Observations on the Diseases of Seamen

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OBSERVATIONS

ON THE

DISEASES

OF

SEAMEN.

BY

GILBERT BLANE, M. D.

F. R. S. S. LOND. AND EDIN.

PHYSICIAN EXTRAORDINARY TO THE PRINCE OF WALES,
PHYSICIAN TO THE DUKE OF CLARENCE,
AND TO ST. THOMAS'S HOSPITAL.

THE SECOND EDITION,

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M.DCC.LXXXIX.

ec Medici, nec Imperatores, nec Oratores, quamvis artis præcepta perceperint, quidquam magna laude dignum sine usu et excercitatione consequi possunt.

CICERO.

CONTENTS.

DEDICATION.

TO HIS

ROYAL HIGHNESS

PRINCE WILLIAM-HENRY.

SIR,

The following Work is the fruit of several years labour employed in the Public Service, chiefly under that great and successful Admiral, Lord Rodney, in a series of Naval Operations, which have been productive of events more glorious than any recorded in the Annals of Britain. As your Royal Highness was present during some part of the service which is the subject of these Observations, and as You have not only honoured the Sea Service by embracing it as a profession, and enrolling your illustrious Name among its officers, but in undergoing the dangers and fatigues of actual service, which is so necessary to attain that practical Skill which Your Royal Highness is well known to possess, I have, upon these grounds, presumed to lay this Work at Your feet. I should do this with greater satisfaction, were it more worthy of Your acceptance; but however inadequate my abilities may have been to the talk, it has been my sincere aim to produce a work of some utility to that only Bulwark of our Country, the British Navy, of which your Royal Highness is the Pride and the Hope.

Your Royal Highness's Permission to inscribe this work to You, and the personal Notice and Protection with which you have been pleased to honour me, I consider as the first Distinctions of my life, and of which I shall ever entertain a becoming sense, by cherishing those indelible sentiments of Respect, Gratitude, and Attachment, which are due to Your Royal Highness from

Your Royal Highness's
Most faithful,
Most obedient, and
Most devoted Servant,
GILBERT BLANE.

LONDON,
May 1, 1785.

PREFACE.

Having been appointed by Lord Rodney Physician to the Fleet under his command, in the beginning of the year 1780, I determined to avail myself, to the utmost of my abilities, of the advantages which this field of observation afforded. This I was led to do, in order to satisfy my own mind as a matter of duty, as well as to find out, if possible, the means of bettering the condition of a class of men, who are the bulwark of the state, but whose lot is hardship and disease, above that of all others.

A fleet, consisting seldom of less than twenty ships of the line of battle, and sometimes exceeding forty, which I attended in the different scenes of active service in that distant and unhealthy region, for more than three years, has afforded me opportunities of making observations upon a large scale.

My object has been prevention as much as cure; and as the former must more particularly depend on a knowledge of the external causes of disease, I have collected and arranged all the facts upon this subject that came within my reach, considering these as the only grounds from whence the remote causes of health and sickness could be deduced.

When I entered upon my employment, the Commander in Chief gave an order, that every surgeon in the fleet should send me a monthly return, stating the degree of prevalence of different diseases, the mortality, and whatever else related to the health of the respective ships. This was done with a view to enable me to regulate the reception of men into hospitals, so that each ship might have a due proportion of relief, according to the degree of sickness on board, taking care at the same time that the hospitals should not be overcrowded; and also to acquaint the Commander in Chief, from time to time, of the state of sickness, or the predominance of particular diseases, in order to recommend such articles of diet, or other means, as might tend to cure them, or to check their progress. These returns have served also in this work as a method of collecting a multitude of well-established facts, tending to ascertain the causes and course of disease.

While the fleet was in port, I also superintended and visited daily the hospitals, of which there is one at almost every island on the station; and having kept an account of the different kinds of disease that were admitted, and of their mortality, I have in this way likewise been furnished with a number of facts that may throw light on the history of human maladies.

Nevertheless, I do not boast of having made great discoveries; and every person of a correct judgement must be aware how difficult it is to ascertain truths, and to draw fair and solid inferences, on medical subjects. I have attempted little more than to amass, from my own observation, and by the assistance of the surgeons of the fleet, a number of well-established facts, and to arrange them in such a methodical manner, as to prove a groundwork for investigation; and I am persuaded that others, of more sagacity and enlarged knowledge than myself, may be able to deduce from them, observations that may have escaped me especially if these new, but imperfect, attempts should come to be compared with similar ones that may be made by other observers in other climates, and in other circumstances of service.

I met with several obstacles in instituting inquiries, purely medical, to the extent I could have wished. There is, in the first place, from the nature of the subject, a great difficulty attending all practical inquiries in medicine; for, in order to ascertain truth, in a manner that is satisfactory to a mind habituated to chaste investigation, there must be a series of patient and attentive observations upon a great number of cases, and the different trials must be varied, weighed, and compared, in order to form a proper estimate of the real efficacy of different remedies and modes of treatment.

But besides this difficulty belonging to the nature of the subject, there were others connected with the nature of the service; for the hospitals were at times so inadequate in point of size, and so ill provided with

necessary articles and accommodations, particularly during the first part of my attendance, that my principal care was to remedy these defects by proper superintendence and representation.

A due attention to air, diet, and cleanliness, is not only more essential than mere medical treatment, but the sick cannot be considered as fit subjects for evincing the powers of medicine till they are properly provided for in these respects. These inconveniences were owing, in a great measure, to the unusual extent of the service; for there was a much greater naval force in those seas, at this period, than was ever before known, and there was of course a proportional want of accommodation for the sick. Towards the end of the war these difficulties were much obviated, so that a fairer field of observation presented itself.

Another obstacle to my practical inquiries was, that the fleets I belonged to seldom remained more than six weeks or two months at any one place, so that any series of observations that might have been instituted was interrupted, and I was in a great degree deprived of the fruits of them, by not seeing the event of cases under my management.

The peace in the spring of the year 1783 put an end to all my inquiries, and particularly prevented me from following out some practical researches. I have ventured, however, in one part of this work, to give the result of my experience in some diseases, more especially such as are peculiar to the climate and mode of life.

Upon the whole, I have, in the following work, humbly attempted to follow what I conceive to be the only true method of cultivating any practical art, that is, to collect and compare a great number of facts. A few individual cases are not to be relied on as a foundation of general reasoning, the deductions from them being inconclusive and fallacious, and they are liable to be turned and glossed, according as the mind of the observer may he biassed by a favourite prepossession or hypothesis. It has been my study to exhibit a rigid transcript of truth and nature upon a large scale, and to take the average of numberless particular facts, to serve as a groundwork for observation; and I have endeavoured to analyse and collate these facts, by throwing the monthly returns that were made to me into the form of Tables, as the most certain and compendious way for finding their general result. If the materials are not sufficiently ample, or if the method should be found faulty and imperfect, let it be remembered, that I had no example to go by in this field of observation. It is to be regretted, that ages have passed without any attempts being made to transmit regular records of this kind to posterity. It would not only be extremely curious, as a piece of natural knowledge, but would conduce greatly to medical improvement and public utility, were we possessed of such information concerning the causes and nature of the diseases prevailing at sea, in various circumstances of weather, climate, and diet, in remote ages and countries, or even in our own age and country, as might enable us to compare them with present facts, and to ascertain more precisely the means of preventing and removing such diseases.

The favourable reception which the first edition of this work has met with, renders it necessary to offer another to the Public; and though no new opportunities have occurred of making additional observations in the naval service I have endeavoured, during the last two years, from a pretty extensive experience in a large hospital, and from private practice, to add some new information on some practical points; and I hope this edition will be found throughout more full and correct than the former.

The method I propose to follow in this work, is, First, to deliver the history of the different voyages and expeditions, so far as relates to health, giving an account of the prevalence and nature of the diseases and mortality on board of ships and in hospitals.

Secondly, To deduce, from observations founded on these facts, and also from the former experience of others, the causes of sickness in fleets, and the means of prevention.

Thirdly, To deliver some practical observations on the cure of the most common diseases incident to fleets, particularly in hot climates.

OBSERVATIONS.
PART I.

BOOK I.

omprehending the MEDICAL HISTORY of the FLEET, from March, 1780, till August, 1781.

CHAP. I.

ontaining an Account of the HEALTH of the FLEET from March, 1780, till July following.——Five Ships of the Line arrive at Barbadoes from Europe in March—Join a large Squadron then on that Station—Their Health compared—Engagements with the Enemy in April and May producing Hardship and Exposure, but little Increase of Sickness—Method of collecting the Returns of the Surgeons—Influence of Situation upon Health in Harbours—Course of the Seasons, and Temperature of the West Indies—The Fleet reinforced in June and July with Ships from England and North America—Their Health.

During the war, which broke out with France in 1778, and with Spain in 1779, the West Indies was the principal seat of naval operations, and much greater fleets were then employed in that quarter of the world than in any former period.

Though there had been a great squadron on the Caribbee station during the greater part of 1779, no physician was appointed to it till the beginning of the next year, when I arrived there in that character with my friend and protector, Lord Rodney.

There were then sixteen ships of the line on that station, most of which had been upwards of twelve months in the climate; and they were reinforced at this time by five more from England.

The squadron which we found on the station was then extremely healthy, and in several of the ships there was not a man unfit for duty. We were told, however, that they had all been subject to sickness, particularly to the dysentery, soon after their arrival in that climate. Of the five with which the fleet was at this time reinforced, all but the Intrepid left England at Christmas, making part of the squadron which effected the first relief of Gibraltar, under the command of Lord Rodney, who continued his route to the West Indies, in order to take the command on the Windward station, where he arrived on the 16th of March. The Intrepid had arrived with a convoy the day before. These five ships were all pretty healthy on their passage, except the Sandwich and Terrible, in which a fever prevailed; but they had almost recovered from it before they arrived in the West Indies. A dysentery broke out in April in all the ships newly arrived, and it prevailed to the greatest degree in those which had been most affected with fevers in Europe, namely, in the Terrible and Intrepid. The Sandwich and Ajax were also affected, though in a less degree; but the Montagu, though this was her first voyage, and though she was just off the stocks, had been the most healthy of any of them from the time of leaving England, and continued so during all this campaign. I have not observed that new ships are more unhealthy than others, unless they are built of ill-seasoned timber; and they have this advantage, that there is no previous infection adhering to them. What may have contributed also to the superior health of the Montagu, was the precaution that was taken when this ship was first manned and fitted out, of stripping and washing the men that were brought from the guardship to complete the crew.

The Intrepid, while in England, had been afflicted with fevers to a most uncommon degree; for, being one of the fleet in the Channel cruise the year before, almost the whole crew either died at sea, or were sent to the hospital upon arriving at Portsmouth. This ship, after refitting, was pretty healthy for a little time; but, probably from the operation of the old adhering infection, she became extremely sickly immediately after joining our fleet, and sent two hundred men to the hospital the first two months after arriving in the West Indies. Most of these were ill of the dysentery.

The Pegasus frigate arrived with the ships from Gibraltar, and we have here an instance of the superior health commonly enjoyed by this class of ships over ships of the line; for when she was dispatched to England in the end of April, there had not been a man taken ill from the time of her arrival on the station.

This season was a very active one in the operations of war; for, besides the general battle of the 17th of April, there were two partial actions in May; and, from the 15th of the former month till the 20th of the latter,

our fleet was constantly in the face of the enemy's, except for a few days that it was refitting at St. Lucia after the first battle. This was extremely harrassing to the men, not only from the incessant labour necessary in the evolutions of the fleet, but by their being constantly at quarters with the ships clear for action; for, in that situation, they had nothing to sleep upon but the bare decks, the hammocks and bedding being removed from between decks, where they might embarrass the men in fighting, and they become useful on the quarter deck, by serving to barricade the ship, which is done by placing them in ranges on the gunwale, to cover the men from the enemy's grape and small shot. These hardships were productive of some sickness, though much less than might have been expected; for the weather is at all times warm, and it was at this time extremely moderate and dry. Besides we shall see in other instances as well as this, that, in the ardour inspired by the presence of an enemy, men are less exhausted by their exertions than on ordinary and less interesting occasions.

Almost the whole of the sick and wounded, to the number of 750, were put on shore at Barbadoes, where all the fleet, except three ships[1], arrived on the 22d of May.

I now began to keep regular and methodical accounts of the sickness and mortality in the fleet, though in a manner more imperfect and less accurate than was afterwards adopted. I was embarked on board of the Sandwich, where the Commander in Chief had his flag, so that I was always present with the main body of the fleet, whether at sea or in port.

A form of monthly returns[2] was adopted, which, as well as other points of method, was afterwards improved.

After collecting the returns for each month, I made abstracts of them in tables; in one column of which the complement of each ship is set down, in order to form calculations of the comparative prevalence and mortality of different diseases at different times. One of the abstracts is here inserted, (Table I.) by way of specimen, and the proportional result of them for fourteen months is set down in another table, (Table II.)

Though this last exhibits a tolerably just view, yet it may be remarked, as one imperfection, that there was no distinction made at this time in my returns between the killed and those who died of disease; so that in the month of May, which stands first, the proportion is too high; for there were sixty-four killed, and two hundred wounded, in the two actions of that month.

TABLE I.
ABSTRACT of RETURNS,
1st June, 1781.

Transcriber's keys:

A Complement.
B Sick and Wounded on Board.
C Sent to the Hospital in the course of last Month.
D Dead on Board in the course of last Month.

SHIPS' NAMES.	A	B	C	D
Sandwich	732	28	36	2
Barfleur	767	133	22	1
Gibraltar	650	67	88	10
Triumph	650	7	9	2
Centaur	650	45	26	5
Torbay	600	31	57	5

Monarch	600	62	14	2
Terrible	600	85	24	1
Alfred	600	57	38	1
Russel	600	44	134	7
Alcide	600	42	35	1
Shrewsbury	600	30	23	5
Invincible	600	50	63	9
Resolution	600	107	54	3
Ajax	550	20	10	2
Princessa	560	88	40	5
Belliqueux	500	19	0	1
Prince William	500	25	14	2
Panther	420	16	6	0
Triton	200	5	1	0
Hyena	200	11	0	0
Cyclops	200	5	2	0
Total	11979	977	696	64

The main body of the fleet lay at Barbadoes till the 6th of June, and the men had recruited extremely by their stay there; for vegetables, fruit, and other refreshments, can be procured at an easier rate, and in much greater plenty, at this island, than any other on the station.

The fleet arrived at St. Lucia the next day after it sailed from Barbadoes, and remained there till the 18th of June. The whole of this month was showery at this island, though it is not accounted the common rainy season; for more rain falls here than at any of the other islands at that time in our possession, being the most mountainous, as well as the most woody and uncultivated, of them all. These rains produced some increase of sickness, but very little, when compared to what took place at the same time in the army on shore, and in the ships refitting at the Carenage. There died about this time from fifty to fifty-five men every week in an army of not quite two thousand men.

The difference in point of health between the Carenage (which, as the word implies, is the place where ships go to be hove down, or otherwise repaired) and Gros-Islet Bay, where the main body of the fleet lay, affords a striking proof of the effects of situation. The Carenage is a land-locked creek, with a marsh adjacent to it, whereas the other is a road open to the fine air of the sea, the only land sheltering it to windward being a small, dry island, consisting of one hill, of half a league in circumference, and some of the cliffs of the main island of St. Lucia.

The increase of sickness here was farther prevented by the men having little labour to perform on shore, nor any haunts to encourage intemperance, a vice which the Admiral endeavoured still more effectually to prevent, by ordering all the rum stills in the neighbourhood to be destroyed.

It may be proper here to introduce a general account of the seasons and temperature of the West Indies, as there will be frequent occasion hereafter to make allusions to them. With regard to the heat, though the range of the temperature is very small, in comparison of what it is in Europe, the variations follow the same seasons; for July and August are the hottest months, and December and January the coolest. This we would naturally expect, as our plantations lie all in the northern hemisphere, between the 10th and 20th degree of N. latitude, and therefore bear the same relation as Europe does to the sun’s annual course. The hurricanes happen in the same season in which the periodical rains chiefly fall, that is, in the months of August, September, and October, which are called the hurricane months, and this is also the most unhealthy season. The time of the year which is most apt to be rainy, next to this, is from the middle of May to the middle or

end of June, but this is not invariable. The lowest I ever observed the thermometer was at 69°; it stands very commonly at 72° at sunrise, in the cool season, rising to 78° or 79° in the middle of the day. In the hot season, the common range is from 76° to 83°. It seldom exceeds this in the shade at sea; and the greatest height at which I ever observed it in the shade at land was 87°. This is far short of the extremes of heat which they experience at certain seasons on the continent of North America, even very far north. In Pennsylvania and New York, the thermometer, I have been assured, rises frequently above 90°. It does so commonly enough in the East Indies; but I believe it never was known to rise so high in the West Indies, so that the heat, comparatively speaking, may be called moderate and steady.

The comparative mortality in June is small, owing to the fleet's having been cleared of all the bad cases at Barbadoes before it sailed from thence. Though the proportion of sick in July is less, that of the mortality is greater, (see Table II.) which seems to be owing to this circumstance, that the cases taken ill during the rainy weather of June did not terminate fatally till the succeeding month.

In the course of this summer the fleet was reinforced by several ships of the line from England. The Triumph arrived in May, without any sick on board; but a flux prevailed a few weeks afterwards, without any evident cause, except the influence of the climate, and the exposure and fatigues during the operations of May. The disease, however, soon subsided, and the ship being kept in excellent order and discipline, continued healthy during all the remaining time in which she served with us.

In June, the Russel, of 74 guns, arrived from North America, and the Shrewsbury, a ship of the same rate, from England. The former left England in 1778, but was obliged to put back by stress of weather and sickness, and upon arriving afterwards on the coast of America, was extremely afflicted both with fevers and the scurvy. These were removed to the hospital, and this ship had become free of all sickness before sailing for the West Indies, except that a few of the men were seized with fevers, and she remained healthy after arriving there, not suffering from any regular attack of sickness, such as affected the ships in general from Europe. The Shrewsbury left England healthy, but was soon attacked with a fever and flux, which continued to prevail till the end of the year.

The fever in these two ships resembled rather the low ship fever of Europe than the bilious one peculiar to the climate. This last, indeed, seldom or never prevails to a great degree on board of a ship, unless it has been caught on the watering duty, or from some other exposure to the air of the land. I have, however, known a few instances of bilious fevers in men who never had been on shore from the time they left England; I have even known men of the same description attacked with intermittent fevers, which are supposed to depend still more on land air. This is perhaps owing either to the quantity of water in a great ship, part of which is always more or less putrid, or to the fresh-cut wood of the country taken on board for fuel, the steam of all which must resemble a good deal the effluvia of woods and marshes, which are supposed to give rise to intermittents.

In the beginning of July our fleet was reinforced with the Culloden, Egmont, and Centaur, all of 74 guns. In the end of the same month we were joined by the Alcide and Torbay, of the same rate, and also directly from England. The fleet was at this time at St. Christopher's, having arrived there on the 22d of the month, with a large convoy from England, which had joined it at St. Lucia, under protection of the Thunderer and Berwick, two ships of the line, which being bound to Jamaica, I do not reckon as belonging to our fleet.

TABLE II.

hewing the proportional Sickness and Mortality, in relation to the whole Numbers on board, for fourteen Months.

Transcriber's keys:
A Proportion of Sick and Wounded on board on the First of the Month.
B Proportion of Sick and Wounded sent to the Hospital in the Course of the Month.

C Proportion of Deaths on board in the Course of the Month.

Months.	A	B	C
	ONE IN	ONE IN	ONE IN
May, 1780	18½	20½	87
June	13	68½	418
July	17½	80	163
August	18	227	80
September	9	6	188
October	14	25	0
November	33½	192	265
December	16	67	185
January, 1781	14	60½	316
February	18	413	214
March	15½	30	201
April	11	59	169
May	9½	17	188
June	12	40	701
Mean Proportion	15½	93	227

CHAP. II.

ccount of the HEALTH of the FLEET from August, 1780, till December following.——The Fleet divided—The principal Squadron goes to North America—Fluctuation between Fevers and Fluxes—The Alcide and Torbay the most sickly Ships—Health mended by the Climate and Diet in North America—Hurricane in the West Indies—Sufferings in consequence of it—Fevers the chief Disease.

The hurricane months approaching, the season for active operations in the West Indies was now over. The whole force of the enemy, consisting of thirty-fix French and Spanish ships of the line, having gone to St. Domingo in the end of July, ten sail of the line were detached after them from our station, for the protection of Jamaica. The Admiral sailed for North America in August, with eleven ships of the line, leaving six for the protection of the islands.

There was little alteration in the general state of the sick during the voyage to America, and indeed we found no diminution of the West-India heat, which at this season is at the greatest height, until we came to the 33° of N. latitude.

The only material alteration in point of health was in the Alcide and Torbay, which had arrived from England with a few men ill of fevers; but in the course of this voyage these two ships became as unhealthy as any that ever came under my observation. There was a greater number of sick on board of them than all the fleet besides, and it increased to such a degree, that upon their arrival at New York, which was in the middle of September, after a passage of three weeks, near one half of their men were unfit for duty. In the Alcide it was a fever that raged; in the Torbay it was a dysentery; and the unusual degree of sickness and mortality which appears in the Table for the month of September, was owing to the very sickly state of these two ships.

TABLE III.

Shewing the Number of FEVERS and FLUXES on board on the First of each Month, and the Number sent to the Hospital in the Course of the Month.

Key: B On board. H Sent to the Hospital.

SHIPS' NAMES, AND Date of their Arrival.	MAY, 1780.				JUNE.				JULY.			
	Fever.		Flux.		Fever.		Flux.		Fever.		Flux.	
	B	H	B	H	B	H	B	H	B	H	B	H
Sandwich, 16th March	6	0	16	19	3	0	12	0	10	5	16	3
Terrible, 16th March	0	0	40	20	0	3	86	75	3	25	60	24
Triumph, 7th May		0		0	0	0	0	0	0	0	32	17
Russell, 18th June									22	0	0	0
Shrewsbury, 26th June									5	0	0	0

Alcide, 30th July												
Torbay, 30th July												
Monarch, 22d Nov.												
Alfred, 22d November												

SHIPS' NAMES, AND Date of their Arrival.	**AUGUST.**				**SEPTEMBER.**				**OCTOBER.**			
	Fever.		**Flux.**		**Fever.**		**Flux.**		**Fever.**		**Flux.**	
	B	**H**	**B**	**H**	**B**	**H**	**B**	**H**	**B**	**H**	**B**	**H**
Sandwich, 16th March	20	0	5	0	16	4	5	2	5	9	4	0
Terrible, 16th March	25	0	30	13	19	12	41	9	2	0	3	0
Triumph, 7th May	5	0	7	0	0	0	3	0	continued healthy.			
Russell, 18th June	10	3	0	0	continued healthy.							
Shrewsbury, 26th June	14	0	12	0	20	0	20	0	No return, the Ship being absent.			
Alcide, 30th July	17	0	0	0	54	0	3	22	20	2	59	37
Torbay, 30th July	6	0	3	0	3	0	169	143	3	0	12	0
Monarch, 22d Nov.												
Alfred, 22d November												

SHIPS' NAMES, AND Date of their Arrival.	**NOVEMBER.**				**DECEMBER.**				**JANUARY, 1781.**			
	Fever.		**Flux.**		**Fever.**		**Flux.**		**Fever.**		**Flux.**	
	B	**H**	**B**	**H**	**B**	**H**	**B**	**H**	**B**	**H**	**B**	**H**
Sandwich, 16th March	3	0	5	0	8	0	10	0	9	0	13	0
Terrible, 16th March	continued quite healthy.											
Triumph, 7th May												
Russell, 18th June												
Shrewsbury, 26th June	No return, the Ship being absent.				0	0	13	0	1	0	7	0

Alcide, 30th July	0	0	23	10	0	0	14	0	6	5	17	0
Torbay, 30th July	6	0	5	0	0	1	22	30	5	0	10	1
Monarch, 22d Nov.					3	0	2	0	5	12	15	4
Alfred, 22d November					6	0	5	0	15	16	11	8

We shall hereafter see reason for supposing that fever and dysentery proceed from the same cause; and as both these ships arrived from England in a similar state with regard to health, fevers would probably have been the prevailing disease in both; but a part of the 87th regiment, then serving as marines in the fleet, was put on board of the Torbay at St. Christopher's, and some of them being ill of the dysentery, gave this turn to the disease which afterwards prevailed on board. I have formed a Table to shew the fluctuating state of these two diseases, and this was one of my first and most imperfect attempts towards a medical history of the fleet in a methodical way. (Table III.)

There was but little sickness in the rest of this squadron, except in the Terrible, where the dysentery prevailed a good deal. None of the ships of the line which we found in the West Indies, upon our arrival there, were now in company, except the Yarmouth, and this was the most healthy of all the ships that went to North America.

The health of the fleet was very much recruited by its short stay in America; for the men were supplied with fresh meat and spruce beer, and they enjoyed the two finest months of the year in that temperate climate. The squadron left New York in the middle of November, and though dispersed by a violent storm, all the ships arrived safe in the West Indies before the middle of December.

In October the fleet had attained such a degree of health, that though the calculation in the Table is made from five of the most sickly ships, no death happened in this month on board of any of them. In November the mortality was also inconsiderable, though the ships left in the West Indies are included in the calculation; which, had it been made upon those only that went to North America, the deaths would have been no more than one in seven hundred and eleven in this month, which is rather less than that of any other month in the Table.

The amendment in health, in consequence of the change of climate, was most remarkable in the Terrible, which, by the time she left America, had entirely got rid of the violent dysentery that had prevailed for some time on board. This sudden change in the health of this ship was evidently owing to the great attention of the Captain to cleanliness and discipline, and no less to the assiduity and abilities of the Surgeon. The Alcide still continued sickly, though not so much so as the Torbay. The former had sailed on a cruise in October, and having met with very rough weather, the sick list was thereby increased. The dysentery now prevailed in that ship, as well as fevers, and those men chiefly were attacked with fevers who were ill of the scurvy, or recovering from it. This was not very common; and there were several other remarkable particulars with regard to the fevers in this ship; for her men were not only uncommonly subject to this disease, both in America and the West Indies, but to all the various forms of it; the low, infectious, ship fever of Europe, the bilious remitting, and the malignant yellow fever of hot climates. It would appear from this, as well as other instances, that a ship may assume, as it were, a particular constitution, or a tendency to some particular disease, for a length of time, and this depending on some lurking and adhering infection, or the manner in which she may have been victualled, watered, disciplined, or manned.

The great benefit derived to the health of the fleet, from the change of climate, as well as other reasons, justified the Admiral in going to North America; and there was the more merit in this measure, as it was

undertaken without precedent, and without instruction. Upon our return we found there was great good fortune in it, as well as wisdom; for there had happened on the 10th of October a more violent hurricane than any in the memory of man, and the ravage it made both by sea and land is, perhaps, unparallelled in history. Several of the ships of the line were exposed to it; but though they suffered extremely, and were in the utmost danger, none were lost. Two of them happened to be at Antigua, which was out of the track of this hurricane, as it extended only from the 12th to the 15th degree of N. latitude; so that the only islands that suffered by it were Barbadoes, St. Lucia, St. Vincent, and Martinico.—Four frigates, and as many sloops of war, either foundered or were wrecked, and about one thousand seamen perished in them. One of the buildings of the hospital at Barbadoes was entirely demolished by the impetuosity of the sea, which, having risen to a great height, dashed a ship against it, and twenty-three seamen were buried in the ruins[3].

The Montague suffered most on this occasion, and was also most subject to sickness and mortality, brought on in consequence of the great fatigue and hardships of the men in bringing her into port and refitting her; for the ship was almost torn to pieces both in the rigging and hull, and the bedding and other necessaries and conveniencies were entirely destroyed. The fever that prevailed on board at this time was of the most malignant kind known in this climate; and the worst cases arose in watering, and the other necessary duties on shore, from which the men would sometimes return frantic, and die in a few hours. There was a party of soldiers on board; and as they were not called upon to perform any duties on shore, they had but little sickness in companion of the sailors.

The other ships having suffered less from the storm, were also less sickly, as it was not necessary for them to remain so long in the unhealthy Carenage to repair.

The only disease that prevailed at this time, in these two ships, was fevers, there being few or no fluxes, though they had been so frequent in the former part of the year. Though fevers and fluxes depend on the same general causes, yet when these causes exist in a higher degree, it would appear that they are more apt to produce fevers. Thus the exhalations of the earth from marshes are more apt to produce fevers; and mere excesses of heat and cold, or moisture, are more apt to produce fluxes; just as in Europe a catarrh, which may be considered as a local febrile affection, as well as a dysentery, will be excited by exposure to cold or damp, without any specific bad quality in the air.

The Ajax and Montague are the only two ships of those left in the West Indies, which are included in the estimate of sickness and mortality in November and December, and they bear a very great proportion to the whole; for out of forty-four that died in fourteen ships of the line in November, twenty died in the Montague, and five in the Ajax; and out of forty-three, the whole number of deaths in December in twenty-one ships of the line, ten were of the Montague, and eleven of the Ajax.

CHAP. III.

ccount of the HEALTH of the FLEET from January, 1781, till July, 1781, both Months included.——Arrival of seven Ships of the Line from England—Increase of Sickness in consequence of a Descent on St. Vincent's—Long Cruise to windward of Martinico—Great Prevalence of Scurvy—Difference of Health in different Ships—New Ships not more unhealthy than others—Why Frigates are more healthy than Ships of the Line—Remarkable Cure of Scurvy in two Ships—Essence of Malt—Vegetables most antiscorbutic in their natural State—Advantage of supplying Refreshments on board of Ships in preference to Hospitals.

We are now come to that period in which our fleet was reinforced with seven ships of the line, which arrived at Barbadoes from England on the 5th of January, 1781, under the command of Lord Hood. This addition, with two which had arrived in November, made the force upon this station again amount to twenty-one ships of the line.

TABLE IV.

Shewing the Number of each Disease on board on the First of each Month, the Numbers sent to the Hospital, and Dead, in the Course of the Month.

KEY:
B On board.
H Sent to the Hospital.
D Dead.

SHIPS' NAMES. N. B. Those marked *, arrived with Lord Hood.	FEBRUARY, 1781.								
	Fever.			Flux.			Scurvy.		
	B	H	D	B	H	D	B	H	D
Sandwich	8	0	0	4	0	0	2	0	0
* Barfleur	8	0	1	4	0	1	3	0	0
* Gibraltar	25	0	2	4	0	0	4	0	0
Triumph	0	0	1	1	0	1	21	8	0
Centaur	2	0	0	2	0	0	20	0	8
Torbay	6	0	0	11	0	0	1	0	0
Monarch	13	0	3	13	0	0	2	0	0
Terrible	2	0	0	10	0	0	1	0	0
Montagu	40	0	8	14	0	5	4	0	0
Alfred	4	0	0	4	0	0	4	0	1
Russel	0	0	0	7	0	1	2	1	0
Alcide	1	0	2	9	0	0	1	0	0
* Invincible	0	0	0	0	0	0	0	0	0
Resolution	1	0	0	7	0	1	0	0	0
Shrewsbury	8	0	0	0	1	1	6	7	0
Ajax	8	0	1	6	0	5	3	0	1
* Princessa	8	0	1	3	0	1	0	0	0

Intrepid	18	1	1	10	4	0	1	0	0
* Belliqueux	11	0	0	10	0	5	0	0	0
* Prince William	21	0	0	17	0	0	4	0	0
* Panther	2	0	0	4	0	0	0	0	0
Triton	7	0	0	15	2	0	14	0	0
Hyena	0	0	0	0	0	0	0	2	0
Cyclops	4	1	0	3	0	0	0	1	0
Total	197	2	19	158	7	21	93	19	10

SHIPS' NAMES. N. B. Those marked *, arrived with Lord Hood.	**MARCH.**								
	Fever.			**Flux.**			**Scurvy.**		
	B	**H**	**D**	**B**	**H**	**D**	**B**	**H**	**D**
Sandwich	8	3	1	4	0	0	2	2	0
* Barfleur	28	4	0	35	0	0	5	27	2
* Gibraltar	8	1	0	0	0	0	6	22	0
Triumph	3	0	0	2	0	1	24	18	1
Centaur	7	0	0	4	0	0	50	0	8
Torbay	7	0	0	8	0	0	8	0	0
Monarch	5	0	0	4	0	0	1	0	0
Terrible	2	0	0	9	0	2	3	0	0
Montagu	§	§	5	§	§	3	§	§	1
Alfred	25	0	0	8	0	1	56	16	2
Russel	7	0	0	8	2	0	0	61	5
Alcide	1	0	0	1	0	0	15	0	0
* Invincible	6	1	0	1	0	0	5	6	0
Resolution	6	0	0	5	0	0	1	0	0
Shrewsbury	5	0	1	6	0	0	0	0	0
Ajax	2	0	2	10	0	5	6	0	6
* Princessa	6	0	5	2	0	0	4	102	2
Intrepid	10	0	0	9	0	0	0	0	0
* Belliqueux	3	1	2	52	0	1	0	1	0
* Prince William	23	12	0	47	62	5	6	10	0
* Panther	5	0	0	8	0	0	4	0	0
Triton	3	2	0	12	2	0	6	0	0
Hyena	0	0	0	0	1	0	0	0	0
Cyclops	4	0	0	3	0	0	0	0	0
Total	174	24	16	238	67	18	202	265	27

SHIPS' NAMES. N. B. Those marked *, arrived with Lord Hood.	**APRIL.**								
	Fever.			**Flux.**			**Scurvy.**		
	B	**H**	**D**	**B**	**H**	**D**	**B**	**H**	**D**
Sandwich	6	0	2	9	1	1	2	4	0
* Barfleur	24	0	0	25	0	0	33	0	0
* Gibraltar	0	0	1	0	0	0	18	0	0

Triumph	0	0	1	3	0	2	12	0	2
Centaur	1	0	0	3	1	0	55	1	1
Torbay	6	0	0	8	0	0	23	27	2
Monarch	8	0	4	17	0	0	0	0	0
Terrible	0	0	0	10	0	0	4	3	1
Montagu	§	§	§	§	§	§	§	§	§
Alfred	11	0	0	26	0	1	116	44	4
Russel	0	0	0	4	0	1	44	0	3
Alcide	1	0	0	3	0	0	8	16	0
* Invincible	4	0	0	4	0	0	2	0	1
Resolution	5	0	0	8	0	2	7	0	1
Shrewsbury	4	3	0	0	0	0	4	6	0
Ajax	4	0	1	15	4	2	30	5	10
* Princessa	6	0	0	1	0	0	40	0	1
Intrepid	9	§	§	13	§	§	1	§	§
* Belliqueux	0	0	0	3	0	0	2	0	0
* Prince William	19	2	0	147	40	0	16	7	0
* Panther	2	0	0	4	3	0	9	1	0
Triton	2	0	0	2	0	0	0	0	0
Hyena	0	0	0	0	0	0	2	0	0
Cyclops	2	0	0	2	0	0	0	0	0
Total	115	5	9	317	49	9	428	115	26

SHIPS' NAMES. N. B. Those marked *, arrived with Lord Hood.	**MAY.**								
	Fever.			**Flux.**			**Scurvy.**		
	B	**H**	**D**	**B**	**H**	**D**	**B**	**H**	**D**
Sandwich	2	2	1	10	5	0	5	18	0
* Barfleur	12	3	1	16	1	0	54	10	0
* Gibraltar	4	0	0	0	0	0	30	22	4
Triumph	0	1	1	0	0	0	13	8	1
Centaur	0	0	0	2	0	2	15	4	0
Torbay	6	0	0	13	7	0	44	31	0
Monarch	5	2	2	3	0	0	57	11	0
Terrible	0	0	1	10	4	0	5	20	0
Montagu	§	§	§	§	§	§	§	§	§
Alfred	15	10	1	11	3	0	130	25	2
Russel	0	1	0	8	0	0	132	102	4
Alcide	0	0	1	1	0	0	40	35	0
* Invincible	7	0	1	6	8	4	31	54	4
Resolution	5	2	0	9	0	0	15	45	2
Shrewsbury	3	1	0	5	2	0	22	6	2
Ajax	4	1	1	3	0	0	8	0	1
* Princessa	2	0	0	2	0	1	30	40	2
Intrepid	§	§	§	§	§	§	§	§	§
* Belliqueux	0	0	0	2	0	0	2	0	0

* Prince William	5	5	2	53	5	0	7	4	0
* Panther	3	2	0	8	4	0	1	0	0
Triton	2	0	0	4	0	0	0	1	0
Hyena	0	0	0	0	0	0	0	0	0
Cyclops	0	0	0	0	0	0	0	0	0
Total	76	30	12	166	39	7	641	436	22

SHIPS' NAMES. N. B. Those marked *, arrived with Lord Hood.	**JUNE.**								
	Fever.			**Flux.**			**Scurvy.**		
	B	**H**	**D**	**B**	**H**	**D**	**B**	**H**	**D**
Sandwich	2	0	0	3	0	0	10	0	1
* Barfleur	20	0	0	13	0	0	58	0	0
* Gibraltar	3	1	0	4	0	0	48	17	0
Triumph	1	0	0	0	0	0	6	5	0
Centaur	4	0	0	9	0	1	15	0	0
Torbay	16	0	0	6	0	0	9	0	1
Monarch	4	3	1	4	0	0	36	5	0
Terrible	3	1	0	12	0	0	20	1	0
Montagu	§	0	0	§	0	2	§	0	0
Alfred	14	§	§	10	0	0	26	0	0
Russel	0	1	0	19	1	0	14	1	0
Alcide	4	2	0	5	0	0	26	5	0
* Invincible	8	0	0	22	0	0	10	1	0
Resolution	1	0	0	3	12	0	84	0	2
Shrewsbury	3	§	§	4	§	§	20	§	§
Ajax	2	0	0	2	0	1	6	0	0
* Princessa	2	0	0	6	40	0	70	154	0
Intrepid	§	§	§	§	§	§	§	§	§
* Belliqueux	2	0	1	3	0	0	8	0	0
* Prince William	4	4	2	13	3	1	8	7	0
* Panther	3	0	0	8	1	0	1	1	0
Triton	2	0	1	1	0	0	0	1	0
Hyena	3	0	1	2	0	0	5	0	0
Cyclops	§	§	§	§	§	§	§	§	§
Total	101	12	6	149	57	5	480	198	4

N. B. Where the Spaces are marked thus, §, no Return was made.

The whole fleet was tolerably healthy during this month, the season being dry and cool; there was, however, a small increase of sickness at this time, and it was owing to a descent made on St. Vincent's in December. The soldiers, (of whom there was still a regiment on board of the fleet) the marines, and some of the seamen, had been on shore for one night only; but many of them having lain on the ground, some having been intoxicated, or having eaten to excess of sugar-cane and fruit, caught fevers and fluxes, which increased the proportion of diseases and deaths the following months, as appears by the Table.

I have exhibited, in another Table, a view of the sickness and mortality of this fleet for the five succeeding months. (Table IV.) This account, as well as most of those that are to follow, is confined to three diseases, that may be called the sea epidemics. These are, fever, flux, and scurvy.

The whole fleet met at Barbadoes on the 13th of January, and no service was undertaken till the accounts of the Dutch war arrived on the 30th of that month. In consequence of this intelligence, the greater part of the ships of war went against St. Eustatius, which was taken on the 3d of February.

Ten days after this a squadron of seventeen ships of the line was sent to cruise to windward of Martinico, with a view to intercept a French squadron which was then said to be on its passage from Europe. The cruise was there continued for six weeks; after which small divisions of the ships were sent to water and refit, by turns, at St. Lucia, and were relieved by the ships left for the protection of that island.

Soon after this, the whole squadron came to leeward of Martinico; and though the former intelligence had proved false, the greater part of our fleet still kept the sea, in order to block up the enemy in Fort-Royal Bay. This they continued to do till the 29th of April, when a French fleet of twenty-two ships of the line, from Europe, joined by four from Martinico, forced their way into their own port, pushing to leeward our fleet, consisting only of eighteen ships of the line; so that the greater part of them did not get into port till they came to an anchor at Barbadoes on the 23d of May.

It was in this season of cruising, and keeping the sea, that the fleet contracted such a degree of scurvy as had never before been known in the West Indies. This disease is not so apt to arise in a hot climate as in a cold one; and the prevalence of it on this occasion was owing to the men having been for a great length of time upon sea victualling; for one part of the fleet had not had a fresh meal from the time of leaving America, that is, for six months; and that part of it which came last from England had been in the same circumstances for seven months; nor had any of them been in a place capable of supplying vegetable refreshments from the time they left Barbadoes in the end of January. But though no fresh meat or vegetables could be procured at St. Lucia or St. Eustatius, yet the scurvy did not make such progress in the ships that lay at anchor there, as in those that were at sea; and it appears that the time in which it prevailed most was, while the greatest number of ships was at sea, that is, in the month of March. It appears, indeed, by the Table, that there was a greater number ill of this complaint on the 1st of May than on the 1st of April; but it appears also, that more were sent to the hospital in March than in April, and very near half of the May list must have been taken ill in March[4]. The difference of being in port and at sea consists chiefly, 1st, In there being plenty of water while in port, so that it can be used freely, not only to drink, but to wash the clothes; and we know that cleanliness tends greatly to ward off the scurvy. 2dly, Though no fresh meat nor vegetables could be procured at those ports, sugar, which may be considered as a very antiscorbutic article of diet, could always be procured at a very cheap rate, and the seamen, when in port, used to exchange their salt provisions for it. 3dly, There is at sea a dismal uniformity of life, favourable to indolence and sadness, and therefore tending to hasten the progress and aggravate the symptoms of the scurvy; whereas the change of scene and variety of objects, when in port, tend to cheer and recreate the mind, and thereby to avert this disease.

