begged the doctor to mesmerise him in the hope of getting some relief. The nerve was so sore, he said, that he could not summon up courage to have the tooth drawn. Morton, greatly excited, told his patient that he could do better for him than mesmerising him. He could take the tooth out without pain if he would consent. The sufferer agreed eagerly, and Morton, with two assistants, proceeded to operate. A handkerchief, saturated with ether, was applied to the mouth and nostrils, and unconsciousness was produced almost immediately. A tooth, a firmly-rooted bicuspid, was extracted without arousing the patient. Then followed a minute of intense fear. The man remained motionless, and Morton felt convinced he was dead. Seizing a glass of water he dashed it into the face of this first subject, who at once revived. “Are you ready to have your tooth drawn?” asked Morton. Rather hesitating assent was given, and then the extracted tooth was shown to the patient in the chair. His name, which ought to be recorded in the annals of surgery, was Eben Frost.

On October 16, 1846, a tumour was removed from a patient at the Massachusetts General Hospital, Boston. Morton administered the ether, and Dr. Collins Warren, the senior surgeon, operated. The patient made no sound, and after he recovered consciousness declared that he had experienced no pain. “Gentlemen, this is no humbug,” said Dr. Warren to the other surgeons who had witnessed the operation. Morton died in 1868.

The first operation under ether in Great Britain was performed by Liston at University College Hospital in December, 1846. In January, 1847, James Young Simpson commenced to employ it in midwifery cases in Edinburgh. Simpson had already acquired a high reputation as a gynecologist, and was an enthusiast in his profession. Delighted though he was with the results of his trials of ether, he felt sure that an anæsthetic with more lasting effect could be found or made, and with characteristic courage and pertinacity he and his two assistants, Drs. Keith and Duncan, carried on personal experiments at Simpson's private house on such evenings as they could spare. At the same time the scientific world was appealed to for suggestions. About this time David Waldie, a Scotch pharmacist then settled in Liverpool, where he was manager of the Liverpool Apothecaries Company, was visiting Edinburgh and had a conversation with Simpson on his absorbing topic. Waldie had had some special experience with chloric ether at Liverpool, and had made experiments on its chemical character, which had led him to the conclusion that the chloric ether then used was chemically only a mixture of chloroform with some undecomposed spirit. Chloroform, it must be remembered, was then but little known. Dr. Samuel Guthrie, formerly an army surgeon, but later practising at Jewelsville, Jefferson County, N.Y., published an account of a chloric ether he had made from alcohol and chloride of lime in May, 1831. In October of the same year Soubeiran in France, and a month later Liebig in Germany, announced the discovery of a similar compound. None of these products was an absolute chloroform, but all were heavy substances. Dr. Guthrie called his chloric ether, and familiarly sweet whisky, Soubeiran's was a bichloric ether, and Liebig described his as a trichloride of carbon, but Dumas showed in 1834 that the essential substance was a trichloride of formyl, $HCCl_3$ and a substitution product of marsh gas. He invented the name chloroform. It appears too that another French chemist, Flourens, in March, 1847, reported to the Academy of Sciences of Paris some experiments he had made with chloroform on animals, which indicated its anæsthetic properties; but probably neither Simpson nor Waldie was aware of this paper. This was the chemical which Waldie recommended to Simpson in the summer of 1847, and the chemist promised to send some to Simpson on his return to Liverpool. A fire in the laboratory of his establishment prevented the fulfilment of this promise, and also, Waldie said, prevented him from experimenting on himself with chloroform, as he had intended to do.

Simpson got chloroform from Duncan and Flockhart in Edinburgh, but did not expect it would answer on account of its density. The sample was set aside for some time, but on November 4, 1847, he and Duncan and Keith resolved to test it. They all inhaled some from a tumbler, and almost immediately became loquacious and hilarious. Then unconsciousness came on, and Simpson, who was the first to recover, found Duncan under the table, eyes staring, and snoring vigorously, while Keith was kicking at the supper table. The experiment was repeated a few evenings later, and this time a niece of Simpson was induced to take a turn. After inhaling the vapour she fell asleep, murmuring "I'm an angel; I'm an angel." Simpson at once began the use of chloroform in his practice, and his great reputation and powerful advocacy soon caused its general adoption.

SIR JAMES YOUNG SIMPSON, M.D.
(From a drawing by T. M. Pape, lent by the publishers of the *Century Magazine*.)

A MYSTERIOUS ANÆSTHETIC.

A strange and little known story is told by Professor Franck. Van Swieten was a Dutch physician, a pupil of Boerhaave. He did not succeed in his native land so well as he ought to have done, for he was a devout Catholic. He went to Vienna, where he attained the highest medical position and the utmost esteem from his patroness, the Empress Maria Theresa. On May 1, 1771, three young gentlemen called on Van Swieten and were shown into his study. The professor was then an old man, 71 years of age.

"What do you desire, my children?" he asked, as he fingered his beads.

"We come to teach Van Swieten what he knows not," answered one of the young men.

"That is not difficult," replied the veteran. Then they told him they wished to show him a medicine new to the world, and as the doctor smiled incredulously, one of his visitors added:

"Like the philosopher of old, we will say to Pain:—Thou art but an idle word."

Van Swieten was doubtful, but after further explanation he invited them to come to his hospital the next morning and demonstrate their secret. When they were gone he went to Maria Theresa and told her of the interview. The Empress declared her intention of being present at the experiment.

The next day when the three young men appeared at the hospital they found Van Swieten and a veiled lady awaiting them. Certain chemicals had previously been placed in retorts by them, and a mastiff was made to inhale the product. The animal exhibited symptoms of inebriation, and soon fell on the floor unconscious. One of the strangers made a deep incision into the dog's chest and covered the wound with a surgical dressing. The animal showed no sign of pain, and shortly afterwards recovered consciousness, got on his feet, and walked about as if nothing had happened.

"This is indeed a miracle," said the Empress.

"Would you dare to operate thus on a patient?" asked Van Swieten.

"Willingly, Master," was the reply.

"Then operate on me," said the Professor.

To this proposal, however, they demurred, and the Empress supported their objection. An appointment for further experiment a few days later was made, but when the day arrived Van Swieten was ill. He died on May 18, and Maria Theresa was at the time immersed in political troubles. The sequel to that strange history has never been told, but some of the old books tell of the “Holland Oil,” which is believed to have been the mysterious medicament employed. Professor Franck thinks one of the strangers was Gautier Van Decoren, a physician of Flemish Holland.

SYNTHETIC REMEDIES.

Early Distinction between Inorganic and Organic Chemistry.

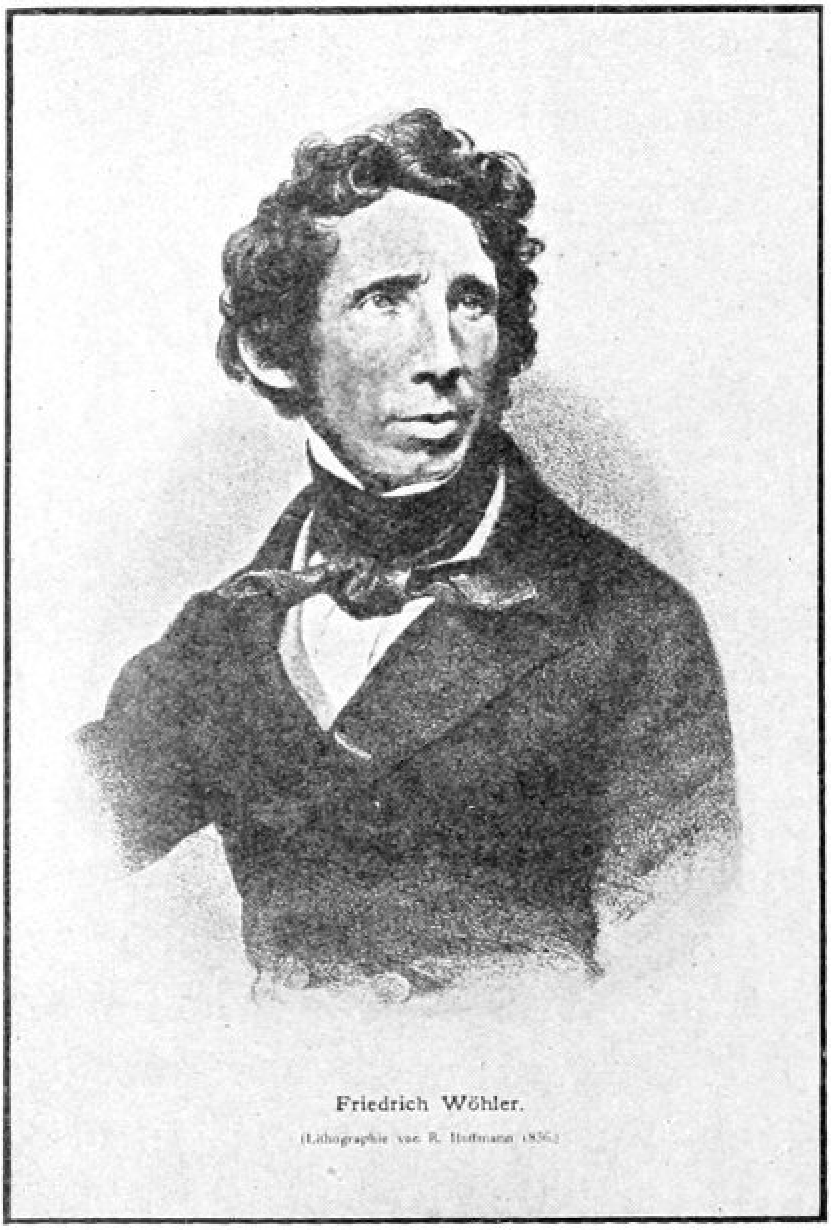
The development of organic chemistry in the course of the nineteenth century is a subject so vast that it is mentioned in this place with something approaching despair. The great chemists who, in the latter part of the eighteenth and in the early years of the nineteenth century, had rescued their science from the superstitious and fantastic theories and conceits which had encumbered it, Lavoisier, Priestley, Scheele, Cavendish, Dalton, Fourcroy, Berzelius, and many others who might be named, distinguished sharply between the products of the mineral kingdom and those which they called organic, that is, substances of vegetable or animal origin, combined, it was agreed, under the influence of what was described as vital force. This force, it was considered, inherent in living bodies, could never be imitated in the laboratory, and its achievements were beyond human skill. It was even doubted whether the elements composing organic substances were subject to the same laws of combination as were those of the mineral world.

Lavoisier, it is true, regarded organic bodies as consisting of radical compounds, hydrocarbon radicals, as he called them, instead of the metallic bases. His last scientific work was the investigation of the statics of organic chemistry, and on this subject his clear vision would probably have enabled him to anticipate many modern conclusions. He had already recognised some of the transformations of sugar, had analysed alcohol, and had declared that in animal and vegetable chemistry no less than in the inorganic kingdom nothing is ever destroyed, but that vegetation and animalisation are only inverse phenomena of combustion and putrefaction.

Synthetic Organic Compounds.

Some isolated results of the artificial productions of organic substances are recorded which do not seem to have been recognised as challenging the reign of vital force. Scheele, in 1786, formed oxalic acid by oxidising sugar by nitric acid; and in 1822 Döbereiner produced formic acid, previously known as a distillate of ants, by oxidising tartaric acid. In both these cases, however, the transformation was essentially one from a previous organic substance.

The inauguration of synthetic chemistry is understood to date from the year 1828 when Wöhler, then a professor of chemistry at Berlin, produced a supposed cyanate of ammonium by the action of ammonium chloride on silver cyanate. Wöhler was surprised to find the cyanate of ammonium which he had obtained did not correspond with other ammonium salts, but resembled, and as he afterwards proved, was identical with the organic substance, urea, a crystalline compound which constitutes about half of the solid matter dissolved in urine. Wöhler and Liebig next collaborated in a study of organic substances, and one of the early results of their investigations was the discovery of the compound radical, benzoyl, as they termed it, C_7H_5O, which they found could be combined with chlorine, bromine, iodine, sulphur, ammonium, and other substances, always retaining its own individuality. It was, in fact, a compound radical, and though it has never been isolated, its compounds prove its character. Berzelius was so struck by this discovery that he suggested the name of proine or orthrine, either meaning the dawn, in substitution for benzoyl.



FRIEDRICH WÖHLER.
(From the Royal Collection of Etchings at Munich.)

Born at Eschersheim, near Frankfort, 1800; died at Göttingen, 1882. Wöhler's notable discovery of the artificial production of urea in 1828 is famous as the starting point of synthetic chemistry.

Henceforward discoveries and theories based on them, or propounded to explain them, so crowd the field that even in bulky volumes the story is only told in outline. But several of the famous theories or laws or expositions, on which modern chemistry relies, have been so fertile in consequences that they must be very briefly mentioned.

Substitution.