The squadron that came from England under Lord Hood, suffered, upon the whole, much less from acute diseases, during the first months of their service in this climate, than the ships that arrived with Lord Rodney, which was probably owing, in part at least, to the former having arrived at the driest and coolest season of the year. The Barfleur, however, had a large proportion of all the three prevailing diseases; and large ships are in general more subject to them than those of a smaller rate. But of all the ships in the fleet, the Alfred had the greatest proportion of the three sea epidemics. The Prince William suffered more than any other ship in the fleet from the flux, and the Princessa from the scurvy. In some instances, reasons can be assigned for the prevalence of particular diseases in particular ships, such as accidental infection, or the manner in which they have been victualled, manned, or disciplined; but in many cases the cause is so subtile or obscure as to elude our inquiry.

The most healthy of the new squadron, during this campaign, were the Belliqueux and Panther; the former was a new ship, and came from England with a very irregular and ill-disciplined crew. Soon after arriving in

the climate, she was threatened with a dysentery, which, though it spread a good deal, did not prove severe nor mortal; but being left at St. Eustatius on this account, while the rest of the fleet was cruising, she soon became very healthy, and remained so. This is the second instance we have had occasion to remark of a new ship being healthy.

The Panther preserved her health by being on small separate cruises, and frequently in port, not being attached to the main squadron. The Sandwich was the only other ship not engaged in the long cruise.

Of the ships lately from England, that were employed in this cruise, the Gibraltar seems to have been the least sickly. This ship left England healthy; but having received a draft of dirty men when upon the eve of sailing, a fever of the infectious kind broke out on the passage, so that she arrived in the West Indies in a sickly state. This fever disappeared very soon after; and it is proved by this, as well as other facts, that a warm climate, so far from tending to generate, or even to foster the infection of fever, tends rather to extinguish it. The Gibraltar had been put under excellent discipline by her former commander, while in the Channel service; and this being afterwards kept up, the men were always clean and regular. This was the Spanish Admiral's ship, taken by the fleet under the command of Lord Rodney off Cape St. Vincent's, in January 1780. She was then called the Phœnix, and was of a singular excellence both with respect to materials and construction. Whether the cedar, of which a great part of her timbers consisted, contributed to the healthiness, by its balsamic effluvia, I will not pretend to determine.

The Invincible was also uncommonly healthy during this cruise, which may likewise be ascribed to good discipline, and to her having been more than three years in commission before sailing from England, whereby the men were brought into order, and accustomed to each other and to a sea life. This ship was almost singular in having no acute diseases for several months after arriving from Europe; but at length paid the tribute to the climate in May and June, as may be seen in the Table.

From the account of the three frigates at the bottom of the list in the Table, it appears how much more healthy they are than ships of the line. The total complements of the three is exactly equal to that of one seventy-four-gun ship; but their whole sickness and mortality is less than that of any one ship of the line of that class, although the Triton was uncommonly sickly for a frigate.

There seem to be several causes for the superior degree of health usually enjoyed by this smaller class of ships. There is less chance of mixtures of men in frigates, as their complement is smaller, and it is more easy for the captain and officers to keep an eye over a few men than a great number; for, in a great ship, there are generally men, who, concealing themselves in the most retired parts, no one takes cognizance of them, and they destroy themselves, and infect others, by their laziness and filth. In the next place, there is a greater proportion of volunteers and real seamen in frigates, and more landmen and pressed men in ships of the line, the former being more in request, on account of the greater chance of prize money. Lastly, a small ship is more easily ventilated, and the mass of foul air issuing from the hold, from the victuals, water, and other stores, as well as the effluvia exhaling from the men's bodies, is less than in a large ship.

Many other and more minute remarks might be made on different ships in this season of hard service; but to do this would be tedious, and the inspection of the Tables may suggest observations to the reader. There is a striking and instructive fact, however, with regard to two ships, which I cannot help relating. The Alcide and Invincible, both of seventy-four guns, in working to windward, after the action with the French fleet, on the 29th of April, anchored at Montserrat on the 11th of May, in order to water. They remained there only part of two days, and they procured no refreshment, except a few bushels of limes. The scurvy then prevailed to a great degree in both ships; but between this time and the 23d of May, when they came to an anchor at Barbadoes, sixty men, who had been confined with this disease, were discharged, as fit for duty, from the sick list of the Invincible, and a hundred and fourteen from that of the Alcide. These were the only two ships that had the advantage of the limes; and during these twelve remaining days of the voyage the scurvy continued to increase in all the other ships. Dr. Lind is the first author who gives a decided preference to lemons, limes, and oranges, over every other antiscorbutic; and the above-mentioned fact proves as demonstrably as possible the infinite advantage of this species of acid in scurvy.

The fleet was supplied with essence of malt during all this campaign; and though it was, no doubt, of service, it was far from having that powerful and manifest effect that the acid fruits had, and certainly did by no means prevent the scurvy in all cases. I have strong testimonies, however, of its beneficial effects from the surgeons of several of the ships, particularly of the Gibraltar, Centaur, Torbay, and Alcide, in all of which it was found either to cure the scurvy in its first beginning, to retard its progress, or to mend the appearance of scorbutic ulcers, and dispose them to heal.

I had conceived that melasses, being a vegetable sweet, must have been a very powerful antiscorbutic; but the greatest part of the last reinforcement of seven ships came from England furnished with this as an article of victualling, as a substitute for a certain proportion of oatmeal, which was withheld agreeably to a late very judicious order of the Admiralty. But though I am persuaded that this article of diet mitigated the disease, it was very far from preventing it; and the Princessa in particular, which suffered most from the scurvy, was well supplied with it.

There is reason to think that it is not in the vegetable sweet alone that the antiscorbutic principle resides, but in this in conjunction with the natural mucilage, such as exists in the malt. I suspect likewise that the change which the essence undergoes in its preparation tends also to rob it of some of its original virtue. But the melasses are still farther altered by being deprived of the natural mucilage by means of quick lime, with which all sugar is clarified in the boilers. Dr. Hendy, of Barbadoes, to whom I have been obliged for several remarks, informed me, that the liquor, before it undergoes this operation, has been found by him to produce the most salutary effects in the scurvy; but as this cannot be had at sea, we had no opportunity of comparing it with other antiscorbutics. It is certain also that the medical effects of the native sweet juices are, in other respects, very different from what they are in their refined state; for manna, wort, and the native juice of the sugar cane, are purgative; whereas sugar itself is not at all so[5]. This affords a presumption, that they may be also different in their antiscorbutic quality; and there is reason to think, from experience, that the more natural the state in which any vegetable is, the greater is its antiscorbutic quality. Vegetables, in the form of sallads, are more powerful than when prepared by fire; and I know, for certain, that the rob of lemons and oranges is not to be compared to the fresh fruit. Raw potatoes have been used with advantage in the fleet, particularly by Mr. Smith, of the Triton, who made the scorbutic men eat them, sliced with vinegar, with great benefit. This accords also with what Dr. Mertans, of Vienna, has lately communicated to the Royal Society of London.

When the fleet arrived at Barbadoes on the 23d of May, it was found that the number of sick on board amounted to sixteen hundred, and that there was not accommodation for more than two hundred at the hospital. As there was hardly any complaint but scurvy, the Admiral, at my representation, issued an order for serving the sick on board of their own ships with fruit and other vegetables and refreshments, such as milk and soft bread. This course of diet commenced in the beginning of June; and as the greater part of the fleet was near four weeks thereafter in port, they enjoyed the advantages of it during that time; and the very great diminution of sickness and mortality, which appears by the Tables in that month, sufficiently evinces the benefit derived from it. In less than four weeks the fleet, from being very sickly, became extremely healthy.

It was remarked, that the men recovered faster on board than on shore; and it would appear that land air, merely as such, has no share in the cure of the scurvy, and that the benefit arises from the concomitant diet, cleanliness, and recreation. The expedient of curing men on board of their ships was here suggested by necessity; but it succeeded so well, that it was adopted afterwards in preference to an hospital, which is indeed a useful relief to a fleet where there are contagious, acute disorders; but with regard to scurvy, I am convinced, that on foreign stations, at least, where the accommodations of the sick are more indifferent than in England, many advantages would arise from supplying men with refreshments on board of their ships. It appears that only four men died of this disease in the whole fleet in the month of June, though there were so many ill of it; whereas it appears by the books of hospitals, that scorbutic men die there in a much greater proportion, and chiefly in consequence of other diseases, particularly the flux, which they catch by infection, or bring on by intemperance. It is farther in favour of this scheme, that great numbers of those sent on shore

are lost by desertion. It is also a great saving to Government, the expence not being a fourth part of what it would cost at an hospital.

The fleet left Barbadoes on the 10th and 12th of July, and continued healthy till the greater part of it sailed for North America in the beginning of August.

PART I.
BOOK II.

ontinuation of the MEDICAL HISTORY of the FLEET, from August, 1781, till the Conclusion of the War in April, 1783.

CHAP. I.

ɔme Account of the Interval between the Campaign of 1781 and the Junction of the Reinforcement from England in April, 1782.——The main Body of the Fleet goes to North America—Lord Rodney goes to England, and returns to the West Indies with twelve Ships of the Line—Health of the Fleet in England —Sickness most prevalent in the Beginning of a War—A natural Tendency to Recovery in Ships and Individuals—Advantages of this Squadron in point of Victualling.

When the main body of the fleet went to America in August, Lord Rodney went to England for the recovery of his health.—Wishing to lay before the public boards several reforms that suggested themselves to me in the course of the late service, I accompanied the Admiral, purposing to return when the season for hostile operations should have brought back the fleet from the coast of America.

Soon after arriving in England, I presented a memorial[6] to the Board of Admiralty, proposing such means for the preservation of the health of the fleet as had occurred to me during my past service.

The Board of Admiralty considered this memorial with all the attention that could be expected in the general hurry of service, inseparable from a great and extensive war; and I am happy in being able to say, that, in consequence of my application, most of the particulars recommended have since been so far carried into effect as to produce a practical conviction of their utility.

Lord Rodney having recovered his health, hurried out to his station with all the force that could then be equipped, as the enemy were expected at the Caribbee Islands, with a superior force, after their successes against us in the autumn campaign in America.

I had again the honour to accompany the Admiral. He first sailed from Portsmouth, with four ships of the line, on the 14th of December, and was to have been joined by two more that lay ready at Plymouth; but by the time we arrived off this harbour the wind became contrary, whereby we were detained there till the 14th of January, 1782. During this time more ships were got ready, and six were added to the squadron; for the public anxiety at that time called forth every exertion to strengthen this reinforcement, upon which the fate of the whole West Indies was supposed to depend.

This fleet cleared the Channel in the midst of a storm, and with the wind at the same time so scanty, that we barely weathered Ushant; but Lord Rodney's perseverance and resolution, stimulated by the exigency of the occasion, banished all hesitation and timidity. The rough weather, and contrary winds, continued through the variable latitudes; but having met with fresh blowing trade winds, common at that season, we had the good fortune to get safe to Barbadoes with the whole squadron on the 19th of February.

All the twelve ships[7] of this reinforcement had been on service for a considerable length of time since they had been last commissioned, except the Anson, a new ship, which had never before been at sea, and the Fame and Yarmouth, which had lately undergone a thorough repair, since which time they had been only for a few weeks at sea in the Channel before they were ordered on this expedition.

The only ship that was sickly when we left England was the Fame, on board of which some pressed men, with the infection about them, had been received from the Conquestadore guardship; and the fever which broke out in Plymouth Sound, where I was first sent for to visit that ship, was probably owing to the infection which these men brought with them. The other ships were, upon the whole, healthy; for it appeared by the weekly accounts delivered to the Admiral, that the mortality, including even that of the Fame, for the four weeks before we sailed, had been only one in thirteen hundred, and that there had been about one in twenty-nine on the sick list.

An opportunity offered on this occasion of comparing the health of ships of war in England with that in the West Indies. The health of the fleet in general at home was at this time about the proportion above mentioned; but it is to be remarked, that it was healthier then than in the former part of the war.

Plymouth hospital, which is calculated for twelve hundred men, was not half full; and there were not at this time more than six hundred men at that of Haslar, which is calculated to contain two thousand; but the latter was generally full during the first two or three years of the war, from the great fleets that put into Portsmouth. At one time part of the sick were even obliged to be accommodated with tents in the neighbourhood of the hospital, for want of room. But towards the end of the year 1781 the infectious fever, which constitutes a great part of the sickness in the European seas, was almost extirpated, and in a cruise of five weeks in the north part of the Bay of Biscay, under Admiral Darby, in September and October of this year, only six men were buried in that time from twenty-eight ships of the line.

This was chiefly owing, as I apprehend, to the length of time which the war had continued, in consequence of which the men of the respective ship's companies had been accustomed to each other, and habituated to the mode of life peculiar to a man of war, regulating themselves according to certain rules of good order and cleanliness. The causes of the fever above mentioned, as shall be more fully illustrated hereafter, are chiefly connected with the circumstances occurring in the beginning of a war, when men of all descriptions are mixed, without proper precautions being taken to guard against the infection imported from jails or guardships. The sickness in the French fleet was still greater in the beginning of the war than in the British; and this has been the case in all the wars of this century. In the fleet commanded by the Comte d'Orvilliers, in 1779, the sickness was so great as to disable many of the ships from service, and great numbers of men were landed at Brest, with a fever so malignant as to infect the inhabitants of the town and country adjacent. I believe, besides, that the general health prevailing at this time in the fleet in England, was, in part, owing to the sour crout and melasses, which were now supplied more amply than had ever been done before. The entire exemption from scurvy in particular is to be ascribed to these improvements in diet.

There is a tendency in acute diseases to wear themselves out, both in individuals that labour under them, and when the infection is introduced into a community. Unless there was such a *vis medicatrix*, there could be no end to the fatality of these distempers; for the infectious matter would go on multiplying itself without end, and would necessarily destroy every person who might be actually attacked, and would infect every person who might be exposed to it. But animal nature is so constituted, that this poison, after exciting a certain set of motions in the body, loses its effect, and recovery takes place; and those who happen not to be infected at first, become in some measure callous to its impression, by being habitually exposed to it. There is, therefore, a natural proneness to recovery, as well with regard to that indisposition which takes place among a set of men living together, as with regard to a single individual who actually labours under the disease. Thus the most prevailing period of sickness is when men are new to their situation and to each other, so that time of itself may prove the means of prevention as well as of cure.

This consideration, however, ought not to supersede any part of our attention with regard to the scurvy, which does not become spontaneously extinct like acute diseases.

During the three first weeks of this passage from England to the West Indies, there was wet and boisterous weather, but it had very little effect in augmenting sickness; and though it not only subjected the men to fatigue, cold, and damp, but prevented the ships from opening their lower-deck ports till the 2d of February, between the 31st and 32d degree of latitude, thereby producing close air and moisture where the men sleep, yet, in the whole squadron, from its leaving England till this time, there were only seven deaths, four of which were in the Fame.

The only sea epidemic that made its appearance was the infectious ship fever, which, in many cases, was attended with pleuritic, rheumatic, and other inflammatory symptoms, owing to the cold and wet, to which the men were exposed in the variable latitudes. The warm, dry, fresh breezes which we had during the remainder of the passage, were probably what prevented any bad consequences from the former hardships, for there died only four men from the above-mentioned date till we arrived at Barbadoes; and it appeared by

the Admiral's weekly account, that the proportion of the sick neither increased nor diminished from the time we got into a warm climate and fine weather till our arrival on the 19th of February.

This squadron left England with several advantages in point of victualling, which no ships had before enjoyed. They were amply supplied with sour crout and melasses; they had all more or less wine, of an excellent quality; and the Formidable had an entire supply of it, in place of spirits, of which none was put on board. This slip had hitherto, and did for some months afterwards, enjoy an extraordinary, perhaps an unparallelled, degree of health. What farther contributed to the health of this ship was, that she had been long in commission, and most of the recruits with which the crew had been completed were men turned over from other ships. There was also extraordinary medical attention paid, particularly in watching the first beginnings of complaints.

Upon the arrival of the squadron at Barbadoes, it was found, that, the two hostile fleets having returned from North America in the beginning of December, the campaign had opened with the siege of St. Christopher's, which had been invested by twenty-eight ships of the line, and a considerable army. Our fleet, under Lord Hood, having attempted, with great enterprise and skill, but without success, to relieve it, Lord Rodney made haste to join them with the reinforcement he had brought from England. He remained at anchor at Barbadoes only one night, and in a few days came off Antigua, where he was informed of the surrender of St. Christopher's; and here, on the 25th of February, he was joined by the rest of the fleet in their return to windward.

CHAP. II.

Account of the HEALTH of the FLEET from the Junction of the Squadron from England, till the general Rendezvous at St. Lucia in the Beginning of April.——The Fleet found on the Station very healthy—Health of the Ships from the American Station—Health of the Ships from England compared with that of the Ships found on the Station—Small-pox prevalent—Instance of the remarkable Efficacy of Lemon Juice in curing the Scurvy—Additional Reinforcement from England—Watering Duty dangerous and unhealthy—The most healthy Ships those that had been longest in the Climate—List of the Numbers taken ill of each Complaint in March—Inflammation of the Liver not common in the West Indies.

The fleet which was found in the West Indies consisted of all the sixteen that went from thence to America in August, 1781, (except the Terrible, which had been lost) together with six ships of the line[8] from the American station, the St. Albans, which arrived from England in November, and the Russel, which had remained in the West Indies during the hurricane months. They were all extremely healthy, having only one man in twenty-eight on the sick list, and very few had been sent to hospitals.

This fleet, after arriving from America, had lain at anchor for three weeks at Barbadoes, where it had the advantage of the vegetable refreshments which that island affords; but during three weeks that it lay at anchor, in the face of the enemy, at St. Christopher's, the men were excluded from all communication with the shore, and had no vegetable food, except some yams, with which they were supplied from Antigua, in place of biscuit, of which there was at this time a scarcity. These ships had therefore been in no port for six weeks, except for a few days that they lay in the road of Antigua refitting, and putting the sick and wounded on shore.

The men had also been deprived of their natural rest, and exposed to the air during all the time that the fleet was at anchor before St. Christopher's; for they had been twice attacked by the enemy in that situation, and were therefore under the necessity of keeping the ships constantly clear for action; yet no increase of sickness followed. This might partly be owing to the eagerness and alacrity of spirits naturally excited in such a situation, and also to the fleet not lying under the lee of any land, and having springs upon their cables, so that they had all the perflation and all the purity of air which ships enjoy when at sea. The fumigation which ships undergo in battle, has also been thought to contribute to their health.

To whatever cause it was owing, the fleet we found in the West Indies was at this time healthier than that which had just come from England; and there was but little difference in the degree of health of the different ships that composed it. Of those which left the West Indies in August, and returned in December, the only one that could be said to have any epidemic disease was the Prince William, which had never got entirely free from the dysentery that was formerly mentioned as prevailing so much on board of this ship last year. The disease was kept up, by the ship never having been cleared of the men affected with it, and by the crew in general being ill provided with slops[9], a circumstance that would render them more susceptible of whatever infection they might be exposed to.

There were also some remains of the same disease in the Intrepid, the seeds of it having been more or less continued from the summer of 1780, at which time it prevailed to a most violent degree. The Alfred had a few of all the sea epidemics, and had been for a long time before more or less in the same situation, from a neglect of cleanliness, particularly of the men's persons.

The only ship in which there was any thing like an epidemic was the Canada, This ship, when at home, had for many months before she sailed been in unremitting service, and very little in port. On the passage from England to America, in August, 1781, there broke out a severe dysentery, to which the scorbutic habit of the men, from being so long at sea, probably predisposed them. Though it had abated much in February, 1782, it was then by no means extinct, and continued till April. The Prince George had been in commission all the

war, and was a model of discipline and cleanliness, and consequently of health. This continued till the passage from America, when, upon the first cold weather after leaving New York, there broke out a violent dysentery, of which sixteen men died. This is agreeable to what Dr. Lind observes, that the flux may be brought on by a sudden transition, either from cold to heat, or from heat to cold. All the men that were ill of this disease having been sent to the hospital at Barbadoes, and the usual attention to cleanliness having been kept up, the disease entirely vanished.

All the other ships of the American station had been more or less visited with sickness after they left England, except the Bedford. This was probably owing to this ship having been longer in commission than any of the others, that is, for four years, and all that time under the same commander. This last circumstance falls to the lot of few ships; but a great advantage attends it; for the mutual knowledge and attachment of the captain and ship's company is naturally productive of regularity and good discipline, and thereby of health.

The Royal Oak, Prudent, and America, which left England with the Bedford, though they had been afflicted with the scurvy and other complaints soon after arriving in America, had been quite healthy for some time before coming to the West Indies, and were so much so at this period, that, though there were a few sores and slight complaints on their sick lists, there was not a man confined with illness, so as properly to be called sick. The Royal Oak, having been the flag ship of Admiral Arbuthnot, was manned with choice seamen, which is a circumstance generally conducive to health; for these being accustomed to a sea life, are more provident, more handy and methodical in all that relates to diet, cloathing, and cleanliness. The scurvy, which infected her upon first arriving in America, was successfully treated on board by serving to those who were ill of it a mess, composed of soft bread, baked on purpose, and mixed with wine and essence of malt.

The Prudent, though now quite healthy, had been sickly soon after being put into commission in Europe, and upon first arriving in America. She had been uncommonly sickly, when a new ship, upon her first voyage, which was to the East Indies, during the peace. This remarkable degree of sickness was probably owing to a particular experiment that was made in preparing the wood of which she was built. This experiment consisted in soaking the timber for a length of time in a strong pickle, in order to make it less corruptible. The only other ship on which the trial of this was made was the Intrepid; and it has been already mentioned that this was an extremely sickly ship. The effect of it upon the wood was to cause a constant moisture and mouldiness in the orlops and holds. In the Intrepid, the sickness was never conquered till a practice was followed of pumping and bailing her with great care, and putting a fire into the well for six hours every day, by which means the dampness, and the mildew produced by it, were removed and prevented, and the ship thereby rendered healthy.

The two squadrons being united, and consisting of thirty-four ships of the line, proceeded to St. Lucia, where they arrived on the 1st of March.

I received monthly returns as formerly, and the form of them was improved by adding a column for the numbers taken ill of the several diseases in the course of the month. The returns of February are not complete, there being none for the 1st of that month, as we had not then arrived; but as the returns of the 1st of March have relation to the preceding month, a judgement may be formed of the sickness and mortality of February from the following table:

Extract from the Returns of the 1st of March, 1782.

DISEASES.	Put on the Sick List last Month.	Died last Month.	Sent to the Hospital last Month.
Fevers	53	15	9
Fluxes	263	67	0
Scurvy	121	2	5

Other Complaints	618	25	59
Total	1555	109	73

This account is abstracted from the returns of twenty-nine ships of the line, and two frigates.

The diseases and deaths under the head of “Other Complaints,” is much more numerous in this month than usual, which is chiefly owing to the preceding actions with the enemy, and to the prevalence of the small pox. Of the deaths under this head, seventeen were in consequence of wounds, six from small pox, one from a mortification[10] in the shoulder, and one from consumption.

None of the epidemics affected one part of the squadron more than another, except that the ships last from England had a less proportion of the flux than the rest; and the few cases of this disease that were in these ships arose after their arrival in the climate. The Conqueror and Fame, which were the two most sickly ships, had no complaints but fevers.

The fevers had now begun to take on some of the characteristic symptoms of the climate; the chief of which is a greater abundance of bile. In the Repulse, two men had the yellow colour of the skin, which is so peculiar to the fevers of this climate.

The crew of the Anson caught an infectious fever from a guardship in England; and when the Prothée sailed, there was a fever of the same kind on board; but from the change of climate, the symptoms became milder, and the disease disappeared in both these ships in the course of this month.

The small pox prevailed more at this time in the fleet than I have ever known it to do either before or since, and that both in the squadron from England and in that from North America. There were six cases in the Formidable, all of which did well, though two were of the confluent kind.

Though there needs hardly any additional proof of the extraordinary efficacy of lemon juice in curing the scurvy, yet it may be of service to impress so useful a truth on the mind by mentioning such striking proofs of it as occurred from time to time. The Arrogant spoke with a Portuguese vessel near Madeira, from which some of this fruit was procured, and the only scorbutic man on board happening to have some of the most desperate symptoms, such as putrid gums, contracted hams, the calves of the leg hard and livid, and frequent faintings, a fair opportunity offered for trying its virtues. The man was allowed two of them daily, and was perfectly well in sixteen days, during all which time the ship was at sea, so that it was impossible to ascribe the cure to any other cause.

The fleet remained at St. Lucia from the 1st till the 18th of March, completing the water, provisions and stores, landing the sick at the hospital, and also watching the motions of the enemy, who arrived about the same time at Martinico from the siege of St. Christopher’s. During this time we were reinforced with the Duke, of 90 guns, and the Warrior and Valiant, of 74 guns, from England. On the 18th the whole fleet, except the Invincible, which was detached with a convoy to Jamaica, sailed on a cruise to windward of Martinico, in quest of a French convoy expected from Europe; which having eluded us, and got into their own harbour, the whole fleet returned to St. Lucia on the 30th of March, excepting the Prudent, which was sent to Barbadoes.

We found at St. Lucia the Magnificent, of 74, and the Agamemnon, of 64 guns, which were the last reinforcement of this campaign, making the British fleet on this station amount to forty ships of the line, a much greater force than was ever before employed on foreign service. They were all copper bottomed.

The weather continued fine all this month, yet there was some increase of sickness, owing chiefly to the hardship the men underwent in wooding and watering. In Choc Bay, where the fleet watered, there was at this time a higher surf than was ever remembered, which made the operation of watering (at all times noxious in this climate) uncommonly toilsome and dangerous. It was, indeed, next to impracticable; for

many longboats were staved on the beach, by which several men had their limbs broken, and some lost their lives, by being crushed or drowned; but the necessity of the service admitted of no relaxation or delay. There was no increase of wind to account for this surf, so that it was owing either to something in the currents, or to some subterraneous cause; and there had been felt at Barbadoes and St. Lucia, about this time, a slight shock of an earthquake[11], to which many imputed this extraordinary surf. In other respects, there were fewer causes of sickness than usually occur to a fleet in port in this part of the world; for the air of the road is remarkably pure, and there were fewer temptations and opportunities of intemperance than at the other islands.

The monthly returns of the surgeons were very full and complete; but as it would be tedious to insert at length those of every particular ship, and as the number of ships fluctuated in different months, I shall do no more hereafter than set down the general results from calculation, so as to shew the proportional prevalence of disease and mortality in each month.

TABLE, shewing the proportional Sickness and Mortality in March.

Transcriber's Keys:
A Proportion of those taken ill in the Course of this Month.

B Proportion of those who died, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	20	64
Fluxes	35	71
Scurvy	126	0
Other Complaints	33	108
General Proportion	9	76

The first column is formed by dividing the whole number on board by the number taken ill. The second column is formed by first adding the number ill on board on the first of the month to the number taken ill during the month, subtracting from this sum the number sent to the hospital, and dividing the remainder by the number of deaths.

The number on the sick list of twenty-eight ships of the line, and two frigates, on the first of this month, was eight hundred and forty-five; the number put on the lists in the course of the month was one thousand eight hundred and eighty-four; and the number sent to the hospital in the same time was three hundred and seventy-three; and there died on board thirty-one.

The total mortality this month, in relation to the whole number of men on board, was one in six hundred and seven.

It almost always happens, that ships of war are more or less short of complement, and allowance is made for this in all the calculations; for having had an opportunity of inspecting the weekly accounts delivered to the Admiral, it was always in my power to be informed how many there were short of the legal complement of men in each ship.

It appears, from comparing the Tables of this month with those of the preceding, that there had been a great increase of fevers and fluxes, particularly of the latter. The fevers prevailed chiefly in the ships lately from

England, especially the Fame and Conqueror. In the Duke there were a great number ill of fevers; but this ship not having arrived from England till after the first of the month, is not included in the calculation. The fluxes were most prevalent in the ships we found on the station, particularly the Canada, Resolution, and Nymph frigate. The scurvy had increased very little, but prevailed most in the ships we found here. The only ships of the new squadron that had this disease to a considerable degree, were the Conqueror and Nonsuch. The former had indeed a good many ill of it; but the return having been made in an imperfect manner, this ship is not included in the calculation.

But the ships that were by far the most healthy were those that had been the longest from England, the Ajax, Russel, Montague, Royal Oak, and Prudent. There had been formerly a great mortality in all these ships; and it would appear that this uncommon degree of health was owing, in some measure at least, to this circumstance, that the most weakly had been swept off by the different distempers to which they were exposed; so that only the more hardy and robust had survived.

Under the head of "Other Complaints," a much smaller number were put on the list, and still fewer died, in this than the preceding month. This difference is owing to the number that died of wounds last month.

There died on board, in the course of this month, thirteen of fevers, seven of fluxes, and seven of other complaints, of whom five died of small pox, one of asthma, and one of wounds he received at St. Christopher's.

In order to show more fully and minutely what are the complaints incident to fleets in this climate, I shall set down a list of the numbers taken ill of the different diseases and accidents during this month, extracted from the returns of twenty-eight ships of the line, and two frigates.

Fevers	806
Fluxes	463
Scurvy	130
Ulcers	129
Small pox	49
Pectoral complaints	40
Venereal complaints	32
Colds	30
Rheumatism	18
Angina	10
Gravel	3
Dropsy	1
Ophthalmia	1
Leprosy	1
Fistula in ano	3
Hernia humoralis	1
Abscess	1
Fractures	3
Various slight accidents, as bruises, cuts, scalds, &c.	163
Total	1884

The number of ulcers bears here a smaller proportion to the whole than it does in general to the sum total of the sick list; for being the most tedious of all complaints, they consequently accumulate more than any other. Thus many of the cases now set down as slight accidents, will, in the ensuing month, be in the state of obstinate ulcers.

Most of the diseases of one hot climate resemble those of another, so far as I know; but there is one disease which we hear of as being extremely prevalent all over the East Indies, which is hardly ever met with in the tropical regions of the West. This is the inflammation of the liver, of which I remember to have seen only one well-marked case, and it was that of a gentleman who had been in the East Indies, and had been subject to it there: nor do I recollect more than one, or at most two, cases of this sort out of several thousand cases of various diseases that were reported to me. This is either owing to the greater heat and dryness of the air in the East Indies, or some other peculiarity with which we are not acquainted[12].

Every other inflammatory complaint exists more or less, though they are much rarer than in cold and temperate climates. The phthisis pulmonalis is not so common as in cold climates, but proves sooner fatal to most constitutions. There are certain pulmonic complaints, particularly those of the asthmatic kind, to which the climate of the West Indies is remarkably favourable; but those in which there are tubercles and ulceration seem to be hurried faster to a fatal termination. The climates, from the thirtieth to the fortieth degree of latitude, seem to be best suited to consumptive complaints. The rheumatisms that occur in hot climates are mostly of the chronic kind.

CHAP. III.

tate of Health of the Fleet in April 1782——Battles on the 9th and 12th—The Fleet very healthy—from the Quality of Provisions—from the Effects of Victory—Advantages of close Action—What Diseases most prevalent—Extraordinary Degree of Health in the Formidable.

This month being interesting, on account of the memorable engagements that happened in it, the remarks shall, for this reason, be somewhat more full and particular.

Three ships of the line having been sent to protect convoys to Jamaica, and one having been sent to protect a convoy to Barbadoes, there remained thirty-six at St. Lucia in the beginning of this month. By the end of the first week their damages were repaired, their water and provisions complete, and the sick in a great measure recovered.

An equal force of the enemy lay over against us at Martinico, the two powers of Britain and France being to make this distant quarter of the world the theatre for trying their strength, and deciding the sovereignty of the seas. In the view of this great event, our commander forwarded the necessary duties of the fleet with such zeal and diligence, and watched the motions of the enemy with such vigilance, that he overtook their grand squadron a few hours after they left their own port, and engaged them two several days, with a success, glorious and complete.

Nothing had been wanting to equip this fleet for the great and decisive exertion it was to make. Every ship, except two, might be said to be healthy, most of them were complete in men, well appointed with officers, and well found in stores and provisions.—Conformable to this was the eagerness, the confidence, and resolution, which led them to success and victory.

After this battle, the whole fleet, with the prizes, bore away for Jamaica, where part of it arrived on the last days of April, but the greater part of it kept the sea, till after the middle of May.

As this month is more than usually interesting, the tables are given at full length, and a column is added for the wounded.

The sum total, of the numbers of the men on board of the thirty-six ships that composed the line of battle on the 12th of April, was 21,608, and the mortality during the month, exclusive of those who were killed or died of wounds, was one in 862.

There was less sickness, and less death, from disease in this month, than any of the former twenty-three months, in which I kept records of the fleet, and less than in any subsequent month, till the fleet got to the coast of America.

To account for this, it is to be observed, that the men had not been exposed to the noxious air of the shore in watering, as in the preceding month: they had received from England a fresh supply of provisions, among which was sour krout, melasses, and essence of malt, all in addition to the ordinary articles of victualling: many of the ships were supplied with wine, in place of rum, and as the weather was all along dry and fine, the men suffered the less from the exposure and want of sleep, which are the necessary consequences of keeping ships clear for battle for several days and nights together.

TABLE V.

ABSTRACT of the RETURNS for APRIL, 1782.

Transcriber's Keys:
F Sick on board on the 1st of the Month.
M Put on the List during the Month.
D Dead.
H Sent to the Hospital.

SHIPS' NAMES	FEVER.				FLUX.			
	F	M	D	H	F	M	D	H
* Formidable	0	6	0	1	2	7	0	0
Barfleur	6	20	0	1	5	13	0	1
Prince George	0	12	2	1	4	18	1	0
* Duke	57	78	2	32	0	3	0	0
* Namur	5	14	0	2	11	9	0	3
Royal Oak	1	4	0	0	11	23	0	3
Alfred	8	46	1	0	6	14	0	0
Montagu	6	11	0	0	8	2	1	5
* Valiant	§	10	1	0	§	0	0	0
Monarch	5	21	1	0	3	10	0	1
* Warrior	0	2	0	0	6	12	0	0
Centaur	12	20	0	1	10	15	0	1
* Magnificent	0	21	0	0	0	8	0	0
Bedford	11	20	0	0	3	27	0	0
Ajax	0	0	0	0	0	0	0	0
Canada	0	6	1	4	24	70	2	0
Resolution	19	25	1	0	21	27	0	0
* Hercules	2	38	0	4	5	18	0	0
Russel	3	3	0	0	5	4	0	0
* Fame	36	50	0	0	3	8	1	0
Torbay	10	10	0	0	9	2	0	0
Princessa	1	2	0	0	2	8	0	3
* Conqueror	30	§	1	11	0	§	0	0
* Arrogant	2	16	0	0	6	33	0	0

* Marlborough	7	19	2	0	12	21	1	0
* Yarmouth	0	3	0	0	4	3	0	0
Belliqueux	43	118	0	0	6	4	0	2
Prince William	4	27	0	0	2	24	0	0
* Repulse	20	40	0	0	2	2	0	0
St. Albans	1	22	0	0	0	6	1	0
* Agamemnon	2	5	0	0	0	1	0	0
* Prothée	6	13	1	0	5	49	0	0
America	2	5	0	0	3	14	0	0
* Anson	3	6	0	0	0	26	0	0
* Nonsuch	6	11	1	0	0	4	0	0
Alcide	2	6	0	2	7	16	0	0
Ramillies	§	26	1	4	§	6	0	0
Nymph	2	7	0	0	8	9	0	0
Flora	0	0	0	0	2	0	0	0
Total	312	743	15	65	195	516	7	19

SHIPS' NAMES	SCURVY.				WOUNDS.			
	F	M	D	H	F	M	D	H
* Formidable	0	5	0	0	0	37	0	0
Barfleur	6	30	0	1	0	37	8	6
Prince George	0	7	0	0	0	14	3	0
* Duke	0	1	0	0	0	60	2	0
* Namur	8	5	0	2	0	25	0	0
Royal Oak	1	1	0	1	0	54	5	15
Alfred	15	14	0	2	0	30	0	0
Montagu	2	2	0	0	0	25	5	0
* Valiant	§	0	0	0	0	37	0	0
Monarch	0	1	0	1	0	33	2	1
* Warrior	0	0	0	0	0	20	0	0
Centaur	5	15	0	0	0	14	0	0
* Magnificent	7	16	0	0	0	20	0	0

Bedford	1	10	0	0	0	17	4	0
Ajax	0	0	0	0	0	30	1	5
Canada	1	8	0	0	1	12	0	0
Resolution	0	0	0	0	0	19	2	0
* Hercules	0	12	0	2	0	18	0	0
Russel	0	1	0	0	4	29	3	1
* Fame	0	7	2	0	1	12	2	0
Torbay	3	2	0	0	0	25	3	0
Princessa	0	0	0	0	0	19	2	0
* Conqueror	10	§	0	0	0	23	2	0
* Arrogant	4	10	0	0	0	11	0	0
* Marlborough	0	6	0	0	0	16	1	1
* Yarmouth	3	3	0	0	0	33	2	0
Belliqueux	0	3	0	0	0	10	0	0
Prince William	5	18	0	0	1	0	0	0
* Repulse	3	2	0	0	0	9	1	0
St. Albans	0	0	0	0	0	7	1	0
* Agamemnon	0	0	0	0	0	23	7	0
* Prothée	0	0	0	0	0	24	2	0
America	2	0	0	0	1	27	2	0
* Anson	1	1	0	0	0	13	0	0
* Nonsuch	18	25	0	6	0	2	0	0
Alcide	7	0	0	0	0	15	0	3
Ramillies	§	3	0	3				
Nymph	0	0	0	0	0	0	0	0
Flora	0	0	0	0	0	0	0	0
Total	103	208	2	18	8	810	60	32

N. B. The Ships marked thus, *, came from England in February and March, 1782.

All the Ships named in the Table were in the Engagements in April, except the Ramillies and the two Frigates.

In the Spaces marked thus, §, no Return was made.

Might not this extraordinary degree of health have also been owing, in part, to the effects of success upon the spirits of the men? It is related[13], that, when the fleet under Admiral Matthews was off Toulon, in daily expectation for some time of engaging the combined fleet of France and Spain, there was a general stop put to the progress of disease, particularly of the scurvy, from the influence of that generous flow of spirits, with which the prospect of battle inspires British seamen. But if the mere expectation and ardour of a battle, without any happy event, could have such a sensible effect, what must have been the effect of the exultation of VICTORY, a victory in which the naval glory of our country was revived and retrieved, after a series of misfortunes and disgraces, which had well nigh extinguished the national pride in every department of service! The plain and honest, though unthinking seaman, is not less affected by this than the more enlightened lover of his country. Even the invalids at the hospital demonstrated their joy, upon hearing of this victory, by hoisting shreds of coloured cloth on their crutches.

It would appear, that there is something in situations of exertion and danger, which infuses a sort of preternatural vigour. When the mind is interested and agitated by active and generous affections, the body forgets its wants and feelings, and is capable of a degree of labour and exertion, which it could not undergo in cold blood. The quantity of muscular action employed in fighting at a great gun for a few hours, is perhaps more that what is commonly employed in a week in the ordinary course of life, and though performed in the midst of heat and smoke, and generally with the want of food and drink, yet the powers of nature are not exhausted nor overstrained; even the smart of wounds is not felt; and the future health of those who survive unhurt by external violence is so far from being injured, that it is sometimes mended by this violent, but salutary agitation.

The loss in action, and the number of mortal wounds, were not so great as might have been expected in a battle continued for a whole day. This advantage was owing to the superiority of our fire, as well as to the closeness of the fight, of which the Commander in Chief set the illustrious example, by penetrating the enemy’s line with his own ship; a bold and singular effort which first decided the event of the day. When ships in action are opposed to each other at a small distance, the velocity of cannon balls is so great, that in

penetrating a ship's side, few or no splinters are torn off; and by these more men are commonly killed and wounded, than by the ball itself. For the same reason, a close shot does less damage also to the ship itself, than a distant one; for a quick-flying ball makes an aperture less than its own diameter, whereas a spent one produces innumerable deadly splinters, at the same time shivering the object it strikes, and making wide and extensive rents in it. The proportion of the wounded to the killed, is also greater in distant, than in close fight, on account of the great number of small splinters; and we have an experimental proof of this, in comparing the action in Fort Royal Bay in April 1781, with this near Dominica in April 1782. In the former, the enemy having kept far to windward, and engaged at a great distance, the proportion of the wounded to the killed was considerably more than four to one[14]; whereas in the latter, where the greater part of the battle was close, the proportion of the wounded to the killed, was little more than three to one[15].

Though it is a remark not belonging to a medical work, yet it may be observed, that the greatest advantage that arose to us from close action was, that the fire of the enemy was thereby silenced; for the advantages would be mutual and equal, on the supposition, that the French, in such a situation, were to keep the deck, and stand to their guns equally well with the British seamen.

It appears, by examining the table, that the ships in which the fevers chiefly prevailed this month, were those that came last from England, and that those in which the fluxes prevailed most were chiefly of the squadron we found on the station, namely, the Canada, Resolution, and Prince William. The latter however recovered greatly in the course of this month. Some of the Ships that arrived last from England, namely, the Arrogant, Prothée, and Anson, were also considerably afflicted with fluxes, but they were of an extremely mild kind; and the small number of deaths from this disease in comparison with those from fevers, is a proof of a former observation, that this is the safest form in which an acute disease can shew itself. This small degree of mortality was also owing to the judicious method of treating it which was in general practised throughout the fleet; and it is but justice to the medical gentlemen to say, that they shewed on this, as well as every other occasion, great skill and attention in the treatment of the sick and wounded.

The sum total of fevers and fluxes that have been put on the list this month, is much the same as that of the preceding month; but the proportion of fluxes in April is much greater.

The proportion of scurvy is somewhat increased; which is not to be wondered at, when it is considered, that though the fleet had not been so long at sea as is necessary to produce it, especially in this climate, yet the men having had no refreshments when last in port, may be considered as having been all that time at sea.

The superior degree of health in this month will appear in a still stronger light, if we cast our eye on the column expressing the number sent to the hospital, the proportion of which is, comparatively, very small.

The ships that had been the longest from England, were still among the most healthy. But of all the fleet, none was so free from sickness and mortality as the Formidable. No man belonging to this ship died of disease for the first four months after sailing from Plymouth, though there were at times 900 men on board, and never less than the established complement, which is 750; and so few were taken sick in that time, that only thirteen were sent to hospitals, and their complaints were small-pox and ulcers.

This ship left England provided with every thing that could be supposed to conduce to the health of men, and may be considered as an experiment to prove what degree of health may be attained by proper management and attention. She was furnished not only with abundance of sour krout, melasses, and essence of malt, in common with the other ships; but what was peculiar to her, was an entire supply of excellent wine, in place of spirits, of which none was used during the period mentioned.

CHAP. IV.

ccount of the HEALTH of the FLEET while it lay at Jamaica during May, June, and Part of July, 1782.——French Prizes Causes of Sickness—Their Difference from the English in point of Cleanliness and Discipline—Bad Effects of Land Wind and Watering Duty—Situation of Port Royal—Season uncommonly dry and windy—Fluxes more prevalent at Sea than in Harbour—Comparison of the Sickness at this Time with that of the Army and with that of the Squadron under Admiral Vernon forty-one Years before—Effects of Contagion and foul Air—Officers more affected than the common Men.

All the squadron that was left to windward of Jamaica, consisting of twenty-four ships of the line, kept the sea during great part of May, the last division of it not having come to Port Royal till the 25th of that month.

The whole fleet remained in harbour during the remainder of the month, and the whole of the next, except the Warrior, Prothée, and Russell; the two former were sent on a cruise, in which the Warrior continued quite healthy, as she had been ever since her arrival from England; and in the Prothée a great check was given to the fevers and fluxes which had begun to prevail at Port Royal. The Russell was sent to England with a convoy.

TABLE, shewing the proportional Prevalence of Sickness and Mortality in May.

Transcriber's Keys:
A Proportion of those taken ill or wounded in the Course of the Month.
B Proportion of those that died in relation to the Numbers of Sick or wounded.

DISEASES.	A	B
	ONE IN	

Fevers	26	29
Fluxes	18	63
Scurvy	57	34
Wounds	627	60
Other Complaints	44	127
General Proportion, including wounded	7½	46
General Proportion, exclusive of Wounds	8	48

The whole number of sick on board on the first of this month, in thirty-six ships of the line and two frigates, upon which the preceding calculation is formed, was one thousand four hundred and eighteen. The whole number taken ill in the course of the month was two thousand eight hundred and twenty-eight; the number sent to the hospital was one hundred and seventy-three; and there died on board ninety-four.

The proportion of those who died this month, in relation to the whole number on board, was one in two hundred and eighty-seven.

There was a considerable increase of sickness and mortality this month in all the common diseases, and chiefly in that part of the squadron which was in port. There was less increase in the number of fevers than either of the other two epidemics; but such was their increased malignancy, that more died of them than of both the others. The number of fluxes was more than double of what it was the preceding month, and the mortality from them was also in a much greater proportion, as may be seen from the Tables.

The fevers prevailed chiefly in port, and the fluxes at sea. A good many of the latter, indeed, arose in the Alcide, though constantly in port; but this seemed to be owing to contagion conveyed by some British soldiers, who were sent on board of this ship after being retaken in one of the French men of war, several of whom were ill of this disease. But there were few fluxes in those ships at Jamaica in which the most malignant fevers appeared. There were a few in those in which the fevers arose from the air of the marshes on the watering duty; but there were none on board of the French prizes, nor in those ships in which that sort of fever was which proceeded from a similar cause,

that is, filth and animal effluvia. Upon the whole, in those ships in which the fever was most malignant, there the fewest fluxes were found.

Several circumstances contributed to the increase of sickness and mortality this month.

1st. The infection, or rather the foul air, of the French prizes, in most of which a very bad fever broke out among the officers and men that were sent from the ships of our fleet to take charge of them.

The discipline and internal œconomy of the French ships of war are greatly inferior to those of the British. Their decks are never washed, and there is a great defect in every point of cleanliness and order. The free course of the air is obstructed by lumber of every kind, and by bulkheads, which are not taken down even in the time of battle; and the gratings are covered night and day with tarpaulins, even in a hot climate. There are not even scuppers opened on the lower deck as outlets to the water and filth, which necessarily accumulate there, and for which the only vent is a pipe contrived on purpose, passing from that deck along the ship's side into the hold, which becomes thereby a common sink, inconceivably putrid and offensive. And in addition to the ordinary causes of corruption, there was one peculiar to the occasion; for the blood, the mangled limbs, and even whole bodies of men, were cast into the orlop, or hold, and lay there putrifying for some time. The common sailors among the French have a superstitious aversion to the throwing of bodies overboard immediately after they are killed, the friends of the deceased wishing to reserve their remains, in order to perform a religious ceremony over them when the hurry and danger of the day shall be over. When, therefore, the ballast, or other contents of the holds of these ships, came to be stirred, and the putrid effluvia thereby let loose, there was then a visible increase of sickness. For the first three weeks after the capture, the stench proceeding from the numbers of wounded men contributed also to taint the air.

The Ville de Paris was much more sickly than the other prizes, not only from her being larger, and thereby containing a greater mass of foul air, but by receiving the surviving part of the crew of the Santa Monica, one of our frigates, which had been cast away on the Virgin Islands, and whose men were so reduced by hardship and intemperance, that most of them were taken ill as soon as they came to breathe the unwholesome air of the French prize.

To whatever cause it was owing, the fever was much more violent here than in the other prizes, and it generally carried men off on the third or fourth day; and what is remarkable, the officers were affected by it in a greater proportion than the common men. One lieutenant, and every warrant officer, except the boatswain, died of it. This was a proof that the sickliness was owing to the bad air, and not to the intemperance and irregularity so usual on board of prizes, which only the common men give into; and the probable cause of the officers being most affected is, that they were accustomed in common to a purer air, by living in the most clean and airy parts of the ship.

It is also remarkable, that the Ville de Paris was healthy when taken, and had been so ever since leaving France in March, 1781; nor had any other of the captured ships of the line been sickly for some time before, except the Ardent, when she arrived at Martinico four months before, at which time the greater part of the crew were sent to the hospital with fevers. This, as well as other facts of the same kind, tends to prove, that when men come to be much habituated to bad air, their health is not affected by it.

The French ships were purified by washing and scraping, by fumigating daily with gunpowder and vinegar, and by the use of wind sails; but nothing seemed to contribute so much to sweeten the air in them as burning fires in the hold; for this tended both to make the putrid matter exhale, and to carry it off, by producing a perpetual change of air. Captain Curgenven, who at this time commanded the Ville de Paris, had great merit from his very assiduous and successful endeavours in so difficult a duty as the management and equipment of this great ship. In consequence of the judicious measures taken, and the men becoming more used to the bad air, the sickness ceased in the course of a few weeks.

In the accounts given in the tables, the French prizes are not included, for the disorderly state in which they were at this time prevented my receiving regular returns: but having made inquiry concerning the mortality in the Ville de Paris, I found, that of a crew of three hundred and twelve men, there died ten in the month of May, and there were thirty sent to the hospital, whose cases were so unfavourable, that about one half died. The only diseases were fevers. The surgeon of the Ardent told me about the same time, that one third of the crew of that ship was ill of fevers.

The second cause of the prevalence of sickness, while the fleet was at Jamaica, was, the watering duty, which was carried on at Rock-fort, about three leagues from Port Royal. It was the practice of many of the ships to leave the water casks on shore all night, with men to watch them; and as there is a land wind in the night, which blows over some ponds and marshes, there were hardly any of the men employed on that duty who were not seized with a fever of a very bad sort, of which a great many died. The ships that followed a different practice were somewhat longer in watering; but this was much more than compensated by their preserving the health and saving the lives of their men.

The land wind which blows on the shore in the night time, is a circumstance in which Jamaica differs from the small islands to windward, over which the trade wind blows without any interruption: but though this land wind blows upon Port Royal from some marshes at a few miles distance, it does not seem to produce sickness, for it is a very healthy place, and several of the ships enjoyed as good health as in the best situations on the windward station. The bay which forms this harbour is bounded towards the sea by a peninsula of a singular form, being more than ten miles in length, and not a quarter of a mile broad at any part. Great part of it is swampy and overgrown with mangroves, and though of such small extent, we fancied that some of the ships that lay immediately to leeward of this part were more sickly than those that were close to the town of Port Royal, which stands at the very extremity of this long peninsula upon a dry, gravelly soil.

The weather this month was uniformly dry in port; but at sea the air was moist and hazy. Between Jamaica and Hispaniola, where part of the squadron was left to cruise, dead calms prevailed; and this, joined to the moisture of the air, was probably what caused the flux to prevail chiefly in this part of the fleet. At Port Royal, on the contrary, there was a strong dry breeze, which set in every day about nine o'clock in the morning, and blew all day so fresh, that there was frequently danger in passing from one ship to another in boats. This is called, in the language of the country, the *fiery sea breeze*, an epithet which it seems to have got not from its absolute heat, but from the feverish feeling which it occasions by drying up the perspiration. It was remarked, that this breeze was stronger this season than had ever been remembered; and it sometimes even blew all night, preventing the land breeze from taking its usual course. This year was farther remarkable for the want of the rains that

were wont to fall in the months of May and June. We shall have occasion to remark hereafter, that this was a very uncommon season also in Europe and America. The heat, by the thermometer, this month, on board of a ship at Port Royal, was, in general, when lowest in the night, at 77°, and when highest in the day, in the shade, at 83°.

There was a considerable increase of scurvy in this month, compared with the former months of this campaign; but very inconsiderable, compared with what had occurred in cruises of the same length in former years. The last division of the fleet had been at sea seven weeks, all but one day, when it arrived at Port Royal; and though the scurvy had appeared in several of the ships, it did not prevail in any of them to a great degree, except in the Nonsuch. Out of fourteen deaths which happened in the whole fleet from this disease, in May, seven of them were in this ship, and several were sent from her to the hospital in the last and most desperate stage of it. But, upon the whole, the cases of the true sea scurvy in the fleet, in general, were few and slight, and a great many of those given in the reports under the head of scurvy, were cutaneous eruptions or ulcers, not properly to be classed with it.

The cruise in the preceding year to windward of Martinico, may be compared with that in May of this year; for the fleet in both cases had been at sea about the same length of time. But the comparison is very greatly in favour of the latter, which is most probably to be imputed to the plentiful supply of melasses, wine, sour krout, and essence of malt. But no adequate reason that I could discover can be assigned for the prevalence of it in the Nonsuch to a degree so much more violent than in the other ships; and it was here farther remarkable, that it attacked every description of men indiscriminately; for I was assured by the officers and by the surgeon, that not only the helpless and dispirited landsman was affected, but old seamen, who had never before suffered from it on the longest cruises. I have been led by this, and some other facts, to suspect that there may be something contagious in this disease.

JUNE.

The greater part of the fleet remained at Jamaica during this month, refitting and watering. Twelve ships of the line were sent to sea on the 17th, under the command of Rear-admiral Drake, but not being able to get to windward on account of the fresh breezes that prevailed, they returned to Port Royal on the

28th. Such of these ships as were sickly, became more healthy while at sea; but some bad fevers arose, particularly in the Princessa; and it is a curious circumstance, that these fevers attacked only those men who had been on shore on the watering duty; from which it would appear, that something caught or imbibed, which is the cause of the fever, lies inactive for some time in the constitution, some of the men not having been affected for more than a week after they had been at sea.

The weather continued dry and windy, as in the former month; but the heat was in general about two degrees higher, the thermometer varying from 79° to 84½°.

TABLE, shewing the proportional Sickness and Mortality in June.

Transcriber's Keys:
A Proportion of those taken ill in the Course of this Month.
B Proportion of those who died, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	11	19
Fluxes	20	83
Scurvy	47	231
Other Complaints	37	97
General Proportion	6	39

The proportion of deaths in relation to the whole numbers on board, was one in one hundred and thirty-eight.

There was only one in thirty of the sick sent to the hospital in the course of this month.

There was an increase both in the numbers and fatality of fevers. This increase was chiefly in that sort of fever which depends on the air and climate, the greater part of which was caught on the watering duty. There was a diminution of those fevers depending on infection, and the foul air of ships, which arose in the French prizes. The care that was taken in purifying these ships was very effectual; for only four died this month in the Ville de Paris, and fewer also were sent to the hospital than in May. The increase of the other kind of fever was chiefly owing to there being a greater number of ships in port, the crews of which were employed in watering, and partly, no doubt, to the increase of heat in the weather. The ships in which the fevers were most fatal were the Monarch, the Duke, the Torbay, and the Resolution. The sickness in the Duke was still in a great measure owing to the same infection that had hitherto prevailed; for this ship had never been cleared of the infectious fever, for want of room at the hospital. That which broke out in the Torbay was also of the low infectious kind, few of them having the symptoms of that which is peculiar to the climate, which prevailed in the other ships. This ship, though formerly very subject to infectious complaints, had been remarkably healthy for some time past; but it would appear that there was a large stock of latent infection, which shewed itself from time to time.

Some ships, particularly the Montague and Royal Oak, had no increase of fevers or other complaints, though the one lay in port for seven, and the other for eleven weeks, and were more or less exposed to the causes of sickness which affected the rest of the fleet. This is a proof, among many others, that a particular combination of causes is necessary to produce a disease: no single one, however powerful, being sufficient, without the concurrence of others. What seemed to be wanting here was the predisposition requisite for the admission of disease into the constitution; for the ships that enjoyed this happy exemption were such as had long-established and well-regulated crews, accustomed to the service and climate.

There had been this month a diminution both of the numbers and mortality of fluxes, which is agreeable to what was before remarked, that fevers were more apt than fluxes to prevail in the bad air of a harbour[16]. It was also before remarked, that there were few or no fluxes in those ships in which the fever was most malignant; and now that the fever began to grow more mild in the French prizes, the flux began to appear. In the Barfleur, Duke, and Namur, both diseases seemed to prevail equally; but the fevers, though numerous,

were more of the low nervous kind than bilious or malignant; and the fluxes chiefly attacked those who were recovering from fevers. We may farther remark, that these three men of war were three-decked ships, of 90 guns, the crews of which being more numerous, and composed of a more mixed set of men, were consequently subject to a greater chance of infection, and a greater variety of complaints. The Formidable still remained healthy to an extraordinary degree. Some fevers were indeed imported from the Ville de Paris by men that had been lent to that ship, and who were taken ill after their return. Of these, a few of the worst cases were sent to the hospital, and two died on board, who, with one that died the preceding month, make the whole mortality of this ship, since leaving England, amount only to the loss of three men.

There has been little or no increase of scurvy this month; for though the numbers put on the list appear to be greater, the mortality is much less. It may indeed appear a matter of surprise that there should have been any scurvy at all, considering that the greater part of the fleet was at anchor all this month. But as this was the greatest fleet that had ever visited Jamaica, it was impossible to find fresh provisions for the whole; and the small supply they had did not amount to one fresh meal in a week. Port Royal is also remote from the cultivated part of the island, so that fruit and vegetables were both scarce and high priced, particularly this year, on account of the usual rains in May and June having failed. There was, however, an allowance of fresh provisions and vegetables made to the sick by public bounty; for as the hospital could contain but a small proportion of the sick and wounded, an order was given for the supply of fresh meat, fruit, and vegetables, to the sick, and five hundred pounds of Peruvian bark were also distributed as a public gratuity, besides sugar, coffee, and wine.

With these aids, and the various good articles of victualling from England, the fleet was preserved uncommonly healthy for a West-India campaign: for though the mortality had increased considerably during our stay at Jamaica, yet the loss of men, upon the whole, was small, compared with that of other great fleets in this climate on former occasions. The greatest squadron, next to this, that had ever been on this station was that under Admiral Vernon in the year 1741, at the same season. From this fleet upwards of eleven thousand men were sent to the hospital in the course of that and the preceding year, of whom there died one in seven, besides what died on board of their own ships

and in two hospital ships[17]. The disproportion of sickness in the two fleets will appear still greater, when it is considered that Admiral Vernon's contained only fifteen thousand seamen and marines[18]; whereas that under Lord Rodney contained twenty-two thousand. What added to the sickness of the former was the unfortunate expedition to Carthagena in April, 1741; to which probably it was owing that a much greater proportion of yellow fevers were landed from the fleet at that time than from ours, as appears by the papers left by Mr. Hume, who was then surgeon of the hospital. The hospital was then at a place called Greenwich, on the side of the bay opposite to Port Royal, and was very large; but it was found to be in a situation so extremely unhealthy, that it was soon after abandoned and demolished, and the hospital has since been at Port Royal.

It appears by the tables, that a greater number was put on the list under the head of *other complaints* in this month than the last. This was owing to the great number of ulcers which I have remarked to keep pace with feverish as well as scorbutic complaints; for when the constitution of the air is favourable to disease, or the habit of body prone to it, wounds and sores are found then to be more difficult of cure. There were twelve deaths besides those occasioned by what have been called the three epidemics. Of these, five perished by drowning and other accidents, three died of ulcers, one of wounds received in action, one of *cholera morbus*, and one of an abscess.

It has appeared that very few ships of this numerous fleet preserved their health while lying at anchor; and it would seem that short and frequent cruises are very conducive to health. It was eleven weeks from the time that the first of our fleet came to anchor at Jamaica till the main body of it sailed for America on the 17th of July. Great fleets are in time of war under the necessity of being at one time longer at sea, and at another time longer in port, than is consistent with the health of the men, the ships being obliged to act in concert and to co-operate with each other. This is one reason, among others, for ships of the line being more sickly than frigates. As ships of war must be guided by the unavoidable exigencies of service, it would be absurd to consider health only; but if this were to be the sole object of attention, a certain salutary medium could be pointed out in dividing the time between cruising and being in harbour; and it is proper that this should be known, that regard may be had to it, as far as may be consistent with the service. I would say, then, that in a cold climate men ought not to be more than six weeks at

sea at one time, and need not be less than five weeks, and that a fourth part of their time spent in port would be sufficient to replenish their bodies with wholesome juices. In a warm climate men may be at sea a considerable time longer, without contracting scurvy, provided they have been under a course of fresh and vegetable diet when in port.

Though contagion is not so apt either to arise or to spread in this climate as in colder ones, there were several circumstances about this time tending to prove that it may exist in a hot climate. Those ships which had their men returned to them from the French prizes, in all of which fevers prevailed, had an increase of sickness not only in the men that were returned, but in the rest of the crew. There was another presumption of contagion, from the proportion of mortality among the surgeons and their mates, who were by their duty more exposed to the breath, effluvia, and contact of the sick. There died, during our stay at Jamaica, three of the former, and four of the latter, which is a greater proportion than what died of any other class of officers or men.

It has been the opinion of some, that fevers do not arise from any putrid *effluvia*, except those of the living human body, or some specific infection generated by it while under the influence of disease. It has been alledged in proof of this, that the putrid air in some great cities is breathed without any bad effects; and a celebrated professor of anatomy[19] used to observe, that those employed in dissecting dead bodies did not catch acute diseases more readily than other people. I believe this may be true, in a climate like Europe, where cold invigorates the body, and enables it to resist the effects of foul air; but I am persuaded it is otherwise in tropical climates. The external heat of the air induces great languor and relaxation, and we cannot breathe the same portion of air for the same length of time in a hot as in a cold climate, without great uneasiness. The want of coolness must, therefore, be compensated by a more frequent change of air, and by its greater purity: any foulness of the air is accordingly more felt in a hot climate; and, according to the modern theory, air, already loaded with putrid phlogistic vapour, will be less qualified to absorb the same sort of vapour from the blood in the lungs, in which, according to this theory, the use of respiration consists. Be this as it will, there is something in purity of air which invigorates the circulation, and refreshes the body; and the contrary state of it depresses and debilitates, particularly in a hot climate; and in this way foul air may induce disease, like any other debilitating cause, independent of infection, or any specific quality. There was

no reason to suspect any such infection in the Ville de Paris; for there was no sickness on board of this ship when in possession of the enemy, and the sickness that prevailed after her being captured seemed to proceed from what may be called simple putrefaction. There was an instance of the same kind in one of our own ships of the line, in which a bad fever broke out in the beginning of July, which seemed to be owing to the foul air of a neglected hold; for there was a putrid stench proceeding from the pumps, which pervaded the whole ship. I perceived this very sensibly one day, when visiting some officers who were ill of fevers; and before I left the ship an alarm was given of two men being suffocated in what is called the *well*, which is the lowest accessible part of the hold. This fever was of a very malignant kind, and fell upon the officers more than the men; for six of them were seized with it, of whom three died on the third day after being taken ill.

The fevers, which were of the greatest malignity at this time, affected the officers more than the common men. Only one captain died at Jamaica while the fleet was there, and it was of this fever. We lost five lieutenants, of whom four died of it; and this was the disease which carried off the three surgeons. But foul air was not the only cause that produced this fever among the officers, several of whom brought it on by hard drinking, or fatiguing themselves by riding or walking in the heat of the sun. It cannot be too much inculcated to those who visit tropical countries, that exercise in the sun, and intemperance, are most pernicious and fatal practices, and that it is in general by the one or the other that the better sort of people, particularly those newly arrived from Europe, shorten their lives.

Before leaving Jamaica, I sent to England a Supplement to the Memorial given in, last year[20].

CHAP. V.

Account of the HEALTH of the FLEET, from its leaving Jamaica on the 17th of July, till its Departure from New York on the 25th of October.——What Diseases most prevalent on the Passage to America—Rapid Increase of the Scurvy during the last Week of the Passage—Method of supplying the Sick at New York—The Fleet uncommonly healthy in October—State of the Weather and of Health in America in Summer and Autumn, 1782.

The season of the hurricanes approaching, and all the convoys destined for England this year being dispatched, the main body of the fleet, consisting of twenty-four ships of the line, left Port Royal on the 17th of July, under the command of Admiral Pigot, in order to proceed to the coast of America. A great convoy for England had been sent off a few days before, protected by the Ville de Paris and six other ships of the line, which we overtook and passed at the west end of the island. When we arrived off the Havannah, a large squadron of the enemy was seen there in readiness to sail, which induced the Admiral to wait in sight of it for the convoy, which did not come up till ten days after. Owing to this delay, and our meeting with baffling winds on the rest of the passage, we did not arrive at New York till the 7th of September. We found there the Invincible and Warrior, which sailed after us, but arrived before us, by having taken the windward passage.

TABLE, shewing the proportional Prevalence of different Diseases, and their Mortality, in July, 1782.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B

	ONE IN	
Fevers	13½	16
Fluxes	24	49
Scurvy	91	0
Other Complaints	20	134
General Proportion	5½	33

The mortality this month, in relation to the whole numbers on board, was one in a hundred and thirty.

There were only one in thirty-eight of the sick sent to the hospitals.

The fevers arose chiefly during the first two weeks after leaving Jamaica, which renders it probable that the seeds of them were brought from thence. Had they been owing to the heat simply, they would have been as apt to arise in some subsequent part of the passage; for the tropical heats at this season of the year extend to the 30th degree of latitude, which we did not cross till the 22d of August, that is, near five weeks after leaving Jamaica. The only ships in which the fever could be imputed to infection or foul air were the Barfleur, Alcide, and the Aimable frigate. The first had received, as recruits, at Jamaica, men who had been confined for some time before in a French jail, and a fever of a bad kind spread on board of her soon after. The Aimable was a prize from the French; and the sickness was here so evidently owing to foul air, that, whenever the contents of the hold were stirred, so as to let loose the putrid effluvia, there was then an evident increase of sickness. The fever in the Alcide was of a peculiar slow kind, to be described hereafter, and seemed to be a continuation of the same infection which had so long existed in that ship.

The Duke, which had hitherto been by far the most subject to fevers of any ship in the fleet, became more and more free from them even in the most early part of this passage, and might be said to be entirely so at the time she arrived in America. The fever had been so very prevalent in this ship since leaving England, that there was hardly a man who had escaped it. Could this have any effect in making them less liable to catch it a second time?

In the course of this passage the dysenteries came to prevail over the fevers, as we have found to be commonly the case at sea. It appears by the former table, compared with the next, that the mortality in fevers was much the same, and that in the dysentery it was greater than while the fleet was at Jamaica. This does not argue, however, that the diseases were equally malignant, but was owing to the want of an hospital, and of those comforts of diet which the sick enjoyed on board while in harbour. This last was particularly felt in the dysenteries, in the cure of which more depends upon diet than in most other diseases. In all the calculations of mortality on board of ships, if any have been sent to the hospital, they are to be deducted from the number; and these make a greater difference in the mortality on board than their numbers simply would indicate; for only the worst cases, and those therefore who were most likely to die, used to be sent to the hospital. But as the fleet was at sea during the whole of this month, no allowance of this kind is to be made.

TABLE, shewing the proportional Sickness and Mortality in August.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	31	17
Fluxes	46	35
Scurvy	25	66
Other Complaints	27	43
General Proportion	7½	31

The mortality this month, in relation to the whole numbers on board, was one in one hundred and sixty-nine.

The scurvy began to appear very soon upon this passage; for by the end of August, at which time the fleet had only been six weeks at sea, and that in a warm climate, and in dry weather, it had made considerable progress. It first appeared and prevailed most in the Prince George and Royal Oak, though they had been ten weeks at Jamaica. This was the first sickness with which the latter had been affected since arriving in the West Indies; and there was no perceivable peculiarity in either of them to account for their being subject to it more early, or more violently, than the rest of the fleet. If the disease is contagious, as has been suspected, there might be a few men on board of them, who, being uncommonly prone to the disease, would be soon affected, and communicate it, or at least hasten the symptoms in those who might be less predisposed to it. But this is only conjecture. Before the end of the voyage, the whole fleet was more or less afflicted with it, though it had been only seven weeks and three days at sea; but the men had received so few refreshments while in port, that their constitutions were prepared to fall into this disease. The Barfleur, Alfred, and Princessa, were most affected with it next to the two ships mentioned above.

The seventeen ships which arrived from England in February and March were much less affected with it than the rest of the fleet, which was, no doubt, owing to the wine, melasses, and sour krout, with which they were so amply supplied. Though these articles were all expended before leaving Jamaica, yet the good effects of them on the constitutions of the men were visible in the course of this passage.

The America was the most free from it of all the ships of the old squadron; and this was owing to the great humanity and attention of the captain[21], who, as soon as any of the men were taken ill, allowed them wine and other refreshments from his private store. There was another proof in the Conqueror of the great importance of attending to this disease in its earliest stage. Mr. Lucas, the surgeon of this ship, by watching the first beginnings of it, by a proper regulation of diet, and the administration of the essence of malt and juice of limes, not only prevented the progress of the disease, but proved, that, with great attention, it may even be cured at sea. It is of the utmost consequence in this disease to put the men on the sick list on the very first appearance of the symptoms, so that they may early have the advantage of proper treatment and regimen. It is only at this period of it that the effects of

essence of malt are sensible; but we have seen that the juice of certain fruits will cure it in more advanced stages.

There is a very important remark suggested by comparing the two preceding tables with that which follows. It appears that in the month of September a much greater number was taken ill of scurvy, and also that there died of this disease a greater proportion than in the two preceding months. All the mischief from it in that month happened in the first week of it, during which as many died as in the whole month of August; for the fleet came to an anchor on the 7th of September at New York, where the worst cases were immediately sent to the hospital, and those that remained on board were supplied with every necessary refreshment. Had the fleet remained longer at sea, the mortality would probably have increased in the same progression; and this circumstance ought to be well considered in undertaking cruises.

TABLE, shewing the proportional Prevalence of Sickness and Mortality in September.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	49	31
Fluxes	46	68
Scurvy	15½	39
Ulcers	68	0
Other Complaints	62	226
General Proportion,	7	58

The proportion of deaths, in relation to the whole numbers on board, was one in three hundred and ninety-eight.

About one third of all the sick were sent to the hospital.

As the proportion of ulcers was uncommonly great, I thought it worth while to make a calculation of it. The Barfleur had the greatest number; and this ship, for causes I cannot assign, was more afflicted with bad ulcers than any other in the fleet, for several months together.

The fleet having arrived at New York in this unhealthy state, the first care was to make provision for the sick. There were somewhat more than fifteen hundred on the sick lists of all the ships, and the hospital could accommodate little more than six hundred. In order that it might not be overcrowded, and that each ship might have a just share of relief, I went round the fleet to ascertain the due proportion of those cases that were the most proper objects for being sent on shore. All the infectious and acute Complaints, and some of the worst scorbutics, were accordingly sent to the hospital. Those who were kept on board being chiefly such as were affected with the scurvy, were supplied with various refreshments in their respective ships, and seemed to recover as soon as if they had been sent on shore. They had indeed almost every advantage enjoyed by those at the hospital; for, besides fresh meat thrice a week, and spruce beer daily in common with the other seamen, each man on the sick list was supplied every week at the public expence with four pounds of apples and half a pound of sope. There were also thirty casks of limes taken in a prize, which were distributed among the scorbutic men, and proved of infinite use. Admiral Pigot's great zeal for the good of the service, as well as his natural humanity, induced him to listen to whatever was proposed for the benefit of the men.

The supply of sope was a thing entirely new in the service; but the good effect of all the other articles would most probably have been defeated, unless the men had been furnished with the means of cleanliness, which is the most essential requisite of health. The advantage of this method will appear by the returns of next month to have been very conspicuous; and it was on this occasion more than any other that I saw realised in every particular the plan proposed in the memorial to the Admiralty. It may be added, that the sick that were left on board were not even without the recreation of the shore enjoyed by those at the hospital; for most of the captains had the attention to send daily on shore, for amusement and exercise, such as were able to walk. Thus there were all the advantages of an hospital obtained at much less expence to

Government, and without the risque of intemperance, desertion, or infection, which are the inconveniencies connected with an hospital. What farther contributed to health at this time was, a large quantity of excellent wine with which the fleet was supplied.

TABLE, shewing the proportional Sickness and Mortality in October.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	45	250
Fluxes	61	69
Scurvy	34	197
Ulcers	181	0
Other Complaints	127	0
General Proportion	12½	196

The proportion of deaths in this month, in relation to the whole number on board, was only one in fourteen hundred and seventy-eight.

About one in twenty-nine of the sick was sent to the hospital.

There was, upon the whole, less sickness and mortality in this month than in any other during which I kept records of the fleet. This was, no doubt, owing in part to the climate, but was chiefly the effect of the extraordinary attention paid to the refreshments of the men. The fleet was here exactly in the same situation, and at the same season, two years before, but was not near so healthy.

Nor were the advantages derived from the great plenty of refreshments, procured at this time at New York, merely temporary; for the men's constitutions were so much improved by them, that the part of the fleet which remained under the command of Lord Hood was at sea for twelve weeks without being affected by the scurvy. This was chiefly to be ascribed to the previous refreshments; for we have seen, that, in a passage of seven weeks from Jamaica to New York, the fleet was greatly affected with the scurvy, in consequence of not having had the advantages of fresh meat and vegetables when last in port. The climate had, no doubt, also a share in keeping off the scurvy; for the greater part of the twelve weeks was taken up in a cruise off St. Domingo; and, I believe, it never was known that a fleet was so long at sea, in a cold climate, without being greatly affected with this disease.

It appears, that though the proportion of fevers had increased somewhat this month over that of fluxes, yet the former were less fatal; and, I think, the true dysentery is more frequent in this climate, and more apt to prove fatal in its acute state, than in the West Indies. I have indeed preferred the term flux to that of dysentery, for this reason, that the symptoms in many cases did not rise so high as properly to constitute dysentery; and the disease proves fatal in the West Indies more frequently in the chronic than in the acute state. The fluxes were daily gaining ground when we left New York, and continued to prevail to a great degree in the Magnificent, which remained in that climate several weeks after us.

The climate and situation of the fleet had a greater effect in diminishing ulcers than any other complaints; for the proportion of them in this month is little more than one third of what it was in the last.

The calculation for October was made upon thirteen ships of the line, which sailed from New York on the 25th of that month.

The weather had then begun to grow cold; but few or none of the diseases peculiar to a cold climate had appeared. There occurred, while we were at New York, several cases of inflammation of the liver among the officers and men who came from the West Indies. It was remarked formerly, that this complaint hardly ever occurred in the West Indies; but it would appear that the residing there disposes to an inflammation of this organ upon changing to a colder climate.

The preceding summer had been uncommonly cold, not only in North America, but in the whole temperate part of the northern hemisphere, so far as I could learn by inquiry. In consequence of this, the crops failed in Europe, America, and the northern parts of Asia. The same circumstance had a remarkable effect on the reigning diseases of the season at New York; for, instead of the bilious complaints common in the end of summer and in autumn, a slight fever of the inflammatory kind had prevailed. An epidemic catarrh had spread all over Europe, and some part of Asia, in the earlier part of the year; and perhaps this was connected with the peculiar state of the atmosphere about this time. It was before observed, that there was something unusual in the state of the weather at Jamaica while the fleet lay there; and it is possible that this might be owing to the same general cause.

CHAP. VI.

ccount of the HEALTH of the FLEET from its Departure from New York till the Conclusion of the War.——Passage to the West Indies—Account of the Ships there during our Absence—Arrival of a Squadron from England—Of these, two Ships only were healthy—Causes of this—Inflammatory Complaints in the Union—Probable Cause of these—Comparison of the two Squadrons—Increase of Sickness from Recruits brought from England—from French prisoners.

Thirteen ships of the line sailed from America for the West Indies on the 25th of October, under the command of Admiral Pigot, and the other half of the fleet was left under Lord Hood, to watch the motions of the French squadron, which was then at Boston.

The day on which we left the coast of America a storm came on, which lasted two days; but the rest of the passage being fair and moderate, we arrived at Barbadoes on the 20th of November, where the fleet continued for the remainder of the month.

All the above-mentioned squadron, except two ships, is comprehended in the calculation of the following table, and also the Magnificent, Prudent, and Nonsuch. The two last had continued in the West Indies, during our absence.

TABLE, shewing the Prevalence of Sickness and Mortality in November.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	

Fevers	54	25
Fluxes	78	132
Scurvy	86	0
Ulcers	94	0
Other Complaints	46	103
General Proportion	15	77

About a sixth part of the whole sick were sent to the hospital this month, and one half of these were sent to the hospital at Halifax from the Magnificent.

The proportion of deaths this month, in relation to the whole number on board, was one in eight hundred and eighty-seven.

Fewer were taken ill this month than the preceding, but more in proportion died; which might partly be owing to the fleet having been more at sea, and partly to the change of climate.

Fevers were now more numerous, and also more fatal than any other disease; and we see them follow the contrary proportion to fluxes in the progress to the southward, that they did in our progress to the northward. These fevers prevailed chiefly in the Formidable and Warrior. In the former it first appeared among some men that had been pressed at New York from a privateer, some of whom were seized a few days after our arrival at Barbadoes with the yellow fever, and they were the only instances of it at this time in the fleet.

The scurvy continued to diminish, but the ulcers increased as we came into the torrid zone.

Diseases in general were so slight and so few at this time, that the whole squadron from America sent only forty-eight men to the hospital at Barbadoes from its arrival to the end of the month.

It may be proper here to give an account of some of the ships that remained on this station, while the main body of the fleet was in America.

The Prudent, when she left us, was extremely healthy, and continued so till a flux broke out in July, which was communicated by some men from a cartel, who were ill of this disease. It spread among the ship's company, and prevailed for three months. The only deaths during the seven months that this ship was separated from the fleet were, two from flux, and one from scurvy, and only twenty-five were sent to hospitals. This is a proof how much more healthy the windward station is than that of Jamaica. The scurvy arose at one time, in a cruise of five weeks, though there was no appearance of it at another time in a cruise of six weeks. The cause of this seems to be the difference of the weather at the two periods; for it was very wet in the former, and very dry in the latter. The time in which this ship was most exposed to sickness was while she was under repair at Antigua, a situation in which hardly any ship escapes a severe visitation of sickness; yet this ship was not at all affected by it, which seemed to be owing to the uncommon pains taken by the captain to prevent the men from labouring in the sun during the hot part of the day.

The Nonsuch was five months separated from the fleet, during which time ten men died. Nine of these died of fevers, and one of the dysentery. She sailed from Jamaica for Barbadoes about the same time that the fleet sailed for North America, and was nine weeks on the passage. A fever was the prevailing disease, and the men probably inhaled the seeds of it at Jamaica, in common with most of the other ships' companies that were there. The scurvy, which had formerly prevailed so much, appeared at this time; but it was in a very moderate degree, considering the length of the passage. None died of it, and few were so ill as to require being sent to the hospital. Had this ship gone into a colder climate, like the others, it would probably have prevailed to a greater degree. The whole number sent to the hospitals for various complaints, during the five months, was only thirteen.

The Nymph frigate was the only other ship left in the West Indies which is included in the tables. There happened only two deaths in her from June to October, both months included. One of these was from scurvy, the other from asthma. She was in that time upon two cruises, each of which lasted eight weeks. During the first the weather was dry and fine, and during the other it was wet and sultry, with the same effect upon health as in the Prudent; for in the second cruise the scurvy prevailed to a considerable degree, but not at all during the first. This disease was prevented from becoming violent or fatal,

on either occasion, by the great attention of Mr. Anderson, the surgeon. He found great benefit from the essence of malt, when given early in the complaint; and some limes having been taken in a prize, while this disease was at the worst, the scorbutic men were so much recovered by the use of them, that they were all able to return to duty before the ship arrived in port.

DECEMBER.

The whole squadron remained at anchor at Barbadoes, and nothing worth notice occurred till the arrival of a reinforcement of eight ships of the line, under Sir Richard Hughes, on the 8th of December. This squadron had been detached by Lord Howe, after the relief of Gibraltar, and the action with the combined fleets on the 20th of October. It consisted of one ship of 90 guns, one of 80, three of 74, and three of 64. They sailed from England on the 9th of September, and from that time till their arrival at Barbadoes they had not been in port, except for ten days that they were at Madeira, where they were supplied with fresh meat, fruit, and vegetables, by which means the scurvy, which had begun to prevail to a considerable degree, was almost entirely eradicated, and the health of the men was surprisingly restored, for so short a time.

When they joined us, however, there was a good deal of sickness on board of them all, except the Union and Ruby. The former had been more than three years in commission, and in that time had never been sickly, and had now all the advantages of a long-established and well-regulated ship's company. All the rest had been newly commissioned and manned when they left England. The superior health of the Ruby was owing to her having been manned with the crews of other ships, some of which had just arrived from the West Indies; whereas the others had been manned chiefly by draughts of pressed men from guardships, or by raw volunteers, of whom a great many were raised in Ireland about this time. The Bellona and Berwick having been somewhat longer in commission than the rest, were less sickly.

The following tables will shew the comparative state of health of the squadron formerly on the station with that which had newly arrived from England.

TABLE, shewing the Prevalence of Sickness and Mortality in the old Squadron, in December.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	32	80
Fluxes	94	99
Scurvy	62	0
Ulcers	64	0
Other Complaints	57	71
General Proportion,	11½	124

The proportion of the deaths this month to the whole number of men belonging to this part of the fleet, was one in eleven hundred and two. There were fifty-six sent to the hospital, which was one in eighteen of all the sick.

TABLE, shewing the Prevalence of Sickness and Mortality in the new Squadron, in December.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	11	55

Fluxes	86	0
Scurvy	107	0
Ulcers	191	0
Other Complaints	56	54
General Proportion	5	64

The proportion of the deaths this month to the whole number of men belonging to this part of the fleet, was one in four hundred and forty.

There were one hundred and eighty-nine sent to the hospital; but the proportion to the whole number of sick cannot be ascertained, as we do not know how many were on the list on the first of the month.

The increase of fevers in the old squadron was chiefly owing to their having spread in the Nonsuch; and they seemed to partake more of that kind which originates in jails and ships, than of that which is peculiar to the climate. The body of one of the men who died of this fever was inspected at the hospital, and there was found to be inflammation and even perforation of the intestines, without any previous symptom that could lead to expect such an appearance, a circumstance more likely to happen in the former sort of fever than the latter.

The increase of scurvy was owing to the numbers that were taken ill of it in the Magnificent on the passage from Halifax, from whence she sailed in the beginning of this month, and joined the fleet at Barbadoes in the end of it. There was a great deal of sickness in this ship at Halifax, and on the passage, owing to the want of such clothing as was suitable to that severe climate. One of the principal complaints was an inflammatory sore throat.

There was no change in the situation of the fleet, only that four ships of the line were sent on the 16th to cruise near Guadaloupe, and they continued at sea till the beginning of February.

The new squadron was much afflicted with the jail fever, brought from England; and it was much more prevalent, as well as malignant, on board of the Suffolk than any of the rest. During the passage it prevailed most in the

Princess Amelia, not less than twenty having died of it. It subsided in this ship before she arrived in the West Indies; but on board of the Suffolk it continued to rage for some months after.

As the hospital at Barbadoes was too small to contain all the sick of this squadron, only the cases of greatest danger and the most infectious were sent on shore, and those that remained were provided with fresh vegetables and milk on board of their own ships, in the same manner as had been formerly practised with such success on similar occasions. This was continued for four weeks, during which time they all got into tolerable health, except the Suffolk.

There appeared, by the returns of the new squadron, to be a greater number under the head of "Other Complaints," which was owing to the number of pulmonic complaints, the consequence of the influenza which prevailed in Europe, at sea, as well as on shore, in the spring and beginning of the summer of this year.

Though inflammatory complaints are rare in this climate, yet in a few of the ships there was some appearance of them; and I remarked that they occurred in those ships which were in other respects most healthy, and most free from infection. A good many of the men were seized with inflammatory sore throats in the Bellona a few days before she arrived at Barbadoes, and this was in other respects the most healthy ship next to the Union and Ruby. In the Union there was no violent acute complaint whatever, which was very singular among so great a body of men; but several rheumatisms, coughs, and catarrhs, arose in her this month, and there even occurred two pleurisies in the following month. The bowel complaints which occurred on board of this ship were also of an inflammatory nature. These distempers seemed to proceed from accidental exposure and irregularity; and is it not highly probable that these causes, instead of producing local inflammatory complaints, might have been the means of exciting bad fevers and fluxes, as in the other ships, had the men been equally predisposed to them, by living in foul air, or under the influence of infection?