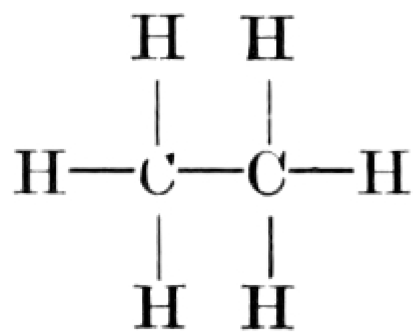
Before 1840 the famous French chemist J. B. A. Dumas developed the theory of substitution, or "metalepsy," showing that the hydrogen atoms in organic substances can be removed one by one from their molecules, other atoms being substituted for them. A simple illustration of this process is manifest in the action of potassium on water, though this is not an example of organic substitution. The water, H_2O takes up one atom of potassium, K, in place of one of its hydrogen atoms, becoming caustic potash, KOH. It is further possible by an indirect method to replace the remaining hydrogen atom by another of potassium, yielding potassium oxide, K_2O. Changes of organic bodies are always proceeding on these lines, and Frankland said the recognition of the process had contributed more to the progress of the science than any other generalisation.

Homologues.

About 1850 C. F. Gerhardt, one of Liebig's pupils who settled in France (and died in 1856 at the age of 40), gave the next great impetus to the development of organic chemistry, or the chemistry of carbon compounds, as it was coming to be termed, by showing how vast numbers of organic compounds could be classified and grouped into homologous series. Starting, for example, with marsh gas, CH_4, which is chemically known as methane, he showed how from this type methyl alcohol, CH_4O, and formic acid, CH_2O_2, are formed. Ethane, C_2H_6, comes next in the series and ethyl alcohol and acetic acid follow just as methyl alcohol and formic acid follow from methane. The addition of CH_2 to ethane gives propane; propyl alcohol and propionic acid following; another addition of CH_2 results in butane with butyl alcohol and butyric acid; and the next type is pentane, with amyl alcohol and valeric acid in its train. Thus it was perceived that all the multitude of complex bodies included in the organic kingdom were compounded in an orderly system.

Valency.

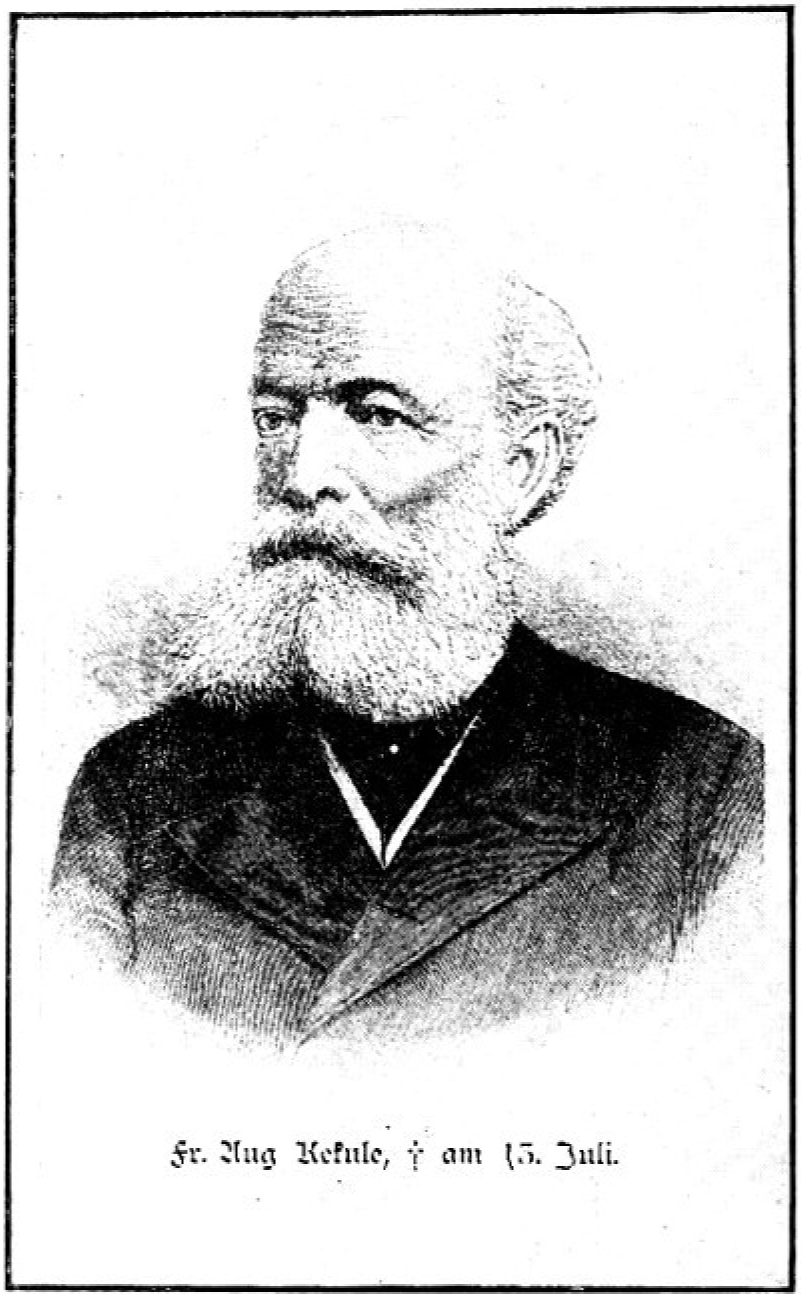
The English chemist Edward Frankland next put forward the doctrine of valency. According to this theory atoms possess one, two, three, four, or more links each, and require that number of other atoms of minimum combining capacity to "saturate" them in a molecule. Carbon, for example, is usually considered to be quadrivalent, and as shown in the instance of methane, requires four hydrogen atoms to saturate it. But how is it then that in the case of the next type, ethane, C_2H_6, the conditions are satisfied? The explanation is that the molecule is arranged in this manner:



each carbon atom having three hydrogen atoms attached to it, the fourth bond uniting it with the other carbon atom. This and other difficulties led to the theory of

Structural Formulas,

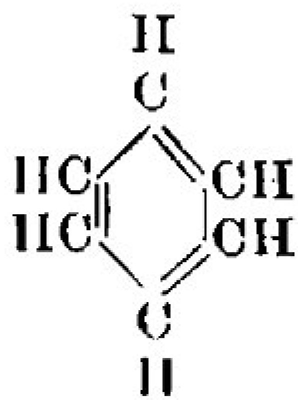
towards which Kekulé, of Heidelberg, was the principal contributor. "Rational formulæ" as distinguished from "empiric formulæ" were already recognised as shown by the homologous series of Gerhardt. Let this be illustrated by the instance of alcohol. The atomic composition of compound bodies was ascertained by many of the earlier chemists. Lavoisier analysed alcohol, and assigned to it almost the same composition as we know it to be. Its empirical formula is C_2H_6O; but that does not explain how it is built up. By deductive reasoning it is established that alcohol is ethane with one hydrogen atom in each molecule replaced by hydroxyl (OH). Ethane is C_2H_6; alcohol is thus formulated—C_2H_5OH. That is its "rational formula." Alcohol is a comparatively simple substance; we shall deal with some formulas of much greater complexity presently.



AUGUST KEKULÉ.
Born at Darmstadt, 1829; died at Bonn, 1896.

But these explanations were by no means sufficient to meet all the cases which were coming before chemists, and now Kekulé's brilliant "closed ring" theory was conceived, and on this most of the wonderful building up of the synthetic compounds has been planned. Kekulé was puzzling over the formula C_6H_6 which had been found to represent benzene, now so famous as the starting point of the aromatic series. He stated that the solution of the problem came to his mind on the top of a London omnibus in 1865, when he was an assistant in the chemical laboratory of St. Bartholomew's Hospital Medical School. He conceived the idea of a hexagonal structure with an atom of carbon at each angle, each united to one atom of hydrogen, and on one side a double link or bond, and on the other a single one, connecting it with the next carbon atom, the quadrivalency of each atom being thereby satisfied.

The formula is depicted in the margin, and is generally accepted; but it ought to be stated that it has rivals, though all are founded on the necessity of providing for the saturation of the four links of the carbon atoms.



Aniline.

Among the events which gradually led to the production of artificial compounds for which physiological properties and action have been claimed, the discovery of aniline is prominent. The substance, now so well known by that name, was first separated from indigo in 1826 in the course of a dry distillation of that dye by a pharmacist of Erfurt, named Unverdorben. He named his product "crystalline," from its character. In 1834 the same substance, as it was later known to be, was obtained from coal-tar by Runge, who, observing the violet colour which bleaching powder caused in its aqueous solution, designated the product "kyanol." Ten years subsequently Hofmann continued the investigations which Runge had pioneered. Meanwhile Fritzsche had obtained anthranilic acid from indigo, and from that he had produced an oily base which he called "aniline." This term was derived from the specific name of the indigofera anil, which was the Sanskrit designation of the famous blue dye. Hofmann's researches ultimately proved that Unverdorben's crystalline, Runge's kyanol, and Fritzsche's aniline were all chemically identical. Hofmann would have preferred to retain the first of these names, but the more definite aniline prevailed.

The colour producing power of aniline had been observed (as has been already mentioned) by Runge in 1834, but it was not until 1856 that this property became of practical importance, when W. H. Perkin, at the time a pupil of Hofmann's, commenced the investigation which resulted in such a complete revolution in the dyeing industry. Perkin's patent for his "mauve" dye was obtained in 1858. It is an interesting circumstance that he made his discovery as a consequence of experiments he was conducting with the view of manufacturing an artificial quinine. Now we may turn to the

August Wilhelm v. Hofmann, † am 5. Mai.
Nach einer Photographie von Wilh. Fechner in Berlin.

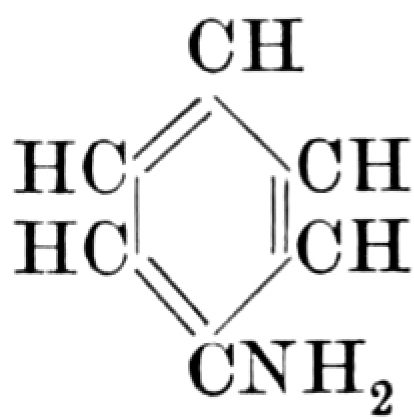
A. W. von Hofmann.

Born, 1818; died, 1892. Was Director of the Royal College of Chemistry, London, 1845–1864; subsequently Professor of Chemistry in Berlin University. Hofmann commenced the researches into coal-tar chemistry and established the chemical characteristics of aniline, and was thus one of the principal founders of modern organic chemistry.

(*showing how coniine, piperine, atropine, nicotine, caffeine, theobromine, and others, have been synthesised; and that quinine, strychnine, morphine, and codeine await conquest*).

Liebig, Gerhardt, and other chemists had been progressing towards this attainment by studying the structural constitution of various alkaloids. In 1842 Gerhardt separated a base which he called quinoline from quinine, cinchonine, and strychnine. This base was subsequently identified by Hofmann with the leucol which Runge had obtained from coal-tar in 1834. In 1846 Runge also produced a substance which he called pyridine from bone oil. Hofmann showed that this was the base of certain other alkaloids, coniine, piperine, nicotine, and atropine among these. Now it will be necessary to illustrate progress by means of a few formulæ diagrams.

Benzene is C_6H_6; aniline is a derivative of benzene in which one atom of hydrogen has been replaced by the amino-group, NH_2. Its formula is $C_6H_5NH_2$, and it is represented thus:

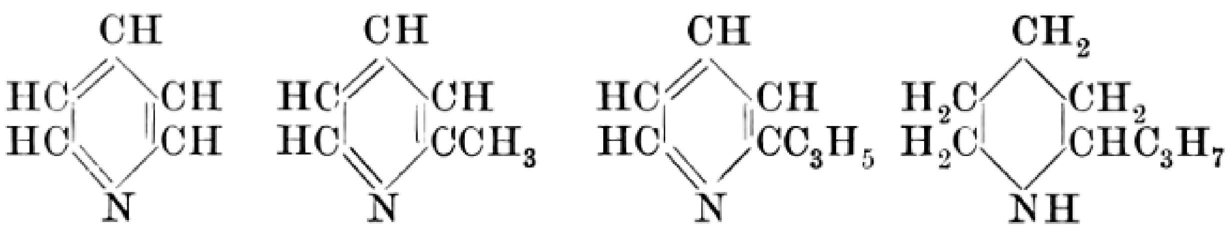


Aniline is basic; that is, it combines with acids to form salts. Together with aniline in coal-tar there occur other basic nitrogenous substances; of these pyridine and quinoline have already been mentioned, and to them must be added isoquinoline, which is also the parent substance of a series of alkaloids.