The following tables will shew the comparative state of health of the two squadrons in the three first months of next year.

TABLE, shewing the Prevalence of Sickness and Mortality in the old Squadron in January, 1783.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	67	70
Fluxes	157	0
Scurvy	44	0
Ulcers	0	0
Other Complaints	48	117
General Proportion	12½	214

The mortality this month, in relation to the whole number on board, was one in twelve hundred and fifty-seven. About one fifteenth of all the sick were sent to the hospital.

TABLE, shewing the Prevalence of Sickness and Mortality in the new Squadron in January, 1783.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	12	48

Fluxes	29	153
Scurvy	320	0
Ulcers	137	0
Other Complaints	19	0
General Proportion	5½	109

The proportion of deaths to the whole number on board was one in five hundred and forty. About one in thirty of all the sick were sent to the hospital.

TABLE, shewing the Prevalence of Sickness and Mortality in the old Squadron in February.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	46	69
Fluxes	159	0
Scurvy	63	0
Ulcers	100	0
Other Complaints	51	136
General Proportion	13½	173

The proportion of deaths to the whole number on board was one in sixteen hundred and ninety-seven. One ninth of all the sick were sent to the hospital.

TABLE, shewing the Prevalence of Sickness and Mortality in the new Squadron in February.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	30	50
Fluxes	34	0
Scurvy	212	0
Ulcers	174	0
Other Complaints	52	0
General Proportion	11	185

The proportion of deaths to the whole number was one in twelve hundred and seventy-six. The proportion sent to the hospital was the same this month as in the other part of the squadron.

TABLE, shewing the Prevalence of Sickness and Mortality in the old Squadron, in March.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	28	12½
Fluxes	71	0
Scurvy	46	0

Ulcers	226	0
Other Complaints	76	44
General Proportion,	11	194

The proportion of deaths to the whole number was one in thirteen hundred and sixty-one. About one ninth of all the sick were sent to the hospital.

TABLE, shewing the Prevalence of Sickness and Mortality in the new Squadron, in March.

Transcriber's Keys:
A Proportion of those taken ill in the Course of the Month.
B Proportion of Deaths, in relation to the Numbers of the Sick.

DISEASES.	A	B
	ONE IN	
Fevers	44	0
Fluxes	49	0
Scurvy	123	0
Ulcers	183	0
Other Complaints	38	138
General Proportion	12	403

The proportion of deaths to the whole number was one in four thousand and eighty-seven. About one in eleven of all the sick were sent to the hospital.

The main body of the fleet remained at Barbadoes till the 12th of January, when they went to cruise to windward of Martinico, in order to intercept a French squadron expected from North America. This cruise lasted four weeks; and intelligence being received of the enemy's having taken a different route,

the whole fleet bore away for St. Lucia, where it came to an anchor on the 8th of February.

In the course of the three months above mentioned, we see the two squadrons approaching to each other, in point of health, till they became pretty equal and similar; and the new squadron became even somewhat more healthy than the old.

The increase of fevers in the old squadron was owing to two causes. One was the importation of new-raised recruits brought from England by some ships that arrived in the beginning of January. These were distributed to such ships as stood most in need of men; and being very dirty and ill cloathed, were likely to harbour infection. They were evidently the cause of sickness in the Warrior and Royal Oak; for these ships were before that time healthy, and the fever began with these strangers, and spread amongst the former crew. It is remarkable that the ships that brought them from England were not affected by them.

It was caught in the Royal Oak from six men that came from England in the Anson, which men, though first put on board the Namur, communicated no fever there, having been kept separate from the rest of the men; but being sent to the Royal Oak, they were themselves first taken ill with a fever, which afterwards spread to about thirty of the other men. What was singular in this fever was, that the eyes and skin of all that were affected by it became yellow, though without any particular malignancy; for only two died on board, and one in the hospital. There was one whose skin was very yellow, yet his complaint was so slight as never to confine him to his bed.

The other cause of the increased proportion of fevers in the old squadron was, the great number of these complaints that arose in the Magnificent. This ship having been sent on a cruise about the middle of February, and the weather being rainy, squally, and uncommonly cold, for the climate, many fevers of the inflammatory kind appeared. During this cruise she made prize of a large French frigate, called the Concord, and the greater part of the prisoners being taken on board, the fever from that time assumed a different type, with new and uncommon symptoms; for, instead of being inflammatory and requiring bleeding, as before, it became more of a low, putrid kind, and was attended in most cases, if not in all, with a continual sweating; so that, instead of evacuations, the remedies that were found most effectual were the Peruvian

bark, blisters, and opium. Thus we see fevers variously modified according to men's constitutions, the state of the air, and the noxious *effluvia* of the strangers that intermix with them.

We find the proportion of fluxes increasing in the new squadron in January and February, as they had formerly done in most of the ships soon after their arrival from England. They were observed also to prevail principally in those ships that had formerly been most subject to fevers, and not to arise till the fever had subsided. They were found, for instance, to arise later in the Suffolk, where the fever was obstinate and malignant, than in the Princess Amelia, where the fever had been at one time general and fatal, but not so violent and lasting as in the other.

The four ships that were sent to cruise near Guadaloupe continued at sea for seven weeks; and it was owing to the prevalence of scurvy in these and in the Magnificent that the proportion of that disease was greater at this time in the old than in the new squadron.

The fleet remained at St. Lucia till the accounts of the peace arrived in the beginning of April. The service was then at an end, and I returned to England with the first division of the fleet, which sailed from St. Lucia on the 12th of April, under the command of Rear-admiral Sir Francis Drake, who was at this time in extremely bad health, and requested me to accompany him.

PART I.

BOOK III.

Of the Numbers and Mortality of different Diseases sent to Hospitals.

CHAP. I.

ospital at Gibraltar, 1780—at Barbadoes, 1780—Causes of Mortality from various Diseases—Accidents—the Hurricane—Wounds—Amputations—Scorches—Fluxes very apt to arise at the Hospital—Proportion that were received and died at Antigua—St. Christopher's—St. Lucia, and at Barbadoes, 1782—at Jamaica, 1782—at New York, Autumn, 1780—1782—General View of the Admissions and Mortality at all the Hospitals during the War.

In order to judge of the loss sustained by disease, in the course of that service of which a relation has been attempted, the sick sent to the hospitals must be taken into account. I shall, therefore, give a short view of the different diseases admitted, and their mortality, at the several hospitals connected with the fleets in which I served. This will serve also to illustrate the different effects that different situations have upon the health and recovery of men[22].

The fleet which effected the first relief of Gibraltar, under the command of Lord Rodney, consisting of twenty ships of the line, arrived there in the third week of January, 1780, after a passage of three weeks and a few days from England, in which they had an action with the Spanish fleet, and obtained a victory over them, on the 16th of that month. The whole fleet, except one ship, sailed from Gibraltar on the 13th of February, and while it lay there, the diseases sent to the hospital, and their respective mortality, were as follows[23]:

DISEASES.	Admitted.	Died.	Proportion. ONE IN
Fevers	622	65	9½
Fluxes	17	0	0
Scurvy	13	1	13
Ulcers	20	3	7
Wounds	29	9	3
Other Complaints	12	3	4

Total	713	79	9

[24]This comprehends not only the deaths in the time the fleet remained there, but all that happened afterwards. The mortality, from wounds and ulcers, is greater than might be expected in so fine a climate, and at the coolest season of the year; but as the place was then besieged, the sick and wounded could not be supplied with those refreshments that were necessary to the recovery of the men, and wounds and ulcers are complaints very apt to be affected by the quality of the diet.

The following is an Account of the Men admitted at the Hospital at Barbadoes in the Campaign of 1780, that is, from the 16th of March till the end of June:

DISEASES.	**Admitted.**	**Died.**	**Proportion.** ONE IN
Fevers	277	43	6½
Fluxes	70	22	4
Scurvy	199	47	4
Ulcers	92	16	5½
Wounds	167	61	2½
Other Complaints	129	23	5½
Total	943	212	4½

The fevers were chiefly from the five line-of-battle ships that came immediately from Europe in March. Upon their arrival they sent on shore one hundred and ninety-three men ill of fevers, only one with the flux, fifteen with the scurvy, and five with ulcers.

When these ships returned to Barbadoes in May, along with the rest of the fleet, the greater part of the sick were then also on board of them. By that time the flux and scurvy had broke out. The former prevailed chiefly in the Terrible; the latter in the Intrepid. That part of the fleet which we found on the

station sent on shore a very small proportion of all the classes of complaints, except wounds.

Of the wounds, nineteen were amputations, of which there died nine, mostly of the locked jaw. There were forty-six scorched by gunpowder, of whom there died fourteen; so that, besides those who were killed outright, and those who died on board in consequence of accidents of this kind, before they could be sent to an hospital, about one fourth of all the wounds, and the same proportion of all the deaths from wounds, at the hospital, was owing to this cause. This circumstance ought to induce commanders to take every precaution to prevent such accidents. In the subsequent part of the war they were less frequent, in consequence of that greater caution, and more accurate method of working great guns, which were acquired by practice and experience[25].

In the account of the mortality, I have included only such as died before the 1st of January, 1781; for if any were carried off after that time, it was most probably by some incidental complaint. There were sixty-five of them at that time remaining, and they were chiefly men disabled by lameness waiting for a passage to England as invalids.

Out of the twenty-three that were killed by the fall of the house in the hurricane on the 10th of October, eight were of the number above accounted for; but these are not included in any of the classes of deaths.

The mortality among the men admitted at this time was greater than what occurred afterwards in any of the hospitals that I attended, except that at Jamaica. The principal cause of this was, that as the fleet was so much greater than had ever been known here before, there was not suitable accommodation for such numbers as it was necessary to send on shore, and we had not then fallen on the method of supplying refreshments to the men on board of their ships. The circumstance by which the men suffered most was, the great crowding which the want of room made necessary. There is here no public building appropriated for an hospital; so that this, as well as every thing else, being found by contract, and the number of sick being so much greater than it was usual to provide for, the whole was at this time conducted in a manner not very regular.

It appears that the greatest mortality in any class of disease was that of the fluxes, of which the greatest number sent to hospitals are such as have languished for some time under this disease, in which state it generally proves fatal in the West Indies, in consequence of incurable ulcers in the great intestines, to which the heat of the climate, as well as the scorbutic habit and sea diet, is particularly unfavourable. But the whole of the mischief arising from it does not appear in the table; for it was the most apt of any disease to supervene upon other complaints which were under cure at the hospital. It more particularly attacked those who were recovering from the scurvy, and was the cause of the greater number of deaths under this head in the table. It was found to be more contagious than fevers, either because the men's constitutions were more predisposed to it, or, perhaps, because the infectious matter of it being more gross and less volatile, it is not so readily dissipated by the heat of the climate; for, either from this, or some other circumstance, infectious fevers are not so easily generated, nor so apt to spread, as in Europe. That these fluxes were owing to infection may be inferred from hence, that, when men ill of the scurvy were cured on board of the ships they belonged to, they were not liable to this disease, neither did they prevail at these hospitals afterwards, when great care was taken to separate infectious diseases from the others.

The only regular hospital on this station is that at Antigua. This island being the seat of the royal dock yard, there is an established hospital in time of peace as well as war. It so happened, that great fleets never came here to put their sick and wounded on shore, as at Barbadoes; so that the greater number of those received into it were from single ships that came to careen. As there was, therefore, less necessity for crowding, and as the slighter cases could be admitted, there was a less proportion of deaths here than at most of the other hospitals.

There were two other establishments for the reception of the sick and wounded on this station, but they were only temporary. These were at St. Lucia and St. Christopher's, where the men being received in great numbers at a time from large fleets, and as there were accommodations only for the most urgent cases, the mortality approached more nearly to that of Barbadoes. There died at St. Christopher's, in the years 1780 and 1781, in the proportion of one in six, and at St. Lucia, in the same time, one in five and a half, or two in eleven. The air of the hospital at St. Lucia was remarkably pure, and this

degree of mortality was owing to the sick having been accommodated in tents and huts. In the two last years of the war, when an hospital was built, and regularly established, the mortality was not much above one half of this.

Some authors have endeavoured to form an estimate of the success of practice from the different rates of mortality; but this is extremely fallacious; for the fatality of diseases will depend on their violence, the proportion of deaths being very different in cases that are slight, from what it is in those that are dangerous. We shall take a view, however, of the hospital at Barbadoes at another period, in which there seemed little or no difference in the violence of the disease, and when the superior success seemed to be owing to the hospital's not being so crowded, and to the better attendance and treatment of the sick. The following is a view of the diseases that were admitted in the last three months of the year 1782, the greater part of which were landed from the reinforcement of eight ships of the line that joined the fleet at Barbadoes in the beginning of December:

DISEASES.	**Admitted.**	**Died.**	**Proportion.**	
			NEARLY	**ONE IN**
Fevers	224	29	8	
Fluxes	17	6	3	
Scurvy	50	5		10
Ulcers	25	10		2½
Other Complaints	46	8	6	
Total	362	58	6	

It happened on this, as on the former occasion, that none were sent on shore but such as were very ill, or had contagious complaints, the rest being provided with refreshments on board of their ships. There were no wounds at this time, but there was a greater proportion of fevers; so that the complaints, upon the whole, might be said to be about equally dangerous. The mortality now was, however, considerably less, and this is to be imputed to the more favourable situation of the hospital, which I did not allow to be overcrowded; and the men had all manner of justice done them in point of attendance and accommodation.

I shall give another example of the same kind in the hospital at Jamaica, when our fleet went there after the battle of the 12th of April. All the men accounted for here were landed from the fleet under Lord Rodney in May, June, and July, 1782[26].

DISEASES.	Admitted.	Died.	Proportion. NEARLY ONE IN
Fevers	224	71	3
Fluxes	65	23	3
Scurvy	48	10	5
Ulcers	92	21	4
Wounds	70	18	4
Other Complaints	40	18	2
Total	539	161	3½

This uncommon degree of mortality was not owing to the bad air of the place, for Port Royal is naturally as healthy as most parts in that climate; nor was it owing to bad accommodations, or to neglect of any kind; but is imputable entirely to this circumstance, that the hospital being extremely small, those only were sent to it who were very ill. There were at this time upwards of forty ships of the line at Jamaica, and an hospital, containing only three hundred beds, could afford but a very inadequate relief. Some officers are unwilling that any man should die on board of their ships, for fear of dispiriting the others; and many were sent to the hospital, in the most desperate stage of sickness, that they might there die.

There cannot be a stronger proof than this of the fallacy of judging of the success of practice by the proportion of the deaths; for the sick on this occasion were better accommodated, better provided for in every respect, and as regularly attended, as at any other period of my service in the West Indies, yet the mortality was greater than at any other time.

Having given instances of the common rate of mortality in hospitals in Europe and the West Indies, I shall next give examples of the success we had

in North America, when the fleet was there in the autumns of 1780 and 1782.

ACCOUNT of the Sick landed at New York from the West-India Fleet, consisting of eleven Ships of the Line, in Autumn, 1780.

DISEASES.	Admitted.	Died.	Proportion. NEARLY ONE IN
Fevers	34	9	4
Fluxes	229	27	9
Scurvy	433	40	11
Ulcers	47	8	6
Other Complaints	82	10	8
Total	825	94	9

ACCOUNT of the Sick landed at New York from the West-India Fleet, consisting of twenty-six Ships of the Line, in Autumn, 1782.

DISEASES.	Admitted.	Died.	Proportion. NEARLY ONE IN
Fevers	104	14	7
Fluxes	131	14	9
Scurvy	617	30	20
Ulcers	74	10	7
Other Complaints	70	4	17
Total	996	72	14

The difference of mortality here, from what occurred in the West Indies, is partly imputable to climate, and partly to the smaller number of acute diseases. In the two accounts last stated, the difference in favour of the latter seemed chiefly to arise from the superior attention to the sick, and the better

treatment of them. It was mentioned before, that in autumn, 1782, at New York, they were better supplied, both at hospitals and on board of their ships, with every thing that could be wished, and that on this occasion almost every scheme I had proposed was realised. The extraordinary success in the scurvy was owing to the great quantities of vegetables that were supplied; for several fields of cabbages had been planted in the neighbourhood of the hospital for the use of the sick. This was owing to the humane attention of Admiral Digby, who had also caused cows to be purchased to supply the hospital with milk. Cleanliness, and the separation of diseases, were also strictly attended to; and I am persuaded that many of the scorbutic men were saved by keeping them separated from the fevers and fluxes; for it has been observed, that men ill of the scurvy, or recovering from it, are very apt to be infected, particularly with the flux.

It appears, that the disease in which climate makes the greatest difference is the flux. It was observable, that though the dysentery at this time was more fatal on board of the ships at New York than in the West Indies, yet it was less so at the hospital. The cause of this seems to be, that the acute state of this disease, of which men die on board before there is time to remove them to an hospital, is more fatal in a cold climate; but when it becomes more protracted, which is the case with most of the cases sent to hospitals, they then do much better in a cold than in a hot climate.

I shall here subjoin an account of the numbers that were admitted, and died, during the whole war, at the hospitals of the different parts at which the fleets I was connected with touched.

DISEASES.	Admitted.	Died.	Proportion. NEARLY ONE IN
At Gibraltar	2131	203	10
Barbadoes	4604	861	5
Antigua	6099	914	7
St. Lucia	3363	478	7
St. Christopher’s	853	142	6
Jamaica	10088	1672	6

New York	17880	2179	7½
Total	45018	6449	7

I have been able to calculate the numbers of deaths from disease in this great fleet, both on board and at hospitals, during the period of my own service, which was three years and three months, and they amounted to three thousand two hundred[27] independent of those that were killed and died of wounds.

There died of disease in the fleet I belonged to, from July, 1780, to July, 1781, about one man in eight, including both those who died on board and at hospitals[28]. But the annual mortality in the West-India fleet, during the last year of the war, that is, from March, 1782, to March, 1783, was not quite one in twenty[29]. This difference was partly owing to the general increase of health in fleets as a war advances, partly to some improvements in victualling, and partly to better accommodations as well as regulations in what related to the care of the sick.

Though the mortality in fleets in the West Indies is, upon the whole, greater than in Europe, yet it has so happened, that, in the late war, the fleet at home has, at particular periods, been considerably more sickly than that in the West Indies was at any one time. I was informed by Dr. Lind, that, when the grand fleet arrived at Portsmouth in November, 1779, a tenth part of all the men were sent to the hospital. It appears[30], that in the years 1780 and 1781, a period at which the fleet in the West Indies was most sickly, the medium of the numbers on the sick list was one in fifteen, and many of these were very slight complaints; whereas, in the fleet alluded to in England, the diseases were mostly fevers, and so ill as actually to be sent to the hospital. It appears likewise, that there was the greatest proportion of sick in our fleet when it was on the coast of America in September, 1780[31]. This difference is owing to the greater prevalence of the ship fever, and of the scurvy, in a cold than in a hot climate.

With regard to the mortality at hospitals, the comparison is greatly in favour of those in England. This is owing to the greater regularity, and the better accommodation and diet, which an hospital at home admits of, as well as to the difference of climate. It has also been mentioned, that, on most occasions, the hospitals I attended abroad were so limited as to contain only the worst

cases, in consequence of which there would of course be a greater proportional mortality than in the great hospitals of England.

The following is an account of the whole loss of lives from disease, and by the enemy[32], in three years and three months, in the fleets and hospitals with which I was connected:

Died of disease[33]	3200
Killed in battle	648
Died of wounds	500
Total[34]	4348

PART II.

OF THE

CAUSES of SICKNESS in FLEETS,

and the

MEANS of PREVENTION.

INTRODUCTION.

In the year 1780 I printed a small treatise for the use of the fleet, containing general rules for the prevention of sickness; and this part of the work is chiefly taken from it.

My own opportunities of experience, as exhibited in the preceding Part, have been sufficiently extensive to suggest many observations on this subject; but as my object is utility, rather than the praise of originality, I shall not confine myself to these. Great part of what is to be advanced is taken from books[35] and conversation, as well as my own experience, my design being to exhibit a concise view of all the discoveries on this subject that have come to my knowledge. I have assumed nothing, however, from mere report or testimony, having had opportunities, from my own observations, of verifying or disproving the assertions of others.

More may be done towards the preservation of the health and lives of seamen than is commonly imagined; and it is a matter not only of humanity and duty, but of interest and policy.

Towards the forming of a seaman a sort of education is necessary, consisting in an habitual practice in the exercise of his profession from an early period of life; so that if our stock of mariners should come to be exhausted or diminished, this would be a loss that could not be repaired by the most flourishing state of the public finances; for money would avail nothing to the public defence without a sufficient number of able and healthy men, which are the real resources of a state, and the true sinews of war.

In this view, as well as from the peculiar dependence of Britain on her navy, this order of men is truly inestimable; and even considering men merely as a commodity, it could be made evident, in an œconomical and political view, independent of moral considerations, that the lives and health of men might be preserved at much less expence and trouble than what are necessary to repair the ravages of disease.

It would be endless to enumerate the accounts furnished by history of the losses and disappointments to the public service from the prevalence of disease in fleets. Sir Richard Hawkins, who lived in the beginning of the last century, mentions, that in twenty years he had known of ten thousand men who had perished by the scurvy. Commodore Anson, in the course of his voyage of circumnavigation, lost more than four fifths of his men chiefly by that disease. History supplies us with many instances of naval expeditions that have been entirely frustrated by the force of disease alone: that under Count Mansfeldt in 1624; that under the Duke of Buckingham the year after; that under Sir Francis Wheeler in 1693; that to Carthagena in 1741; that of the French under D'Anville in 1746; and that of the same nation to Louisbourg in 1757[36].

That the health of a ship's company depends in a great measure upon means within our power, is strongly evinced by this, that different ships in the same situation of service enjoy very different degrees of health. Every one who has served in a great fleet must have remarked, that out of ships with the same complement of men, who have been the same length of time at sea, and have been victualled and watered in the same manner, some are extremely sickly, while others are free from disease. Is it not naturally to be inferred from hence, that the health of men at sea depends in a great measure upon circumstances within the power of officers, and, indeed, upon their exertions, much more than medical care[37]?

It has appeared in the preceding part of this work, that the diseases most prevalent among seamen are fevers, fluxes, and the scurvy. These are indeed some of the most fatal that can attack the human body; but there is a numerous tribe of complaints, which are also some of the most severe scourges of human nature, from which they are in a manner entirely exempt. —These are the diseases to which the indolent and luxurious are subject, and which so far embitter their life as to render their portion of worldly enjoyment nearly on a level with that of the poor and laborious. The diseases alluded to are chiefly the gout, stomach complaints, hypochondriac and other nervous disorders. In all countries it is the better sort of people that are most subject to these; for they are owing to the want of bodily exercise, to the great indulgence of the senses, and a greater keenness and delicacy in the passions and sentiments of the mind. Man being formed by nature for active life, it is necessary to his enjoying health that his muscular powers should be

exercised, and that his senses should be habituated to a certain strength of impression. Animal and vegetable nature may be aptly enough compared to each other in this respect; for a tree or plant brought up in a greater degree of shelter and shade than what is suitable to its nature, will be puny and sickly; it will neither attain its natural growth nor strength of fibre, nor will it be able to bear the influence of the weather, nor the natural vicissitudes of heat and cold to which it may be exposed.

It is to be remarked, however, that exercise and temperance may be carried to excess, and that in these there is a certain salutary medium; for when labour and abstinence amount to hardship, they are equally pernicious as indulgence and indolence. This is strongly exemplified in seamen; for, in consequence of what they undergo, they are in general short lived, and have their constitutions worn out ten years before the rest of the laborious part of mankind. A seaman, at the age of forty-five, if shewn to a person not accustomed to be among them, would be taken by his looks to be fifty-five, or even on the borders of sixty[38].

The most common chronic complaints which a long course of fatigue, exposure to the weather, and other hardships, tend to bring on, are pulmonary consumptions, rheumatisms, and dropsies. It is also to be considered, that these complaints, particularly the last, are farther fomented by hard drinking, which is a common vice among this class of men, and they are led to indulge in it by the rigorous and irregular course of duty incident to their mode of life.

With regard to gout, indigestion, hypochondriac complaints, and low spirits, there is something in hard labour of every kind that tends to avert them, and particularly in that rough mode of it peculiar to a sea life. There is also something in the harsh sensations from the objects which seamen are in use to see, hear, and handle, which so modifies their constitutions and hardens their nerves as to make them little liable to what may be called the diseases of excessive refinement, such as those above mentioned. I have, indeed, met with such diseases at naval hospitals; but I always remarked that they were in landsmen who had been pressed, and who had been bred to sedentary and indolent occupations.

The diseases above enumerated, as well as most other chronic complaints, being the offspring of indolence and luxury, while fevers and feverish complaints fall equally on all ranks and descriptions of men, it was a saying

of some of the ancients, that acute diseases were sent from heaven[39]; whereas chronic diseases were of man's own creation. But I shall endeavour in the course of this work to evince, that, with regard to seamen at least, acute diseases are as much artificial as any others, being the offspring of mismanagement and neglect; with this difference, that they are imputable not so much to the misconduct of the sufferers themselves, as of those under whose protection they are placed.

If I were to add any other complaint to the three already mentioned, as most prevalent, and peculiar to a sea life, it would be those foul and incurable ulcers which are so apt to arise at sea, particularly in a hot climate. The slightest scratch, or the smallest pimple, more especially on the lower extremities, is apt to spread, and to become an incurable ulcer, so as to end in the loss of a limb. The nature of the diet, and the malignant influence of the climate, both conspire in producing them.

The diseases most frequent and prevalent at sea have this advantage, that they are more the subjects of prevention than most others, because they depend upon remote causes that are assignable, and which increase and diminish according to certain circumstances, which are in a great measure within our power.

The prevention of diseases is an object as much deserving our attention as their cure; for the art of physic is at best but fallible, and sickness, under the best medical management, is productive of great inconvenience, and is attended with more or less mortality. The means of prevention are also more within our power than those of cure; for it is more in human art to remove contagion, to alter a man's food and cloathing, to command what exercise he is to use and what air he is to breathe, than it is to produce any given change in the internal operations of the body. What we know concerning prevention is also more certain and satisfactory, in as much as it is easier to investigate the external causes that affect health than to develope the secret springs of the animal œconomy.

This part of the work, therefore, is chiefly addressed to those who direct the navy either in a civil or military capacity; for the general health of ships depends so much upon the victualling and manning in the first instance, and, afterwards, on the degree of discipline and order which are kept up, that I am

persuaded that a certain degree of attention on their part would almost entirely eradicate disease from our fleets.

Several remarks in this part of the work will be found so obvious, that it might seem superfluous to mention them. But it has been my intention to omit nothing that I have heard of or observed as a matter of ascertained utility, and, I believe, the most experienced will find either something new, or what they had not before sufficiently attended to. Though the design of it is that of being extensively useful, yet my trouble would be compensated, should it prove the means of health and comfort to a single ship's company; nay, I should not repent my labour, could I enjoy the conscious certainty of its being the means of saving the life of one brave and good man.

The prevention of disease has relation only to the external causes that affect health, and I shall consider these under the four heads of

I. AIR,
II. ALIMENT,
III. EXERCISE,
IV. CLOATHING.

CHAP. I.

AIR.

Under this head I shall not only consider the natural state of the air of the atmosphere in point of heat and cold, moisture and dryness, purity and corruption, but also the different artificial impregnations of it from the holds or other parts of a ship, or from the persons of men who have been neglected in point of cleanliness.

The common air of the atmosphere at sea is purer than on shore, which gives to a sea life a very great advantage over a life at land. This advantage is still greater in the tropical regions, where the land air, especially such as proceeds from woods and marshes, is so fatal, and where the heat is also considerably less at sea than on shore. But this superior purity of the air at sea is more than counterbalanced by the artificial means of propagating diseases on board of a ship. Since a sea life, however, has this great natural advantage to health, the causes of disease peculiar to it are chargeable rather to the mismanagement of men than to any thing unavoidable in nature; and we are from this encouraged to exert our endeavours in removing them.

The effects of land air, however, are not to be neglected by those who are studious of preserving the health of a ship's company, for seamen are exposed to it in various ways while they are in harbour; and this is what we shall first treat of.

SECT. I.

Of the noxious Effects of Land Air in particular Situations.

All the diseases incident to a fleet, except the scurvy, are more apt to arise in a harbour than at sea, and particularly the violent fevers peculiar to hot climates. There are generally woods and marshes adjacent to the anchoring places in the West Indies, and the men are exposed to the bad air proceeding from thence, either in consequence of the ship's riding to leeward of them, or of people's going on shore on the duties of wooding and watering. Instances of this, without number, might be adduced from the accounts of voyages to all

the tropical countries. Our fatal expeditions to the Bastimentos, and to Carthagena, in former wars, are striking proofs of it; and we have seen the same effects, though in a much less degree, while the fleet was at Jamaica in 1782.

I have known a hundred yards in a road make a difference in the health of a ship at anchor, by her being under the lee of marshes in one situation, and not in the other[40]. Where people at land are so situated, as not to be exposed to the air of woods and marshes, but only to the sea air, they are equally healthy as at sea. There was a remarkable instance of this on a small island, called Pidgeon Island, formerly described, where forty men were employed in making a battery, and they were there from June to December, which includes the most unhealthy time of the year, without a man dying, and with very little sickness among them, though they worked hard, lived on salt provisions, and had their habitations entirely destroyed by the hurricane. During this time near one half of the garrison of St. Lucia died, though in circumstances similar in every respect, except the air of the place, which blew from woods and marshes.

The duties of wooding and watering are so unwholesome, that negroes, if possible, should be hired to perform them. In general, however, the employing of seamen in filling water and cutting wood is unavoidable, but it should be so managed as not to allow them, on any account, to stay on shore all night; for, besides that the air is then more unwholesome, men, when asleep, are more susceptible of any harm, either from the cold or the impurity of air, than when awake and employed.

As the service necessarily requires that men should be on shore more or less, however unwholesome the air may be, means are to be used to prevent its pernicious impressions on the body. Certain internal medicines, such as bitters, aromatics, and small quantities of spirituous liquors, tend to preserve the body from its bad effects. Of the bitters, Peruvian bark is, perhaps, the best; and there is a well-affected instance of its efficacy in the account given by Mr. Robertson of a voyage in the Rainbow to the coast of Africa; and by the same means Count Bonneval and his suite escaped sickness in the camps in Hungary, while half of the army were cut off by fevers. In consequence of Mr. Robertson’s representation of the effects of bark in curing and preventing the fevers of that climate, the ships of war fitted out for the coast of Guinea

have been supplied with it gratuitously, and Government would find its account in extending this bounty to all the tropical stations.

We have seen, in the former part of this work, that the fever produced by the impure air of marshes may not appear for many days after the noxious principle, whatever it is, has been imbibed; men having been sometimes seized with it more than a week after they had been at sea. It naturally occurs, therefore, that something may be done in the intermediate time to prevent the effects of this bad air; and nothing is more adviseable than to take some doses of Peruvian bark, after clearing the bowels by a purgative. Some facts, related in the first part of this work, show that an interval of ten days or a fortnight may elapse between the imbibing of the poison and its taking effect. And, in order to guard against the diseases of this climate in general, it would be more proper to take some large doses of bark once in either of these periods, than to make a constant practice of taking a little, as I have known some people do, by which they may also render their body in some measure insensible to its good effects. I knew a physician of some eminence in the West Indies, who always enjoyed uninterrupted health, and he imputed it to his taking from half an ounce to an ounce of bark every change and full of the moon, as he thought that fevers of the intermitting and remitting kind, were more apt to occur at these periods. Whether this idea be well founded or not, the practice is proper, upon the other principle that has been mentioned, and the phases of the moon will at least serve as an aid to the memory.

The spices of the country, such as capsicum and ginger, for which nature has given the inhabitants of the torrid zone an appetite, have also been found powerful in fortifying the body against the influence of noxious air. Either these, or the bark, or similar substances, of a bitter and aromatic nature, given in a glass of spirits to men going upon unwholesome duty, have been found to have a powerful effect in preventing them from catching the fevers of the climate. The practice may be thought too troublesome in the hurry of service in a great fleet; and I in general avoid mentioning any thing but what is easily practicable, and highly important to the body of seamen at large; but such a precaution may be of service at least to officers, or to a ship’s company, when service is easy, or on a small scale.

But besides the poisonous effluvia of woods and marshes, the sensible qualities of the air are also to be attended to. If I were required to fix on the

circumstances most pernicious to Europeans, particularly those newly arrived in the West Indies, I would say, that they are too much bodily exercise in the sun, and sleeping in the open air; and the practices most hurtful next to these are, intemperance in drinking, and bad hours. The sickness and mortality among new comers may, in general, be imputed to some one of these causes. It is in favour of this opinion that women are not subject to the same violent fevers as the other sex, which is probably owing to their not giving into the above-mentioned irregularities.

The last direction I shall mention with regard to the preservation of health in a harbour is, that the ship should be made to ride with a spring on the cable, that the side may be turned to the wind, whereby a free ventilation will be produced, and the foul air from the head, which is the most offensive part, will not be carried all over the decks, as it must be when the ship rides head to wind.

Having little experience of my own with regard to diseases at sea in cold climates, I cannot recommend any particular precautions; but Dr. Lind thinks that garlick infused in spirits is one of the best preservatives against the bad effects of cold and wet. The French ships of war are furnished with great quantities of garlick as an article of victualling, and its effects seem to be very salutary. It would appear, that substances of this kind are very conducive to health in hot climates also. I was informed by Capt. Caldwell, that, when he commanded a sloop of war on the coast of Guinea, he was supplied with a large quantity of shalots by a Portuguese about the time he left the coast, and his men were remarkably healthy on the passage to the West Indies, while the other ships in company, who wanted this supply, were very sickly.

But besides the obvious and sensible qualities of the air above mentioned, there are certain obscure properties which we do not understand, and which we find difficult to investigate; for there are diseases prevailing in certain places which seem to depend on some latent state of the air. Of this kind is the complaint of the liver, so common in the East Indies, yet almost entirely unknown in the West Indies; and in the West Indies there are certain diseases which prevail in one island and not in another; such as the *elephantiasis*[41] of Barbadoes, which is an affection of the lymphatics peculiar to that island. In the climates of Europe there are also certain obscure conditions of the air that favour one epidemic more than another, and in some years more than others[42].

All this is very mysterious to us; and although we could detect these properties of the air, we probably could not prevent their bad effects, since man must every where breathe the air, whatever its qualities may be.

SECT. II.

Of Foul Air from the Neglect of Cleanliness in Men's Persons—Infection.

Nature has wisely so contrived our senses and instincts, that the neglect of cleanliness renders a person loathsome and offensive to himself and others, thereby guarding against those fatal diseases that arise from bodily filth. The noxious air we speak of is generated by men keeping the same clothes too long in contact with the body, while they are at the same time confined and crowded in small and ill-ventilated apartments. Such is the origin of the jail fever, otherwise called the ship and hospital fever; and it seems to be with reason that Dr. Cullen ascribes the low, nervous fever of Britain to a similar origin, being caused, as he thinks, by an infection of a milder kind, arising in the clothes and houses of the poor, who, from slovenliness or indigence, neglect to change their linen, and air their houses.

Man is evidently more subject to disease than any other species of the animal creation, owing partly to the natural feebleness of his frame, but still more perhaps to the artificial modes of life which his reason leads him to adopt. There is no circumstance of this kind by which health is more affected than by clothing. Some of the most fatal and pestilential diseases are produced and communicated by it; for we see that the greater number of fevers, particularly those of the low and malignant sort, may be traced to the want of personal cleanliness.

There are few subjects more mysterious and difficult of investigation than this of infection. The origin of specific contagions, such as the small pox and the venereal disease, seems to be almost beyond the reach of a conjecture; and why all the contagions we know, excepting that of the bite of a mad dog, should be confined to one species of animal, their effects not being communicable to any other, is equally unaccountable. Why is the body incapable of being affected more than once by certain morbid poisons; and whence comes the striking and curious differences of susceptibility to

infection in different individuals at the same time, and of the same individual at different times?

It would appear that the infection of fever, which we are chiefly to consider here, does not, like some of the diseases above mentioned, depend on the continued propagation of a certain poison, but that it may spontaneously arise from a concurrence of circumstances, producing a long stagnation of the effluvia of the body on the clothes, for want of clean linen, while people are excluded from the free air, as in jails, hospitals, or ships.

In order, therefore, to preserve the crews of ships from such diseases, means should be taken not only to prevent the introduction of infection already existing, but to prevent the generation of it on board.

1. Means of preventing the Introduction of Infection.

War being a state of violence and confusion, in which the hurry and emergency of service may be such as to render it impossible to put in practice all the rules which might be laid down concerning the preservation of health, yet it is necessary that those who direct the navy, either in a civil or military capacity, should be aware of the causes of sickness and mortality, in order to guard against them as far as is practicable. From an indolent acquiescence in this idea of the hardships and inconveniences of war being unavoidable, I have known neglect to arise in the conduct of officers with regard to those under their command, as if it was not the duty of a commander to employ his utmost attention to alleviate the misfortunes and mitigate the sufferings of his fellow creatures; and we have seen that much more of the calamities of war arise from disease than from the sword. The like excuse might be framed for the neglect of stores and arms, which, the hurry of service might equally expose to injury. We see, indeed, infinite pains taken to prevent cordage from rotting, and arms from rusting; but however precious these may be as the necessary resources of war, it will not be disputed that the lives of men are still more so; yet, though there is the additional inducement of humanity to watch over the health of men, I do not think that this, in general, is studied with a degree of attention equal to what is bestowed on some inanimate objects.

Ships of war are exposed to infection chiefly by receiving such men as have been raised by pressing, who are frequently confined in guardships, under such circumstances of bad air and bodily filth as tend to generate the most virulent infection. The service also requires sometimes that men be received from jails, and they are either criminals delivered over by the civil jurisdiction of the country, or captives who have been restored by the enemy after a course of confinement in their prisons. It may happen too, as we have seen[43], that the enemy, who are made prisoners at sea, may have infection about them, and will communicate it the more readily that they are strangers.

There are few fevers but what are infectious at some stage or other of the disease; but it is not necessary that fever should actually exist in order to create infection. In the most violent and pestilential fevers, such as have sometimes originated in the jails of England, the persons who communicated them were not affected with it themselves[44]. Infection, like some other poisons, does not affect those who are accustomed to it, and therefore those who are in the habit of being exposed to it frequently escape its bad effects, especially if it is gradually applied, as must be the case with those about whose persons it is generated. For the like reason, physicians and nurses are less susceptible than others; and strangers, who are accustomed to a pure air, are the most susceptible of any. It is observed by Dr. Short, that contagious epidemics are more frequent and fatal in the country than in London, and this may probably be accounted for on the same principle; for every person in a great town is exposed to the breath and effluvia of others, and to a variety of putrid exhalations, which are unavoidable where multitudes inhabit together; but they are so used to them, that they are not affected by them; whereas in the country, where people are less accustomed to each other's company, and less used to impure air in general, they are the more readily affected when infection is introduced among them. It may even admit of a doubt if any society of men, living together, are entirely free from morbid contagion. It certainly sometimes happens, that a ship, with a long-established crew, shall be very healthy; yet, if strangers are introduced among them, who are also healthy, sickness will be mutually produced. This principle in the human constitution, by which the presence of strangers affects it, is well illustrated by a fact[45], founded on the best testimony, that, in one of the small western islands of Scotland, which is so remote, that the inhabitants are frequently without any communication with strangers for several months together; they become so susceptible, in consequence of this long interruption of

intercourse, that they are seized with a catarrh when strangers of any description come among them. It was said before, that cleanliness was founded on a natural aversion to what is unseemly and offensive in the persons of others; and there seems also to be implanted in human nature, for the same purpose, an instinctive horror at strangers, as is visible in young children and uncultivated people. In the early ages of Rome, one word signified both a stranger and an enemy[46].

These observations naturally suggest several useful and practical remarks. It would appear that the utmost attention is necessary not only to guard against the actual presence of of disease, but to be jealous of all new draughts of men, especially if they should come from guardships, jails, or tenders, and have been turned over from ships where disease is known to have prevailed; nay, that it is best to avoid mixtures of any kind.

The infection of fevers seems different from most others in this, that it is very various in its degrees of virulence. There is reason to think that the poison of the small pox, and that of the venereal disease, are in their own nature invariable, and that the difference of these diseases, in point of malignancy, depends on the constitution and other circumstances of those affected; whereas that of fevers being of different degrees of activity, and being frequently obscure and latent, is, on that account, the more treacherous, and ought to be watched with the greater circumspection.

The mode of manning the navy by pressing, I take it for granted, is unavoidable; at any rate, it would not become me to arraign a practice which has had the public sanction for ages. It is, however, one of the principal means both of generating and spreading the seeds of disease, in consequence of the indiscriminate seizure of men for the public service, and the confinement that is necessary to secure them. And as the exigences of the service make it necessary to admit persons of every description, there is no other remedy for this evil but to annihilate, if possible, the contagion that may thus be conveyed into ships of war. This is done by stripping and washing the new recruits who may be suspected of importing infection; also by cutting off their hair, clothing them with new clothes, and destroying the old, before they are allowed to mix with the ship’s company in which they are to enter.

Those who have put these methods strictly in practice, have been sensible of their great utility; and the most exact attention is necessary, as a single

infected man, or even any part of his clothing, may spread sickness through a whole ship's company. When we reflect what havock an infectious fever sometimes makes in a ship, it will appear how very important this fort of attention is; and when the cause of the sickliness of particular ships is traced to its source, it will generally be found to have originated from taking on board infected men at Spithead, or wherever else the ship's company may have been completed.

After the first edition of this part of the work was printed, an excellent institution was established at Portsmouth for the prevention of infection. A ship was appointed for the reception of the recruits of the fleet to which they were carried, to be stripped, washed, and provided with new apparel, before they joined their respective ships. This had a visible good effect on the health of the fleet; and it was planned and executed by Sir Charles Middleton, Comptroller of the Navy, whole unwearied assiduity, as well as integrity and ability in that important post, claim the highest praise and gratitude from his country.