In pyridine one of the CH groups of the benzene ring is replaced by a nitrogen atom, the formula of the substance being C_5H_5N. In 1886

Ladenburg succeeded in synthesising the alkaloid coniine, starting with pyridine. This was the first occasion on which the artificial preparation of an alkaloid was achieved. The steps of the process were as follows;—

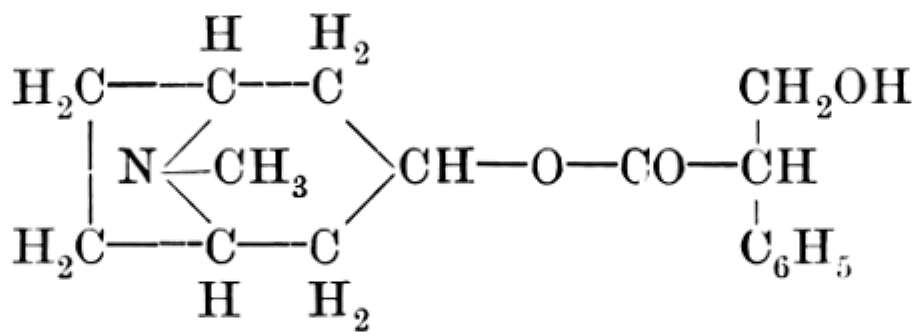
By the action of methyl iodide (CH_3I), pyridinium methyl iodide is formed, which is transformed on heating into α-methyl-pyridine hydriodide. The free base, when treated with acetaldehyde (p. 271), yielded a compound known as α-allyl-pyridine, which, in turn, was made to combine with nascent hydrogen. The resulting compound (isoconiine) becomes coniine on heating to 300° C. or boiling with solid potash. The chemical history is shown graphically below:—



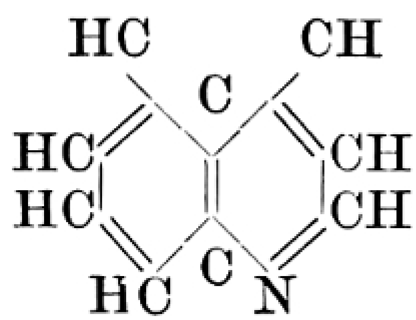
Pyridine. α-Methyl-pyridine. α-Allyl-pyridine. Coniine.

Pyridine, it may be mentioned, can be built up from its elements.

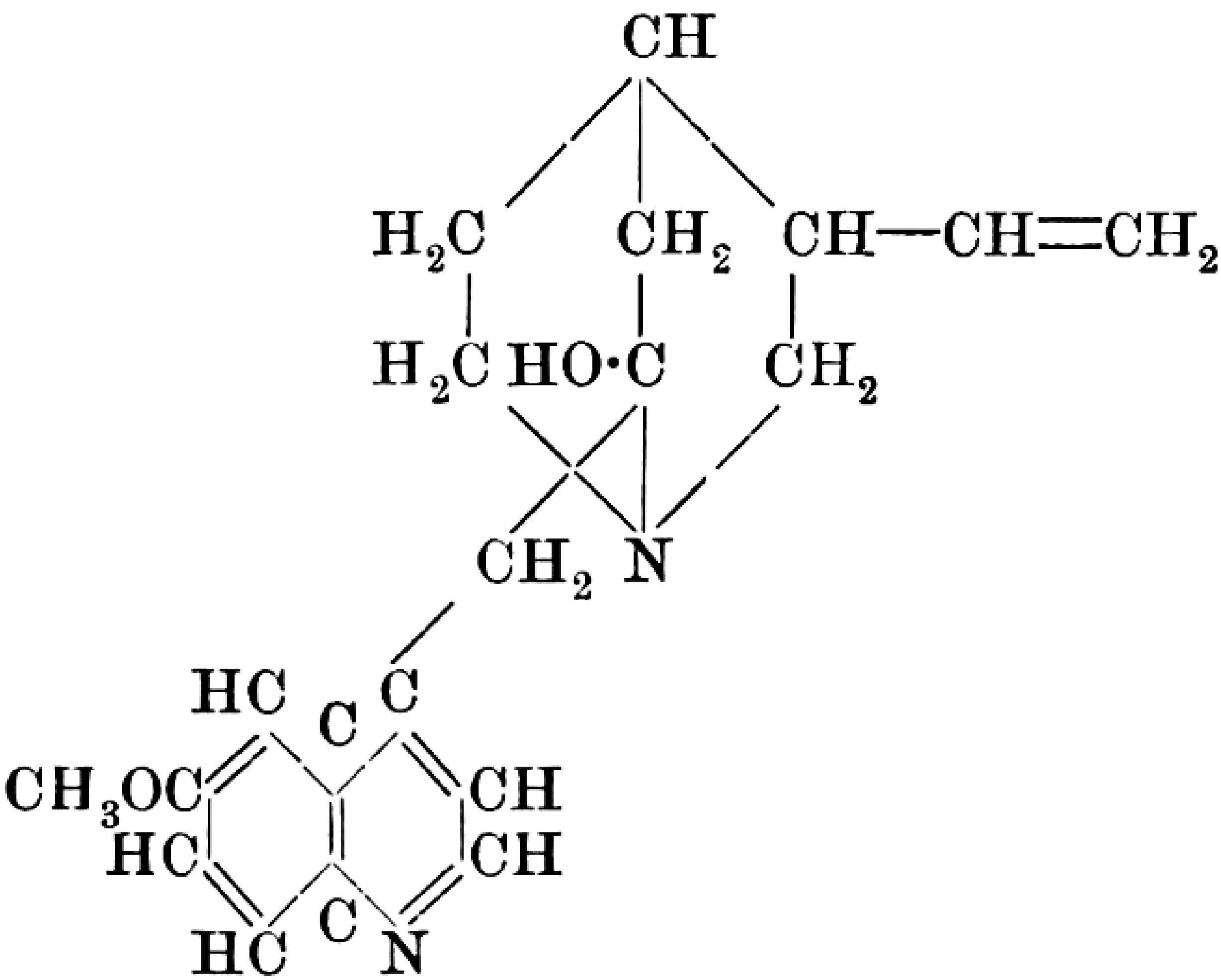
This coniine triumph of synthetic chemistry has been followed by many others of a similar character, and now all the alkaloids mentioned above in connection with pyridine have been produced artificially. Piperine was synthesised by Ladenburg and Scholtz in 1894; atropine together with other solanaceous alkaloids, and cocaine[4] by Willstätter in 1901–2; and nicotine by Pictet in 1903. The structure of these alkaloids is considerably more complicated than that of coniine; atropine, for example, is represented by the formula



The molecule of quinoline contains a benzene and a pyridine nucleus condensed thus:—

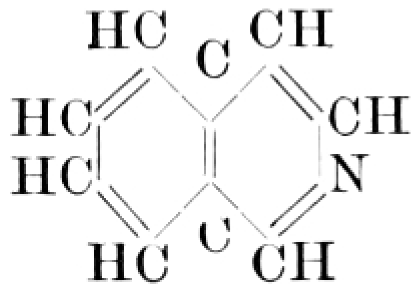


Among the alkaloids of the quinoline group may be mentioned those of cinchona bark and nux vomica. The constitution of these alkaloids is very complex, and in most cases but little understood. As an example of the cinchona group quinine may be taken. Its structure is probably



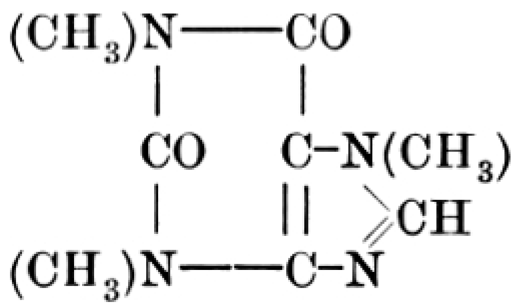
the formula being $C_{20}H_{24}N_2O_2$. Quinine has not been completely synthesised, but it has been prepared from cupreine, another cinchona alkaloid. The strychnos alkaloids likewise have not yet been artificially prepared, and their structure still requires elucidation.

The derivatives of isoquinoline, which was discovered by Hoogewerff and van Dorp in 1885, include some of the opium alkaloids, papaverine and narcotine, for example. Morphine and codeine do not, strictly speaking, fall into either of the three groups mentioned; our knowledge of the chemical nature of these substances has been much advanced recently, and it is probable that their synthesis will be effected before long.

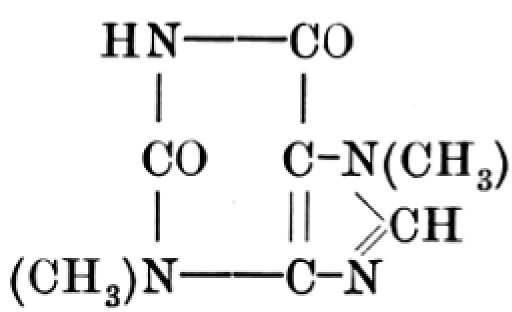


Isoquinoline.

One of the most beautiful pieces of work on the synthesis of vital products during recent years was the artificial preparation by Fischer (1895–98) of the bases caffeine and theobromine. The processes employed are too long and complicated to be described here, but the formulas may be given, since they demonstrate the close relationship which exists between the two substances.



Caffeine.



Theobromine.

Other Synthetic Products.

(*Benzoic acid, camphor, adrenaline, salicylic acid.*)

Certain chemical bodies which have been used in medicine for centuries have been analysed, their structural formulas ascertained, and then the atoms have been put together in the laboratory so perfectly that in many cases the artificial products cannot be distinguished from the natural original ones. Benzoic acid, obtained by subliming gum benzoin, has been in use since the latter part of the sixteenth century, when under the name of fleurs de benzoin, soon anglicised into flowers of benjamin, they were introduced by a French physician, named Blaise de Vigenère, who was secretary to Henri III. [The name benjamin was not a bad corruption after all, as the Arabic term from which the European designations were derived was Luban Jawa, the incense of Java. The Spaniards first dropped the first syllable under the mistaken impression that it was the Arabic article. Old etymologies traced the name to a supposed Ben-jui, or tree of the Jews.] The artificial benzoic acid is obtained by the oxidation of toluene, a hydrocarbon distilled from coal-tar.

Comparatively recent achievements of synthetic chemistry are the artificial production of camphor and of adrenaline, the active principle of the suprarenal gland. The synthetic products can be distinguished from the originals by their behaviour towards polarised light.

Salicylic acid, prepared by acting on carbolic acid by carbon dioxide in the presence of an alkali, became a practical commercial product in 1874, but its discoverer, Kolbe of Leipzig, had prepared it in his laboratory since 1859. The natural product, prepared from willow bark or oil of wintergreen, was worth twelve guineas a pound; the artificial salicylic acid in a few years came to be sold at not so many shillings per pound. Kolbe's theory was that the compound he devised would decompose within the organism into phenol and carbon dioxide, and thus exercise an anti-putrefactive effect.

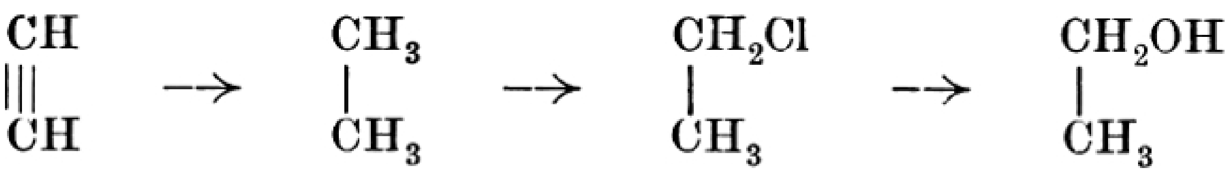
Physiological Speculations.

In many other cases the physiological effect of the compound was distinctly foreseen, and latterly the relation between chemical constitution and physiological action has become the objective of much research. It may be reasonably anticipated that before many years have passed it will be possible to predict the physiological powers of a substance from a knowledge of its structural formula, just as already many of its more noteworthy physical properties may be so foretold. Even at present certain trustworthy rules, affording guidance in this respect, have been formulated. Dujardin-Beaumetz and Bardel, dealing with compounds of the aromatic series, have laid down that (*a*) those containing hydroxyl (OH) are antiseptic; (*b*) those containing an amino-group (NH_2) or an acid amide are hypnotic; and (*c*) those containing both an amino-group and an alkyl group (CH_3, C_2H_5, etc.) are analgesic.

In order to show how synthetic remedies have been built up from simple products it will be convenient to take a few typical examples in the order of increasing chemical complexity, rather than with strict regard to chronological progression.

ALCOHOL, ETHER, ALDEHYDE, ACETIC ACID.

Ethyl (that is, ordinary) alcohol forms a convenient starting point. It has been already stated that the molecule of this substance is represented by the formula C_2H_5OH but for centuries before its constitution was unravelled it had been prepared in a more or less pure condition, as it still is, by a process of fermentation followed by distillation. Alcohol can be built up from its elements thus:—When an electric arc burns between carbon rods in an atmosphere of hydrogen, acetylene is formed; acetylene can be made to combine with hydrogen, forming ethane; ethane reacts with chlorine, yielding ethyl chloride; and this acted upon by an aqueous solution of potash gives alcohol as a result. The steps of the process are shown below:—



Acetylene. Ethane. Ethyl chloride. Ethyl alcohol.

Alcohol is the basis of a number of substances used in medicine. On treating it with a dehydrating agent such as strong sulphuric acid, the elements of water are removed, and two molecules of alcohol unite into one, the resulting product being ether (diethyl oxide). The reaction is rather more complicated than is explained here, but the net result is as stated. The process was described by the German physician, Valerius Cordus, and was incorporated in the "Dispensatory" published after his death by the Senate of Nuremberg, under the title of "Oleum vitriole dulce verum." As explained in the article on Ether (Vol. I. p. 347), the chemical reaction was, until recent times, a favourite topic for investigation.

When alcohol (C_2H_5OH) is oxidised, a substance known as aldehyde (CH_3CHO) is formed. This was first prepared and described by Fourcroy and Döbereiner, but its constitution was explained by Kolbe. On further oxidation acetic acid (CH_3COOH) is formed. The relationship between the alcohol, aldehyde and acetic acid was traced by Liebig.

Chloral Hydrate and Chloroform.

The oxidation of alcohol may be effected by the agency of chlorine, and in that case an intermediate oily product is obtained, in which three of the hydrogen atoms of the aldehyde are replaced by three of chlorine. The compound resulting is chloral (CCl_3CHO), and this readily combines with water and forms the familiar chloral hydrate crystals which were first prepared by Liebig in 1832, but only got into the "British Pharmacopœia" (Additions) in 1874. Chloral hydrate treated with caustic potash splits into chloroform and potassium formate. Chloroform was discovered in 1831 by Liebig and Soubeiran, and was admitted into the "London Pharmacopœia" of 1851, four years after Simpson had demonstrated its wonderful anæsthetic property.

Sulphonal.

Returning to acetic acid, it may be stated that by heating its calcium salt two substances, acetone, $(CH_3)_2CO$, and calcium carbonate are formed. Also that when alcohol is acted upon by phosphorus pentasulphide, mercaptan, C_2H_5SH, is obtained. By the reaction of acetone and mercaptan, mercaptol results, and this, when oxidised, becomes the well-known synthetic hypnotic, sulphonal. It is not necessary to give the full formulas of these reactions, as they may be found in the usual chemical manuals; but it may be stated that the full descriptive name of sulphonal is dimethyl-diethylsulphone-methane. The group of sulphones furnishes an illustration of the reasoning on which new synthetic compounds come to be constructed. The theory was that the physiological action of sulphonal was due to, or connected with, its ethyl group. It was supposed, therefore, that by increasing the number of such groups in a molecule the hypnotic effect would be proportionately developed. It was believed that experiments on dogs supported this deduction; but it was not maintained in clinical experience.

Acetanilide and Phenacetin.

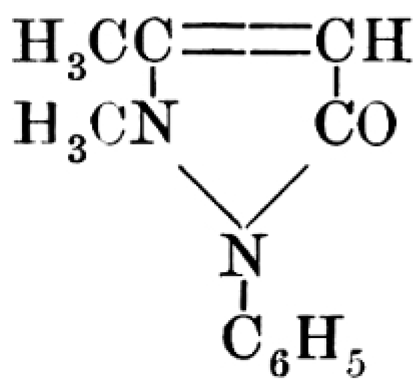
Many of the popular synthetic remedies belong to the benzene series. Benzene is obtained from coal-tar, but, as shown by Berthelot, it is possible to prepare it by heating the gaseous hydrocarbon, acetylene, C_2H_2, in a closed vessel. By this means three molecules of acetylene are condensed into one, C_6H_6, which is benzene. Benzene acted upon by nitric acid yields nitrobenzene, and this by the action of nascent hydrogen is changed into aniline. Aniline may be regarded as ammonia, NH_3, in which one hydrogen atom has been replaced by the phenyl group, C_6H_5, and, like ammonia, it combines with acids to form salts. Aniline acetate being formed, the elements of water being eliminated in the process, the product is acetanilide, or antifebrin. Acetanilide was first prepared by Gerhardt, in 1853, but its physiological action was only discovered by Cahn and Hepp in the ’eighties. By the substitution of an ethoxy-group for one of the hydrogen atoms of acetanilide, para-ethoxy-acetanilide, commonly called “phenacetin,” is produced.

Salol.

Phenol is another of the multitudes of substances obtainable from coal-tar; it can be prepared from aniline by the action of nitrous acid, and can be shown to be benzene with one hydrogen atom replaced by hydroxyl. If one of the adjacent hydrogen atoms of phenol is replaced by carboxyl, salicylic acid is produced; and in the presence of a suitable dehydrating agent salicylic acid reacts with phenol and phenyl salicylate, known as salol, is formed.

Antipyrin.

Many of the synthetic chemicals are much more complex than those so far described. They are built up on similar lines, but the processes involve a greater number of stages. Antipyrin (phenazone, or phenyl-dimethylisopyrazolone) may be added to the examples selected for this notice. Antipyrin is represented by the annexed formula, which is said to be heterocyclic, because its molecules, like those of pyridine, consist of rings not made up exclusively of carbon atoms.



It must be understood that in this sketch only a very few notable instances of modern chemical research have been given, these being some of the more familiar products which have been introduced into medicine. Favourite colours, odours, and flavours have likewise been synthesised, and the manufacture of some of these artificial products has developed into vast businesses. The object of this chapter has been to make it clear that the marvellous activity which has been displayed in these directions during the past half-century, has been guided by the most profound and skilful research, one step leading to another, and that the new products have not been hit upon by mere chance.

XXIV

NAMES AND SYMBOLS

> "Every trade and handicraft, every art, every science, is constantly changing its materials, its processes, and its products; and its technical dialect is modified accordingly, while so much of the results of this change as affects or interests the general public finds its way into the familiar speech of everybody."
> (W. Dwight Whitney:—"Language and its Study." 1876.)

The technological vocabulary of pharmacy is very voluminous, and has been recruited from all languages. Many of the names of vegetable drugs literally household words in English, have been transferred direct from savage tongues. Guaiacum, ipecacuanha, and jalap may be cited as examples. Other names of drugs cover histories which well repay investigation.

Take, for example, the word hyoscyamus and its English equivalent henbane (which I select because it does not happen to be alluded to elsewhere in this work). The obvious and usual explanation of these names is that hyoscyamus is the Greek genitive hyos, of a hog, and kyamos, a bean, and in fact the name of hog's bean is applied to it in several languages. Henbane, too, is supposed to be self-explanatory. But there is good reason to believe that neither of these interpretations is correct. Dioscorides, who calls the plant hyoscyamos, also mentions that its almost obsolete name was dioskyamos; and henbane is well known to be a corruption of henne-bell. The obsolete name is obviously more likely to convey the original meaning than its corruption, and therefore hyoscyamos is more likely to have meant the bean of the gods than the bean of the pigs. Possibly its name was traceable to the idea that the delirium which the drug produced was the condition induced in human beings when the gods communicated with them, or that some priests used it to produce that condition in which messages presumably from the higher powers could be transmitted. Henbane, again, is not satisfactorily accounted for by its surface meaning. There is no evidence that hens ever eat the herb or the seeds. But the Saxon name henne-bell suggests some sort of a musical instrument, and it is a curious fact that in mediæval Latin henbane was sometimes known as Symphoniaca Herba; the Symphoniaca being a rod with a number of little bells on it. This description might be appropriately applied to the plant, and we have only to suppose a Saxon term “hengebelle” to clear up the mystery.

I am indebted for the foregoing notes to three very suggestive articles in *The Chemist and Druggist* of October and November, 1877, and February, 1878, by Mr. W. G. Piper.

Next we come to the fanciful and poetic names of metals and their salts, and of all sorts of chemical compounds, invented by the alchemists. They gave the names of aquila alba, mercurius dulcis, panchymagogum minerale, manna metallorum, draco mitigatus, and others to calomel; regulus, or the little king, to antimony (gold being king); lunar caustic, ethiops martial, and salts of Saturn; vitriol, tartar, pompholix, and scores of others, not selected without judgment, but intended rather to mystify the public than to instruct them.

Chemical nomenclature of the present day has gone to the opposite extreme. The ingenious laboratory devisers of synthetic products have developed a nomenclature which it is impossible to use. It explains itself to the initiated, but even for intercommunication between chemists, pharmacists, and physicians words like tetrahydroparamethyloxyquinoline or calcium betanaphthol-alphamonosulphonate insist on being simplified if the substances they describe come into medicinal use; and to do them justice it must be admitted that the inventors of the products are always ready to meet this requirement with a more or less expressive title which can be protected as a trade mark. This forces other manufacturers to devise other distinct names for the same article, so that among the new chemicals which have become popular within the past thirty years there are sometimes a dozen designations for the same substance.

A Pharmaceutical Vocabulary.

The subjoined list of technical terms is limited to the names of pharmaceutical processes, products, and apparatus; and only (as a rule, with some exceptions) of such as are not dealt with in other sections. Many of the terms are obsolete, but are to be met with in old treatises. Occasionally rather more than a bare definition has been thought desirable.

Acetabulum. Originally a vessel used by the Romans for holding vinegar at the table. Then a liquid measure about 2½ oz.

Acetum Philosophicum. Vinegar made from honey.

Acopon. A stimulating or anodyne liniment, almost of the consistence of an ointment. If acopa contained aromatics they were called myracopa.

Adept. An alchemist who “had attained.”

Adust. A dried up condition of the humours.

Aggregatives. Pills devised by Mesué which were intended to purge all the humours.

Alabaster. A special kind of carbonate or sulphate of lime used by the ancients for ointment containers which were sometimes called alabastra. The name is supposed to have been derived from a town in Egypt.

Album Rhasis. White lead ointment, which Rhazes was believed to have introduced.

Alembic. The Arabic name for a still. It was adapted by the Arabs from the Greek ambix, a vase, to which was prefixed the particle al. The word became corrupted in English to Limbeck.

Alembroth. Sal Alembroth was the double chloride of mercury and ammonium. Also called the salt of wisdom. The word has not been traced, but has been supposed to be a Chaldaic term meaning the key of art.

Alexipharmic (in Greek alexipharmakon). A remedy against poison.

Alexiteria. Remedies against the bites of venomous animals.

Alhandal. The Arabic name for colocynth which was applied to certain lozenges or tablets of that drug.

Alkahest. The universal solvent, or menstruum. The word has an Arabic appearance, but cannot be traced to that language. It is believed to have been one of Paracelsus’s many etymological inventions. The derivation has been guessed to have been from the German al-geist, all spirit, Paracelsus said it was a liquid to cure all kinds of engorgements. Van Helmont’s

Alkahest was capable of restoring to their first life all the bodies of nature. Glauber's Alkahest was nitrate potash which had been detonated on live coals. It was carbonate of potash.

Alkali, in Arabic al-qaly. Qaly meant to fry, and the technical term was applied to the ashes of plants after frying or roasting.

Alkekengi. The Winter Cherry, formerly in much esteem as a remedy in kidney and urinary complaints.

Alkool. This name was given to powders of the finest tenuity. It was also applied to spirit of wine rectified to the utmost extent. Boerhaave employed the term to indicate the purest inflammable principle.

Aloedarium. A purgative medicine with aloes as the principal ingredient.

Aludels. Pear-shaped pots constructed so that they could be fitted one into another, a series of them being used for sublimations. The name is supposed to have had an Arabic origin, or it may have meant "not luted."

Amalgam. A compound of mercury and some other metal. Believed to have been a perversion of malagma, a soft ointment, with the Arabic article prefixed.

Amphora. An earthenware vessel with two handles wherewith to carry it. Used by the Greeks and Romans for wine and oil. The Greek vessel contained about 9 gallons; the Roman amphora was equivalent to nearly 7 gallons.

Analeptica. Restorative remedies.

Anoyntment. An old term for ointment.

Antidotary. A frequent title of books of formulas for medicines.

Antidote. Something "given against." Originally, perhaps, an adjective, and in old medicine employed for various remedies; now limited to substances which will counteract the effect of poisons.

Apozems. Strong decoctions or infusions. A Greek word meaning "boiled off."

Aqua Mirabilis. Once a popular household remedy. Water distilled from cloves, cardamoms, cubebs, mace, ginger, and other spices.

Aquila Alba. An old name for calomel.

Arcana meant secrets. The original idea of the word was things shut up and protected as the occupants of Noah's Ark were shut up. The alchemists used the word arcanum freely, but it came to be applied to medicines of known composition but of mysterious action. Arcanum tartari was acetate of potash. Arcanum duplicatum was another name for the Sal de Duobus or sulphate of potash which was supposed to combine the virtues of nitre and vitriol.

Athanor was a self-supplying furnace, the coals or fuel being provided in a reservoir above the fire and intended to be supplied to the furnace automatically.