It follows farther, from the preceding observations, that there is a sort of risque in mixing two different sorts of men, even when there is no actual disease or suspicion of infection; for, whether it is from dormant infection, or merely from the circumstance of change of air, such mixtures are known from experience to be sometimes productive of sickness. The late Admiral Boscawen was so sensible of this, that he avoided it, unless when some evident utility or necessity of service made it proper; and upon this principle he used to resist the solicitation of captains when they requested to carry men from one ship to another upon changing their commands.

One probable reason, among others, for ships of the line being more sickly than frigates or smaller ships is, that in greater numbers there is a greater chance of men of various descriptions and modes of life being mixed together.

2. Means of preventing the Production of Infection.

The infection of fever is not always imported from without, but may be originally and spontaneously generated on board. The causes of this, as

mentioned before, are want of personal cleanliness, and also confinement and crowding in close apartments.

In order to promote cleanliness, care should be taken that every man, on his first entering into the service, be provided with a proper change of linen, and that a frequent muster and review be made, in order to inspect their persons, and to examine their stock of apparel. A true seaman is in general cleanly, but the greater part of men in a ship of war require a degree of compulsion to make them so; and such is the depravity of many, that it is common enough for them to dispose of their clothes for money to purchase spirituous liquors. A muster and review, therefore, wherein men should be obliged once in the week to present themselves clean before their officers, and to produce a certain necessary quantity of clean apparel, would conduce both to sobriety and cleanliness. The exertion of authority, and the infliction of punishment, is so far from being considered by the men as a hardship, that they expect it; and it is the duty of an officer, as it is of a parent to a child, to constrain those entrusted to his care to perform what is for their good. It is common also for men to lay up their clothes in a wet and unwashed state, which in time is productive of the most offensive and unwholesome vapours; and this can be prevented only by their chests and bags being frequently inspected by their superiors.

It must be evident to any one who reflects on this subject, that a regulation of this kind is as necessary as any other part of duty; and it deserves to be made an article in the public instructions, instead of being left to the discretion of officers. This sort of discipline is particularly necessary in ships of the line, in which one cause of the greater unhealthiness is the difficulty of taking cognizance of so great a number; for, unless some regular method, as by muster, is established, there will be men who will escape notice, and skulk below, indulging in laziness and filth.

The good sense and humanity of many captains in the late war, led them to adopt certain methodical regulations for the preservation of cleanliness and order. The only public sanction given to this sort of discipline, was that of Lord Howe, who gave it in orders to those under his command, that each ship’s company should be divided into as many divisions as there were lieutenants, and that these should be divided into squads, with a midshipman

appointed to each; and that the officers should be respectively responsible for the good order and discipline of the men assigned to them.

It is an excellent custom, and pretty general in the navy, to allow the men one day in the week for washing, when the weather and other circumstances will admit of it. It would be a farther improvement in the rules of the service to supply sope in the same manner as tobacco and slops are supplied, that is, to let the men have what quantity they want from the purser, who is allowed to charge it against their wages[49].

Next to want of cleanliness, the circumstances most apt to give rise to infection are, close air and crowding. A certain length of time is necessary, in order that these should have this effect, and the longer they take place, the more certainly will infection be produced, and it will be the more virulent[50].

In order to admit air freely, the ports should be kept open whenever the weather will permit this to be done. The great objection to free ventilation is the danger of exposing men to the air in cold climates. But it fortunately happens, that fire, while it is the most effectual means of counteracting the cold air, is also the best means of promoting ventilation; for wherever there is fire, there is a constant change of air taking place by means of the draught to which it gives occasion. This cannot be done with safety and convenience in all parts of the ship; but frequent fires in the lower parts of a ship will prove extremely salutary by drying up the moisture, and producing a change of air, and also in a cold climate by the warmth it produces.

The hammocks and bedding should also be aired by exposing them upon deck, especially after the ports have been long shut in consequence of bad weather. They cannot be thoroughly aired unless they are unlashed; and as this could not be conveniently done daily in men of war, it might be done from time to time by the different divisions in rotation[51]. When the men come to sleep upon them after these operations, they experience the same agreeable sensations as from a change of linen; and this must conduce to health as well as pleasure, like all other natural and moderate gratifications. It may be farther remarked in favour of cleanliness, that it is not only directly conducive to health, but is naturally connected with habits of good order, sobriety, and other virtues. The most cleanly men are always the most decent and honest, and the most slovenly and dirty are the most vicious and irregular.

A ship of war must have a much greater number of men on board than what are necessary to navigate her; for, besides the marines, a great many hands are necessary to man the great guns in time of action. For this reason, there is a greater risque of the inconveniences of overcrowding than in ships intended for commerce, and therefore much greater attention is necessary with regard to ventilation and cleanliness. There is a piece of management which tends also in some measure to obviate the necessity of crowding. This is to berth the watches alternately, by which it is meant, that one half of each watch should lie on different sides, whereby they do not sleep so close, and are not so much exposed to each other's breath and to the heat and effluvia of each other's bodies. This has the farther advantage of preserving the trim of the ship.

What has been said of the ship and men in general, applies still more strongly to the sick, and the berth[52] assigned to them; for there is nothing so apt to increase, and even generate, contagion, as a number of sick together, unless uncommon attention is paid to cleanliness and ventilation. This is so true, that, unless where the complaint is very catching, it is best not to separate the sick; for if they are a good set of men on board, those who are confined by sickness will be better nursed and tended by their messmates than in a sick berth. But if the state of infection renders separation necessary, the best part for the accommodation of the sick, in a ship of the line, is under the forecastle in a warm climate, and on the fore part of the main deck in a cold one. When they are under the forecastle, however, they ought to occupy only one side, as they would otherwise be disturbed by the men who must pass to and from the head, and the men in health would, in this case, be exposed also to contagion. As infection is most likely to arise among the sick, attention to cleanliness and air is doubly requisite where they lie; and it has a good effect to sprinkle hot vinegar and diffuse its steams among them once or twice a day.

Thus we see that cleanliness and discipline are the indispensable and fundamental means of health, without which every other advantage and precaution is thrown away. Government never bestowed more attention and expence upon the victualling of the navy than during the late war; but it would be to little purpose to provide the most nourishing and antiscorbutic diet, the most wholesome and cordial wines, the most efficacious remedies, and the most skilful physicians and surgeons, if the men are not constrained to keep their persons sweet, their clothing and bedding clean, and their berths airy and dry. It is, therefore, upon officers more than any others that the health

of the fleet depends; and I should be excused in the frequent mention I make of this, were it known how often I have been the witness of the fatal effects of the neglect of these rules.

3. Means of eradicating Infection.

When, from a neglect of the means above mentioned, an infectious fever comes actually to prevail, and the infection, perhaps, adheres obstinately to the ship in spite of cleanliness, good air, and diet, and all the other means, which, if employed in due time, would have prevented it, then some measures are to be taken for eradicating this subtile poison.

The first step towards this is, to prevent the disease from spreading, and this is done by separating the sick from the healthy, and cutting off all intercourse as much as possible. For this end, it is necessary to appropriate a particular berth to contagious complaints, and not only to prevent the idle visits of men in health, but to discover and separate the persons affected with such complaints as soon as possible, both to prevent them from being caught by others, and because recent complaints are most manageable and curable. Officers might be very useful in making an early discovery of complaints, by observing those who droop and look ill in the course of duty; for seamen think it unmanly to complain, and have an aversion to be put on the sick list. I have heard of a method practised in some ships, of keeping a book on the quarter deck for the officer to mark the names of such men as might look ill, or might be missed from duty upon calling the roll, in order to afford the surgeon a means of finding out those who should be the objects of his care.

Those whose profession it is to superintend the health of the ship, would find it for their ease and interest, and should consider it as their duty, to walk over the different decks once a day, or every other day, in order to make an early discovery of those who may be taken ill. Though I have laid great stress on the duty of the commander, as the proper guardian of health, yet his assiduity will not avail unless the surgeon also does his part, by such acts of attention as I have mentioned, joined to skill in his profession.

Surgeons are, perhaps, more regarded in our service than in that of other nations; but it would be for the public benefit if they were still more respected and encouraged. To men of liberal education and sentiments, as surgeons

ought to be, and generally are, the most effectual inducements for them to do their duty are flattering attentions, and a certain degree of estimation in the eyes of their officers. Liberality of manners, on the part of superiors, is the most likely means of encouraging a conscientious performance of duty in this profession; for though strict and distant behaviour may operate upon the minds of those whose functions are merely mechanical, how can it infuse that tender attention to human sufferings, and that sense of duty, which may induce a man entrusted with the health and lives of his fellow creatures to act his part with propriety and effect?

In order to prevent sickness from spreading, it is not sufficient to cut off all personal intercourse. The clothes of men are as dangerous a vehicle of infection as their persons; and it should be a strict and invariable rule in case of death from fever, flux, or small pox, to throw overboard with the body every article of clothing and bedding belonging to it.

Upon the same principle, in case of recovery from any contagious disease, as it would be too great a waste to destroy the clothes and beds, they should be smoked, and then scrubbed or washed before the men join their messes and return to duty. This precaution is the more necessary, as infection in a ship is extremely apt to be communicated by bedding, from the custom of stowing the hammocks in the netting, by which they are brought in contact with each other. This, however, is an excellent custom, as it not only clears the ship below, and serves to form a barricade on the gunwale, but tends to air the bedding; and this salutary effect should not be prevented, except in case of rain, by the coverings, called hammock-cloths, by the use of which utility is evidently sacrificed to an excess of neatness.

It sometimes happens that the number of sick in a ship is so great, that it is not possible to take proper and effectual measures on board for stopping the progress of disease. But when she can be cleared of the sick by sending them to an hospital, no pains should be spared to extirpate the remaining seeds of infection.

For this purpose, let their clothing and bedding be sent along with them; let their hammocks, utensils, and whatever else they leave behind, be smoked, and either scrubbed or washed before they are used by other men, or mixed with the ship’s stores; let the decks, sides, and beams of their berths, be well

washed, scraped, smoked, and dried by fire; then let them be sprinkled with hot vinegar, and, finally, white-washed all over with quick lime.

Should any officer object to the trouble and inconvenience of all this, let him reflect for a moment how much more troublesome and inconvenient, as well as noisome and disagreeable, sickness itself proves to be; let him reflect that the efficiency of the ship, considered as a bulwark of defence, or an engine of annoyance, depends on the number of healthy hands, and that his own character is to depend on the exertions to be made by them in the day of battle, not to mention the attention due from him as a man to the sufferings of the objects themselves.

But besides these recent infections, it sometimes happens that the seeds of disease adhere to the timbers of a ship for months and years together, and can be eradicated only by a thorough cleansing and fumigation. Sweeping, washing, scraping, and airing, are not sufficient entirely to remove the subtile infectious matter; but they will assist and will prepare it to be acted upon by heat and smoke, which are the only means to be depended upon. A complete fumigation can only be performed when the ship is in dock; and I shall here transcribe a method recommended by Dr. Lind.

“It will be proper to remove every thing out of the ship, so that the hold may be swept, and, when the men have withdrawn, to light a number of charcoal fires in different parts, and to throw a handful or two of brimstone on each. The steam of these should be closely confined by shutting the ports and hatchways from morning till evening, no person in the mean time being allowed to go below, nor for some time after opening the ports and hatchways, that the steam may be dispersed.

“In order to purify the men’s clothes, it would farther be proper to fumigate the hulk into which they are removed with tobacco once or twice a week while their ship is in dock, the men remaining below as long as they can bear it.

“The clothes and hammocks of the men should be exposed in the hulk to the smoke of the tobacco, and those which are more particularly suspected may be hung up the ship, and exposed to the steam of the charcoal and brimstone.

“The ship having been already fumigated with tobacco, it will be sufficient to use the fumigation of charcoal and brimstone above described for three days, and, after the last day’s fumigation, the inside of the ship should be well washed with boiling vinegar, and, before the men return on board, all the decks should be scraped and washed.”

When a ship is at sea, these precautions cannot be taken so completely; but if infection is present, or is suspected, then cleansing and fumigating may be practised in a less degree. I have known a ship at sea fumigated with gunpowder kneaded with vinegar, so as to prevent it from exploding, and to make it burn slowly with a spattering flame. Flowers of sulphur[53], with about an eighth part of nitre, will answer still better. A quantity of these is placed in each interval of the guns between decks, every person being turned up, and the ports and hatches shut till they are consumed, and till the smoke has dispersed. It has also been recommended to burn resinous bodies, such as the woods of fir, spruce, and juniper, as the smoke of these is more salutary. Upon the same principle, the effluvium of tar is thought wholesome; and the cables that are coiled in the lower parts of a ship being soaked with tar, like most of the other ropes of a ship, probably conduce to the health of a place otherwise dank and unwholesome. Fumigation may also be performed by means of tar, either by throwing it on red-hot irons, or a wood fire, which may be carried about between decks in a pot or moveable grate, or over some cannon balls in a tub, or by immersing a red-hot loggerhead[54] in a bucket of tar. If this is done in the place occupied by the sick, it will have a still better effect; and it will be of service to them to be removed for a short time under the half deck or forecastle till this or other means of purification are put in practice. In whatever manner fumigation is performed, it will be of service to spread out the clothes and bedding of the men, or to hang them upon lines, that they may be exposed to the heat and smoke.

It will also be of great service to make the men expose their frowsy clothes to the sun and wind. If a strong infection is suspected, and it cannot be afforded to destroy the clothes, the best means of eradicating the poison is to hang them for a length of time over pots of burning brimstone in a large cask standing endways, with small apertures to admit air enough for the brimstone to burn.

Fire in every shape is to be considered as the principal agent of purification, by its heat and the ventilation it occasions, perhaps, still more than its smoke. It has already been repeatedly inculcated, that the great enemies of infection are ventilation and heat. I have mentioned smoke and the effluvia of balsamic bodies, but these are not to be depended on; and it is the more necessary to mention this, as the attention bestowed on more trifling means may divert the mind from a proper regard to what is more essential. It is mentioned by the benevolent Mr Howard, that it is the custom in some parts abroad to scatter fresh branches of pine or spruce in the hospitals, in order to purify the air; but, trusting to this, they neglect the admission of fresh air, which is the only effectual method of sweetening the air.

There is reason to think that the open air very soon dissipates and renders inert all infections of the volatile kind, and of course the warmer the air is the more readily it will have this effect. It is accordingly observed, that infection is much less apt to be generated about the persons of men, and that it adheres to them for a much less space of time in a hot climate than in a cold or temperate one. This is a remark, which, so far as I know, has not been made by any author; and, till observation suggested it to me, I fancied the reverse to be the truth. I have seen so many instances of filth and crowding in ships and hospitals in the West Indies, without contagion being produced, and which in Europe could hardly have failed to produce it, or to render it more malignant, that I am convinced there is something in tropical climates unfavourable to the production and continuance of infectious fevers[55]. The ships which bring this fever from Europe in general get rid of it soon after arriving in a warm climate; and nothing but the highest degree of neglect can continue or revive it.

The facts above mentioned brought into my mind what is related of the plague at Smyrna and other places, that it disappears at the hottest part of the year. It is also curious and important to remark, that the true pestilence never has been heard of between the tropics. It is not easy to assign the cause of this effect of heat upon infection, as every thing relating to this subject is very obscure. We can conceive it to be owing to the greater degree of airiness which the heat of the climate makes necessary, or to the use of fewer woollen clothes. There may be something in the state of the body, particularly in the pores of the skin, which disposes them less to imbibe or produce the poisonous effluvia, or, when imbibed, it may more readily be thrown out by

perspiration with the other acrimony of the blood; or more probably, as has been hinted above, the virulent matter is of such a degree of volatility as to be readily dissipated in a certain degree of heat[56].

There is a fact, which, though seemingly of a contrary tendency, yet is in reality in proof of the same opinion. It is, that these same diseases disappear in circumstances of great cold. When England was last visited by the plague, it disappeared in winter; and the same is observed at Moscow and other places. In this case the infectious matter is rendered *inert*, but not *extinct*, and the return of heat sets it afloat in the atmosphere, so as to expose it to human respiration. Dr. Guthrie informs us, that infection is entangled and fixed by the cold of winter on the doors and walls of the houses of the Russian peasants, and that upon the return of the warm season it is set loose by the thaw, and then becoming active, produces diseases.

With regard to the West Indies, the precautions that have been laid down are chiefly necessary when a ship newly arrives in the climate; for it is during the first three or four months that sickness is apt to prevail.

This does not depend upon any thing peculiar to the climate; for I have known ships arrive without being visited with any sickness. It seems to be owing, for the most part, to that flock of infection and disease imported from Europe exerting its effects, and when this has spent itself, the men remain in good health, unless exposed to the land air or other accidents; for the air at sea in those climates, as well as every where else, is extremely pure and wholesome, and there is no where that seamen are more healthy or comfortable.

SECT. III.

Of the Foul Air generated in a Ship.

I mean here to distinguish the unwholesome vapour produced by the contents of the ship from the infection produced by the effluvia of men’s persons, which was treated of in the last section.

The means of preventing this foul air from being generated are, cleanliness, dryness, and ventilation.

All parts of a ship may, if neglected, become dirty, and emit an offensive vapour; but the parts under water consisting of the orlop and hold, are more particularly so from the materials they contain, and from the want of free access to the fresh air; accordingly, there is always more or less stench in those parts, even in the best-regulated ships.

It was mentioned in the first part of this work, that an opinion was entertained by some that no foul air was productive of fevers but such as proceeds from the living human body. I alledged that this was otherwise, at least in hot climates; and some proofs of this opinion were adduced, particularly from the French prizes. Though the neglect of personal cleanliness is the principal source of disease, yet cleanliness of every kind, and purity of the air in every respect, is to be anxiously studied.

With regard to general cleanliness, it is hardly necessary to mention sweeping, washing, and scrubbing of the decks; for the natural propensity of the English[57] nation to neatness seldom allows any neglect of these. Lord Howe, to whose virtues as a man, and abilities as an officer, his country is so much indebted, gave it in general orders to wash the upper decks every day, the lower decks twice a week, and the orlop once a week at least. He also ordered that, every washing, smoking, mustering, and review of clothes, or any other means taken for the health of the ship, should be marked in the logbook, and the reason to be assigned there if omitted at the stated times. These rules are a good specimen of the order that ought to prevail in every branch of public duty; for it is well known to every experienced officer that it is a methodical proceeding of this kind which can alone render service either easy or effective.

The loss of men’s lives from the foul air of the well is a common accident in ships, and I have been myself witness to several instances of it. Where there is the least suspicion of this, a candle should previously be let down, and if it should be extinguished, it may be concluded that the air is deadly. It becomes safe for men to breathe in it by leaving it open for some time, or, more expeditiously, by letting down fire in a pot or grate, which soon changes the air, by producing a draught of it upwards.

It is a very salutary practice to let down fires frequently into the well, both in order to purify the air and to dry the surrounding parts. It was formerly mentioned that this was daily done in the Intrepid, and the effect of it was to

remove the wetness of the ballast and the mouldiness which had overspread the sides and beams; and having had the effect of sweetening and purifying the air, it seemed to be the principal circumstance that tended to make this ship extremely healthy from being the most sickly of all the fleet. This precaution, as well as every other point of cleanliness, is more necessary in large ships, because the mass of foul air, as well as the quantity of corrupting materials, is greater[58].

The following fact strongly evinces the good effect of fire and smoke:—When it was the custom for frigates to have their kitchens between decks, they were much more healthy than in the present construction, in which they have them under the forecastle, where the heat and smoke are dissipated without being diffused through the ship, and causing a draught of air upwards, as formerly. The men derived then also great benefit and comfort from having a large fire, round which they might assemble to warm and dry themselves in a sheltered place. I leave it to those who preside in the construction of the navy to determine how far it would be advisable to return to the old manner of construction. The French ships of the line have their kitchens and ovens between decks, and this must tend to counteract the effects of their want of cleanliness. The Dutch ships of the line have their kitchens on the orlop deck, which must be still more conducive to the general purity of the air.

Moisture is pernicious both in itself and as the instrument of putrefaction. All the complaints, called colds, are more owing to wet than cold; and moisture may be the means of producing, or at least of exciting dangerous fevers, when they would not otherwise appear. It besides contributes greatly to the production of scurvy. Ships built of ill-seasoned wood are found to be very unhealthy on account of the moisture contained in it. The moisture of timber arises not only from being used too soon after being felled, but also, as I am informed, from being stripped of its bark and outer surface when piled and exposed to the weather in dock yards. This method of smoothing and piling the wood is only a late practice; and the advantage in point of convenience and neatness seems to be more than overbalanced by the detriment it thereby receives.

A wet hold diffuses moist vapour all over the ship; and it was a rule with some of those commanders whom I observed to be most successful in preserving the health of their men, not only to have daily fires in the well, but

to bail out the water when the pumps could not exhaust it all, and never to allow it to collect to more than the depth of a few inches. It is, therefore, very doubtful whether it is a good practice to let in water, as is very commonly done in order to sweeten the hold, for the same sweetness will be preserved if it is kept strictly dry. If it should happen, indeed, that there should be a great deal of putrid matter in the lower parts of the ship, from previous neglect or unavoidable leakage, it may be adviseable to let in a quantity of water in order to loosen and wash off what is offensive, and then to pump it out.

There is a circumstance in the first fitting out of a ship well worth attention, as highly conducive to the dryness and cleanness of the hold. I mean the choice of the ballast; for that which is called *shingle*, consisting all of pebbles, is far preferable to that which is sandy and earthy, as it does not so readily soak and retain the moisture and filth. Water or fluid of any kind readily subsides in it, and should any putrid matter be entangled in it, there will be less difficulty in washing it out.

The decks should not be washed so often when the weather is moist as when it is fine, as it will be more difficult to dry them, and more harm may arise from the moisture than benefit from the cleanness. Washing should also be performed very early in the morning, even in the best weather, in order that there may be time for the decks to become dry in the course of the day. It is after a general washing that the moveable fires, formerly described, are most proper and useful.

Every contrivance should be fallen upon to change the air in the orlop and hold. Ventilators and windsails[59] are well adapted for this purpose, and should be used as frequently and for as long a time as possible. It has also a good effect in cooling the air in the lower parts of a ship in the West Indies, to lift the gratings of the hatches, raising them on their edges, and lashing them to the staunchions. It contributes likewise to cleanliness and coolness to keep the decks as clear as possible from[60] chests and other lumber, which are in the way of sweeping and washing, and prevent also the free course of the air.

Particular attention to ventilation is necessary in frigates, for almost all that part in which the men sleep is excluded from the air, and they are therefore very uncomfortable in the West Indies unless small scuttles are cut in the sides. But if this should be objected to as weakening or endangering the ship, there is a good contrivance for the same purpose, which I met with on board

of the Nymphe frigate. It consists of a square wooden pipe, of about nine inches in the side coming from between decks, running along the side of the ship, and opening over the gunwale of the forecastle. There was one on each side.

SECT. IV.

Means of guarding against Infection and Bad Air.

Infection never prevails to such a degree, as to affect every person indiscriminately who is exposed to it. Even where the plague and small-pox prevail to the greatest degree, there are some persons who, though susceptible of these diseases, yet escape them. There are certain other infections of a weaker nature, as was before observed, and these will remain entirely inactive, till they find constitutions so disposed as to be fit subjects of their action. The seeds of disease may be compared to those of vegetables, which lye dormant, unless they happen to fall into a situation peculiarly adapted for exciting their activity. It is very difficult to account for this uncertainty in the operation of infection, but it is extremely providential, that under the most calamitous state of sickness, there are always some who are in health and who survive, for the necessary purposes of life. If this were not the case, it might happen that every person on board of a ship might perish from sickness in the course of a voyage, a circumstance which I believe has never been known to happen.

There is an endless variety in the constitution of the human frame, both in mind and body, as well as in the features of the face. There are, perhaps, no two individuals in the world in whom the same effect precisely is produced by the same food, air, medicine, poison, or passions of the mind. The different effects of infection, therefore, upon different people, seem to depend, in many cases, on peculiarities of constitution too obscure to be explained; but there are also known circumstances which resist or encourage its effects.

The great power of habit[61] in taking off the effect of infection, has already been mentioned, and it would appear that novelty gives an increased energy and activity to all impressions, as well as those on the senses. If a person, therefore, escapes the first attack of infection, he will be more likely to continue exposed to it with safety in future.

There are certain precautions necessary to be attended to by those who are unavoidably exposed to contagion, particularly in the first instance. Those who can afford a full diet, and a liberal use of wine, have been observed to resist infection better than those who use food and drink that is meagre and watery. It is also a good rule not to go among the sick, nor otherwise to expose one's self to infectious air, with an empty stomach; for whether it is that the body is then more susceptible, or that the pores of the skin and lungs are in a more highly absorbing state, so as with greater readiness to inhale the poison of disease, it is certain that a person in that situation is more apt to catch harm from foul air of any kind. Whatever else weakens and exhausts the body, renders it also more susceptible of noxious impressions. Under the head of weakening powers, I comprehend not only what empties the body of its fluids, such as loss of blood, or a diarrhœa, but intoxication, fatigue, fasting, watching, and certain affections of the mind, such as care and grief.

Cold and moisture may also be enumerated among the causes that invite the attack of infectious diseases. They are of themselves simply productive of catarrhs, rheumatisms, and the like disorders; but if an infection should be accidentally present when the body is exposed to them, then instead of these complaints, the disease peculiar to that infection will be produced[62]. This was illustrated in the last reinforcement we had from England; for while bad fevers were breaking out in most of the other ships, the [63]Union was affected with those complaints only which are simply the effects of cold and moisture. It would be more proper, perhaps, to say, *exposure to the air*, than to call it *cold*; for exposing the naked body to the open air, even in the warmest climate, is prejudicial to health. This holds at least with regard to Europeans who are accustomed to clothing, however the natives of hot climates who are naked, may expose themselves with impunity.

It is of the greatest consequence to ascertain the extent of the influence of infection, for the means of avoiding and preventing it will very much depend upon this. It is now known, that infection extends itself to a very small distance. There are, indeed, some morbid poisons, such as that of the bite of a mad dog, and that of the venereal disease, which require actual contact to make them take effect. Others are more volatile, and seem to he inhaled by the breath, or absorbed by the skin, but these do not extend far. That of the plague[64] does not reach above a few yards, and that of the small-pox and of fevers is probably equally limited. This discovery is very valuable, by

ascertaining the limits of danger; for when a person imagines he runs the same risk when at a considerable distance from the seat of disease, as if he were in contact with the person affected, he will be apt to expose himself wantonly and unnecessarily to the infection.

It seems to be owing to the ignorance of the extent of its influence, that the plague has in general been so fatal; for in consequence of the opinion that the whole surrounding atmosphere was affected, it was vainly attempted to purify it by large fires in the open air, or by [65]firing off artillery, instead of trusting to the separation of the sick so as to avoid their near approach, and to the confinement of those in health to their own houses, which are all the precautions necessary to prevent its progress.

CHAP. II.

Of Aliment.

SECT. I. Of Solid Food.

The most unnatural circumstance in a sea life is the food which men use, and the disease most peculiar to it is one which is owing chiefly to the nature of the aliment; for though other causes conspire in aggravating the scurvy, the depraved state of the INGESTA is the main and fundamental cause of it.

It is this disease that is most fatal to seamen next to fevers. It was formerly as fatal, if not more so; but some modern improvements have rendered it less frequent and violent. The habitual use of salt provisions, besides producing evident symptoms of scurvy, begets such a state of the constitution, that, upon the least scratch being received, particularly on the lower extremities, a large and incurable ulcer ensues; and this circumstance, trifling as it appears, is the cause of losing an incredible number of men to the service, especially in the West Indies. The greater part of the food of a ship's company is necessarily salted meat. Biscuit and pease, though of a vegetable nature, are hard of digestion; and though they qualify the animal food, they do not answer the purpose of fresh vegetables. Though officers have a supply of live stock even for the longest voyages, it would be impracticable to carry a quantity sufficient to preserve a whole crew from the scurvy. But certain articles have of late been introduced into use, of a durable and portable nature, which so qualify the salt provisions, that they can be used without inducing this disease. These are either such as are articles of common diet, viz. melasses and sour krout, or those which are intended only for the sick and recovering, such as portable soup and the preserved juice of lemons and oranges.

It is one of the most ancient and real grievances in the service, that there has not been a sufficiently ample supply of nourishment and cordials for the

weak and recovering. This complaint is made by [66]Dr. Cockburn, who was physician to the fleet in the end of the last century; and it is a complaint that has not yet been entirely redressed, nor has the subject been considered with the attention it deserves. The only improvement in the sea victualling that I know of from that time till of late, has been the use of raisins for puddings, and the occasional use of vinegar, which is an article extremely salutary, and was looked upon as the great preservative of health in the Roman armies.

After the force of disease has been subdued at sea, men are frequently lost by relapses, or pine away in dropsies and other chronic complaints, for want of being supported by some cordial and nourishing diet. It is mentioned in my memorial to the Admiralty, how insufficient the small quantity of surgeon's necessaries are; and it is recommended that a large quantity of certain species of refreshment should be put in the purser's charge, which, being substituted for the common sea victualling while men are ill or recovering, would cost Government little or nothing. Besides the articles already mentioned, it was recommended to set apart a quantity of the best wines, and to be provided with brown sugar, dried fruits, barley, rice, sago, and salep. To these might be added eggs, which, if greased and put in salt, may be preserved fresh for a great length of time. Carrots and other roots might also be preserved for the longest voyages by means of sugar; and green vegetables might in like manner be preserved by means of salt. But of all the articles, either of medicine or diet, for the cure of the scurvy, lemons and oranges[67] are of much the greatest efficacy. They are real specifics in that disease, if any thing deserves that name. This was first ascertained and set in a clear light by Dr. Lind. Upon what principle their superior efficacy depends, and in what manner they produce their effect, I am at a loss to determine, never having been able to satisfy my mind with any theory concerning the nature and cure of this disease, nor hardly indeed of any other. An ingenious treatise has been published on this subject by Dr. Milman, to which I refer the reader, meaning to confine myself in this work chiefly to what is practical.

Every person who has beheld with attention and feeling the tedious and languishing series of suffering which the sick and recovering endure for want of the means of supporting and recruiting their strength and spirits,

must wish that those who preside in the civil department of the navy would seriously consider this subject, and complete the reform that has already been begun.

With regard to the victualling of men in health, a most commendable attention has been paid to the improvement of it. The ordinary articles of victualling have not only been of excellent quality, but some new articles have been added, from which the greatest benefit has been derived. The chief of these are sour krout and melasses. The latter was first brought into use by Captain Ferguson in the beginning of the late war. He ordered it to be served with rice to the men who were affected, or threatened with the scurvy, in the ship under his command. The benefit experienced from it in this and other instances was so great, that during the last two years of the war it was made a regular article of sea victualling, and substituted in place of a certain proportion of oatmeal[68].

As bread is one of the principal articles of diet, the utmost care should be taken in preserving it, and great advantage would arise from stowing it in casks that are water tight, instead of keeping it in bags, or letting it lie loose in the bread room. Captain Cook, by this method, and by giving it a cast in the oven in the course of the voyage, preserved his biscuit found in every respect for more than three years. But the greatest improvement in this article of diet would be to have, in the form of flour, a greater proportion of what is now allowed in bread. The flour might be made into puddings, and seems, in this form, to be more nutritious and antiscorbutic than biscuit which has undergone a strong force of fire. This sort of mess would be still more proper and agreeable now that melasses is a stated article of diet. Flour, by being well pressed and rammed, will keep as long as biscuit, and it can be stowed in one fifth part of the space; it will, therefore, cost much less in freight than the same quantity of it in that form, and it may be baked abroad if necessary[69]. Malt, by being well rammed, may also be preserved for a great length of time.

Of all the former articles of sea victualling, there was none more abused than oatmeal. The quantity allowed to each man was twice as much as he could consume, and the overplus went to the purser’s profits, or was wasted by being given to the hogs, or even wantonly thrown overboard. Melasses

have, with great advantage, been substituted for part of it, in the proportion of eleven pounds for two gallons of oatmeal. The first trial of melasses was in the[70] Foudroyant, and it answered so well, that, in a cruise under Admiral Geary in 1780, this was the only ship free from the scurvy, and out of two thousand four hundred men that were landed at the hospital with this disease, there were none from this ship. It appears to be so similar in its nature and effects to essence of malt, that it seems hardly worth while for Government to be at the expence of providing the latter.

A certain proportion of barley has also of late been substituted for part of the oatmeal, which being more light and palatable, makes a pleasing variety, particularly to the sick and recovering. Captain Cook carried wheat with him, and found it to answer equally well. Might not potatoes also be a proper and salutary substitute, as they will keep a considerable length of time in a warm climate, and they have been successfully employed in their raw state for the cure of scurvy? It would not be right, however, to abolish oatmeal entirely; for there is a certain preparation of it which is an antiscorbutic of equal efficacy with any whatever, except the juice of lemons and oranges. This is flummery, or sowins, which is prepared by letting oatmeal and water stand together till they grow acidulous, and then boiling them into a jelly. I know of some well-attested instances of the crews of ships being saved from the scurvy by this alone.

Butter is a good article of victualling in so far as it renders that part of the diet which consists of grain and vegetables more palatable, and thereby induces men to eat more. But as it is extremely corruptible in a warm climate, hardly any being used by the seamen but what is more or less rancid, it should never be sent to a tropical station. Greater quantities of it are condemned than of any other article of victualling, and it is therefore the most expensive to Government. There are certain articles that are the natural produce of the West-India islands, which may be substituted for it with the greatest advantage. These are sugar and cocoa[71], which, during the last year of the war, were served in place of butter with great success, and this proved an alteration in diet not only salutary, but agreeable to the seamen, whose inclinations are always to be consulted in such changes[72].

When a ship is in port, encouragement should be given to the sale of roots, greens, fruits, and sugar. The men have a good custom of exchanging part of their bread, beef, and pork, for what they can get from the shore; but as they in general prefer spirituous liquors to the above-mentioned articles, the greatest care and vigilance should be used to preclude men from such opportunities of injuring themselves[73]. Every ship should be furnished with a seine, and other implements for fishing, when in harbour.

When captures are made, in which there are such articles as sugar, wine, rice, or fruits, it would be much better in many cases to allow the immediate use of them at sea, where the men may be disposed to scurvy or other diseases, than to wait for the conversion of them into money.

Though it has been my object to introduce as many articles of diet as possible, independent of salt provisions, it does not follow that these are in themselves unwholesome. They are pernicious by being made almost the sole and exclusive article; but if used in moderate quantity, they are even in some respects well adapted for the food of seamen. The nature of their life gives them a strong digestion: in their duties they not only employ violent exercise, but use more muscles and a greater variety of postures and motions than men of any other profession. To such constitutions may not food of a refractory nature and hard of digestion have even an advantage over what is more delicate and digestible?

It does not appear that it is the salt quality of the provisions used at sea that makes them productive of scurvy, but the want of their native juices and of the nutritious principle. A small quantity of salt is necessary to make all food palatable and wholesome, in so much that it is reckoned one of the necessaries of life. All animals have a craving for sea salt, and nature has kindly made it the most abundant and universal of all saline bodies. Food, without this seasoning, not only comes to be loathed, but the want of it renders the animal weak and flabby. As it not only assists digestion, but invigorates all the bodily functions by stimulating and bracing the fibres, it is in some cases a valuable medicine. It is remarkable that men are very apt to tire of a long continuance of fresh provisions[74], but never of what is salt; and even under the scurvy the latter will be relished, and sometimes preferred to most other kinds of food. It has been a practice with some to

make the scorbutic men drink sea water; but though it is not attended with any manifest benefit, I never heard that it aggravated the disease.

I was told by the gentlemen of the army at New York in 1780, that the soldiers in cantonments were not near so subject to agues as the people of the country; and the only difference in their mode of life was, that the former had in their allowance a certain, proportion of salt provisions.

In an unhealthy country I should think a free use of salt, as well as spice[75], would be salutary; and when ships are in port it would perhaps be better to allow a certain proportion of salt provisions, because it would not only be wholesome and agreeable, but the men's constitutions would probably be more reconciled to an entire salt diet when necessary: but I would except from this the crews of such ships as have newly arrived from a long cruise or voyage, in which it may be necessary to alter the constitution as quickly as possible by a diet entirely fresh.

Nothing that I have collected from my own observation, or that of others, has been neglected under this head, except one particular caution with regard to the preparation of the victuals. The large utensils employed to boil the provisions are made of copper, and it sometimes happens from neglect that these are allowed to contract a rust, which is one of the most active poisons we know. The neglect consists chiefly in allowing any thing acid, or what is liable to become acid, such as gruel or burgoo, to remain for a length of time without being washed out; for when victuals have been prepared in the boilers thus uncleaned, they produce the most violent effects, even to the loss of life, as once happened in a ship belonging to our fleet[76].

SECT. II. Of Drink.

As the solid part of sea diet is very dry and hard, and as the salt it contains is apt to excite thirst, a freer use of liquids than at land is necessary, particularly in a hot climate.

It has been the custom, as far back as we know, to allow seamen the use of some sort of fermented liquor. We need hardly inquire if this is salutary or

not; for it would be impossible at any rate to withhold it, since it is an article of luxury, and a gratification which the men would claim as their right. There is a great propensity in seamen to intoxicating liquors, which is probably owing to the hardships they undergo, and to the variety and irregularity of a sea life. But there is reason to think that all sorts of fermented liquors, except distilled spirits, are conducive to health at sea.

There is no doubt that malt liquor is extremely wholesome and antiscorbutic. The common quantity of small beer allowed daily is so liberal, that few men make use of their whole allowance; and there is no objection to the constant use of it, except that it is apt to spoil in the course of a few weeks, and that upon foreign stations the stock can seldom be renewed. One of the greatest improvements that could be made in the victualling of the navy would be the introduction of porter[77], which can be preserved in any climate for any length of time that may be necessary.

Spruce beer seems to possess similar and equal virtues with malt liquor and it has this advantage, that the materials of it can at all times be carried about and used occasionally. It agrees with malt liquor in being a fermented vegetable sweet, the principal ingredient of it being melasses. The other ingredient, from which it takes its name, being a balsamic substance, seems to be more medicinal and antiscorbutic than hops, and is therefore, perhaps, preferable to malt liquor. There have been sufficient proofs of its virtues in single ships; and all the men of war that go to America and the West Indies might be conveniently supplied with it. Admiral Pigot provided a sufficient quantity for the whole fleet; but the peace coming on prevented the trial of it.

The most salutary kind of drink next to malt liquor, and spruce beer, is wine. The benefit which the fleet derived from it at different times, and the advantage it has over spirits has been often taken notice of in the former part of this work. It seems to be owing to this that the French fleet sometimes enjoys superior health to ours, and is less subject to the scurvy[78]. Wine is also preferable to every other medicine in that low fever with which ships are so much infested; and there is no cordial equal to good wine in recruiting men who are recovering.

Spirits differ from wine in this respect, that they are a mere chemical liquor, incapable of assimilation with our fluids, having lost in distillation the native vegetable principle in which the whole of its nutritious quality and great part of its medical virtue resides.

The abuse of spirituous liquors is extremely pernicious every where, both as an interruption to duty, and as it is injurious to health. It is particularly so in the West Indies, both because the rum is of a bad and unwholesome quality, and because this species of debauchery is more hurtful in a hot than in a cold climate.

It is with reason that the new rum is accused of being more unwholesome than what is old; for, being long kept, it not only becomes weaker and more mellow by part of the spirit exhaling, but time is allowed for the evaporation of a certain nauseous empyreumatic principle which comes over in the distillation, and which is very offensive to the stomach; therefore, though this is the produce of the West-India islands, yet what is supplied there is inferior to that which is brought from England.

It was originally the custom to serve seamen with their allowance of spirits undiluted. The method now in use, of adding water to it, was first introduced by Admiral Vernon in the year 1740, and got the name of *grog*. This was a great improvement; for the quantity of half a pint, which is the daily legal allowance to each man, will intoxicate most people to a considerable degree, if taken at once in a pure state.

The superiority of wine over spirits in any shape was so conspicuous, that towards the end of the war the fleets in the West Indies and North America were supplied with nothing but wine, and with a success sufficient to encourage the continuance of the same practice in future.

Of Water.

As water is a necessary of life, and as the health and comfort of men at sea depend upon its quality, it deserves particular attention.

Spring water is to be preferred to running or stagnated water; for, unless it is taken at the source, or near it, it is apt to be impregnated with decayed vegetable and animal substances, such as leaves, grass, wood, and dead insects. This inconvenience is greatest in a hot climate, where every thing teems with life, and where the materials of putrefaction are both more abundant and more prone to corruption. This is the most pernicious kind of impurity; for the mineral impregnations common in springs are seldom, in any degree, unwholesome, and do not tend, like the other, to make the water corrupt. At many of the West-India watering places the water is found stagnated just above high-water mark; and care should be taken to go higher up to take it where it is running.

The purest water is apt to spoil by producing a putrid glare upon the inner surface of the cask which contains it. There is a great difference in this respect between a new cask, especially if made of moist wood, and that cask which has been hardened and seasoned by age and use. Several contrivances have been proposed for preparing the vessels that hold the water; but none have been found by experience so effectual as letting them stand for some time full of sea water; and it is a great advantage of this method, that it is so easily practicable.

It is in few places we meet with water such as that of Bristol, which, in clean vessels, may be kept for any length of time. We may consider all water kept in wooden vessels as more or less liable to putrefaction; but there is a substance, which is neither rare nor costly, that effectually preserves it sweet. This is *quick lime*, with which every ship should be provided, in order to put a pint of it into each butt when it is filled. It has the advantage of not being injurious to health; but, on the contrary, is rather friendly to the bowels, tending to prevent and check fluxes. In the year 1779 several ships of the line arrived in the West Indies from England, and they were all afflicted with the flux, except the Stirling Castle, which was the only ship in which quick lime was put into the water. Nor does it spoil the water for any culinary purpose. Its action in preventing putrefaction consists, in part at least, in destroying vegetable and animal life. An addition of putrescent matter is produced in water by the generation of small insects; and the glare that collects on the sides of casks, and also what collects on the surface of the water, is a species of vegetation of the order

called by naturalists *algæ*[79]. Quick lime is a poison to this species of vegetable life as well as to insects: but upon whatever principle it depends, the property of it in preserving water sweet is so well ascertained, that it is inexcusable ever to neglect the use of it.