Balm and Balsam, which are words with the same origin, have always been suggestive of medicinal and healing virtues. Probably balsam has descended through the Greek and Latin from Semitic terms meaning spices. The Hebrew Besem or Bosem, often translated "spices," in one place "cinnamon," in another "calamus," always meant some grateful aromatic. But the opobalsamum or juice of the Balsam tree, the famous Balm of Gilead, was Tsori in Hebrew. Old etymologists, supported by Littré and other moderns, consider that Baal-schaman, prince of oils, was the original word from which balsam was derived. The Arabic Abu-scham, father of perfumed oils, was a name for the balsam tree. Paracelsus taught that the human body contained a natural balsam which tended by itself to heal wounds.

Basilicon ointment is first met with in Celsus. It means royal ointment but no explanation of the origin of the term is given. He compounded it of panax, (perhaps opopanax), galbanum, pitch, resin, and oil. Mesué made a basilicon minus, composed of wax, resin, pitch, and oil. This he also called unguentum tetrapharmacum, because it was made from four drugs. Both of these were black ointments. Later the pitch was omitted and the ointment was then named yellow basilicon. A green basilicon ointment was also formulated in the early London Pharmacopœias, containing verdigris, and used as a detergent. It is sometimes stated that the ointment acquired its name because it contained the plant basil (*Ocimum basilicum*) among its ingredients; but I find no authority for this statement.

Baths. The most usual form of digesting substances in a gentle heat was in a Balneum Mariæ, Bain-Marie, or as old English writers translated it a St. Mary's bath. It was supposed to have been derived from balneum maris, as if sea water was used; but there is no justification for this guess. Littré thinks it was called the bath of Mary because of its gentleness. Sand-baths, cinder-baths, horse-dung baths, and iron-filings baths were also ordered.

Bezoards. Mineral bezoard was diaphoretic antimony. Silician earth was also called mineral bezoar.

Blisters. Freind says these were introduced into medicine in Venice and Padua during the plague of 1576. Jerome Mercuriali wrote about them. They superseded dropaxes and metasyncretics.

Bolus was a medicine of the consistence of an electuary or rather stiffer, taken in pieces about the size of a bean. The Greek word meant a lump of earth, and it was used medically by the Romans. It was the same as katapotia.

Calx was the name applied to lime which had been burnt, and from this it came to be applied to the white powdery product yielded by burning metals. Thus came the calx Lunæ, the calx Saturni, the calx Jovis, the calx Mercurii, and others. The ancient theory was that in burning the metal the sulphur principle was driven out, and this was the parent of Stahl's phlogiston theory.

Caput mortuum and terres damnées were names applied to residues in retorts after operations.

Carminative. A medicine which expels winds. One theory traces it to carmen, a charm, but most authorities consider that it was an application to medicine of the term carminare, to card wool, and suggested that the remedy acted by combing through the humours.

Cataplasm. From Greek kata-plassein, to apply over. Used originally for both poultices and plasters. Cataplasmata were perfumed powders sprinkled over the clothes, or sometimes depilatories.

Catholica. Electuaries which purged all the humours.

Cerates were ointments made solid by wax, but not so hard as plasters.

Cerevisiæ (Beers). Medicinal preparations made by adding medicines to malt wort and letting them ferment together were popular in the early part of the 18th century. It was believed that the process of fermentation extracted the properties of drugs more effectively than mere digestion. Quincy (1739) names thirty cerevisiæ, aperient, antiscorbutic, diuretic, hysteric, stomachic, &c. Many of these were compounded with numerous drugs.

Ceruse. Old Latin name for white lead. Flowers of antimony were called ceruse of antimony. The name is supposed to have had some association with wax, but the connection is not clear.

Cochleare. The usual prescription term for a spoonful, was in Latin the twenty-fourth of a cyathus or wineglassful. It was an egg-spoon, but owed its name to a pointed tip used to extract winkles from their shells as we use pins, and, the cochlear being a small snail, the name was transferred to the instrument. From it has descended the French cuillier, a spoon.

Cohobation came to mean only the repetition of distillation, the distillate being poured on the material from which it had already been distilled, and again distilled. Paracelsus uses the term cohob to signify a repetition of the same medicine.

Colcothar. The name was applied to the prepared rust of iron now called rouge, but originally to the residue left in the retort after oil of vitriol had been distilled from sulphate of iron. Paracelsus used, and some say invented, the word; but Murray traces it through the Spanish to an Arabic origin, qolqotar, which Doxy believes to have been a corruption of the Greek Chalcanthos, a solution of blue vitriol (from chalkos, copper, and anthos, flower). Colcothar was the same as crocus Martis.

Collutories. Medicines of the consistence of honey for applying to the gums and mouth. Honey and borax is an example. A fluid mouth-wash was called a collution.

Collyrium. Collyria were “dry,” or powders such as alum, sulphate of zinc, or calomel, which were insufflated into the eye; soft, or pomades applied to the eyelids; and liquid, or eye lotions. The term kollyrion was used in Greek medicine with the same meaning; it was originally derived from kollyra, a roll of bread.

Conserves properly consisted of only one medicament and sugar.

Crocus (Saffron). The term was applied to certain metallic combinations of a saffron colour, such as crocus Martis (rust of iron), crocus Veneris (a copper oxide), and crocus Metallorum (liver of antimony). Damocrates left a formula for Crocomagma, tonic cakes or trochiscs, of which saffron was the principal ingredient.

Crucible. A vessel in which metals are melted. The word is generally attributed to a supposed association with crux, crucis, a cross; but this is not proved. It was originally the name of a night-lamp, and several authorities consider it owes its name to the crossing of the wicks.

Cucupha. A cap to be worn on the head in which certain aromatic drugs were fixed with the idea of curing headaches.

Cucurbit. A gourd-shaped vessel of glass or earthenware used as a retort.

Cyathus, translated wineglassful when the word appears in prescriptions, was the ladle with which the wine was scooped out from the cratera into the poculum. It was also a Roman measure, about the twelfth part of a pint.

Decocta have been attributed to Nero as the inventor. At least they appear to have originated in his household. They were simply boiled water refreshed by ice, and often flavoured by fruits. These were employed as beverages. “Et hæc est Neronis decocta” exclaimed the fallen tyrant as he fled from Rome and allayed his thirst by scooping some dirty water from a pond.

Deliquium. Deliquescence; as when salt of tartar was resolved into “oil of tartar” by mere exposure to the air. This was called “deliquium per se.”

Despumation. The removal of the froth from boiling honey or syrup.

Dia in the “Vision of William concerning Piers the Plowman” written by Langland in 1377 occur the lines:

> Lyf leuede that lechecraft lette shulde elde
> And dryuen away deth with dyas and dragges.

Translated into modern English these lines would read “Life believed that leechcraft should let (hinder) age, and drive away death with dyas and dragges.” The dyas and dragges were evidently the means which leechcraft employed. At that time and for long afterwards a large number of compounded medicines bore titles with the prefix dia-. Diachylon, diagrydium, diabolanum diakodion, diasulphuris are examples of scores. Dia was the Greek preposition, meaning through or from, which appears in a multitude of English words. In medicine it always implies a compound, and in old English it is occasionally found alone as in the instance quoted from “Piers Plowman.” Another given in the Historical English Dictionary is from Lydgate (1430) “Drug nor dya was none in Bury towne.”[5] In combination a few survivals remain in the language as Diachylon, Diapente, and Diacodion, but in the old medical formularies its use is very frequent. Generally it meant an electuary or confection. Thus for example the P.L. of 1746 changed the old Diascordium into Electuarium e Scordio. Apparently the dia- was then going out of fashion.

Diagredium or Diagrydium. This term was often applied to scammony but it was correctly reserved to a prepared scammony (see Dia); the object being to modify the purgative action. One method was to place some scammony in the hollow of a quince and keep it for some time in hot ashes. This gave Diagredium cydoniatum. Or sulphur was burned under a porous paper on which scammony was spread, and the preparation was known as Diagredium sulphuratum. It was also combined with liquorice and called Diagredium glycyrrhisatum.

Dropax was the name of a plaster employed as a depilatory. It was applied warm and pulled off, with the hairs, when cold. It was the Greek term for a pitch plaster.

Drug. The word “dragges” in the “Vision of Piers Plowman” (refer to “Dia”) has been generally supposed to have been an earlier form of drugs; but Skeat contended on philological grounds that the two terms could hardly be the same. Dragges occurs also in Chaucer in the description of the Doctour of Phisike:—

> Ful redy had he his apothecaries
> To send him dragges and his lettuaries.

and Skeat presumed that the dragges were a kind of medicinal sweetmeat corresponding with the French dragées. But Murray has shown that in most of the texts of Chaucer the word is droggis or drugges. So that it is probable that the poet was using the term which we now almost invariably confine to the raw materials of pharmacy. It might easily be shown that in the past it was more generally applied. The etymology of drug is doubtful. The majority of philologists trace it to Anglo-Saxon dryg, and Dutch droog, both meaning dry, the sense originating from dried herbs. There is, however, a Celtic word, drwg, in Irish, droch, which has the meaning of something bad. But Littré suggests that the primary signification of that word is that of an ingredient, and therefore might have been the derivation of our drug. Most likely it is the original of the word when employed as indicating something worthless, as "a drug in the market." It may well be therefore that the word used in different senses has distinct derivations. (Two interesting articles on this subject will be found in *The Chemist and Druggist* for February and March, 1882.)

Eclegma. Thick syrups given on a piece of liquorice root to suck with the object of relieving coughs. (See Electuary for Derivation.)

Ecussons. Compounds of theriaca with some added opium used as plasters.

Edulcorate. To deprive substances of their acrid taste. Generally by the addition of syrup.

Electuary. Old dictionaries give the origin of this word as from the Latin electus, on the theory that an electuary was a composition of selected drugs. It is, in fact, a Latin corruption of the Greek ekleikton, which meant something that could be licked. See Eclegma.

Elixir. An Arabic word, al-iksir, which Littré says signified the essence or the quintessence. Murray suggests that it may have had a Greek origin. Xerion, a late Greek medical term, meaning a desiccative powder for wounds, is the word which he supposes the Arabs may have adopted. It is probable that elixir was from the first used to denote a medicine; perhaps *the* medicine, the great panacea which Arab chemists sought for. For although alchemy, the name at least, may be traced to their laboratories, it is certain that their early efforts were rather in the direction of the discovery of remedies than in that of the production of gold. By the alchemists of Europe and England, however, elixir was understood in both senses. It meant both the philosopher's stone and the elixir of life. In "The Alchemist," Ben Jonson (1610) alludes to an old superstition thus:

> He that has once the "flower of the sun"
> The perfect ruby which we call elixir
> ... by its virtue
> Can confer honour, love, respect, long life,
> Give safety, valour, yea, and victory
> To whom he will. In eight and twenty days
> He'll make an old man of fourscore a child.

The word has been a useful one for empirics many times since.

Emplastra are noted by Celsus, many of his formulæ being made with a lead plaster basis as ours are to this day, litharge (spuma argenti) and olive oil being boiled together.

Emulsion, from emulsus the past participle of emulgere, to milk out, was originally applied to the milky liquid extracted from almonds. Subsequently extended to other milky fluids.

Enchrista. Liquids, Celsus says, "quæ illinuntur," but the word linimentum had not been formed in his time. He uses the word Linamentum for a sort of lint. Acopa were a kind of liniment.

Enema or clyster or glyster are all used to signify either the injection or the instrument by which the injection is applied. Enema (properly pronounced with the accent on the first syllable) means something sent; clyster was the Greek word for the instrument.

Ens. A favourite term with old metaphysicians and alchemists with the same meaning as essence. Supposed to have been derived from Esse, to be.

Epithema. An alcoholic fomentation or liquid medicine applied to the heart and stomach as a stupe.

Epithemation was the name of an application described by Galen as of a consistence between that of a cerate and that of a plaster.

Errhines, called Nasalia in Latin, are substances snuffed up the nostrils to excite sneezing.

Gas was a word invented by Van Helmont. Several guesses have been hazarded as to the idea which suggested the term. The Dutch geest, spirit or ghost, seemed the most likely. The German gäschen, to ferment, has also been proposed. But in 1897 Dr. F. Hurder discovered a paragraph in Van Helmont's writings which stated definitely that he had derived the word from chaos.

Gilla Vitriola. The name first given to white vitriol. Gilla meant simply salt.

Gutteta. A term for epilepsy. Pulvis de Gutteta was a remedy against epilepsy.

Hepars were chemicals of a liver colour, as hepar antimonii, hepar sulphuris.

Infusions first appeared in the London Pharmacopœia of 1720. In the revised edition of that issue (1724), however, the three infusions of 1720 appear as Decocti, the title of Infusum being abandoned, but the directions for the three preparations referred to still give "infunde" and not "coque." In the edition of 1746 Infusa re-appear as such, and "Macera" appears in the directions for the first time. In the 1788 edition Inf. Amarum Simplex becomes Infusum Gentianæ Compositum, and aqua bulliens gives place to aqua fervens. In 1809 the number of Infusions is raised from four to eighteen.