Quick lime is equally efficacious for this purpose, whether slacked or unslacked; and though the latter form is more convenient for stowage, by having less weight and bulk, yet the other is to be preferred for the sake of safety; for if water should by chance reach the unslacked lime, a great degree of heat is thereby produced, which has been known to give occasion to the most formidable accidents.

The only other objection I know of to the use of quick lime is, that it converts the water into a lime water, rendering it thereby disagreeable to the palate and stomach: but the quantity necessary to preserve it makes but a very weak lime water; for part of the lime is precipitated by the mephitic air, or the aerial acid, as it is otherwise called, of which there is some contained in the water. The accidental exposure to the atmosphere, which also abounds with this sort of air, tends farther to lessen the acrimony of the quick lime[80].

There are other substances which have been found useful in correcting bad water. Alum and cream of tartar, as antiseptic bodies, have been employed for this purpose. Vinegar and the vegetable acid juices and fruits, such as tamarinds, may be used occasionally to take off the putrid offensive taste which may have arisen in case the use of quick lime has been neglected. In the fleet under Sir Charles Saunders, the water of the river St. Lawrence having been found to produce fluxes, this quality was removed by throwing four pounds of burnt biscuit into each cask before it was used. But there is nothing so effectual, and subject to so few inconveniences, as quick lime.

The next method to be mentioned of purifying water is filtration, which not only separates the gross impurities, but removes the putrid smell and taste. It is performed with a dripping stone, which is a convenient contrivance for officers, but cannot furnish a supply for a whole ship’s company.

When the water of wells or brooks is found loaded with mud, the following expeditious method of filtration, described by Dr. Lind, has been practised

with success:—Let a quantity of clean sand or gravel be put into a barrel placed on one end, without the head, so as to fill one half or more of it, and let another barrel, with both ends knocked out, of a much smaller size, (or let it be an open cylinder of any kind) be placed erect in the middle of it, and almost filled with sand or gravel. If the impure water be poured into the small barrel or cylinder, it will rise up through the sand of both barrels, and appear pure above the sand of the large one in the interval between it and the small one.

But when water is offensive in consequence of being long kept, the most effectual and expeditious method of sweetening it is by exposing it to the air in as divided a state as possible. Boiling will not expel the putrid effluvia contained in water; but such is the attraction of air for this offensive matter, that the water need only be thoroughly exposed to it to be rendered quite sweet. This is best done by a machine invented by Mr. Osbridge, a lieutenant of the navy. It consists of a hand pump, which is inserted in a scuttle made at the top of a cask, and by means of it the water, being raised a few feet, falls through several sheets of tin pierced like cullenders, and placed horizontally in a half cylinder of the same metal. The purpose of it is to reduce the water into numberless drops, which being exposed in this form to the open air, is deprived of its offensive quality. The same method will serve to separate the superfluous quick lime in the water. It is a machine very deservedly in common use, and the working of it is a moderate and salutary exercise to men in fair weather.

The following contrivance will be found to afford a sufficient supply of sweet water to particular messes, and may be considered as an artificial and more expeditious sort of dripping stone.—Let the narrow mouth of a large funnel be filled with a bit of sponge, over which let there be a layer of clean gravel or sand covered with a piece of flannel, and over the whole another layer of sand. Muddy or offensive water being poured upon this, runs or drops out clear; and care must be taken to change the sand, sponge, &c. frequently, as they will become loaded with the impurities of the water[81].

There should be in every ship an apparatus for distilling water in case of distress. This consists merely of a head and worm adapted to the common boiler, and distillation may go on while the victuals are boiling. More than

eight gallons of excellent fresh water may be drawn off in an hour from the copper of the smallest ship of war[82]. I refer for a more particular account of all this to the works of Dr. Lind, who was the original inventor and recommender of this method.

This invention seems to have escaped others so long, from the idea that the *desideratum* in freshening sea water was some substance to be added to it while under distillation. No such substance is necessary, and, the more simple the mode of distillation, the fresher the water will prove.

Rain water at sea is always pure and wholesome, and may be saved occasionally by means of a sail or awning.

CHAP. III.

Of Clothing.

Nature has made man so defenceless, that even the rudest nations, in the hottest climates, in general, adopt some sort of covering to guard themselves from the weather. We may affirm, that clothing is the most artificial circumstance in the life of man; and there is none, of which the errors subject him to more inconvenience and hardship. Insensible perspiration is performed by the pores of the skin, and being one of the most important functions of the body, the suppression of it seems to be one of the principal causes, or at least one of the most frequent attendants on feverish and inflammatory complaints; and one of the most common causes of this suppression is the application of cold to the skin.

In order to keep up perspiration, it is necessary that the orifices of the pores of the skin should be bathed, as it were, in the vapour already secreted from them; and clothing seems to act in confining this, as well as in preventing the escape of the natural heat and the access of the external air. Though the air should not be cold, it will check perspiration by carrying off this vapour and drying the skin. In the warmest climates exposure of the skin to the external air is unsafe; for it not only produces a feverish and uneasy sensation at the time, but occasions the most dangerous internal disorders. In consequence of the great sensibility and sympathy of the body, and from the pores of the skin being open in a warm climate, exposure is in some respects even more dangerous than in a cold one. Nothing is more apt to bring on the locked jaw and tetanus than sleeping in the open air; and it was observed in Jamaica, that when it was the custom to wear cotton and linen clothes, the dry belly-ache was much more common than now that it is the custom to wear woollen cloth.

We know besides, that the pores of the skin can absorb not only the moisture that floats in the atmosphere, but a variety of foreign bodies, whether noxious or medicinal, which may be applied to their orifices; and

as the air is in certain places loaded with noxious matter, may not clothing be considered as a filter, as it were, to separate the impurities of the air before it comes in contact with the surface of the body?

It is therefore every where of the utmost consequence that sufficient and suitable clothing should be provided.

It would certainly be for the benefit of the service that an uniform should be established for the common men as well as for the officers. This would oblige them at all times to have in their possession a quantity of decent apparel, subject to the inspection of their superiors. It would also be less easy to dispose of their clothes for money without detection, and desertion would also thereby be rendered more difficult.

It is of great consequence that the purser should lay in a sufficient stock of clothing and bedding suited to the climate for which the ship is destined, in order that there may be a sufficient supply after having been on a distant station for a certain length of time. I have known men suffer the greatest inconvenience and hardship, and infectious diseases kept up, from the neglect of this.

The greatest evil connected with clothing is the infection generated by wearing it too long without shifting; for to this cause we have attributed the jail, hospital, or ship fever. The great importance of cleanliness appeared when we were treating of infection, from whence we may judge of what consequence it is that men should be provided with a shift of linen, as that part of the clothing which is in contact with the skin is most likely to harbour infection[83].

As clothing is not the gift of nature, being left to man's own reason, it is subject to caprice, and thereby productive of inconvenience and disease. The necessity of it depends very much upon habit, like every thing else relating to the human body, and therefore sudden and unseasonable changes of apparel are very unsafe to health. It is also found that a partial exposure of the body is more pernicious than a general exposure. If I were writing for the more delicate part of the world, I should illustrate this by the danger of exposing the feet alone to cold or wet. It is seldom that seamen are susceptible to so great a degree, for their hardy and exposed life steels them

against such impressions. But there is another circumstance which renders it of the utmost consequence to defend the feet against external injury. It frequently happens, that, without any visible symptoms of scurvy, the constitutions of seamen are such, that, upon the least scratch being received on the feet or legs, a large spreading incurable ulcer arises; which sometimes ends in the loss of a limb; but at any rate disables them from duty till a cure can be effected by the use of a fresh and vegetable diet, or a change of climate. Next to acute diseases and scurvy, this is the most destructive complaint incident to a sea life, particularly in a hot climate; and I have known great numbers of good men thereby lost to the service. It is, therefore, of the utmost consequence that men should not only be supplied with shoes, but be obliged to wear them, which is found to require a degree of compulsion; for in the West Indies it is observed that seamen always wish to go barefooted.

Since the first edition of this work was published, I have been favoured with several valuable remarks on this subject, by Captain Caldwell, an officer of great humanity and experience. Among other remarks, he observes, that the different articles of clothing supplied to sailors are, in general, too slight, and of too small a size, which renders them expensive and inconvenient to large men. The trowsers, he observes, should be much thicker, and larger, as the least shower goes through them; and, in a cold climate, those made of *fear-nought*[84], which do not cost more than the others, should also be allowed. What a situation are men in when topsails are reefing in the winter season while it rains, when cold and wet, with their trowsers sticking to them, (which would not be the case if they were of flannel) and it is not practicable that they should have change of clothing for every time they are obliged to be wet? Thick, double-milled caps are much wanted in bad weather to cover the head and ears. Dutch caps do not keep out the weather, and will not stay on the head. It is commonly remarked that the men who wear the thickest linen shirts are the most healthy.

Men, upon first entering into the service, are allowed the advance of two months wages, in order to provide necessaries: but this, inadequate as it is for a long voyage, is not extended to pressed men. It is also argued against making large stoppages in seamen’s wages; that, by diminishing what they

have to receive when paid off, a discouragement is thereby given to the service. But as we see men deserting from men of war when several years wages are due to them, the most reasonable and effectual encouragement seems to be to render their lives as comfortable and healthy as possible.

But why might not most of the articles mentioned be supplied gratuitously? In favour of which Captain Caldwell makes use of an argument frequently inculcated in this work, viz. that so much advantage would accrue to Government by preserving the health and lives of men, and so much would be saved in hospitals, as would much more than reimburse the extraordinary expence[85].

CHAP. IV.

Of Exercise.

It commonly happens in a ship of war that a great proportion of the hands is landsmen; for, besides the men required to navigate the ship, a great number is necessary to fight the guns, as well as for other duties, and their health may be affected by the want of exercise.

It has been observed before, that one use of frequent reviews and musters in a numerous crew is, to call forth men that would otherwise be overlooked, to oblige them to come into the open air, to keep themselves clean, and to prevent them from indulging in filth and laziness. It is observed, that seamen are in general less subject to scurvy than marines and landsmen, which seems to be owing to the greater activity of their life and alacrity of their minds.

There is an essay on the causes of the pestilence, by an anonymous author, published at Edinburgh in 1759, in which this disease is said to be entirely the offspring of idleness, and he illustrates this by its being more apt to arise in besieged towns than any other situation; and he alledges that a false alarm of the plague will actually produce it by throwing people idle, as was the case, he affirms, when the plague was last at Messina.

There are always numbers who have been pressed into the service, to whom a sea life is new, and who are therefore prone to indolence, low spirits, and self-neglect. Men of this description are by far the most apt to fall into the scurvy; and next to the quality of the food, there is nothing contributes more to promote the scurvy than such a disposition. It is indeed both a cause and a symptom of this disease, and therefore idleness and *skulking* should be rigidly discouraged, unless the complaint is so far advanced as to render it cruel and even impossible to force men to take exercise.

The Conqueror, of 74 guns, one of our squadron in the last year of the war, was an instance of a ship in which only the prime seamen were attacked

with the scurvy, and this is to be accounted for upon the same principle, for it proceeded from their having been exempted from the duty of pumping, in which the inferior classes of men were constantly employed, owing to the leaky state of the ship.

As low spirits and indolence have such an unfavourable effect upon health, it would be wise, as well as benevolent, to promote whatever produces jollity, contentment, and good humour, so far as is consistent with sobriety and regularity. There are certain rough sports which are now almost in disuse; and whoever would revive and encourage them, would perform a useful office to the service.

A sea life frequently demands violent temporary exertions, from the uncertainty of the weather, and other incidents; so that men are more exposed to extreme fatigue and sudden calls of duty in this than in any other situation of life. Nothing tends more to shorten life than excessive bodily labour and watching; and it is for this reason that seamen in general are short lived, and that their countenance and general appearance make them appear older than they really are by several years. This is remarkably the case when a seaman comes to be upwards of forty and it has been mentioned before, that a person not acquainted with this circumstance will make a mistake of ten years in guessing at the age of a seaman from his looks.

Fatigue being therefore frequently the means of bringing on disease and breaking the constitution, as much tenderness is due to men as is consistent with the necessary duties of service. This is a circumstance in which young officers are apt to forget themselves; and they should take care how they *call all hands* wantonly, and oblige men to make exertions beyond their strength, especially as this will be submitted to more readily by sailors than any other set of men, from the generous alacrity of their nature.

It would be well if it could be rendered convenient at all times, except in cases of danger or emergency, to put the men at three watches instead of watch and watch. By the former arrangement they have eight hours sleep and rest; by the latter only four hours are allowed, which is not sufficient for refreshment, nor is there time for them to get dry, in case they have been exposed to wet.

It would be a good rule to have as few men as possible out of bed in the night-time, unless where active service renders it necessary; for, if unoccupied, they lie about the decks, fall asleep, and catch cold. In such situations, might not all the topmen but one remain on the forecastle, where they might take exercise, which they could not do aloft? I am indebted for this remark to the Rev. Mr. Ramsay, who joins to a great knowledge of the sea service a warm and disinterested zeal for its prosperity, and has been so good in several other instances as to communicate to me the results of his experience and observation.

The good effects resulting from the indulgent treatment of men are, that it encourages them to enter into the service, and to do their duty with cheerfulness and resolution. There is something more daunting to the mind of man to see his companions suffering under oppression and languishing in disease, or perishing miserably from sores or sickness, than in the terrors of fire and sword, which, as we have seen, make the least part of the calamities of war. The good treatment of seamen, in so far as it regards their health, is by no means incompatible with strict discipline. Indeed strictness and even severity is necessary with seamen; for it is observed with regard to men who are used to arbitrary government, that they cannot bear indulgence and relaxation. But the steady enforcement of discipline and regularity is so far from being akin to cruelty, that it tends to prevent both sickness and the commission of crimes, consequently rendering the infliction of punishment less frequent and necessary. The chief excellence in the character of an officer seems to consist in uniting strict discipline with indulgence and humanity.

CONCLUSION.

The subject of the preceding remarks has been the prevention of diseases and it has appeared that the means of this are not so much in the province of the medical profession as of those who are entrusted with the direction of the navy in a civil or military capacity; and that with regard to cure and recovery also, a great deal depends upon them, by their having it in their power to make a suitable provision of proper diet and cordials. The great importance of the subject will plead my excuse for again calling to mind, that such attentions are not only dictated by humanity, but would be the

greatest wisdom in an œconomical and national light, considering how expensive it is to *replace* men and to support invalids, not to mention that it is upon the health and lives of men that every public exertion essentially depends, and upon which may depend not only the character of officers, but the national character in the day of battle.

It must be confessed, that though there is still room for improvement, the navy is now on a better footing with regard to the health and comfort of seamen than it appears to have been in former times. The victuals were in general in the late war of excellent quality; the civil branch has shewn in many instances a readiness to adopt the means and to furnish the articles that were recommended for the health of the men[86]; and most of the commanders whom I have the honour to know are humane, attentive, and intelligent.

To conclude; there is no situation of life in which there is room for more virtues, more conduct and address, than that of a sea officer. The men are thrown upon his humanity and attention in more views than one: they are subject to a more arbitrary exertion of power than the constitution of the date authorities in civil life, Englishmen giving up into his hands, from considerations of public expediency, that which they hold most dear, and of which they are most jealous, their LIBERTY. It is the character of seamen to be thoughtless and neglectful of their own interest and welfare, requiring to be tended like children; but from their bravery, utility, and other good qualities, they seem entitled to a degree of *parental* tenderness and attention from the state they protect and the officers they obey.

APPENDIX TO PART II.

ı order to exhibit a concise view of the most material observations contained in this part of the Work, a Memorial, delivered to the Board of Admiralty in October, 1781, is here subjoined.

MEMORIAL,

roposing Means for preventing the Sickness and Mortality prevailing among His Majesty's Seamen in the West Indies.

I have for the two last years attended a squadron, consisting seldom of less than twenty ships of the line, in quality of physician to the fleet at Barbadoes and the Leeward Islands. I received, by the order of the Commander in Chief, a monthly return from the surgeon of each ship, setting forth the diseases, deaths, and other circumstances of the respective ships companies. I also superintended the hospital of the place where the fleet happened to lie when in port. These advantages have afforded me an intimate knowledge of the nature and causes of the sickness and mortality among the seamen, both on board of their ships and in hospitals.

It appears by my returns, that there died in the course of the twelve months preceding July last, on board of ships, seven hundred and fifteen seamen and marines, of whom only fifty-nine died in battle and of wounds. There died in the same time in hospitals eight hundred and sixty-two: so that out of twelve thousand one hundred and nine men, which is the sum total of the complement of twenty ships of the line, there have perished in one year one thousand five hundred and seventy-seven, that is nearly every seventh man.

There were also sent to England in the same year, three hundred and fifty men, disabled by lameness and chronic complaints, the greater part of whom will be for ever lost to the service.

The degree of sickness is very different at different times; but it appears by the returns, that, at a medium, there has been one man in fifteen on the sick list.

Having employed all the attention of which I was capable to find out the causes of this sickness and mortality, in order, if possible, to point out the means of prevention, I flatter myself with being able to assign the most general causes, and to propose some effectual remedies.

When it is considered that sickness is almost entirely confined to ships of two and three decks, and that some of these are as healthy as frigates and merchant ships, though in the same circumstances of service with others that are extremely sickly, we are led from hence to infer, that sickness is not in its own nature unavoidable, and we are encouraged to hope, that the attainment of general health is within the compass of human management.

I humbly and earnestly solicit attention to some of the most material observations and conclusions which have occurred in the course of a service, which, though short, has been extensive; and whatever is here proposed has this recommendation, that it is easily practicable, and is no addition to the public charges.

First, I hardly ever knew a ship's company become sickly which was well regulated in point of cleanliness and dryness. It is the custom in some ships to divide the crew into squads or divisions under the inspection of respective officers, who make a weekly review of their persons and clothing, and are answerable for the cleanliness and regularity of their several allotments. This ought to be an indispensable duty in ships of two or three decks; and when it has been practised, and at the same time ventilation, cleanliness, and dryness below and between decks, have been attended to, I have never known seamen more unhealthy than other men. The neglect of such attentions is a never-failing cause of sickness.

I would, therefore, with all becoming deference, suggest, that such a regulation, instead of being left to the discretion of officers, should be made a part of the public instructions. From some commanders, who already practise these rules, the advantage of them comes to be known; and would not a public sanction not only render them general and permanent, but facilitate the duty of the officer, by making such a regulation appear a matter of legal necessity, instead of his own arbitrary act?

Secondly, Scurvy is one of the principal diseases with which seamen are afflicted, and this may be infallibly prevented, or cured, by vegetables and fruit, particularly oranges, lemons, or limes. These might be supplied by employing one or more small vessels to collect them at different islands, and such an expedient would prevent much sickness, and save many lives. I am well convinced that more men would be saved by such a purveyance of fruit and vegetables, than could be raised by double the expence and trouble employed on the imprest service; so that policy, as well as humanity, concur in recommending it. Every fifty oranges or lemons might be considered as a hand to the fleet, inasmuch as the health, and perhaps the life, of a man would thereby be saved.

Thirdly, The use of wine, in place of rum, has been found extremely conducive to health. In the course of my observation I have met with the most unquestionable proofs of the benefit that would arise from this substitution. It is a farther reason for such a change, that good rum is seldom or never supplied in the West Indies.

Fourthly, The necessaries provided for the sick by the present establishment are not at all adequate, especially on a distant station, where the supply is not regular, and the quantity at best is such as can contribute but little to their comfort and recovery. An ample provision might be made for the sick, without any additional expence, in the following manner:

It is a rule in the service, that though men are sick, their ordinary allowance of salt meat and other victuals is nevertheless served out, and is either used by the other seamen, who stand in no need of it, or is wasted. Now, if the pursers were instructed to provide themselves with certain species of necessaries, such as Madeira wine, sugar, rice, and dried fruits, to serve to the sick, in place of rum, and the common provisions of the ship, such a regulation would be productive of the very best effects, in recovering the health, and preserving the lives of those men who have the misfortune to be taken ill in a situation necessarily destitute of most of the comforts that can alleviate their sufferings. I cannot help here applauding a late regulation, by which melasses are substituted for part of the oatmeal; for the quantity of the latter heretofore legally allowed was so much greater than what was necessary, that one half of it has commonly been wasted.

It is to be observed, in general, with regard to the West Indies, that ships on service are to be considered, in a great measure, in the light of ships constantly at sea; for, excepting the island of Barbadoes, there is no other port in which fresh meat and vegetables can be procured in any quantity, and therefore sour krout, melasses, and such other articles of antiscorbutic diet as can be supplied on board, are absolutely necessary. Fleets could hardly exist here, were it not that a warm climate is naturally more unfavourable to the scurvy than a cold one.

Fifthly, Though the health of a ship’s company depends chiefly on diet, and that discipline and order which is the business of officers, yet much depends also on the medical art, particularly in the West Indies; and as surgeons

frequently cannot do justice to the men without wronging themselves, in a country where the price of every thing is exorbitant, and medicines often unsound, Government would find its account in supplying gratuitously some of the most costly articles, particularly Peruvian bark in a fresh state, from time to time, from England.

Sixthly, It is now the general custom to send every sick person on shore to an hospital, where there is frequently worse air and worse accommodation than on board, from overcrowding the apartments. Contagious diseases, though not so common as in Europe, are here often mixed with those that are not so, whereby numbers are infected and carried off; and, besides this, the land air is infinitely more unwholesome in the West Indies than the air at sea or in a road. The scurvy is perhaps not at all contagious, nor is it very difficult of cure; but a number of cases of it terminate fatally from the flux or fever, caught either by contagion in hospitals, by the noxious influence of land vapours, or by intemperance. I beg leave, therefore, humbly to suggest, that as few sick as possible of any disease, but what is contagious, be sent to hospitals, and that some method be established for the supply of vegetables and other refreshments to the sick on board of their ships.

Seventhly, Crowding, filth, and the mixture of diseases, are the great causes of mortality in hospitals. There should be a space of five hundred cubic feet allowed for each man; and in general the sick had better remain on board than be crowded beyond that degree; or relief should be provided to the hospital by an hospital ship, which, for reasons already given, is preferable to any accommodation on shore; and such an institution would be more particularly proper for the reception of convalescent men.

I would beg leave, therefore, earnestly to recommend that cleanliness, the separation of diseases, and a competent space, be regularly enjoined and strictly enforced in hospitals; and in order to make this more practicable in the great scale of service now going on, I would farther propose that hospital ships be established for the reception of the sick or recovering. I know from extensive experience and close observation, that these circumstances are more essential than even medicine and diet.

These are a few remarks extracted from a series of observations, and derived from great opportunities of experience. Many other remarks would

suggest themselves; but I purposely confine myself to what is highly important, and easily practicable, with little or no addition to the public expence. Some of the improvements recommended are indeed an immediate, and all of them will be an eventual, saving to the public.

The alterations that have been proposed are,

1st, The establishment of a certain method and discipline, in order to secure regularity and cleanliness among the men, and to render the ships clean and dry.

2dly, The supply of fruit and other vegetables for the cure of the scurvy.

3dly, The substitution of wine[87] for rum.

4thly, The provision of an adequate quantity of necessaries for the sick.

5thly, The gratuitous supply of certain medicines.

6thly, The curing of certain diseases on board instead of sending them to hospitals; and,

Lastly, The preventing of filth, crowding, and the mixture of diseases in hospitals, by proper regulations, and by establishing hospital ships.

I beg leave again to call to mind, that 1518 deaths from disease, besides 350 invalids, in 12,109 men, in the course of one year, is an alarming waste of British seamen, being a number that would man three of His Majesty's ships of the line; and what I advance is from a real conviction that a due attention to the above-mentioned propositions would save more than two thirds of the seamen that would otherwise die in that climate. It was to set this in a proper light that I requested leave to quit my duty during the absence of the greater part of the squadron in the hurricane months; and should any thing I propose meet with public approbation, and be carried into effect, I should esteem it a recompence far above any other gratification I can derive from the service.

LONDON,
October 13, 1781.

To the Right Hon. the Lords Commissioners
of the Admiralty.

Next year the following Supplement to the preceding Memorial was sent to the Board of Admiralty:

SUPPLEMENT to the MEMORIAL delivered last Year to the Board of Admiralty.

Since my return to my duty on this station, additional experience has afforded me farther practical confirmation of the utility of the former proposals.

The great squadron employed on this station has, by the attention of the Commissioners of Victualling, and also of the Commander in Chief, been supplied with most of the articles recommended, in such quantities as to prove their efficacy; and indeed the small degree of mortality in comparison of former times, is a sufficient demonstration of this.

I beg leave to give an instance in the Formidable of the great and salutary effects of the proposed improvements. This ship left England, furnished not only with sour krout and melasses, in common with most others in the squadron, but what was peculiar to herself was, an entire supply of good wine in place of spirits; and an experiment has been made in this instance, under my own eye, to ascertain what degree of health it was possible to attain in a great ship in this climate. With the above advantages, together with good discipline and medical care, no man[88] died of disease from December, 1781, to May, 1782, and only thirteen were sent to hospitals, whose complaints were small pox and ulcers. In the months of May and June last, when at Jamaica, there died of disease in this ship, three men, and

seventeen were sent to the hospital, most of whom had contracted their sickness on board of French prizes.

In the rest of the fleet the health was in proportion to the wine and other refreshments, and the cleanliness, good order, and discipline observed.

In the squadron I attended the last five months, which seldom consisted, during the last three months of that time, of less than forty ships of the line, there have died of disease about 350 men, and about 1000 have been sent to hospitals; a degree of sickness and mortality which, though not greater than what frequently prevails in Europe, I am persuaded would have been still less, had the improvements proposed been complied with in a manner more extensive and complete, and had the general rules of discipline and cleanliness been kept up with due and equal strictness throughout the fleet.

This last article, which, being the most important, I have placed first in the preceding memorial, it is only in the power of supreme authority to enforce; and my additional experience and observation have so far confirmed me in the opinion of the utility of this, as well as the other articles, that I hope to be again pardoned for repeating my humble and earnest solicitations that these regulations may be farther extended and enforced.

FORMIDABLE,
At Port Royal, Jamaica,
July 16, 1782.

PART III.

DESCRIPTION AND TREATMENT

OF THE

DISEASES

MOST COMMONLY OCCURRING IN

FLEETS IN HOT CLIMATES.

It was mentioned in the Introduction to this work, that though my opportunities of experience were extensive, several obstacles had prevented me from making observations so accurately as could have been wished. These were chiefly the bad accommodation of the sick at some of the hospitals, and the shortness of our stay at any one place, which seldom exceeded six weeks or two months, and prevented me from completing such observations as I have happened to be engaged in. But having practised among great numbers, observations necessarily arose from the comparison of so many cases; and amidst the variety of situations connected with the emergencies and hardships of war, nature is seen in certain portions and under certain trials which are not met with in common life. I shall therefore describe the diseases such as they occurred, and shall add such remarks on practice as I could ascertain.

The following observations shall be confined chiefly to what I have called the sea epidemics, viz. Fevers, Fluxes, and the Scurvy.

CHAP. I.

Of Fevers.

Though it is impossible to refer every particular case of fever to a distinct class, on account of the mixed and anomalous symptoms that arise, yet there are certain distinguishing features which afford sufficient ground for dividing them into different kinds, and such a division will at least serve to facilitate description, and to afford room for laying down the outlines of practice.

The fevers which occurred most frequently on board of ships, and at naval hospitals belonging to the fleet in which I was employed, were the infectious ship fever, (which is the same with the jail and hospital fever) the bilious remitting fever, and the malignant yellow fever.

1. Of the infectious Ship Fever.

This does not occur so frequently in hot as in cold climates, both because it is the disease of ships newly fitted out, which they seldom are in the West Indies, and because there is something in the warmth of a climate which prevents the production of contagion, as has been formerly remarked. But as great fleets arrived from time to time in the West Indies from Europe, with numbers of men labouring under this fever, there were sufficient opportunities of making observations upon it.

It has been so well described by Sir John Pringle, Dr. Lind, and other writers, that it is unnecessary to enter into a minute detail of all its different appearances in its several stages; and I shall content myself with recounting some of the most distinguishing symptoms, and with marking the peculiarities that arose from the influence of the climate.

This fever is extremely various in its symptoms and in its degree of malignity and fatality. We are told in some of the histories of the jail

distemper, that, upon its first attack, few escaped that were seized with it; but that afterwards it grew more mild; and it has been already observed, that the contagious poison of fever differs from that of small pox and other specific infections, by varying in its degrees of virulence.

There are, however, certain characteristic symptoms pretty constant in this fever in all its forms.

One of the most remarkable of these is a greater degree of muscular debility than what takes place in other fevers, and it deserves to be mentioned first, as being one of the most constant. It is also a tolerably true index of the degree of malignity, the danger being in proportion to this symptom. In the more advanced stages of the fever, a tremor of the hands, and of the tongue when put out, is a constant symptom, and seems to be connected with this weak state of the muscular fibres. I have seen, however, extreme debility without tremor in cases too of the greatest danger, and it was observable in these that there was little or no delirium.

Another striking character of this fever is the delirium of a particular kind which usually attends it. Sensation and reason are here in a state uncommonly depraved; and it is in this sort of fever oftener than any other that we find a total deprivation of them in the symptom called *coma*. The delirium is seldom of a wild, ungovernable kind, such as occurs in inflammatory continued fevers, in the violent paroxysms of intermitting and remitting fevers, or in inflammations of the brain. It is, however, connected with great suffering; and this consists in anguish rather than pain, shewing itself by outward tremor, agitation, and what is called the *floccorum collectio*; also by sighing, mumbling, and moaning, symptoms always indicating danger.

Delirium is a symptom, to the nature and appearances of which I have been particularly attentive, in consequence of a painful and diligent attendance upon some cases in which I was particularly interested from friendship and affection, and in which this was a remarkable symptom. It seems chiefly to consist in a false reference of our sensations, whether external or internal; and this is in no sort of fever more evident than in this. When any painful impression, for instance, is made by an external body, the patient, if in a state of delirium, does not refer it justly to the part affected; but the general

agitation and incoherence of sentiments will be aggravated for the time. I have known a degree of heat applied to the extremities sufficient to blister them, yet the part did not shrink, though the raving and general uneasiness were increased. In like manner, with regard to internal sensations, when an irritation is excited to expel the urine or *feces*, the mind does not recognize it as such, but from a sense of uneasiness, probably mistaken for something else, an effort is made to relieve nature, which is done without a proper consciousness, and certain symptoms are produced which are well-known marks of danger in this fever. In watching those who have been under the influence of delirium, I have observed it increase when any particular want of nature urged, and this would continue for some time, the patient being incapable of procuring himself immediate relief on account of the false reference of sensation that has been mentioned; but he would become calm after voiding the urine or *feces*, or after receiving something to drink, according to the particular want that was present at the time. So great is the disorder in the common course of sensation in this fever, that a person ill of it has been even unconscious of inflammations of vital parts, which, in the natural state of the nerves, would have excited the most acute pain, and would have been distinctly referred to the part affected, but were not discovered nor suspected till inspection after death[89]. I remember one case in which there were found large erosions, and even holes in the intestines, without any preceding complaint that could have led to suspect such an appearance. It would appear that the motions excited in the brain and nerves in such cases, instead of producing the sensations naturally belonging to them, serve to excite disagreeable emotions of a different kind, in which delirium consists. It seems to be from the same depraved state of sensation, that when a phthisical person is seized with this sort of fever, his cough is for the time suspended. I have seen the same circumstance occur in a maniacal case. From a like cause it sometimes happens in dangerous cases of fever, that in the height of delirium the *epiglottis* loses its natural irritability, so that liquids in the act of swallowing are apt to get into the windpipe, so as to excite coughing and threaten suffocation, as I have observed in some cases that came under my care.

All these different forms of delirium are signs of a body extremely disordered in its functions, and forbode great danger.

The next symptom I shall mention as most characteristic of this sort of fever is, the spots known by the name of *petechiæ* and *vibices*, which, though far from being constant, are, perhaps, more peculiar to it than any other symptom. They occur only in the latter stages of the disease, and in cases of considerable danger. The common opinion concerning their cause is, that the blood is in such a dissolved state, that the red part of it is effused into the cellular membrane. The appearance in such bodies as I have inspected, seems to favour this opinion; for there was hardly any coagulation of the blood in the great vessels, and instead of those firm substances, called *polypi*, in the heart, there were only soft grumous bodies, which were so tender in their consistence, that, upon being handled, they, as it were, dissolved. Since the improved method of treating these fevers has been generally adopted, this symptom seldom occurs; for in most cases it may be called an artificial symptom, chiefly arising from close apartments and the heat of bed clothes.

It may be considered as a peculiarity of this fever, that it is more indefinite in its crisis than most others. In continued fevers of the inflammatory kind, there are frequent attempts at remission, there are certain periodical exacerbations, and there is generally a distinct crisis marked by a freedom of the secretions and turbid urine: but in the fever of which we are treating, though the patient is generally somewhat worse towards the evening and during the night, its course is more equable, and the transition from sickness to health is insensible and gradual, being seldom marked with any perceptible crisis.

The symptom next to be taken notice of, though a minute one, is very constant and characteristic in this sort of fever. It is a peculiar heat in the skin, communicated to the hand of another person. It is usual to grasp the wrist of the patient after feeling his pulse, in order to examine the state of the skin in point of heat and moisture; and in doing this a glow of heat is impressed on the palm of the hand, which lasts for some hours, if one should neglect so long to wash the hands. I have never met with this symptom in any of the sporadic fevers of England, though I am informed it sometimes occurs in these.

The fever we are treating of differs also from the sporadic nervous fever of England, and from most others of the continued kind, in being attended with a more copious secretion of bile, which, when thrown up, is generally green, or, as it is otherwise called, of a porraceous colour. This symptom takes place in all climates; but is more remarkable in a hot climate, as might be expected.

These are the chief characteristic symptoms of this fever. I shall next point out such modifications of it as occurred in the West Indies from the influence of climate.

In the first place, when this fever prevailed on board of any ship that arrived from a northern climate, it was soon after succeeded by, or, as it were, converted into, a dysentery; for those ships that arrived either from England or North America with the greatest stock of feverish infection, were the most subject to fluxes, after being two or three months in the West Indies. This was formerly made use of as an argument, to prove that the dysentery proceeds from the same cause with fever, taking a different determination, from circumstances of climate and constitution.

Secondly, It sometimes happens that men, under the influence of this infection, are more apt than others to be affected with symptoms peculiar to the climate upon their first arrival. A very striking instance of this has been mentioned in the case of men that were pressed into the Formidable at New York, some of whom had the common ship fever on the passage; others, upon our arrival at Barbadoes, were seized with the yellow fever, and were the only men in the fleet who had it at that time. There was another instance in the recruits brought from England by the Anson, who were seized with a fever on board of the Royal Oak; and in this fever the skin and eyes were yellow, though without any symptoms of malignancy[90].

Thirdly, It happened in some ships[91] that the infection was kept up for several months after arriving in the climate, from a neglect of cleanliness, or the want of an opportunity of removing those who were infected to an hospital. It did not in these take a dysenteric turn, as in most of the other ships, but differed from the ship fever of colder climates, as above described, in some particulars, which I shall here enumerate. All the symptoms were milder: it was more protracted, and less dangerous. In the

beginning there was but little difference, only the symptoms were less violent; but in the succeeding period of the disease the pulse deviated very little from the natural standard, and the skin felt cold and clammy. The tongue was white; and this did not seem so much owing to any fur covering it, as to its being itself of a pale, lifeless colour, as well as the face, and it appeared larger in size than natural. The teeth were clogged with a white fur. Those affected with this fever were subject to faintings, and had a constant uncomfortable languor and listlessness. Most of them had a deep-seated pain in the occiput, and an oppression at the stomach, but without any inclination to vomit. The unfavourable symptoms were *coma*, *delirium* and a yellowness of the skin. I never remember to have seen *petechiæ* in any of them. The favourable symptoms were a warm moisture, or a miliary eruption on the skin, and a gentle *diarrhœa*, which, however, if neglected, was in danger of degenerating into an incurable flux. A great number were seized with this fever in the Alcide, in July, 1783, and what is remarkable, most of them had the tape worm, as I was informed by Mr. Telford, the surgeon of that ship, who frequently obliged me with valuable remarks; and he observed also, that it was evidently infectious, and that the skin communicated the same disagreeable feeling to the hand as was mentioned above.

Though the inflammatory fever does not often occur in hot climates, yet, as it is of great consequence to distinguish it in all cases from the infectious fever of which we are treating, it may not be improper, nor uninstructive, here to point out the most remarkable differences. There is more resemblance in their symptoms, especially towards the beginning, than might at first be supposed; and as it is very material to avoid error with regard to the practice, which, in these two sorts of fevers, ought to be very different, and even opposite, I have taken particular pains to discriminate them.

The continued inflammatory fever is very uncommon in the West Indies; but in the form in which I have met with it in North America and England, there are cases in which the blood is sizy during the whole course of the disease, even without local affection, though, in general, there is more or less rheumatism, or pulmonic inflammation. The symptoms which chiefly distinguish such cases from the fever before described are, a greater degree

of muscular strength, a more violent delirium, pale urine, a more parched tongue and skin, greater heat and thirst, and a pulse more frequent and strong, with a particular sharpness. There is another symptom sometimes occurring, which I consider as strongly characteristic of a fever of an inflammatory nature. This is a watery diarrhœa, without *fæces* and without gripes, the stools consisting chiefly of the drink as it was taken in. There seems here to be a suspension of the power of absorption as well as secretion in the bowels, in consequence of a general spasm on the extreme vessels; for there is hardly even bile or mucus in the stools. There is also a particular appearance of the mouth connected with this type of fever, which is better learned by the eye than by description. It consists chiefly in a want of moisture on the lips, and a dryness and shining appearance of the teeth. With these symptoms, it will be found that the patient will bear the lancet in very advanced stages of the disease. These fevers seldom occur but in a sporadic way, unless when there is some peculiarity of season, as at New York in autumn, 1782. They are also more frequent among the better than the lower sort of people.

By comparing these symptoms with those of the infectious fever above described, there will appear an obvious difference in their nature, and evident reasons for varying their treatment.

Treatment of the Ship Fever.

When the body is thrown into disorder by an attack of fever, the first step to be taken is to clear the stomach and bowels of their crude and acrid contents, consisting either of the food imperfectly digested, or the depraved natural secretions. So great is the disturbance produced by such offending matter, that, when nature is freed from this embarrassment, the functions of the body are frequently by this alone restored to their proper exercise, and a remission produced. It seems probable also, that this evacuation proves salutary not only by removing the morbid stimulus, but by preventing the absorption of corrupted or ill-concocted juices into the mass of blood, which would tend still farther to derange the functions of life. But perhaps the circumstance that first suggested the utility of evacuating the stomach, as the first step in the cure of fevers, was the nausea so common in the beginning of them, which may be considered as a natural indication of this

practice. It farther appears rational, that, as acute diseases generally come on suddenly, and find the body in a state of repletion from the recent *ingesta*, the most obvious means of relief should be to free the bowels, and particularly the stomach, from what is foreign and oppressive to it. It seems also probable, that the *nausea* and the act of vomiting have a salutary effect independent of evacuation; for I have seen relief produced from these when nothing was evacuated. Such, indeed, is the great and universal influence and sympathy of the stomach, that the operation of vomiting affects every fibre of the body, and has been known to resolve tumours in the most distant parts. An early administration of an emetic is therefore the first step to be taken in the treatment of this as well as most other fevers.

If it is given in small divided doses, it will most probably evacuate the bowels downwards; and the most convenient form for this purpose is a solution of emetic tartar. If it should not have this effect, some brisk purgative medicine should be given soon after the operation of it.

I mention these evacuations before blood letting; for though this ought to be first in those cases in which it is proper, it is here seldom necessary, and we may pronounce it to be a remedy very ill adapted to this sort of fever, particularly in a hot climate. It sometimes happens, however, that there is violent head-ach, pain of the back and limbs, with a throbbing pulse; and these symptoms may in the very beginning not only justify, but require the losing some blood before the administration of the emetic or purgative.

The next means of relief I shall mention, and also the most probable means of cutting short the disease, is to excite universal sweat. This being an imitation of nature, is founded on reason as well as experience; for it is by sweating that the fit of an intermittent is relieved and terminated; and continued fevers in general, if not always, begin with a fit of the same kind. A dry skin, accompanied with heat, is one of the most constant as well as troublesome and uneasy symptoms in all fevers; and it would appear from the peculiar heat of the skin in this sort of fever, that there is either a more than common acrimony of the matter of perspiration, or something peculiar in the mode of circulation on the surface of the body. Sweating does not seem to operate entirely by the evacuation of acrimony, for no relief is procured by it if it is partial; and it is evident from a number of facts that the

state of the brain and *viscera* depends on that of the external surface of the body; for a free state of the pores of the skin, provided it is general, tends more than any other circumstance to relieve internal pain, and also to take off delirium. The good effect of sweating seems, therefore, chiefly to depend on a general relaxed state of the small vessels on the surface of the body; and it ought to be effected, if possible, by gentle, soothing means, and not by such regimen and medicines as heat the body and accelerate the circulation. This intention is best answered in the beginning by moderate doses of antimonial medicines, and either James's powder or tartar emetic may be employed. The first is a more certain sudorific, being less apt than the other to run off by the bowels; and its effect will be still more certain, if accompanied with a mild opiate, rendered diaphoretic by *Spiritus Mindereri*, which will both prevent the antimonial from acting roughly, and will determine its operation to the skin. A sweat kept up by these means, together with plentiful warm dilution, from twelve to twenty-four hours, is the most probable means of bringing about a complete remission of the fever; and in this case a fresh accession is to be prevented by the immediate administration of the bark.

These are the means proper for stopping the fever in the beginning, or tending to render its future progress more safe; and though, with this view, free evacuations have been recommended, yet, if the fever should go on, great caution is necessary in this respect in the future treatment, debility being the symptom chiefly to be guarded against. Purgatives may, indeed, be occasionally necessary, in consequence of accumulations of bile taking place; but, in general, the evacuations by stool should not be more frequent than in health; and some of the cases which were most unmanageable and fatal, were those in which there was a spontaneous *diarrhœa*. With regard to blood letting, it is always hurtful after the first two days, unless some inflammatory affection of a vital part should arise.

The natural evacuation, which may with most safety and advantage be solicited and encouraged in this disease, is, that by perspiration; and it is observable, that in those cases for which nature does most, there is a universal warm sweat, which has generally a very offensive smell, and seems to be a salutary effort of the constitution to cure the disease. Where this takes place, little medical assistance is necessary, except to keep it up

chiefly by warm dilution; and there is no circumstance in which the judgement of a physician is shewn more than in discerning those cases in which his chief business is to look on, where nature, being equal to the task, ought not to be disturbed by the active and officious interposition of art. We should not, however, aim at producing a profuse sweat, except with a view to effect a remission immediately after the first evacuations. In the course of the disease, it is only necessary to keep up a gentle moisture or softness of the skin.

The head being particularly affected in this sort of fever, the patient is extremely restless and delirious, especially at night; and there is a medicine which has a most pleasing effect in procuring both rest and perspiration. This is a combination of an opiate with an antimonial medicine, which was administered in the evening with great success; and the sudorific effect is rendered more certain by the addition of some saline neutral, especially *Spiritus Mindereri*[92]. I tried pure opiates in the early stage of this, fever, but found them not to answer; though in the low[93] fevers of England, and in the advanced stages and convalescent state of this fever, they are extremely safe and useful. Pure laudanum is also given by Dr. Lind, at Haslar, with great success in the height of the disease; but in the West Indies there is a greater tendency to acrid excretions, and the effect of pure opium in causing a retention of these, seems to be the cause of its disagreeing in that climate in the first stage of this fever.

It may here be observed, that the addition of a little neutral salt alone will sometimes so qualify the operation of opium, as to prevent its bad effects, such as the increase of febrile heat and delirium, and the stupor and head-ach which, when given alone, it frequently induces the following day. I have generally employed nitre with this intention; but this does not seem so well adapted to this disease as some other neutral salts, as it tends too much to lower the powers of life.

But with a view to perspiration, the *Spiritus Mindereri* is the most effectual neutral medicine when conjoined with an opiate, and there is not, perhaps, a more safe and pleasing diaphoretic known than a combination of it with syrup of poppies[94]. There is some neutral salt in Dover’s powder, and this has more effect than could be expected from so small a quantity of an inert

medicine; for I know from trials of my own, as well as those of others, that ipecacuanha and opium given together, in the proportions prescribed in that powder, will not have the same effect as when joined with the neutral salt. This is an instance of those useful combinations of medicines which can be discovered only by experience, but which every physician ought gladly to adopt in practice upon good testimony and fair trial, though he may not be able to account for their effects, nor to explain their mode of operation.

There is nothing more important than plentiful warm dilution; and the infusion of sauge, or any such light aromatic, is rather more proper than farinaceous decoctions, or any compositions in which there is wine or spirits. Success in this, as well as other diseases, depends on attention to nursing as much as upon medicine; for what would it avail here to administer medicines for promoting perspiration, unless they were assisted with fluids to allay thirst, to dilute the acrimony in the first passages and in the vessels, and to furnish the materials of free perspiration?

But however desirable it may be to procure sweat, this is not to be attempted by close rooms and bed clothes, nor by hot medicines, such as volatile salts, serpentary, spirituous tinctures, or aromatics. These, according to the testimony of Sydenham, tend to increase the heat and delirium, and to produce *petechiæ*, miliary eruptions, or local inflammations. In the intervals of the anodyne diaphoretic above described, *Spiritus Mindereri* and small doses of camphor, with proper dilution, may be safely employed to procure a soft skin.

The only other means I shall mention with this view is, the application of warm moisture to the surface of the body, which may be done by soaking the feet and hands in warm water, or by fomenting the feet and legs with stupes[95]. These operations have the effect of bringing on a general relaxation on the skin, thereby taking off febrile agitation and delirium, and inducing sleep. I sometimes, with seeming benefit, ordered cataplasms to be applied to the feet, merely of the emollient kind, without mustard or any other acrid substance, being intended to relax, and not to stimulate.

In the use of pediluvia and fomentations, there is a difference worth attending to between the practice in this fever, and that in the inflammatory fever before described, for they are as hurtful in the latter as they are

beneficial in the former. I have observed, in general, that they have a bad effect in all cases where there is sizy blood, particularly where the breast is affected.

Delirium is one of the most constant and alarming symptoms in this disease, and the removing of it depends much upon the attendants as well as the physician. It has been said before, that it depended on a false apprehension of the impressions or natural sensations. When a person, for example, labours under delirium, and is affected with thirst, the minds is either so agitated with other objects, that this sensation is overlooked, or, instead of producing a craving for drink, it excites some other disagreeable emotion in consequence of the disordered state of *sensorium*. This last seems to be probable from the cessation of delirium, which will take place upon any natural want being satisfied; I have seen a temporary stop put to the patients raving by making him drink, or upon his discharging his urine or *feces*; for he is then unconscious of thirst and other natural wants, is therefore ignorant of the means of satisfying them; and when he does so, he fancies he is about something else which is the subject of his delirious thoughts. This observation leads to a material practical purpose; for it follows from it, that unremitting attention should be given to the patient's feelings and all his possible wants, as those natural notices and instinctive cravings which occur in health are now wanting, in consequence of the depraved state of sensation.

Most of the remarks that have hitherto been made apply to the earlier stages of the disease. The principal remedies applicable in the more advanced stages are, blisters, Peruvian bark, opium, and wine.

I have found what Dr. Lind says concerning the efficacy of blisters confirmed by my own experience, especially in those fevers in which there was great delirium, *coma*, and head-ach; but I have not experience enough to say whether they were as useful in the beginning of the disease in the West Indies as he found them to be in England.

The men that were brought from the ships to the hospitals were affected with the disease in various stages; but as we had in general a very inaccurate history of the several cases, the method of treatment upon their first admission was pretty nearly the same in all; and it consisted, in the first

place, in washing their face, hands, feet, and legs, with warm water and vinegar, from which they derived the greatest comfort, being commonly very dirty. There ought to be a [96]warm bath at every naval hospital kept in constant readiness; for there are so few conveniences on board of a ship for preserving bodily cleanliness among the sick, that the surface of the body becomes loaded with filth, so that the operation of the warm bath could not fail to be highly comfortable and salutary as the first step to their cure when brought on shore. We had generally very indistinct information about the state of their bowels, as well as other circumstances, on account of their delirium; but it was at any rate useful, or at least safe, to give them a clyster. They were enjoined plentiful dilution; and if they were low, some wine and water was allowed. In the evening, the anodyne diaphoretic medicine was administered, and a blister applied to some part of the body. In consequence of this method, we seldom failed to find the patients better next morning; and it was tried in such numbers, that the efficacy of it was sufficiently ascertained. It happened in some cases, that these means were omitted, and a comparison of these with the others served to ascertain the true efficacy of the medicines; the stationary state of the symptoms, when the disease was thus left to itself, sufficiently proving the propriety of the treatment above described.

It is an important question to what circumstances of this fever the Peruvian bark is adapted. An early and indiscriminate use of it is recommended in some late publications, upon the authority of which I tried it without regard to the stages or symptoms, and without any prejudice either for or against the practice; but I found that this powerful remedy was in danger of doing much harm, unless great attention was paid to circumstances, in order to ascertain the proper seasons for giving it. The symptoms that forbid the use of bark are chiefly foul bowels, hard pulse, sizy blood, great delirium, dry tongue, a hot and dry skin, and inflammatory affections of the viscera. It was found extremely pernicious in an early stage of the disease previous to evacuations; and the object of practice at this time should be to relieve the habit by means of these, in order to produce a general relaxation of the secretions, and to render the skin cool and soft, thereby paving the way for the bark.

It is not necessary, however, especially in the advanced stages of the disease in this climate, to wait for an absolute remission, in order to administer the bark. In a cold or temperate climate it will seldom be found advisable to give it in any period of this fever; but in a hot climate it is sometimes admissible where there are symptoms of general debility, such as a small pulse and muscular weakness, even though the frequency of the pulse, delirium, and a dry skin and tongue, should indicate some degree of fever. It may be remarked, by the bye, that a dry tongue is a fallacious symptom, for it may happen in consequence of the patient's breathing through the mouth instead of the nose, without any fault in the secretions of the *fauces*. The symptom which forbids the use of the bark more absolutely than any other is an inflammatory or dysenteric state of the bowels, in which cases it seems to be invariably pernicious.

Where it happens that we are extremely anxious to throw in the bark, as we usually are in the West Indies, where fevers are very rapid and dangerous, and yet the symptoms seem hardly to admit its use, it was very commonly tried either in conjunction with some antimonial medicine or neutral salt, or these were given alternately with it, in order to soften and qualify its effects by preventing it from heating or otherwise aggravating the symptoms. Antimonial wine or *Spiritus Mindereri* were conveniently employed with this intention.

With regard to the quantity of bark to be given, it may be proper in doubtful cases of this kind to begin with small doses, in order to feel how far it agrees or not; but in general it may be laid down as a rule with regard to this medicine, that, where it is really proper, and the medicine to be depended on, it is to be given in as large doses and as frequently as the stomach will easily bear it.

The next remedy mentioned was opium. It is a medicine more admissible and useful in this than any other kind of fever. The same cautions nearly apply in the administration of it as have been given with regard to the Peruvian bark. The caution with regard to foul bowels is particularly necessary in a hot climate, where an over secretion of bile is so apt to take place. When, the Boreas frigate arrived from England in March, 1783, there was a very bad fever of the infectious kind on board, some cases of which

being sent to the hospital at St. Lucia, were treated unsuccessfully with bark and opium, which I had been induced to try upon the authority of the authors above alluded to. I attributed this want of success to the neglect of previous evacuation; for, upon inspecting the bodies, the intestines were found full of bilious *feces*. I profited from this, and was more successful in the other cases. It were to be wished that physicians could oftener bring themselves to confess their errors in practice, and their writings would be more instructive; for it is of consequence to know what we are to avoid as well as what we are to follow.

It has been mentioned that the best effects arise from the conjunction of an antimonial with an opiate; but, in this sort of fever, antimonials, and even most of the neutral salts, are hurtful after the first stage, and opiates may after this be given alone or combined with camphor. With regard to the precise period of leaving off antimonials, it must be left to discretion, and the constitution of the patient is the best guide. There is so great a difference in patients in this respect, that all practical precepts should be qualified by a due discrimination of constitutions. Absolute and dogmatical rules are so far from applying in the practice of physic, that there are some cases of the same disease that require a treatment even opposite to what is in general most adviseable. This may be very aptly illustrated by the small pox, of which there are cases that ought to be treated very differently from the general method laid down by Sydenham, and in which cordial medicines are highly proper and necessary. This difference in diseases themselves seems to be one great cause of the difference of opinion among physicians on practical points, each party finding some countenance in experience for their general doctrine, do not make allowance for the varieties that exist in nature; so that, in one sense, both may be said to be in the right. If the patient is not very much sunk, and if there are bilious symptoms, or an obstinate dryness in the skin, a few grains of James's powder may be given with advantage even in an advanced period of the disease. If a hot and dry skin should at this period be the only troublesome symptom, it will be more safely and effectually removed by camphor combined with something opiate and the *Spiritus Mindereri*, which is the only neutral now admissible, than by antimonials, which, at this time, would be in danger either of ruffling the patient by their operation on his stomach and bowels, or of weakening him too much either in this way, or

by exciting profuse sweats. Evacuant medicines of every kind being then improper, clysters are the only laxatives to be employed in case the state of the bowels require them.

Having mentioned camphor, it may be proper here to remark, that it is a medicine of which I have found it extremely difficult to ascertain the virtues and effects; and in consequence of this ambiguity, I believe there are few articles of the materia medica more abused in practice. In all inflammatory affections, and in the beginning of all fevers where there is much heat and thirst, I think I have observed it to aggravate the symptoms. It seems in no case to be more proper than at certain periods of this fever, and especially when there happens to be spasmodic pains of the stomach, or tremors and cramps in the extremities.

In this advanced stage of the fever, in which the most common symptoms are weakness, restlessness, tremors, and low delirium, no medicine was found so much to be trusted to as opium, which here acts as a cordial as well as an anodyne and antispasmodic. It may be given, in the camphorated julep, in the form of tincture, from five to ten drops every six or eight hours, or some of the officinal compounds, such as the theriaca or mithridate, may be employed with advantage. I have thought also, that, at this period, castor conjoined with opium seemed to improve its virtue. This was first suggested to me by Mr. Crudie, an ingenious German surgeon, whom I employed as an assistant at the hospital at St. Lucia; and since I have been physician to St. Thomas's hospital, I have found the most pleasing effects, in similar cases, from a composition used there, the principal ingredients of which are opium and castor[97].

In this state of the fever I have also used with advantage the decoction of Peruvian bark and serpentary, as recommended by Sir John Pringle; and when the skin is cold and the circulation is very languid, as is sometimes the case, volatile salts and powder of serpentary may very properly be employed.

But in the advanced state, and in the worst forms of this disease, there is perhaps no medicine superior to wine. This was given either pure, or diluted with water for common drink, and sometimes to the quantity of a quart in

twenty-four hours. In delicate people, such as we meet with in private practice, the quantity ought to be less.

There is this caution necessary with regard to the use of wine, that when the fever is gone off, and only extreme debility remains, the free use of it is not safe nor proper; for, in a weak and exhausted state, a person is more apt to be [98]heated and intoxicated by any fermented liquor, than in health, or even in the preternatural and disturbed state of actual disease, such as occurs in this fever.

After the disease is removed, a long state of weakness is apt to succeed, especially in a warm climate. The most proper remedies, then, are bitters, such as decoctions of Peruvian bark, infusions of quassia bark, gentian, or camomile flowers. These answer better than the bark in substance, which is now apt to nauseate and load the stomach, and the patient is apt to take an aversion to this and whatever else he took in a state of sickness. The best strengthening medicines are such as comfort the stomach and create appetite; and we may mention Huxham's tincture of bark, in small doses, and a moderate use of wine, as the most proper for these purposes. Where colliquative sweats take place, elixir of vitriol is serviceable, and with this intention I have joined it, with evident advantage, to the evening anodyne, which, without such a corrector, tends rather to aggravate this symptom. I have known assafœtida prove a useful stimulus to the stomach at this time, and it may even be used while the fever subsists, especially where the secretions of the fauces are scanty. This medicine is recommended by Sir John Pringle in the same circumstances. But I consider the prudent use of opiates, particularly at bedtime, as the most effectual cordial and strengthening medicine in this convalescent state.

But with regard to the management of the sick at this time, as much depends on diet as medicine. Nothing has been said concerning this in the acute state of fever, because no nourishment is then necessary. In that state there is a loathing of all food, and the powers of digestion and assimilation seem to be then suspended, so that alimentary substances become not only an useless load, but offensive and hurtful by turning acid or putrid. It is likewise evident from fact, as well as reason, that nature, in this situation, does not require sustenance; for we frequently see people labouring under

fevers who do well and recover, though they have been entirely without nourishment for a length of time in which the like abstinence in a state of health would have proved fatal. The friends and attendants of the sick, from a prejudice not unnatural, but not considering the difference between health and that state of derangement which takes place in fever, are for ever wishing to supply the patient with nourishment, and every physician meets with trouble in counteracting this officiousness. Nevertheless, when the fever draws out to a considerable length, and the principal symptom is that state of weakness which, in low fevers, runs insensibly into that of convalescence, then it is necessary to pay the utmost attention to nourishment, and nothing tends more to insure and hasten recovery than the assiduous administration of light and nourishing food, the same cautions being observed which have just been mentioned with regard to cordials. One of the greatest hardships of a sea life is the want of those articles of diet that are suitable to a recovering state, and many lives are lost from this circumstance, after the force of the disease has been subdued[99].

With regard to the peculiar form, before described[100], which this fever assumes a few months after ships have been in a hot climate, we found camphor, volatile salts, and serpentary, the best remedies. As there was a remarkable coldness of the skin, I was induced in one case to try the hot bath, and with good effect, from which it seems probable that a short stay in a bath, of a heat from 96° to 100°, so as to have its warming and stimulating, without its relaxing effects, would answer well in fevers of this kind.

2. Of the Bilious Remitting Fever.

This is peculiar to tropical climates, and arises in the same situations in which intermitting fevers arise in temperate and cold climates. It seldom arises at sea, unless where there has been previous exposure on shore, of which some examples have been mentioned in the first part of the work. It may generally be traced to the air of woods or marshes; and in our fleet hardly any men were attacked with it but those who were employed in the duties of wooding and watering.

The most distinguishing symptom is a copious secretion of bile which attends it. Its course, in general, is shorter than that of the fever before described; and though the symptoms are more violent, they are not so equal and steady, owing to the tendency there is to remission. The symptoms are particularly violent at the beginning, in so much that some of the men, after being exposed upon duty to the heat of the sun and the air of marshes and woods, would become frantic, being seized almost instantaneously with *delirium* resembling madness. This fever, when it arises merely from the effluvia of woods and marshes, has a natural tendency to remit; nay, some fevers at St. Lucia, proceeding from this cause, were of the pure intermitting form from the beginning. But in many of those that arose at Jamaica little or no remission was to be perceived; and it was distinguished from the ship fever by the bilious vomits and stools, more violent delirium, and head-ach, and by being attended with less debility. The greater tendency to the continued form at this time was probably owing to this circumstance, that the men who were exposed to the land air in wooding and watering, were then exposed also to such causes as naturally produce continued fevers, such as infection, the foul air of the French prizes, intemperance, and hard labour. There was in some cases a yellowness of the eye, and even of the whole skin, but without the other symptoms that characterise the yellow fever, properly so called.

In cases that proved fatal, the symptoms, for some time before death, resembled very much those of the fever before described at the same stage. There was either *coma* or constant delirium, great seeming anguish, the mouth and tongue very dry, or with only a little ropy slime, a black crust on the teeth, picking of the clothes, and involuntary stools.

Treatment of the Bilious Remitting Fever.

The measures proper to be taken in the beginning of all fevers are pretty nearly the same. There is little difference in the first treatment of this from that of the ship fever, except that blood letting is here more frequently proper, and that a more free evacuation of the bowels is necessary on account of the more copious secretion of bile.

In full and athletic habits the disease very commonly begins with pains in the limbs, back, and head, with a strong throbbing pulse; in which case it is proper first of all to let blood at the arm. This is also highly proper and necessary in those cases mentioned above, in which the patient becomes suddenly frantic. But though the cases requiring blood-letting are more frequent in this sort of fever than that already treated of, yet great caution and nice discernment are necessary with regard to it, in all cases, in a hot climate. As fevers in such a climate run their course faster, the symptoms succeeding each other in a more close and hurried manner, greater expedition, as well as discernment, are required in timing the different remedies than what are necessary in a cold climate. Blood letting unseasonably and injudiciously employed either endangers life, or has a very remarkable effect in protracting recovery, by the irrecoverable weakness it induces.

With regard to the evacuation by the bowels, it has already been mentioned in another part of the work, when on the subject of prevention, that, before the fever comes on, there is a languor and general feeling of indisposition, and that then an emetic and a purgative, followed by some doses of the bark, were the most likely means of preventing the attack of the disease. If the fever has properly begun, which is announced by a *rigor* taking place, then no time is to be lost in procuring evacuation; and, after blood letting, if the symptoms should require it, the best medicine is tartar emetic, which, if given in small divided doses, at short intervals, will most probably evacuate the whole intestines by vomiting and purging, and may even prove sudorific. But it will nevertheless be proper to administer a purgative medicine soon after; and what we found to operate with most ease, expedition, and effect, was, a solution of purging salts and manna, either in an infusion of sena, or in common water, or barley water, with some tincture of sena added to it.

The next step towards procuring a remission is, to open the pores of the skin, which is best done by small doses of James's powder or emetic tartar, assisted by the common saline draughts, which will be given with most advantage in the act of effervescence, or by *Spiritus Mindereri,* together with plentiful warm dilution. I once, by way of comparison, tried the two antimonial preparations above mentioned in a number of men ill of this

fever, who were sent to the hospital at one time, giving emetic tartar to one half, and James's powder to the other, and their effects were so similar, that I could perceive no reason for preferring the one to the other. Antimonial medicines seem better adapted to this than any other sort of fever, and may be more freely given in it.

These are the most likely means of bringing about a remission; and if this is effected, nothing remains to be done but to throw in as much Peruvian bark as the stomach will bear.

But whether from a fresh accumulation of bile, or some other circumstance, it may happen that the fever is kept up; and in this case there is commonly a sense of weight or uneasiness about the *hypochondria*, which seems to indicate that the redundant bile is in the gall bladder or ducts of the liver. In this case a repetition of evacuants is necessary, and calomel will be found to answer remarkably well as a purgative, its stimulus being so extensive as to loosen and bring away bile when the saline purgatives, such as that above mentioned, had failed of having that effect. I have known these to pass through the intestines without relieving the uneasy sensation about the stomach as calomel is found to do; and it will be still more effectual for this purpose, if given alone in a dose, from five to ten grains, and followed some hours afterwards by some other purgative. After this, antimonial medicines are again to be had recourse to; and these, as well as purgative and neutral medicines, are safe and useful in a more advanced stage of this fever than they are in the ship fever; for the strength is not so apt to sink, and the state of the bowels requires them more. Antimonials, however, are to be used sparingly and cautiously as the fever advances; for I have known them, when given only a few days after the first attack, to have the effect, in some constitutions, of making the stomach swell, and of producing a general sense of heat and uneasiness.

After the evacuations of the bowels, the anodyne diaphoretic may be very seasonably given in the manner formerly mentioned; for it will not only tend to sooth and procure sleep after the commotion that has been excited, but by its gentle sudorific effect will assist in completing the remission.

The principal point of management in the fevers of this climate is, to throw in the Peruvian bark in proper season. I formerly took occasion to differ

from the opinion of those who alledge that little or no discrimination is necessary with regard to the circumstances in which bark is proper in continued fevers. I made fair and unprejudiced trials of this, but always found that some sort of remission, especially towards the beginning of the disease, was necessary, in order to make the use of this medicine safe and proper. The greatest vigilance is indeed required that the administration of it be not omitted when it is at all adviseable, as the course of fevers is very quick and critical in this climate. I have watched many nights with some friends in whose health I was particularly interested, to catch the hour when it might be allowable to give it; and where the propriety of it was somewhat ambiguous, it was usual to qualify it either by conjoining some antimonial or neutral salt with the first doses, or by giving them alternately with it, as has been formerly mentioned.

Under the use of these means, the favourable symptoms are, a warm moist skin, a strong steady pulse, with the pulsations under a hundred in a minute, a natural countenance, and being free from delirium. But if the fever should not yield during the first week, but takes an unfavourable turn, the pulse then becomes more small and frequent, there is a general agitation, the tongue is tremulous when put out, there is great thirst and delirium, with a dry and hot skin. In these circumstances, besides the continuation of the antimonials in smaller doses, with the anodyne diaphoretic, and the occasional use of purgatives, blisters now become proper; and we found also camphor combined with nitre an excellent medicine at this period of the disease.

Should the patient survive to the end of the second week, the treatment then comes to resemble more and more that of the infectious fever already described. Bark may be given, though there should be no proper remission, and cordials and opiates may be more freely used. Attention to the state of the bowels will still be necessary, since repeated accumulations of bile are apt to occur even in the most advanced stage, and gentle emetics of ipecacuana, as well as laxatives, may be necessary. For the same reason also, greater caution is requisite in the use of pure opiates than in the infectious ship fever before treated of. In order to keep the bowels soluble, it was a very usual practice, and found very useful, to conjoin a few grains of rhubarb with each dose of the bark.

3. Of the Yellow Fever.

The fever last treated of may be said to be peculiar to a hot climate; but the hot seasons of temperate climates produce something resembling it. That now to be described never occurs, so far as I know, except under the influence of tropical heats. Such a fever is indeed known without the tropics; for it is very common in Carolina in the hot season; but there the heat is even greater than that of the West Indies. In order to produce it, there must be, for some length of time, a heat seldom falling below seventy-five degrees on Fahrenheit's thermometer.

Though it differs from the fever last described, both in its causes and symptoms, it is not meant to say that it is so distinct as to form a separate species of disease, like the measles and small pox. Unless the characters of fevers are strongly marked, it is difficult, and even impossible, to refer them to any particular species; and the different concurrence of causes and constitutions is so various, that great numbers of ambiguous cases occur.

With regard to the cause of the yellow fever, it differs from the bilious remittent in this, that the air of woods and marshes is not necessary to produce it; for it most commonly arose from intemperance or too much exercise in the heat of the sun. It was observable, however, that it was more apt to arise when, besides these causes, men were exposed to unwholesome air, particularly the foul air of ships, whether from infectious effluvia, or proceeding merely from the putrefaction that takes place in neglected holds.

It is also remarkable with regard to it, that it is confined almost entirely to those who are newly come from a cold or temperate climate. The same remark is made by the French, who therefore call it *fievre de matelot*[101], considering it as peculiarly incident to those who have newly arrived from a long voyage. It would appear also, from what has been formerly mentioned[102] that those men, who have been exposed to that sort of infection that prevails in ships in cold climates are more particularly the subjects of the yellow fever when they arrive in a hot climate. It is farther in proof of the same opinion, that there are medical gentlemen, natives of the West Indies, who have hardly ever seen it, their practice lying at a distance from any sea-port town where strangers usually arrive. Of these strangers,

those who are young, fat, and plethoric, are most apt to be attacked; and more of our officers in proportion were seized with it than common men.

It has been said, that it never attacks either the female sex or blacks. This is in general, though not absolutely, true; for I knew a black woman, who acted as nurse to some men ill of this fever at Barbadoes, who died with every symptom of it.

This fever assumes various forms, according to the peculiar constitutions of different men, and other circumstances; but in the following description I shall enumerate the most common appearances:—In general it begins with short alternate chills and flushes of heat, seldom with those rigors which constitute the regular cold fit, and with which most other fevers begin. These are immediately succeeded by violent head-ach, pain in the back, universal debility, sickness, and anguish at the stomach. There is commonly, in the beginning, a good deal of bile on the stomach, which is thrown off by vomiting, either natural or excited by an emetic. Those men who were taken ill of this fever in the Alcide, in the end of the year 1781, had a sore throat in the beginning; but this is not a common symptom.

In the course of this disease there is by no means a free secretion of bile, and least of all in those cases that are most violent, and prove the soonest fatal. In cases that are more protracted, and less desperate, there are frequent accumulations of it, as appears by the vomits and stools[103].

The eye in a few hours takes a yellow tinge, which soon after extends more or less over the face and whole skin. This is a symptom so striking and constant, that it gives name to the disease, though it is not absolutely either peculiar or essential to it. There is something contagious in this symptom, which seems somewhat singular, and difficult to be accounted for. It was observed in the Royal Oak and Alcide to extend to men who were but slightly indisposed; and at the hospital it spread to men in the adjoining beds, without imparting any malignity to their diseases.

There is something very peculiar in the countenances of those who are seized with it, discernible from the beginning by those who are accustomed to see it. This appearance consists in a yellow or dingy flushing or fullness of the face and neck, particularly about the parotid glands, where the yellow

colour of the skin is commonly first perceived. There is also in the eye and muscles of the countenance a remarkable expression of dejection and distress.

One of the most constant and distinguishing symptoms of this fever is an obstinate, unremitting, and painful *pervigilium*, which is the more tormenting, as the patient is extremely desirous of sleep. It is seldom that even a *delirium* comes to his relief to make him forget himself for a moment; but he continues broad awake, night and day, with his reason and senses sound, in a state of the most uneasy agitation.

But the most distinguishing symptom, and that which is expressive of the greatest danger, is, an unconquerable irritability in the stomach, which can be brought to bear nothing. An almost incessant retching takes place, which commonly, on the third day, ends in what is called the *black vomit*, the most hopeless of all the symptoms attending it. When this is examined, the colour is found to be owing to small dark flakes, resembling the grounds of coffee, and seems to be blood which had oozed from the surface of the stomach, a little altered. Indeed pure blood is sometimes thrown up, and we know that the red globules enter the smaller order of vessels, and issue by them; for bleeding at the nose is a common symptom about this time; and some relate that it also escapes by the ears and pores of the skin, which I never saw, but can readily believe it. At the same time, the stools grow black, and the urine is frequently of a very dark colour, which seem to be owing to the same cause. I never remember to have seen any one recover after these symptoms came on.

There seems to be a general *error loci* of the more tenacious and globular parts of the blood into the smaller order of vessels, to which the yellow colour is in a great measure owing; and when any part of the skin is ever so little pressed upon, a damask red colour remains for some time, the small vessels readily admitting the red globules. It is certain that a yellow colour of the skin may be produced by such an *error loci*, without any suspicion of the presence of bile. We have an illustration of this in the ecchymosis which follows upon an external contusion. In this case the red part of the blood is mechanically forced either into the smaller order of vessels, or into the cellular membrane, which occasions a livid appearance, and in the course of

the recovery the same parts become yellow, probably in consequence of some of the gluten of the blood assuming this colour after the red parts have been removed by absorption or otherwise.

In the worst form of this disease there is all along an uncommonly distressing sensation of universal anguish, particularly about the stomach, where there is a sense of burning heat, which, as the miserable sufferers themselves express it, becomes unspeakable torture.

A sense of weight at the breast, deep and frequent sighing, and a great failure of muscular strength, are dangerous symptoms in all stages of the disease.

Upon the first attack the skin is extremely hot and dry, and the pulse hard and frequent; but the external heat soon becomes very little different from the usual standard of health, and the skin feels soft and moist. There sometimes happens an eruption of small pustules, with white heads, on the trunk of the body, which is a favourable sign; and I have seen a head-ach disappear upon this breaking out. The pulse does not serve as an index of danger; for, after the hurry of the first attack, it becomes very moderate in point of frequency, varying from eighty to a hundred pulsations in a minute, and is natural in point of regularity and strength.

In these circumstances this fever differs from that which was last described; and it also differs from it in being attended with little delirium. I have seen cases in which the senses were not affected from beginning to end; and I never observed that violent and incessant delirium which attends other dangerous fevers.

The state of the *fauces* is also different from that of most other fevers, for there is no excessive thirst. The tongue is somewhat white and foul; but I do not remember ever to have seen it black and dry.

A want of action in the bowels, and an insensibility to purgative medicines, indicate great danger; and, next to the black slimy stools, one of the most unfavourable symptoms is, when the *feces* are like white clay, as I have seen in some cases that ran out to the length of a week before they proved fatal. When the black vomit and stools occur, death commonly happens on

the third or fourth day. A bilious diarrhœa spontaneously coming on, is a very favourable symptom.

In more unpromising cases the urine is scanty, and in the last stage of life it becomes of a very dark colour, as was mentioned before. A plentiful secretion of urine is a very favourable circumstance, and seems to be one of nature's methods of curing the disease; for such cases are observed to terminate well. I remember one case in particular in which several quarts were made daily for several days together, and it was of a very dark saffron colour, but looked green where the surface was in contact with the side of the pot. I inspissated a small quantity of it, and found a large residuum, which was very deliquescent, and seemed to be all saline. In a hot climate the urine does not shew that separation and deposition which denote the crisis of fevers in cold climates, and this is perhaps owing to there being less mucilage and more alkali in the former, on account of the more putrescent state of the fluids. Upon adding a little vinegar to the urine in the case above mentioned, it became turbid like the critical urine of the fevers of Europe.

At the approach of death, cold clammy sweats come on; the pulse continues regular and of a certain degree of strength, but grows gradually slower. I have counted it at forty pulsations in a minute. The patient is frequently sensible to the last moment; nor does the countenance sink into what is called the *Hippocratic* appearance. In other cases I have seen, at this time, *coma*, and not infrequently convulsions. Broad livid spots sometimes also appear on the skin. Extreme muscular debility, a great difficulty of deglutition, and a dimness of the eye-sight, are likewise common symptoms in the last scene.

The different stages which lead to dissolution following each other thus rapidly, there is not that gradual failure of the powers of nature that usually give warning of approaching death; but the springs of life run down, as it were, at once, the wretched sufferer expires, and is happily delivered from the most extreme misery of which human nature is capable.

Such is the general train of symptoms in this fever, taken entirely from my own observation; but great varieties occur both in the symptoms and duration, so great indeed, that it is hardly recognisable for the same disease.

I shall give specimens of such anomalous cases in two that occurred at Port Royal, on board of the Canada, in July, 1782.

A lieutenant of that ship had been subject, for four days, to fits of retching, without any bilious discharge or pain in the stomach; and, except a white tongue, he had no symptom of fever in that time, nor any thing to prevent him from doing his duty. On the fourth day, when I first saw him, he began to complain of a fixed pain in the pit of the stomach, which was not very violent, and about the same time a yellowness began to appear on the white of the eye. He took a laxative medicine, which had the desired effect, and some volatile spirits, with some drops of thebaic tincture in simple mint water, for the pain in his stomach. He had a good night. Next day the complaint of the stomach was better; but there was great muscular debility. He had several natural stools; and as there seemed little indication but debility, he took nothing that day except an infusion of some bitters and aromatics in wine. As he did not want for appetite, he eat some broth and chicken; and nothing to give any alarm happened this day, except a short qualm, in which he was faint, with a sense of cold, feeling to himself, as he said, as if he should have expired. In the afternoon he began to have black-coloured stools, which was the first symptom that clearly betrayed the nature of the disease. He was then ordered as much Peruvian bark as he could take with red wine, and these his stomach bore. Decoction of bark was also given him in clysters. He had a strong voice, and was quite sensible, but grew weaker and weaker with frequent returns of the qualms, and he expired that evening before ten o'clock.

I have not the least hesitation in ranking this case with the fevers last described, though so many of the usual symptoms were wanting. This gentleman, though of a lively, active disposition, was of a slender make, and of a dingy, doughy complection, and his case gave me the idea of a disease attacking a constitution which, not having powers to struggle with it, is overwhelmed without making resistance[105]. In those robust, plethoric habits, which are most commonly attacked, there is a sufficient degree of strength to excite the violent symptoms before enumerated.

A few days after this gentleman's death, another officer of the same ship was taken ill with the same sort of fever, and it was also attended with

several unusual symptoms. Neither his skin nor eyes were yellow; the skin was hot and dry throughout the disease, and during the three first days there was a diarrhœa, which was neither bilious, putrid, nor mucous, but consisted in watery stools. There were no gripes, nor any local pains whatever; but I never remember to have seen more suffering from that general anguish, particularly about the stomach, which attends this sort of fever. On the third night he began to vomit and purge blood, which soon terminated in that dark-coloured discharge which is a symptom so characteristic and fatal in this disease. He continued sensible till within eight hours of his death, which happened on the fourth night. The pulse was full and pretty strong during the whole course of the disease; but there was all along great debility and frequent sighing, symptoms that ought always to create alarm.

Treatment of the Yellow Fever.

I feel this as the most painful and discouraging part of this work, the yellow fever being one of the most fatal diseases to which the human body is subject, and in which human art is the most unavailing.

It seems hardly to admit of a doubt that there are particular instances of disease, in their own nature, *determinedly fatal*, that is, in which the animal functions are from the beginning so deranged, that there are no possible means in nature capable of controlling that series of morbid motions which lead to dissolution. Of this kind appear to be the greatest number of cases of the plague, many of the malignant small pox, and some of fevers, particularly of that kind now under consideration. It is extremely difficult to ascertain such cases from observation; and it may be said that the opinion of the existence of them is favourable to ignorance and indolence. But, on the other hand, it may be questioned if more harm is not likely to arise in medicine by being too sanguine and officious, than by a diffidence of art and trusting to the powers of unassisted nature? Were we thoroughly acquainted with the animal œconomy, we should perceive *à priori* in what instances the seeds of disease would either operate so as necessarily to terminate in death, or when they were within the command of art. But we can derive little or no information from this source, on account of our great ignorance of the secret operations of the living body; so that the only

grounds of judging are our observation and experience concerning the usual event of disease, and the effects of remedies. Though these are circumstances attended with great uncertainty and ambiguity, yet I believe it will be admitted as the opinion of the most chaste and experienced observers, that there do really exist diseases whose course cannot be diverted by any means that can be employed. This opinion, I have said, is, in one view, extremely discouraging; yet, to the mind of a feeling and conscientious practitioner, who must often find his best endeavours baffled in many diseases as well as this, and who might be apt to look back and accuse himself of some fault or omission, it affords this satisfaction to his reflections, that the want of success may have been owing to something in the nature of the disease, and not to his want of skill and attention.

But though the fatality of this disease is discouraging, let us not despond, but rather redouble our diligence in observing what assistance and relief nature may admit of.

It is proper in this as in every other fever of this climate, to begin the cure by cleansing the first passages. This does not produce the same relief as in the common bilious fever, probably because there is a less free secretion of bile, and therefore less oppression from the collection of it.

With regard to blood-letting, the most that can be said in its favour is, that if there should be a hard throbbing pulse, with violent pain in the head and back, it is *safe* in the first twelve hours. This limitation is necessary, at least with regard to common seamen, who do not bear evacuations so well as officers and others, who are used to a better diet, and to whom the loss of blood has, in some cases, been found useful in the early stage of this fever. It is, however, in all cases extremely dangerous, except in the circumstances mentioned above. The blood is said to shew a buff in the beginning of the disease, but in the second stage, it is mentioned by a French author[106], that it hardly coagulates or separates. But even the appearance of a buff, without considering other circumstances, does not always argue the propriety of blood-letting[107].

The great object in the cure of this fever is, to bring the stomach to bear the bark. There are here wanting most of the circumstances that in the other cases forbid the use of it; for there is no preternatural quantity of bile in the

stomach and intestines, nor is there a hot and dry skin, nor violent delirium. The only obstacle to its administration is the great irritability of the stomach, which is the most fatal symptom of the disease; and the principal part of the management of the patient consists in the prevention or removal of this. The stomach is to be treated with the utmost tenderness and attention. One gentle emetic at the beginning is all that is allowable; and as fresh collections of bile are less apt to occur, the repetition of it is less necessary.

It is best to abstain altogether from antimonial medicines, and to render every thing, whether food, drink, or medicine, as grateful as possible. The liquid most apt to stay upon the stomach is the juice of the acid fruits of the climate, such as[108] oranges and lemons. It happens frequently, however, that acids come to be loathed extremely, so as to nauseate the stomach and to encourage retching. In this case I have found a composition of wine and water with lemon juice and nutmeg, sweetened with sugar, and given warm, to be a very grateful and salutary drink. The patient sometimes prefers the decoction of farinaceous substances to every other liquid; and in one case in particular, which did well, the patient was led by taste to prefer warm water gruel to every thing else, and the great quantity he drank seemed to have a considerable share in his recovery, by keeping up a warm moist skin and producing a great flow of urine.

In order to check vomiting, the saline draught, in the act of effervescence, has been employed with evident advantage; but in most cases this symptom is so obstinate as to discourage all attempts to remove it. I have known magnesia in mint water have a visible effect in soothing the stomach, particularly when given immediately after some acid beverage.

I was informed by Dr. Young, physician to the army, that he found an infusion of chamæmile flowers one of the best medicines in this vomiting; and a surgeon of one of the line-of-battle ships informed me, that he also found advantage from it in alleviating this symptom. The French author above mentioned affirms, that milk, boiled with some flour or bread, given in the quantity of a spoonful at a time, and frequently repeated, had more effect than any thing he tried in stopping the vomiting in this fever. I have seen this symptom relieved by fomenting the stomach with stupes wrung

from the decoction of bark, and sprinkled with camphorated spirits and tincture of bark[109].

But nothing I have ever seen tried had so great an effect in removing this irritability of stomach as a blister applied to it externally; and it is a remedy which, so far as I know, has not been hitherto recommended. In other fevers, when the head was not particularly affected, I preferred this part for the application of a blister, for it is in some respects more convenient than between the shoulders, and the stomach is the part more affected perhaps than any other in all fevers. But in this fever I was led to apply it to this part, both from its being affected in an uncommon degree, and from observing, upon inspecting the bodies of those who died, that the only morbid appearance that could be discovered was an inflammatory suffusion on the inner membranes of the stomach.

I have employed opiates both externally and internally to allay this symptom, but without the effect that might have been expected from so powerful a sedative.

As the stomach will seldom, even in the most favourable cases, bear such a quantity of bark as to subdue the disease, it must be exhibited in every other way that can be thought of, such as by clyster and by external fomentation, both of which I have employed with good effect. I used to order a pint of decoction of bark to be injected every three or four hours, and the fomentation to be employed nearly as often. I have heard of the decoction of bark being used as a warm bath with success; but I cannot decide concerning this practice from my own experience.

I have no other internal remedy to recommend; for whatever power of retention the stomach may have should be employed in taking bark. If it should become tolerably retentive, camphor will be found of service; and if given in the evening with an opiate, perspiration and sleep will probably be procured, by which the patient will be greatly relieved.

Blisters to the thighs and legs seemed to coincide with the general intention of cure, and they appeared to be of advantage in the cases in which they were tried.

4. Of the Effects of Flowers of Zinc and White Vitriol in the Cure of obstinate Intermittent Fevers.

It frequently happens in the West Indies that intermittent fevers are so obstinate as to resist the common means of cure by the Peruvian bark; so that these complaints become extremely distressing to the medical practitioner as well as to the patient. Indeed this was a difficulty that occurred so often, that I was sometimes tempted to think, either that the great reputation of this medicine is not so well founded as is commonly believed, or that the bark generally in use in these times is not of so good a quality as that employed by the physicians who first established its character.