Julep, a term made popular in medicine by the Arabs. It was used by them exclusively for clear, sweet, liquids. Nothing oily or with a sediment could be a julep. The name is said to be a Persian compound from gul, rose, and ap, water; applied to rose tinted waters. It has lingered in modern pharmacy as camphor or mint julep, but in neither of these cases is it correctly applied, as they are not sweetened. The old way of making camphor julep was to hold a piece of camphor by pincers, inflame it, and plunge it in water, repeating this operation frequently until the water acquired a strong flavour of camphor.

Katapotia. The most usual form of medicine among the Greek pharmacists was the confection or electuary, a composition of drugs made to a proper consistence generally with honey. Frequently these electuaries were called "antidotes," things given against this or that disease. There were antidotes against gout, against stone, against colics, against phthisis, etc. The taste of these antidotes was always unpleasant, so it became the custom to order them to be made up into little balls of such or such size. The Greeks called these little balls "katapotia," that is, things to be swallowed. "Take a katapotium the size of a bean" would be an ordinary Greek direction. Galen describes a composition of 1 part of colocynth, 2 parts of aloes, 2 of scammony, 1 of absinth juice, and a little mastic and bdellium, which was to be formed into katapotia, each of the size of a dried pea. Trallien refers to this same pill, but names the size as that of a kokkion, a seed. This was the origin of our pil. cochiæ or cocciæ as they came to be known. By this time the names globulus, glomeramus, and pilula had taken the place in Latin of katapotium. Actuarius says expressly that what the Greeks called katapotia the Romans knew as pilulæ. Trochisci were katapotia made very hard.

Lac Virginale. The name was applied to a dilute solution of acetate of lead (Goulard's water) and also to water made milky by the addition of a little tincture of benzoin. Both were used by young girls for their complexions.

Lapis Infernalis. Nitrate of silver.

Lapis Medicamentosus. An astringent stone of which oxide of iron was the principal ingredient.

Lapis Mirabilis. An application for wounds, of which green vitriol was the essential ingredient.

Looch—sometimes loch, lohoch, lohoth—was a thick liquid, between a syrup and an electuary, almond emulsion being frequently the basis, which formerly patients were ordered to suck on a stick of liquorice cut in the form of a pencil for throat and lung irritation. Sometimes stronger medicines, like kermes mineral and ipecacuanha, were administered in this way. The word was of Arabic origin, and was derived from the verb la'aka, to lick.

Maceration is the digestion of a solid body in a liquid for the purpose of dissolving its active principles.

Magdaleon. Originally a mass or paste such as crumb of bread (Greek, magdalia), or it may have been used for pill masses made up with crumb of bread. The term became limited to plasters in cylindrical form.

Magistery. A word much in favour with the alchemists and old pharmacists. It had not a very definite meaning, but was understood to be a substance so converted as to present the virtues of the material from which it had been made in their most effective form. Boyle mentions that Paracelsus uses the word to signify many different things, and Boyle himself has not a clear idea of what he understands by it, for, he says, “the best notion I know of it is that it is a preparation whereby there is not an analysis made of the body assigned, nor an extraction of this or that principle, but the whole or very near the whole body, by the help of some additament, greater or less, is turned into a body of another kind.” Boerhaave, however, takes the pretensions of the makers of magisteries to be that they change a body into another form, as, for instance, solid gold into liquid, without any addition. According to Littré, precipitates generally were considered to possess the properties of the bodies from which they were obtained, and thus became magisteries. The magistery of bismuth is the one which has survived the longest with us. Resin of jalap was also regarded as a magistery.

Magma was the residuum left in the press after pressing out the menstruum. It was also used to describe other substances of a soft consistence.

Magnes Arsenicalis was a compound of sulphur, arsenic, and antimony, which, either in the form of powder or made into a plaster, was applied to syphilitic sores to draw out the virus. Angelo Sala was the inventor of the plaster.

Malagmata were substances applied to the skin to soften it, such as poultices.

Malaxation was the process of making a pill mass or a plaster soft enough to be worked.

Manica Hypocratis (Sleeve of Hippocrates) was a long linen bag used to filter pharmaceutical preparations.

Manipulus, a handful, often prescribed as an approximate measure of the quantity of herbs or flowers to be used in a pharmaceutical process.

Manus Christi was the name of a tablet made of sugar and flavoured with rose into which some prepared pearl entered.

Manus Dei was the name of an old plaster containing myrrh, frankincense, ammoniac, and galbanum.

Marmalades were conserves of various fruits, the pulp of which was preserved in sugar. Said to have been originally the pulp of the quince (in Portuguese marmelo). Some old medical books say the pharmaceutical preparations known by this name, which often contained manna, were derived from the French marc mêlé.

Masticatories. Substances chewed with the object of exciting the saliva. Sage, betony, pyrethrum, and tobacco have been employed for this purpose.

Matrass. A round or oval glass vessel used in chemical operations to digest or evaporate liquids. It was provided with a long straight neck, and is supposed to owe its name to this, matras or matrat being an old word for an arrow or javelin.

Mellites were syrups made with honey instead of sugar.

Mensis Philosophicus, a philosophic month, or forty days.

Menstruum. The alchemists used this term much as the word solvent is now used, and some etymologists think it was adopted to indicate that a month was necessary for a solvent to exercise its full power. Dr. Johnson says the idea originated “in some notion of the old chemists about the influence of the moon in the preparation of dissolvents.” Sir J. Murray says “Menstruum was a mediæval term used in alchemy to express belief that the base metal undergoing transmutation into gold corresponded with the seed within the womb which was being acted upon by the agency of the menstrual fluid.” It is possible, however, that the old belief in the extraordinary solvent power of the menstrual fluid may have better accounted for the adoption of the term in pharmacy. Dr. C. S. Carrington, of Brooklyn, has quoted from a French narrative of the conquest and conversion of the natives of the Canary Islands, published in one of the Hakluyt volumes, a passage written by two monks giving an account of the Flood. Describing the Ark, they say it was so perfectly joined by “Betun,” a glue so strong that the pieces united by it could not be separated by any art “sinon par sang naturel de fleurs de femmes.”

Moxa. In the middle of the seventeenth century Ten Rhyn and afterwards Kaempfer, both surgeons in the service of the Dutch East India Company, described a process of cauterisation largely adopted in China and Japan in the treatment of various maladies. They used the hairy leaves of the Chinese artemisia and made it up into a cylindrical shape which they placed on any part on which they wished to act, and then set fire to it, allowing it to smoulder slowly down to the skin. It was adopted by many European surgeons, especially by Van Swieten in gout, rheumatism, and paralysis, but carded cotton, lint, hemp, or other substances were employed in the same way. Sydenham mentions this as a cure for gout, and Larrey designed a little instrument to facilitate the application. Sometimes chemicals were combined, and the stem of the sunflower cut into inch lengths, the pith being burnt, was also used. The operation of course gave great pain, and after a time it was doubted if it did any good.

Nasalia. See Errhines.

Noctiluca. The name given by Boyle to the phosphorus which he made before the latter word became general.

Nutrition. A term used in old pharmacy to signify the act of combining substances in a mortar or by agitation until they acquired the proper consistence. Unguentum nutritum, for example, was an ointment made by stirring together in a mortar some lead plaster with oil and vinegar and generally some belladonna juice.

Nychthemeron meant maceration for a day and night, that is for 24 hours. It appears sometimes in directions for treating herbs and flowers previous to distillation.

Obolos, a Greek weight equal to half a scruple.

Œnclaion, a mixture of wine and oil.

Œnogala, a mixture of wine and milk.

Œnomeli, a mixture of wine and honey.

Œsypus, the name given by Dioscorides to wool fat.

Ointments among the Greeks and Romans were generally liquids. Anything used to anoint with, not being oil simply, was an ointment (miron in Greek, unguentum in Latin). From the Greek word was derived Myrepsus, which meant an ointment maker.

Opiates were originally electuaries containing opium or some other narcotic. Gradually, however, the word lost its significance and was used to indicate any medicinal substance of the same character. It is sometimes used for tooth pastes.

Oxycroceum was the name of a plaster among the ingredients of which were vinegar and saffron.

Panchrest. A remedy for all complaints.

Panchymagogon. A medicine to purify all the humours. Pulp of colocynth, black hellebore, diagrydium, of each 2½ ounces; senna, rhubarb, of each 4 ounces; species of diarrhodon abattis, hermodactils, turbith, agaric, aloes, of each 1 ounce. Make an extract with cinnamon water, adding the salt from the fæces. Dose, 20 to 30 grains. Calomel was called "mineral panchymagogon."

Pedilavium. A decoction of herbs intended to bathe the feet with to induce sleep.

Pelican. A glass vessel with a tubular neck and provided with two beaks, one opposite the other, which conducted the vapour back to the lower part of the vessel, so that cohobation or redistillation was continually being carried on.

Periapt. An amulet hung round the neck, or applied to some other part of the body, to preserve the wearer from contagion, or to drive away evil spirits.

Pessary, from Greek "pessos," a little round stone used in a game. Pessaries were in very common use by the Greek women for every kind of vaginal complaint. They were little balls of wool or lint which were medicated in various ways.

Pill. The word "pilula" is first found in Pliny, who says "Pharmaca illa in globulos conformata vulgo pilulæ nominamus." See "Katapotia."

Poison is the same word as "potion." Both originally meant a draught.

Polychrest. A medicine of many virtues,

Pomatum. Originally an ointment made from the pulp of apples, lard and rose water, and used as an application for beautifying the face.

Populeum. An ointment made from the buds of the black poplar. It was prescribed by Nicolas of Salermo as a narcotic and resolvent application.

Poultice, from the Latin “puls (pult-)” through the Italian “polta,” meaning pap, pottage, pulse. “Poltos” was the Greek term for pottage. The intrinsic purport of the word was something beaten. The Latin “pulsare,” to beat, represents the idea, and it is found in our word “pulse,” which indicates the heart-beats, and also in such words as impulse, compulsory, and the like. In old medical books, “poultice” is generally spelt “pultesse” or “pultass,” and this form was retained until the eighteenth century. In the first quarto of “Romeo and Juliet” (Act II., Sc. 5) the Nurse asks Juliet, “Is this the poultesse for my aking boanes?”

Propomata were drinks made of wine and honey in the proportion of four to one according to Galen.

Psilothrum. A depilatory.

Salamanders’ Blood. The red vapours of nitrous acid.

Salia. Salt was a term very vaguely applied in old chemistry. Anything soluble and possessing a marked taste was called a salt. Thus grew the practice of describing substances as salia acida, salia alkalina, and salia salsa. Sal fixum was a salt not affected by heat.

Scutum. See Ecusson.

Sinapisms were a form of poultices or cataplasms used by the Romans as counter irritants. They were generally made with crushed mustard, sometimes with cantharides and crumb of bread, and often with dried figs wetted and reduced to a pulp.

Smegma was an application to the skin composed of some active remedy such as verdigris, alum, sulphur, pepper, hellebore, or stavesacre.

Sparadrap. An adhesive plaster on linen or paper.

Suffumenta or Suffumigia. Gums, aromatics, or other substances burned and inhaled to fortify the brain.

Supplantalia. Remedies applied to the soles of the feet, believed to attract the vicious humours. Live pigeons cut in two, and other animals were sometimes thus applied.

Suppositories are at least as old as Hippocrates, who called them Prosdita or Balanoi. Suppository is from the Latin sub-ponere, and is stated by modern etymologists to mean to place under; but older writers say the meaning was to substitute. That is, the suppository was employed instead of an enema.

Syrup. An Arabic introduction. The Arabic word is Sharab or Shurab, and our words sherbet and shrub as well as syrup are derived from it.

Tisanes, formerly Ptisans, are mentioned as favourite forms of administering the simpler kinds of remedies by Celsus. The word was derived from "ptissein," to crush, and was applied first to barley water, made from crushed barley. In French pharmacy Tisanes, mostly infusions of herbs, are still very familiar. Celsus uses the term "sorbitio" for gruel. Apozems were stronger than Tisanes.

Troches, from the Greek trochiscos, a cone. Medicines in a hard form. Subsequently called in Latin, pastilli, and in English, lozenges. They were first made in the shape of cones. Trochisci plumbi were compounds of white lead, camphor, gum, etc., like oat grains, invented by Rhazes for application to the eyes. Named also trochisci Rhasis, and Arab soap.

Apothecaries' Weights and Measures Signs.

It is not possible to ascertain with certainty the origin of the familiar signs ℈, ʒ, ℥, used in formulas and prescriptions to represent the scruple, drachm, and ounce respectively. A few guesses may be quoted, but actual historic evidence is not available.

Dr. C. Rice, New York, an accomplished scholar and pharmaceutical authority, supposed that the scruple sign was a slightly modified form of the Greek gamma, γ, the first letter of "gramma," the nearest Greek equivalent weight, and the original of the modern gramme. The same author associated the ounce sign with the Greek x, ξ, which was certainly used in ancient times, often with a tiny ° against it, thus, ξ°, to represent the "oxybaphon," or vinegar vessel, which became a fluid measure equal to about 15 fluid drachms. There is some evidence that the same sign was used for the later Greek (or Sicilian) ungia, Latin uncia, the original of our ounce. The oxybaphon, it may be added, was translated into Latin "acetabulum," which was also a vinegar vessel and a measure.

It has been guessed that the scruple sign may have been a slurred Greek ς, written thus, (see Dr. Wall's "Prescription," published at St. Louis, 1888). Apuleius, who wrote in the second century, gives as a sign for an obolus which was equal to about 14 grains. That symbol could easily have drifted into our Э. Hermann Schelenz ("Geschichte der Pharmacie," 1904, page 153) makes up a table of medicinal weights and measures from Celsus, Pliny, and Galen, and quotes the following signs as being then used: , sextans or obolus; Э, gramma or scruple = about 20 grains; < , drachme or Holea = 3 scruples; γο, oungia or uncia = ounce; λι, libra = pound.

The drachm sign in Dr. Wall's opinion is a reminiscence of an Egyptian symbol for half, somewhat similar to our figure 3, . He supposes that the Greeks adopted this sign to represent the half of the Egyptian medicinal weight unit, which according to the best authorities was equivalent to a double drachm. In a treatise by Ebers on the Weights and Measures of the Ebers Papyrus, he estimates the weight unit at 6·064 grammes (say 103 grains). He explains, however, that the name of the weight is nowhere given in the Papyrus. I cannot say whether there is any evidence of the transfer of the Egyptian weights to Greek pharmacy, but the usual course of the travels of such characters was from the Egyptian hieratic or demotic writing to the Coptic, and thence to the Arabic. It appears certain, however, that the Arabic "dirhem" was adopted from the Greek "drachma."

The sign , which frequently occurs in the Ebers Papyrus, might quite easily and almost inevitably come to be written something like our ʒ; but Ebers values it at two-thirds of a litre, where it is named as a fluid measure. He deduces this from the hypothesis that the is the hieratic equivalent of the hieroglyphic , dnat, or tenat.

Scribonius Largus, in the first century, and Apuleius in the second, both give Z as the Greek sign for a drachm in medical formulas. The former says this was equivalent to the Roman denarius, or one eighty-fourth of a pound.

A writer in the *Lancet* of August 18, 1906, very confidently attributed these signs to the abbreviations made by the copyists of ancient manuscripts in the Middle Ages. One of the old abbreviation marks is still familiar in the z, which appears in "oz." and "viz." The z was formerly a ʒ, which was largely used to indicate that the word had been abbreviated; in the cases quoted from onza and videlicet. Palæontologists say that the ʒ was itself a modification of the mark ";" which was a common contraction at the end of words ending in bus or que. Thus, for instance, omnibus and quaque would be written omni; and qua;. It is alleged that in writing; without removing the pen from the paper, something like ʒ will result. This is interesting, but it does not explain how the abbreviation came to signify drachm.

The *Lancet* writer further stated that the ℥ was a slurred form of writing oz., and that the scruple sign was a ligature representing the letters sr.

It may be added that among the old manuscript signs Э is often used for ejus. I am not, however, prepared to suggest any connection between this word and a scruple.

℞

Paris, in "Pharmacologia," pages 13 and 14, makes the statement that "such was the supposed importance of planetary influence that it was usual to prefix a symbol of the planet under whose reign the ingredients were to be collected; and it is not perhaps generally known that the character which we at this day place at the head of our prescriptions, and which is understood and supposed to mean Recipe, is a relict of the astrological symbol of Jupiter."

I have not met with that statement in any earlier writer, but it has been quoted by scores of compilers since. It is very confidently asserted, but I think its accuracy is questionable. As an excuse for my temerity in challenging such an eminent authority it may be mentioned that on the same page the author informs us that the word "crucible" was derived from the circumstance that the alchemists were in the habit of stamping the figure of a cross on the vessel from which they were to obtain their long sought prize. No modern philologist would endorse that etymology.

Paris quotes, in support of the Jupiter theory, a few instances of directions for gathering specific plants "at the rising of the moon," "when the dog-star is in the ascendant,” and so on. But these have no reference to a compound of several ingredients. It would have been of no use to invoke Jupiter alone for any of the ancient prescriptions. Every plant, said Paracelsus, has its special star. It would have stirred up discord in Olympus if any had been neglected.

Pereira adopts Paris’s theory, but makes it almost impossible to accept it. In “Selecta et Prescriptis,” he says it was usual in old prescriptions to prefix to the formula a pious invocation such as “D. J.” (Deo Juvante), “J. J.” (Jesu Juvante), the figure of a cross, or some similar Christian sign. The suggestion is that we have progressed from Christian to heathen symbols. It would be particularly interesting to know when the physicians of Christendom substituted the appeal to Jupiter for that which their own religion had pressed upon them.

Greek and Roman physicians wrote prescriptions, no doubt; but I am not aware that any of these have been preserved to us. Our prescriptions are the direct descendants of the “bills” which the physicians of the sixteenth and seventeenth centuries scribbled in coffee houses when they met their apothecaries. “Physitians bylles not Patients but Apothecaries know” (Warner, 1612, quoted in “Murray’s Dictionary”). It is too much to ask us to imagine that these scribes were in the habit of sketching the symbol of Jupiter at the head of these documents.

Planets and Metals.

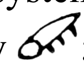
There are no historic records of the origin of the association of the seven metals with the seven planets nor of the connection of either with the deities of antiquity.

That Greece transmitted the mythological connection to Rome is clear enough, but it is not so certain whence Greece obtained the idea. Traces of it can be discovered in both Persia and Egypt, and it is not unreasonable to suppose that the circle of imagery may have developed from the worship of the sun. Allowing that heavenly body to have been the supreme divinity, or at least the residence of such a being, it would be natural to assign to the moon and the five principal planets apparently in attendance on the earth similar though lower dignities. The tendency to group gods and planets and metals into sevens would be an obvious link between the last two, and the characters of the deities named would naturally be extended to the materials named after them.

Berthelot considers that Babylon and Chaldea were the localities where imagination was first most abundantly applied to the elucidation of science. There and elsewhere in the East the mystic relations of the number seven came to be recognised. Perhaps it was the regular appearance of the seven planets, visible to the naked eye, from which those early notions were based. Then the moon’s phases consisted of four equal periods of seven days each. The seven stars in the Great Bear, the seven colours, the seven tones in music, the seven vowels in the Greek alphabet, the seven sages, and, naturally also, the seven known metals, were all evidences of this order of the universe. Out of this correspondence grew the Chaldean and Persian ideas of seven heavens, each with its gate of a different metal; the first of lead, the second of tin, the third of brass, the fourth of iron, the fifth of a copper alloy, the sixth of silver, and the seventh of gold.

The philosophers of Chaldea attributed to the heavenly bodies, or rather to the deities who had made these their homes, extensive control over the products of the earth. The sun-god produced gold, the moon-god silver, and so forth; and this view was prevalent certainly until the sixteenth century. Naturally all the early investigators had to picture their fancies more or less crudely, and thus alphabets originated. The Egyptian ideograms are the most familiar of this ancient poetry to us, and among these are some which are intelligible to us to-day. The sun and gold, ☉, are still represented by that sign; water, 〰, was so indicated in the papyri and in the alchemical books of three or four hundred years ago; and the sign still used for the planet and the metal mercury, ☿, differs but little from the hieroglyph of Thoth, whom the Greeks called Hermes and the Romans Mercury. Greek students have imagined that this sign was derived from the caduceus or winged staff of the god, but some Egyptologists have claimed it as a picture of the “sacred ibis.”

It need not be supposed that any definite table of the planetary symbols was ever drawn up and agreed to. These only very gradually became uniform. Even the association of the planets and the metals was by no means invariable in different nations. Among the Persians, for example, copper was assigned to Jupiter; but the Egyptians dedicated a compound of gold and silver called electron to him, while in more recent systems Jupiter and tin are allied. Venus controlled tin according to Persian lore; but the Egyptian attribution of brass or copper to her has prevailed. Iron belonged to Mercury before quicksilver was recognised as a metal and at that time Mars was the god-father of an alloy similar to bronze. The oldest table known is one given by Olympiodorus in the fifth century, and in that electron is still associated with Jupiter and tin with Hermes (Mercury).

Berthelot's laborious researches into the origin of alchemy, and his reproductions of ancient manuscripts show that while signs were used by the ancient Greek writers of about the first century of our era, they were not used by the Latin authors, but seem to have been in full adoption in the Middle Ages. The manuscript of St. Mark at Venice, which Berthelot believed was written about the year A.D. 1000, probably for some prince, contains a multitude of these symbols. A regular system is followed. Gold, for example, is represented by  ; gold filings by ; gold leaf, thus ; and a combination of gold and silver by . A similar modification of the original symbols is found in connection with the other metals.

There is scarcely any allusion to the symbols in the Arabic manuscripts, for that race had a holy horror of all forms of Greek paganism, though it may be noted that their physicians made a superstition of the practice of bleeding on Tuesdays and Wednesdays only, unconscious perhaps of the origin of this ritual, which depended on the fact that Mars, the god of blood and iron, superintended Tuesday's operations, and Mercury, who had the management of the humours, was in charge on Wednesdays. It was really not until the fifteenth, sixteenth, and seventeenth centuries, when the European alchemists were trying to find a way to transmute the baser metals into gold, that the code became "conventionalised."

As already stated, the signs for the seven metals have not been invariable, but for many centuries they have been distributed thus:—

☉ Sol, the Sun, Gold.

☽ Luna, the Moon, Silver.

♃ Jupiter, Tin.

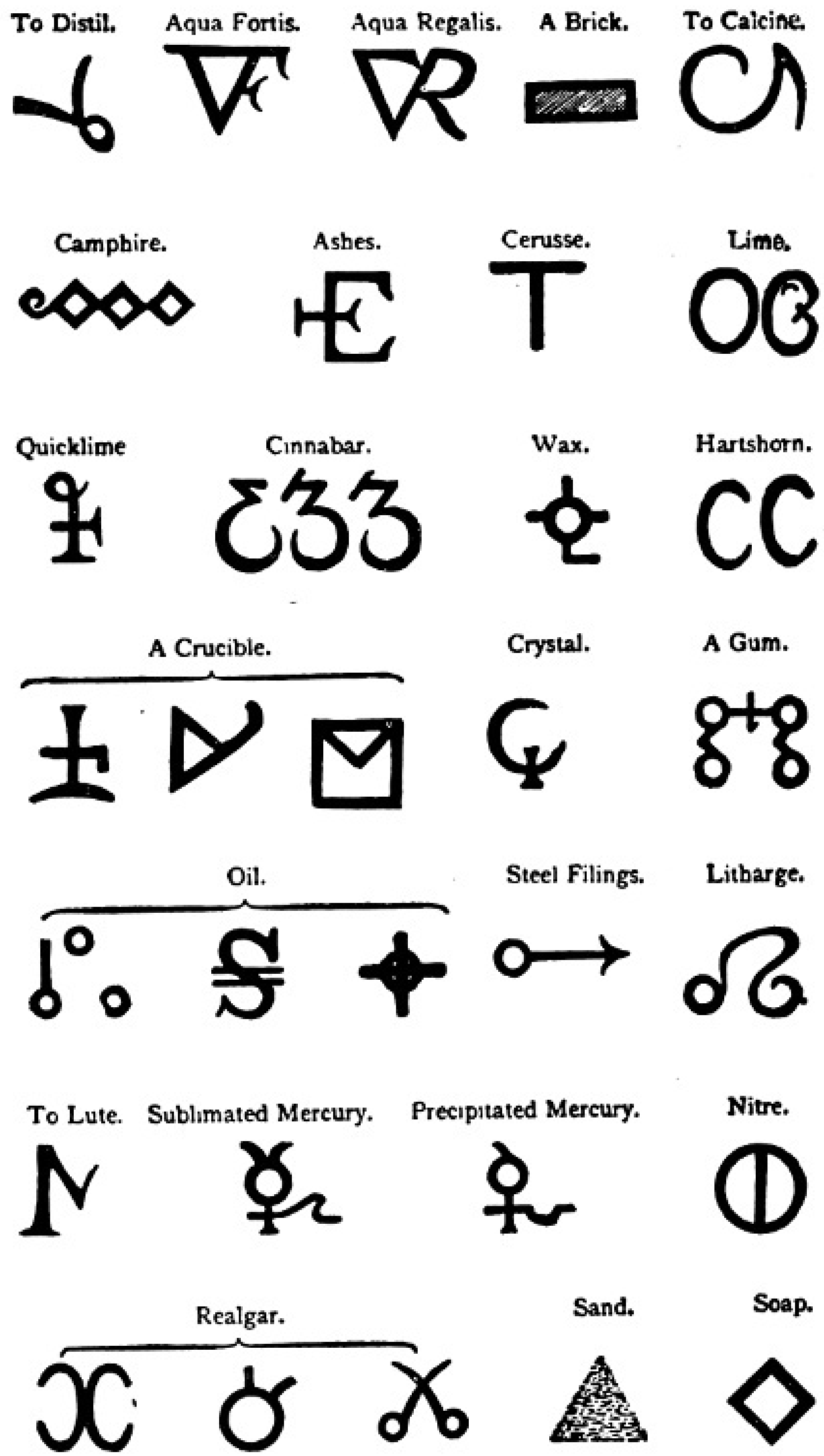
♀ Venus, Copper.

♂ Mars, Iron.

☿ Mercury, Quicksilver.

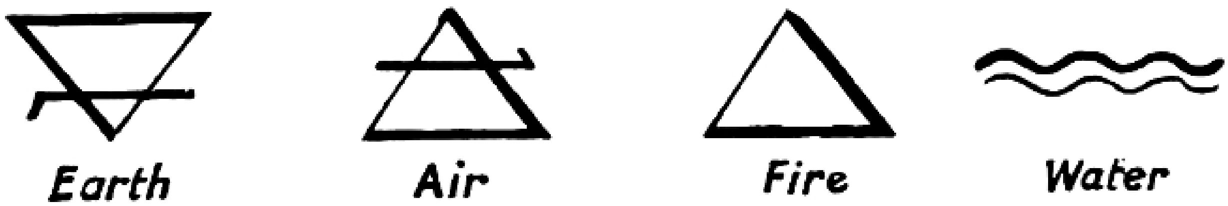
♄ Saturn, Lead.

It may be noted in passing how these old-time fictions have influenced our language, our literature, and especially our medicine. Lunatic, jovial, saturnine, martial, venereal, and mercurial, are etymological reminiscences of the time when temperaments and diseases were associated with the heavenly bodies, and the extent to which metallic compounds acquired their medical reputations from their artificial relationship with the powers which were assumed to have adopted them, is curious. Nitrate of silver was given in brain disorders originally because of the belief in the control of the mental faculties by the moon. The administration of iron for the purpose of invigorating the constitution was largely due to its connection with Mars, whose fame for virility assured the possession of similar virtue in his metallic god-son.

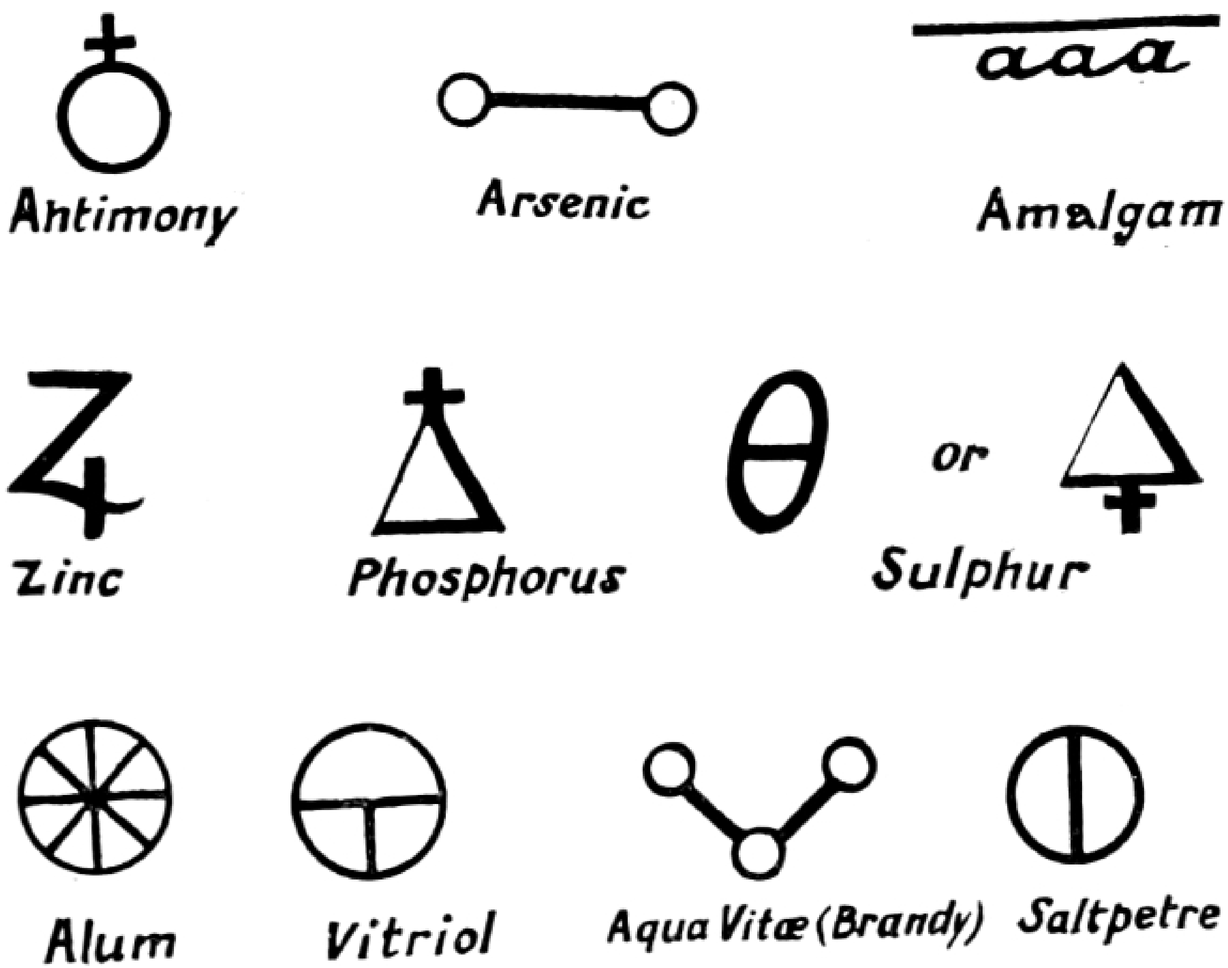


These symbols are a few of those used in alchemical treatises of the fifteenth century. They are collected in “The Follies of Science at the Court of Rudolph II.,” by H. C. Bolton, published by the Pharmaceutical Review Publishing Co. of Milwaukee, U.S.A. Reproduced by permission.

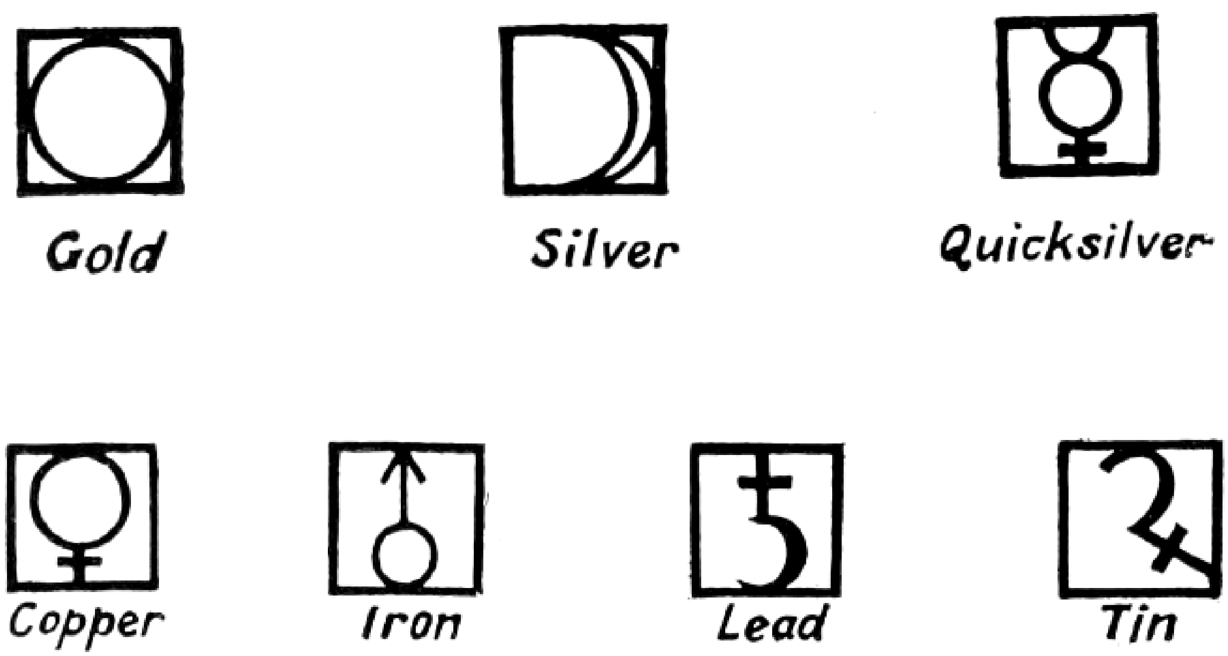
To the ancient planetary symbols the alchemists added a number of other signs to represent chemicals of later discovery, and to make their jargon even more incomprehensible than it would have been without them. Thus they indicated earth, air, fire, and water by the signs



These were a few of their other characters:



The introduction of any kind of mysticism was dear to the alchemical fraternity, some of whom, perhaps, really believed there was some hidden meaning in the symbols, for there were among the adepts clever men, true discoverers, who cannot be accused of fraudulent intentions, and yet can hardly have accepted literally the poetry they devised. Glauber, contemporary with our James I. and Charles I., was one of these. According to him the symbols were invested with a special mysterious meaning. He showed them in squares, thus: and explained that the extent to which the symbol touches the four sides of the square indicates how near it approaches perfection. Gold, it will be observed, touches all four sides, silver three, and the other metals only two each.



Interpreting the Signs.

Interpretations of these symbols have often been attempted, but they are for the most part mere guesses. Those representing the sun and moon are easy, but the others may generally be read in various ways. The sign for Jupiter is alleged to represent one of his thunderbolts; that for copper is supposed to illustrate the looking-glass of Venus; the iron sign is the shield and spear of Mars; the caduceus of Mercury and the scythe of Saturn are likewise traced in their respective signatures. It has also been fancied that the three signs of which a circle forms part—namely, those for quicksilver, copper, and iron—were intended to suggest that gold could be formed from them, the cross or spear attached being in fact the Egyptian phallus, or organ of generative vigour. In tin and lead there are evidences of the presence of silver. Perhaps more probable is the idea that these signs were originally combinations of letters—monograms, in fact, indicating the name which the planet bore in the country where the symbol was first adopted. Thus, in the sign for Jupiter, ♃, the Greek initial for Zeus, has been traced; in that of Venus, Φ, we have the initial of phosphorus; ♂ has been supposed to be Θ, and ς, the first and last letters of Thouros, one of the names of Mars; while ♄ represents the first and second letters of Chronos (Saturn) welded together. But the interpretation depends largely on the period when the signs were first used. Pictures preceded alphabets; they were in fact the originals of the phonetic sounds which ultimately the letters indicated.

The mysteries which made up so large a part of the science of alchemy passed from its votaries to the practitioners of physic and pharmacy, and are hardly dead in those professions yet. Pretended solutions of gold, vaunted as universal cures, were sold under the title of solar elixirs; the popular name of nitrate of silver to this day is lunar caustic; a black oxide of iron is called Ethiops martial; a solution of sugar of lead is extract of Saturn; sulphate of copper was once known as vitriol of Venus; muriate of tin was famous for the expulsion of worms under the name of Salt of Jove; and ointment of quicksilver is still universally labelled mercurial ointment.

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FOOTNOTES:

[1] The historical part of Dr. Tschirch's great work on Pharmakognosie is in course of publication while the proofs of this book are being read. It promises to be very thorough and modern in regard to drugs.

[2] Labdanum or ladanum is a resinous substance which exudes from the leaves and branches of a shrub found in the Isle of Candy—*Cistus creticus* of Linnæus. It was formerly collected by combing the beards of goats which fed on these leaves. A commoner kind was brought from Spain. It was an ingredient in an anti-hysteric nerve cordial called Theriaque Cœleste. It was also combined in a plaster designed to cure rupture.

[3] The footman story is also told of the owner of Murray's Specific for Gout, of whom it was probably true.

[4] Synthetic cocaine and other artificial alkaloids differ from the natural products only in being without action on polarised light.

[5] John Lydgate, a monk of Bury, born 1370, left some amusing poems, very valuable on account of the insight they give into the customs of his period. One of them is an application to the Duke of Gloucester for money. Lydgate says he is dressed in black "'cause my purs was falle in grete rerage"; while his "guttes were out shake, Only for lak of plate and coyngnage." So he "sought lechis for a restauratif, In whom I fonde no consolacione, To a poticary for confortatyf, Drugge nor dya was none in Bury towne."

Transcriber's Note:

1. Obvious printers', spelling and punctuation errors have been silently corrected.
2. Errata have been silently corrected.
3. Some hyphenated and non-hyphenated versions of the same words have been retained as in the original.

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