But, in the first place, the experience upon which its reputation was first built was in a temperate climate, where very few agues are found to resist it when properly administered. In the next place, there is reason to believe that, in fact, the medicine itself now commonly in use is not equally powerful with what was first employed; and a species of it, called the Red Peruvian Bark, has lately been discovered, or rather, perhaps, revived, which is certainly of a superior quality, and has been found to cure intermittents in which the common sort had failed[110].

However this may be, it is an undoubted fact that obstinate agues are much more frequent in the West Indies than in Europe; and something to supply the insufficiency of the bark seemed to be a *desideratum*.

I was informed by Dr. Hendy, of Barbadoes, that he had found the flowers of zinc to answer in cases of intermittent fever, in which even the bark and every other remedy and mode of treatment had failed. It was found very successful in the like cases, both in my own trials at the hospitals, and by the surgeons of the men of war to whom I recommended the use of it. In order to judge what may be expected from it, I shall give a specimen of its success in some cases, at the hospital at St. Lucia, of which I kept an accurate account, in the months of February and March, 1783.

About the time the fleet arrived there, six cases of intermittent fevers were sent to the hospital from different ships. One was of six weeks continuance,

and had been some times of the tertian, sometimes of the quartan type. Two were quartans; one of which was of two months, the other of eight months duration. Two were regular tertians; of which one had only had two fits, but was a relapse after a week's exemption from an attack of several weeks. The other was of three months continuance, attended with an eruption on the hands and arms. The sixth case was a quotidian of three weeks, attended with a cough of the same standing, and joined with sea scurvy.

In all of them the bark had been given at some period or other; and the flowers of zinc were now tried in all, except the last. In three out of the five this medicine had the most visible good effects. In one the disease was so speedily removed, that there was only one fit after the first day of taking this medicine, and the other two had recovered perfectly after it had been used for seven days.

In these cases there can be little or no ambiguity with regard to the real efficacy of the medicine, as the disease had lasted from two to six months, and there was no other circumstance of change in the situation or treatment of the patients that could account for their recovery.

Of the two cases in which it failed, one was the tertian of three months, attended with the eruption; the other was the relapsed tertian of three days.

With regard to the dose, I began with giving it in the quantity of two grains thrice a day, which, in some, produced the desired effect, and without the least sensible operation on the stomach or bowels. If this dose did not stop the fits after a few days trial, it was increased to three grains, which, in some, would produce a little sickness. I found that four grains ruffled the stomach a good deal; but if the patient is gradually habituated to it, even more than this may be given without inconvenience.

In those cases in which it was successful it was not found necessary to give more than two grains at a dose, except in one of them, in which three were given the day before the fit ceased. In the two unsuccessful cases the medicine had a fair trial for a fortnight; but one of them getting no better, and the other seeming to get worse, it was left off.

The cases to which this medicine is adapted are those that have extremely distinct remissions, with no symptoms of bile nor any local affection. When agues come to be long protracted, they are frequently what may be called nervous; that is, consisting of certain morbid motions that seem to be induced by habit, after the original cause is removed, and with a tolerable enjoyment of appetite, sleep, and all the functions of life, during the intermission.

The two cases in which the zinc failed recovered by the use of the bark. This had been unsuccessfully tried before, and its good effects now might either depend on its having been left off for some time, whereby the body recovered its sensibility to its virtues, or it might be in consequence of administering it in ardent spirits with a few grains of capsicum and ginger, additions which I found to improve its effects in other cases, and is a mode of giving it well suited to this climate.

The zinc was not tried in the sixth case, on account of the local affection and the remission being short and imperfect.

The white vitriol, being a salt of zinc, might be supposed to possess the same virtues; and it would appear to do so from some facts[111] that were reported to me in the West Indies, and also from some trials made by me at St. Thomas's hospital since I came to England.

Though this is a medicine of very considerable powers, I do not mean to put it in competition with the bark, by proposing it as a substitute for it, or by representing it as superior to it in all circumstances; but only to propose it as a valuable subsidiary in particular cases. The account I have given is faithfully extracted from a diary of my practice; and were I to say more in its favour than the future experience of others may warrant, I should do more harm than service to its reputation. Many good medicines have had their characters hurt by being over-rated by the first proposers of them, who are naturally sanguine and partial, without, perhaps, intending to deceive. But when others find that their virtues do not come up to what has been asserted, they are apt to run into the other extreme, and explode them altogether; so that what was given out as good for every thing, is now found to be good for nothing[112].

CHAP. II.

Of Fluxes.

These seem to arise in the same circumstances, and to be owing to the same general causes, as fevers. They may, in some sense, be considered as fevers, attended with peculiar symptoms in consequence of a determination to the bowels, just as fevers in cold climates are sometimes attended with rheumatism and catarrh. We have seen, in the first part of this work, that the dysentery arose chiefly in those ships which had been subject to fevers.

This determination to the bowels is owing to a variety of causes, but is chiefly connected with external heat; for it is most common in hot climates, and towards the end of summer or in the autumns of cold climates, owing probably to a greater acrimony of the secretions of the intestines, and particularly of the bile. Dysenteries arise in camps also at the same seasons, and in the same circumstances as bilious fevers[113].

Besides climate and season, the other circumstances determining to the one disease more than the other are, 1. A difference in the constitutions of different men; for in the same ship it sometimes happens that both diseases prevail equally, though all the men are using the same diet and breathing the same air. 2. The nature of the occasional cause. A dysentery, for instance, is more likely to arise from an irregularity in eating or drinking; a fever from being exposed to the weather, particularly marsh effluvia. 3. The particular species of infection that may happen to be introduced. Suppose, for example, that a ship's company is predisposed to acute distempers, and one man or more ill of the dysentery should be brought on board, this will become the prevailing disease, as happened in the Torbay in August, 1780. If the like number of fevers should be introduced, then fevers will be the prevailing disease.

These two diseases may therefore be considered as *vicarious*, the one substituting itself for the other according to particular accidents, and both proceeding from the same general causes; and this is no new idea of mine,

but seems to have been Dr. Sydenham's, when he calls the dysentery a *febris introversa*. It may be farther added, that dysentery is the latest form in which this cause, which is common to both, can exert itself; for it is a disease more within the reach of art; and some of the most dangerous symptoms attending fevers, particularly *delirium*, seldom occur in dysentery. When it proves fatal, it is in consequence of violent local affection, and that in general after it has taken a chronic form. When an incipient fever turns into a dysentery, all the symptoms, and particularly the head-ach, delirium, and *coma*, if there should be any, are immediately relieved. And the most favourable cases of the yellow fever are those in which a bilious diarrhœa comes on, while the most fatal are those in which the bowels are so torpid as to be insensible to any stimulus either from their own contents or from medicine.

I shall not enter into a minute description of this disease in all its stages, as this has been so ably executed by Sir John Pringle, Sir George Baker, and other authors, but shall only give a sketch of some of the most remarkable symptoms, particularly such as are peculiar to the climate and manner of life, so as to explain the varieties that may be necessary in the mode of treatment.

The fluxes that arose in the fleet were either what may be called the acute idiopathic dysenteries, or a dysenteric state of the bowels from neglected diarrhœas, which was most apt to occur in the convalescent state of fevers, or in men labouring under the scurvy. The body is more susceptible of infection in a state of weakness from these or any other causes; and in hot climates the dysentery seems to be more infectious than fevers; for at hospitals it was so frequently communicated to men who were ill of other complaints, that it was in these the principal cause of mortality. For this reason, I was at more pains with regard to this disease than any other, in keeping those who were ill of it in a separate ward.

I have met with some violent and untractable cases which proved fatal in the acute state; but, in general, this disease draws out to a chronic form in this climate, and does not prove mortal for many weeks. The usual cause of death appears, from the inspection of the bodies, to be an ulceration of the great intestines, particularly of the descending colon and the rectum. This

part of the intestinal tube is most affected from its being the receptacle of all the acrid secretions from the rest of the canal; and it is naturally more subject to congestions of the fluids and incurable ulcers, as appears from the rectum being so liable to the hæmorrhoids and the *fistula*. This ulceration of the great intestines is so common, that, out of eight cases which I inspected after death, seven had this appearance. The case in which there was none was not so much a case of dysentery as of inflamed bowels, brought on by the man having drank to excess of spirits while he was recovering from a dysentery. The acute *tormina* which always occur in the first days of the disease seem owing to an inflammation, which terminates in ulcers; and these being constantly irritated by the sharp humours, produce the *tenesmus*, which is the symptom most essential to dysentery in the after part of the disease. Any diarrhœa may in this manner become dysenteric. During the acute griping at the beginning, the stools are loose and copious; but as soon as the tenesmus takes place, they are scanty, which is most probably owing to the spasmodic strictures in the great intestines, in consequence of irritation upon their excoriated surface. The inflammatory state is more lasting and violent in a cold than a hot climate, the gripings are more severe, and the danger is also greater in this stage of it.

The state which the great intestines fall into in old dysenteries seems to have something in it peculiar to itself: the several coats become thick and spongy; their texture is obliterated and destroyed; and they become of a black or very dark purple colour. This, however, cannot be called mortification; for the fibres of the gut do not lose their tenacity, nor is there that putrid and dissolved state in which gangrene consists; but it advances in time to such an extreme state of disease as to be entirely incapable of recovering its natural appearance and functions, and proves therefore the cause of death.

The greater frequency and obstinacy of these chronic fluxes in hot than in cold climates seems to be owing to the same weakening of the powers of life which make recovery in general so tedious, and particularly that of wounds and ulcers. The greater quantity of acrid bile will also tend to keep up the ulceration. Dysenteries have this disadvantage, that the Peruvian bark, which is the most powerful restorative in other complaints of this climate, is here found to be inadmissible on account of the heat, thirst, and

other febrile symptoms, which it seldom fails to induce in all stages of this disease.

Treatment of Fluxes.

There are few diseases in which a prudent employment of art is more useful, or in which early means of relief are more requisite than in this[114].

Where the dysentery is the original disease, and when the patient is robust and plethoric, with acute pain and a strong pulse, blood-letting may be practised with advantage in the beginning of the complaint. But there is no part of the practice in this disease in which the climate and manner of life makes a greater difference than in this; for in a temperate climate it frequently happens that repeated blood-letting is necessary; but in a hot climate, where the fibres are relaxed, and in the constitutions of seamen, whom we seldom or never find plethoric, the inflammatory symptoms requiring this evacuation do not run so high, nor continue so long.

It is in all cases of the utmost consequence to administer as early as possible a brisk saline purgative. An ounce and a half or two ounces of purging salts may be dissolved in a quart of barley water or water gruel, and given warm in cupfuls, at small intervals, till a free and copious evacuation is produced. If there should be much fever, or sickness at stomach, two grains of emetic tartar will be a great improvement of this medicine; and there will be this farther advantage from its use, that if the stomach should be loaded with bile, in which state it is more irritable, an evacuation upwards will also be excited to the great relief of the patient.

This early and seasonable measure will, in many cases, put a stop to the disease, especially if the patient is thrown into a sweat immediately after the bowels have been thus thoroughly evacuated. It is of great service in this disease to promote free perspiration, and even a plentiful sweat, which may be effected with great advantage by giving, at bed time, a medicine composed of opium, ipecacuana, and a little neutral salt, accompanying it with plentiful warm dilution. Nothing tends more to relieve griping and tenesmus than a general, warm moisture on the skin. The ipecacuana, which is an ingredient in this medicine, is one of the best anti-dysenteric remedies

we know; the opium procures rest; and this, joined to the sudorific effect of the whole, not only gives a temporary relief, but tends to carry off the disease. It is most properly given in the evening; for there would be this inconvenience in constantly encouraging a sweat, that if the tenesmus should return, it would either be checked by the patient getting frequently out of bed, or there would be danger of his catching cold. I am well aware that we cannot be too cautious with regard to the use of opium in the beginning of this disease; but it is admissible more early in a hot climate than a cold one, as the inflammatory symptoms are less violent and can be sooner subdued; besides, it becomes an entirely different medicine when conjoined with the other ingredients that have been mentioned.

The best medicine in the day time we found to be small doses of ipecacuana alone twice or thrice a day; and if there should be fresh collections of bile, small doses of the saline purgative will be necessary. Ipecacuana in this intention, may be given in the dose of two grains in athletic constitutions, such as those of seamen; but in the more delicate constitutions, such as are commonly met with in private practice, one grain is a sufficient dose. I have found manna and tamarinds a good addition to this medicine in the earlier stages of the disease, where there was much bile; but in a more advanced stage of it they are apt to produce gripings and flatulence.

The marks of a redundance of bile are, a sickness at stomach, a sense of scalding at the anus when the stools are passing, and the yellow or green colour of the stools themselves. It is apt also to excite symptoms of fever, such as a foul tongue, a hot and dry skin, with thirst. When collections of it are suspected in this disease, it is best to evacuate it by vomiting, for it is thereby prevented from irritating the bowels, and from arriving at the inflamed parts with, perhaps, increased acrimony, acquired in passing through the whole length of the intestines.

Some gentlemen of the fleet informed me that they found oil of almonds a useful addition to the purgative. Others as well as myself made a practical comparison of the saline purgative with that composed of rhubarb and calomel, as recommended by Sir John Pringle, and we gave the preference to the former, as more easy, speedy, and effectual in its operation, especially in the first stage. Cases may occur, however, in which the other may be

more advisable; for where there is a sense of weight about the stomach, which most probably arises from the biliary organs being clogged with bile, and where emetics have failed to remove it, or the weakness of the patient may render them improper, then calomel has the best effect: for it was formerly observed, that it tends to loosen the secretions, and to stimulate the more distant excretories, such as the biliary ducts.

It is very important to caution young practitioners concerning the employment of opium in all stages of this disease, but especially in the beginning; for though it is an excellent remedy when seasonably and judiciously employed, it is very liable to abuse, particularly in the hands of the inexperienced, who may be tempted to give it improperly from an anxiety to relieve; but as more harm may arise from an unseasonable administration of it than could be compensated by the best-timed use of it, it is best to err on the side of caution and omission. The principal caution to be observed with regard to this remedy is, to premise suitable evacuation, such as blood-letting, if necessary, but more especially purging. It is always pernicious to give it in its pure state during the *tormina*, so common in the first days. By these I mean the abdominal gripings, which denote inflammation, and are entirely different from the *tenesmus*, which is a more constant and characteristic symptom of the disease, and seems to arise from irritation and spasms of the rectum and colon.

It was in this disease that I first observed the good effects of a small quantity of neutral salt in taking off the inconveniencies attending opium, such as the feverish heat and confusion of the head, which it is apt to produce in many constitutions; and as the administration of the anodyne coincided with the evening dose of ipecacuana, I was led to adopt a form similar to that of Dover’s powder, but with only half the quantity of opium; or, it was given in a liquid form, by combining twenty drops of thebaic tincture and a drachm of ipecacuana wine, with nitre from five to ten grains, in any simple vehicle in form of a draught. There is a very observable difference, in some cases, between opium given in a liquid and in a solid form; and the former is much more certain in its effect when the intention is to procure speedy and effectual ease.

I have observed great benefit from the use of external remedies in dysentery, and these have, perhaps, been too much neglected by authors and practitioners. The warm bath is of great service, especially where the gripes and tenesmus are severe, and where the fever has been taken off by previous evacuation. Fomentations or warm applications of any kind to the abdomen give temporary relief; and it will be found of advantage to keep those parts, at all times, well defended from the cold air. Blisters to the abdomen were also found of use, and likewise acrid liniments, composed of oil, volatile spirits, and tincture of cantharides. Where the stomach has been much affected, I have perceived relief from fomenting it with stupes, upon which thebaic tincture and camphorated spirits were sprinkled, as recommended by Dr. Lind. I was once affected with a bad dysentery in the West Indies, and I thought myself much relieved by the warm bath and a blister. Strangury is not an uncommon symptom in this disease, independent of cantharides, and the most sensible and effectual relief is derived from fomentations to the pubis and perinæum, as I also experienced in my own case.

What has been hitherto said regards chiefly the acute dysentery; but the most frequent and troublesome complaint that occurred at the hospital, was the same disease in what may be called its chronic state.

There is a considerable variety of symptoms in all the stages of this disease, but particularly in the more advanced or chronic state, so that a corresponding variety is necessary in the modes of treatment, and there are few diseases in which there is more room for exercising the judgement.

In all stages of it an accurate discernment is necessary with regard to the use of opiates, and great part of the practice here consists in timing these well. They are least admissible in the beginning, where evacuation is the principal object; but as the disease advances they become more and more allowable and useful. The principal cautions necessary in their administration are, 1. To premise sufficient evacuation, so that the intestines may not be loaded with bile, *scybala*, or any other irritating matter at the time of giving the opiate. 2. To obviate the effects which an anodyne has of causing a retention of the contents of the intestines. This may be done, either by giving something purgative along with it, or after it has produced

its quieting effect. The former method seems preferable; for as soon as the effect of the opiate is over, the purgative is ready to act; and in this way it is so far favourable to the operation of the purgative that large feculent stools will be discharged: whereas, had the purgative been given alone, it would have been more apt to produce scanty griping stools, attended with tenesmus. Rhubarb answers well in such cases, and may be given in a dose from twelve to twenty grains, according to the age and constitution. 3. To prevent feverish heat and delirium. This was proposed to be done in the first stage of the disease, by combining it with ipecacuana and a little neutral salt. With the same intention, it may now be joined with a few grains of Dr. James's powder, or *vitrum ceratum antimonii*, in which form it would not be so strongly sudorific, an effect not so much required in the chronic as in the acute state.

The principal causes that keep up the flux, and render it so obstinate, are, 1. A too great secretion of bile, either continual or frequently recurring. 2. Ulcers in the great intestines. 3. A lienteric state of the bowels. 4. A retention of *scybala*.

The first cause is much less frequent than might be expected by those who fancy that every disease of this climate proceeds from bile. When there does occur a redundancy of bile, there is more occasion for the employment of evacuant medicines, and more need of caution in that of opiates. A medicine that will dispose the liver, or the circulating system in general, to form less bile, is a *desideratum* in physic; but, in case of an excessive flow of it, emetics and mercurial purgatives, as has been already mentioned, are the best means of evacuating it; and care should be taken that it be discharged before it accumulates too much, or becomes acrid by too long retention.

In order to obviate that irritation in which tenesmus consists, some benefit was found from the injection of emollient and anodyne clysters, to wash off and dilute the acrimony, and to sooth and heal the parts. A strong infusion or decoction of linseed or starch may first be given to the quantity of near a pint, to be evacuated after a short retention, and then a few ounces of the same, with thirty or forty drops of laudanum, to be retained for a length of time, in order to procure rest. Instead of this last, I have known a small

quantity of warm milk, with syrup of poppies, used with advantage in private practice.

I was at first tempted to think that a very frequent injection of such clysters would be very useful, by washing and healing the colon and rectum, and preventing farther exulceration. But besides the objection arising from the tenderness of the parts, which, in some cases, renders the operation itself painful, I found that if they were given oftener than once a day, they rather increased the uneasiness, and made the patient feel languid and exhausted; so true it is that no practical rule can be established from reason alone without being brought to the test of experience. The rectum seems to have a peculiar sensibility, and a remarkable consent with the whole system; for a stool will induce syncope, or even death, in a state of great debility. Clysters may be pernicious, even though they produce no evacuation of *feces*; and Sydenham has remarked, with respect to other diseases, that their unseasonable or too frequent use greatly debilitates and disturbs the patient. When not abused, however, they are of the most eminent service in this and other complaints.

Certain medicines, which have been called *sheathing*, have been recommended to be taken by the mouth. Of this kind are mucilage, oil, and wax. I have made trial of mucilage, such as starch, without any sensible effect, probably because it loses its qualities by the powers of digestion before it reaches the part upon which it is intended to act. With regard to oil, I have hardly enough of experience of my own to decide; but some of the surgeons of the fleet informed me that they found advantage from combining it with the purgatives. I was discouraged from using it by finding that it was apt, in the West Indies, to become rancid on the stomach, and, for this reason, I seldom, in any case, employed the castor oil, which, though produced in that climate, seems to answer better as a medicine in Europe. But since my return to England I have used, with great benefit, at St. Thomas's hospital, a medicine, composed of tincture of rhubarb and oil, in old dysenteries, attended with discharges of blood. I took the hint of this from finding it of great service in deep-seated piles, as recommended by Dr. Griffith[115]. It is necessary to combine something purgative with the oil, otherwise it might be altered by digestion, or absorbed, or might become rancid by too long retention in the first passages. Wax is a body not

changeable by digestion, and seems therefore well suited for the purpose of sheathing the bowels; and I have found advantage from the preparation of it recommended by Sir John Pringle[116], on the authority of Dr. Huck. I have also seen some advantage in old fluxes, in St. Thomas's hospital, from the use of spermaceti, given with an equal quantity of conserve of roses and half as much absorbent powder, agreeably to a form in use at that hospital.

The climate has a great influence in preventing these ulcers from healing, upon the same principle that it prevents the cure of external sores and wounds, so that there are cases that admit of no cure but from a change of climate. I have seen in some cases of old dysentery, small, round, ill-conditioned ulcers break out on the surface of the body, which seemed to proceed from the same general habit that produced those of the intestines. There was something peculiar in the appearance of those external sores, being like small round pits, as if a part of the skin had been removed by caustic, and with little or no discharge. In a case of this kind, which proved fatal, I found the whole surface of the great intestines beset with small ulcers, not unlike those on the skin.

Since the first edition of this work was published, I have met with a pamphlet, written by Dr. Houlston, of Liverpool, in which the friction of mercurial ointment on the abdomen is recommended as a cure for old fluxes; and I have tried this practice in some very obstinate cases in St. Thomas's hospital with evident success. In these cases it is probable the disease is kept up by a vitiated state of some of the various secretions belonging to the intestinal canal, which the mercurial alternative tends to correct.

The next cause that was mentioned of the long continuation of fluxes, was a lienteric state of the bowels. This consists in a great irritability of the whole alimentary canal, whereby all the *ingesta* are transmitted so fast, that there is no time for assimilation. Liquid aliment, such as broth, is particularly subject to this inconvenience. There are few cases of long-protracted fluxes in the West Indies, without this symptom in some degree.

The remedies that are here found of most service are such as counteract irritability or relaxation. It is in cases where this is the prevalent symptom that opium may be most freely used. Frequent and small doses of the

compound officinals, such as theriaca, pulvis e bolo compositus, or diascordium, have been found of service. Though the relaxation would seem here to indicate the Peruvian bark, yet I have hardly ever known it employed in any form in this or any other stage of the disease, without being hurtful. But there are other bitters not only safe but useful in restoring the tone of the bowels; of this kind are simaruba, quassia, and chamomile flowers. The first has been reckoned a specific in this sort of flux; but though its powers are undeniable, it will be found frequently to fail[117]. I have also used, with advantage, a tincture of gentian and cinnamon in Port wine. Something aromatic has a good effect when added to the bitter, being adapted to prevent or obviate flatulence, which is a common and troublesome symptom in this complaint.

That class of remedies which may be called pure astringents, might seem at first sight well calculated for cases of this kind. Of this sort are the *terra Japonica* and *extractum campechense*; but though I have seen evident benefit from this last, there are few cases in which such medicines are found by experience to be of material service. Where the cause consists in simple relaxation, they will effect a cure; but it more frequently happens that the disease is kept up by a vitiated state of the secretions, or a depraved action of the bowels.

The absorbent earths are a more useful remedy in this form of the disease. They have, perhaps, a restringent effect independent of their power of absorbing acid. It is certain, however, that great part of their use consists in the destruction of acid, which is very apt to be generated in that depraved state of digestion which takes place in advanced fluxes, particularly in this lienteric state of the bowels. In the early and acute state the vegetable purgatives, such as cream of tartar, tamarinds, and manna, are proper; but in this advanced stage they are hurtful by the acidity and flatulence which they produce, and both the food and medicines should be so calculated as to avert and correct those inconveniencies. There is something in vegetable acids extremely unfriendly to a weak state of the bowels in general, tending to bring on spasmodic gripings, and preventing a healthy digestion and assimilation, as we know in the case of heartburn, and of those who make use of vinegar to check corpulency, by preventing the formation of blood. Vegetable acids, however, are admissible where there is a redundancy of

bile, or where the excrements are putrid; and Dr. Zimmerman recommends tamarinds as a useful medicine in what he calls the putrid dysentery.

Lime water has been recommended in old flaxes, and I tried it in several cases; but, except in one, I could not perceive any benefit from it.

Absorbents may very properly be combined in prescription with some of the compound-officinal opiates, and a medicine will thereby be formed, which will have at once the advantage of an anodyne, a bitter, an astringent, a carminative, and absorbent. As these earths have little or no taste, they may also be added, with propriety, to the common drink, as in the form of the chalk julep, or *decoctum album*. It may be thought that here and elsewhere I have not been so particular as I ought to be concerning the forms and doses of medicines; but circumstances, such as age, constitution, and symptoms, make these, in a great measure, discretionary; and any one who is sufficiently conversant with physic to be entrusted with the charge of the sick, will have sufficient judgement to vary his practice accordingly. It has, therefore been my object rather to give the general principles of treatment than the particular forms of medicines.

A proper regulation of diet, as well as medicine, is of the utmost consequence in this disease. A free indulgence of animal food is pernicious, particularly in the first stage of it. In the chronic state, a moderate use of it is allowable, and in the lienteric state it answers better in a solid form than that of broth, which is apt to gripe and to run quickly through the bowels. The best general articles of diet are farinaceous bodies; and these are greatly improved by being toasted brown before they are used. It was observed, in a former part of this work, that the flux was supposed to have been prevented, in the fleet commanded by Sir Charles Saunders, by throwing burnt biscuit into the water used by the crews of the ships. It is a good practice to put a well-burnt toast into all that the patient drinks, and toasted bread, or panada made of toasted bread or biscuit, is one of the best articles of diet. Brackish water ought to be avoided, as it ruffles the bowels when in so delicate a state. Fermented liquors are improper, except when the disease is advanced, and where weakness and relaxation are the prevailing symptoms. Malt liquor will hardly ever agree, on account of its acidity and flatulence. Of wines, Port is to be preferred as the most

strengthening; Madeira as the least subject to acidity; and, for the common men, no drink of the fermented kind is safer than a moderate quantity of spirits diluted with water.

Warm clothing is of the utmost consequence in this disease, and external warmth of the abdomen tends greatly to sooth the bowels. I have seen good effects from a warm gum plaster constantly worn on that part. Though cold is in general hurtful and unsafe, I have nevertheless known the sailors, who, by their habits of life, are commonly heedless, bathe in the sea when labouring under what they call the white flux, without any bad effects.

It sometimes happens that this disease baffles every effort both of medicine and diet, so that a change of climate becomes the only resource.

The last cause of habitual flux that was mentioned was the retention of *scybala*, which keep up the irritation and tenesmus. It is very natural to neglect purgative medicines when there seems already to be too great a discharge by the bowels; but there is this inconvenience from omitting them for a length of time, that those hard lumps of feces, called *scybala*, are apt to collect in the cæcum and cells of the colon, as I have seen upon inspecting the dead bodies; and the fibres of the intestines being weakened, their natural strength is not sufficient to expel them without being stimulated by a purgative. It is therefore necessary to give some evacuant medicine from time to time, even though there should be no griping nor any marks of acrimony in the intestines. Rhubarb is allowed to be one of the best medicines for this purpose; and I have also known a combination of salts and sena have a good effect after a long neglect of purgative medicines. It is probable, from the durable effects produced, that these do not operate merely by the expulsion of *scybala*; and we can conceive that they may be of service by the removal of certain depraved fluid secretions, or that they may stimulate the vessels to a more healthy action and a more natural secretion. Be this as it will, experience teaches that in all fluxes it is of advantage to interpose from time to time some purgative medicine.

From the preceding view of the variety of causes which tend to keep up this disease, it will appear that great judgement and discrimination are necessary in varying the practice according to circumstances; and there is no disease in which there is room for more attention and nicety in adapting the

different remedies to the different symptoms. We can hereby also account for the various characters that different remedies have had, some having been extolled by one practitioner while they have been pronounced insignificant by another; for no one remedy will suit all the various cases of this disease. As it is of the greatest consequence to distinguish these cases, I have been more particular and diffuse on this article than any other; and having laboured under this complaint myself, I was naturally led to take a greater interest in its treatment, and had also thereby a better opportunity of making observations on it.

CHAP. III.

Of the Scurvy.

I shall not be so minute either in the description or treatment of the scurvy, as of the preceding diseases. A detail of this kind would lead to unnecessary prolixity and repetition; for the prevention and cure of it consisting in diet rather than medicine, have been fully handled in the former parts of this work; and the subject, in the descriptive as well as the practical part, has, in a manner, been exhausted by Dr. Lind. With regard to the theoretical part, I refer the reader to the ingenious treatise lately published by Dr. Milman.

It has appeared that the principal source of scurvy is a vitiated or scanty diet, and that it is very much promoted by cold, moisture, filth, sloth, and dejection of mind. Hard labour has been assigned by some as a cause; but this is not conformable to my observation in general, and what has been related to have happened in the Conqueror[118], more particularly led me to be of a contrary opinion.

The principal differences of the symptoms of the scurvy in hot and cold climates, so far as I have observed, are, that in the former the livid hardness on the extremities is an earlier symptom, and in the latter the gums are sooner affected, and the difficulty of breathing is a more frequent and more uneasy symptom. This difficulty of breathing is one of the most fatal symptoms, and is most frequent in those cases in which there are the fewest external marks of the disease, and is probably that form of the complaint which attacks a vital part by a sort of translation from the extremities.

There is a remarkable symptom sometimes attendant on this disease which has escaped authors, and is mentioned in Mr. Telford's Report, page 23. This is the *nyctalopia*, or weakness of the eye-sight, which was also common in the garrison of Gibraltar[119], among those who were affected with the scurvy, a disease that prevailed much during the late siege of that place.

With regard to the cure, enough has been said in the preceding parts of this work to prove that fresh vegetables are the most effectual antiscorbutics. I shall here mention a fact farther in proof of this, which has not before been taken notice of. When the fleet arrived at Barbadoes in May, 1781, part of the soldiers, who served as marines, were affected with the scurvy, and being sent to the army hospital, where, at that time, no fresh animal food was allowed, they recovered much faster by being confined to vegetable articles, than the seamen who were fed upon fresh animal food without any fresh vegetables.

It has farther appeared, that there is something in a particular class of fruit of the lemon and orange kind, which far surpasses every other remedy, whether dietetic or medicinal. Numberless instances have occurred, in the preceding part of this work, of men having recovered at sea from using the juice of this fruit alone, even under all the inconveniences of a sea diet. When the juice is intended to be kept for a length of time, it should be expressed and bottled, a small quantity of spirits being added to preserve it for if fire is used in preparing it, as in the form of a rob, I know for certain that its virtues will be thereby very much impaired. It is very difficult to say upon what principle these fruits act, for no sensible effects are produced by them except a small increase of some of the secretions.

It ought to be mentioned here as a fact of great consequence, though very little known, and never, I believe, published before, that the juice of limes and lemons is the best detergent of any external application that has yet been tried in scorbutic ulcers. Nothing was found so effectual in preventing these from spreading, and in disposing them to heal, as an emollient poultice with[120] lemon or lime juice sprinkled on its surface; or it was applied by soaking in it the lint with which the sore was dressed, and also as a lotion, in which case it was used diluted with two or three times its quantity of water; for if used pure, it was found too irritating, and was apt to bring on a fungous disposition. This precaution is particularly necessary with regard to limes, the juice of which is a much more concentrated acid than that of lemons. Mr. Lucas, surgeon of the Conqueror, favoured me with several valuable remarks in proof of this practice. A poultice was always found a good application in these cases, by its power of absorbing the acrimonious discharge, which would otherwise irritate the neighbouring

parts. I have been informed by a navy surgeon, who served in the former war, that he has known the most obstinate ulcers cured by applying a paste of oatmeal and water, the surface of which was sprinkled with Goulard's preparation of lead.

The fleet was furnished with essence of malt; but its powers were so inconsiderable, that some of the surgeons denied that it had any. In trials, however, that were made in an early state of the disease, it was found to have a sensible effect in checking and removing it. It was also found of evident use in the bad ulcers so apt to arise in scorbutic habits, and in this intention was superior to the Peruvian bark as an internal alterative. Indeed, in those ulcers that were truly scorbutic, the bark was found to be of very little use; and, next to what has been already mentioned, joined to the advantages of diet, opium was found of the greatest service in disposing these, as well as all other ill-conditioned sores of hot climates, to heal.

I have mentioned the scorbutic habit as distinguished from the scurvy, but there seems to be no difference except in degree; for a person may be laid to labour under the disease before it betrays itself by any obvious symptom, and it must have gathered a certain degree of force before visible symptoms are produced. The chief mark of this latent and incipient stage of the disease is that incurable state of ulcers that has been mentioned, whether they appear spontaneously or in consequence of slight accidents. There is another mark of this scorbutic habit which is not mentioned in any description of the disease I have ever seen. It is a soft, indolent tumour which arises under the skin on a part which has received a small blow, or contusion, so slight as not to break the skin. It most commonly appears about the elbow or fore-arm, and generally disappears without any inconvenience, what it contains being absorbed. A surgeon, who opened one of them, (a practice, however, not to be approved of) informed me that it consisted of fluid blood. We may also reckon a languor, or sense of weight, as one of those marks of scurvy which occur before the more obvious symptoms appear.

In this state of the disease, the articles of lesser powers, such as malt and melasses, may be of service by preventing its farther progress, or the appearance of actual symptoms, and by restoring the constitution.

In some of the early stages of this disease the effervescing mixture of acids with fixed alkali may probably also be of use. I never could perceive any sensible benefit in those cases in which I tried it, though some of the gentlemen of the fleet reported to me that they thought it of service.

There is no article of the *Materia Medica* yet known that possesses any considerable power over this disease without the assistance of proper diet. With this assistance, however, it is found, that whatever tends to increase the fluid secretions, hastens very much the recovery of the scorbutic patient. I have observed a very striking instance of this in the effects of a spontaneous diarrhoea; for I have seen those hard livid swellings on the legs, that form one of the most constant symptoms of this disease, almost disappear, and the hams, from being contracted, become flexible in the course of twelve hours after the purging came on. I have endeavoured to imitate this with purgatives, but never with the same effects as the natural looseness. A free flow of urine is also found to promote the recovery, and vinegar of squills is one of the most effectual medicines in this intention. It is likewise of singular service to excite sweat; for an obstruction of perspiration seems to be one of the principal constituents of the disease. The goose skin, which is an early and constant symptom of this disease, seems to be owing to a constriction of the exhaling vessels. Dover's powder has been employed with advantage as a sudorific, with decoction of the woods drank warm, and plentiful warm dilution. Camphor, combined with nitre, has been found one of the best remedies, and it acts both as a diaphoretic and diuretic.

Such external applications as relax the skin are found also to forward the cure. The contraction of the hams and the livid hardness of the calves of the legs are relieved by emollient cataplasms. Burying the legs in the earth, which has a sensible good effect, seems to act on the same principle, for it makes the parts sweat profusely.

There can be no doubt that in the scurvy there takes place in certain parts of the body a stagnation of the humours in the small vessels, particularly of the lower extremities, and that it is to this circumstance that the livid hardness of the fleshy parts of the legs is owing. The effect of medicine in removing this, must be to restore the action of those torpid vessels, so as to bring the

stagnated fluids again into circulation[121] Purgatives seem to act upon it as they do in the dropsy, by exciting absorption. The irritation of the bowels and their increased secretion thus affecting the minute vessels in all parts of the body, is the result of that sympathy or balance established between every part of the system, in order to support the harmony and effect the purposes of the animal œconomy.

It has long appeared to me, that the scurvy is owing rather to a defect of nourishment than to a vitiated state of it. In fact, that sort of food which is supposed most commonly to induce the scurvy, is, in most cases, not putrid, but is in an unnatural and depraved state by being drained of its juices, which run off in brine; and perhaps some of the more subtile and nutritious parts are wasted by evaporation. It is not found that salt of itself has any effect in inducing the scurvy, and indeed it can be induced under a state of diet in which there is no salt, as we know from some instances quoted by Dr. Lind; and some cases are related by Dr. Monro and Dr. Milman, in the Medical Transactions, which are in proof of the same opinion. But the case most in point to prove that it depends on a defect of aliment, is that of Dr. Stark, who, by way of experiment on himself, reduced his diet to the least quantity he could subsist upon, and was thereupon affected with the symptoms of the sea scurvy. I have also known some symptoms of it arise in old people in consequence of long abstinence, owing to the want of appetite.

It would appear that the aliment we take in acts in two ways in increasing the vigour of the body. First, by assimilation, whereby it affords the matter of which the solids of the body are made, in order to carry on growth in youth; and to repair the waste of parts in adult age. A very small quantity of matter is necessary for these purposes; and as a proof of it, we see people supported equally well with very different quantities and qualities of food. Secondly, Food is necessary as a stimulus, either by a power it has of soothing the nerves of the stomach, and the other surfaces to which it is applied, or by its volume in distending the intestines and blood vessels. It is upon this principle that luxury renders the great quantities of food we take in necessary; and those species of food which satisfy most by their stimulus are by no means such as are the most nutritious. It is also upon this principle, that in cases of accidental hardship from want of food, or in

barren and inclement countries where food is scarce, the body is supported, in some measure, by what contains little or no nutritious matter, such as pure water, or the bark of trees powdered and kneaded into a sort of bread, as we are told of the inhabitants of Lapland.

There are other familiar and well-established facts, which prove, that either from the influence of disease, from habits of life, or the nature of particular animals, life can go on for a length of time with little or no aliment. This is the case in fevers, in sea-sickness, in certain singular cases that have been recorded[122], in torpid animals, and in animals of cold blood. Though a man in health will die if deprived of food for a very few days, it does not follow that this is owing to the want of matter to repair the waste of the body. The craving for food, and the faintness from long abstinence, arise from the want of the accustomed stimulus, especially in those who are used to live well; and a person feels himself most refreshed by food and drink when newly taken in, and before it can be applied to the purpose of nutrition.

As there is a continual waste and decay, however, both of our fluids and solids, some degree of reparation is absolutely necessary, especially to animals of warm blood; and such *ingesta* as would give the stimulus of food, without being possessed of any nutritious principle, would indeed continue life for a certain time; but disease would ensue. The provision used at sea answers, in a great measure, to this description; for unless the powers of digestion and assimilation are remarkably strong, salt beef and biscuit, which have been long kept, do not contain much more nourishment than saw-dust, or the bark of a tree, and the disease induced by this diet is the scurvy.

The nature and symptoms of the scurvy countenance this opinion: for as the means of renewing the animal matter of our bodies is withdrawn under this course of diet, nature, in consequence of an accommodating principle, observes a sort of frugality, and the animal œconomy adopts such measures as may be productive of the least possible waste and corruption of the fluids. Accordingly all the secretions become scanty; and, in particular, one of the first symptoms of this disease is a suppression of perspiration, as appears by the goose-skin that attends it. There is a paucity of urine. There is also a great languor in the circulation, which may be considered either as

a means adopted by nature to prevent that vitiated and effete state of the fluids which a brisker action might induce; or it may happen from a want of that due supply of nourishment necessary to produce a vigorous action of all the functions.

We have a proof of this general languor not only from the great aversion to motion, and the great disposition to syncope, but from the inspection of the dead body, from which it appears that the whole circulating system, being more flaccid and less elastic, is subject to preternatural distention. The heart is accordingly found enlarged in bulk, the size of the cavities being increased; and in the extremities, where the circulation is naturally most languid, the small vessels carrying the colourless part of the blood, are so far enlarged as to admit the red part of it, as appears by the livid colour; and where this is the case, these vessels being unable to carry on the circulation, a stagnation ensues, as is evident in those livid appearances most common about the calves of the leg, which feel like a hard cake. I have examined those parts in the dead subject, and found a want of fluidity in the contents of the vessels, but could not discover any thing like *eechymosis*; from which I concluded that the colour was owing to an *error loci*, and the hardness to stagnation and coagulation of the fluids, and a want of action of the vessels.

The incurable state of ulcers, so common in this disease, is also what we might expect from the defect of fresh assimilated juices; for where a breach is made, either by nature or accident, in the solids, particularly of the extremities, the proper suppuration is prevented by the depraved state both of the fluids and vessels; and we cannot expect that renewal of solid parts in which healing consists, where both the instruments and materials of its formation are so defective.

I shall conclude what I have to say on this subject, by shortly considering whether or not this disease is ever contagious.

There is something in the nature and history of the scurvy that would lead us at once to pronounce that it is not infectious; for the external causes on which it depends are so obvious, and seem so adequate to account for its appearance and prevalence upon certain occasions, as at first sight to exclude every other external cause.

But it seems extremely unphilosophical to deny the reality or possibility of any thing in Nature, from our supposed knowledge of the means and causes she employs, particularly in a branch of science so obscure as the animal œconomy. Could we, therefore, prove the point as a matter of fact, it would be in vain to deny it, from our fancied acquaintance with Nature's modes of operation.

The facts which give a suspicion of the scurvy being infectious are, 1st, What is related by Dr. Lind, that the sea scurvy spread at one time from the naval hospital to the people of the adjacent country. 2dly, There occurred several instances, in the first part of this work, of this disease prevailing to a much greater degree in some[123] particular ships than others, though upon the most accurate inquiry there was found no difference in the diet, or any other external or predisposing cause adequate to account for this. We can conceive, that those ships having accidentally a few men, whose constitutions were remarkably predisposed to this disease, might catch it earlier than in other ships, and communicate it to the rest of the crew.

The only practical inference that would lie from the establishment of this fact would be, that when the disease begins first to appear, the men affected should be separated from the rest; and this is a good practice, whether this opinion is true or not; for such men ought to be put in one mess, in order that they all may live upon the same antiscorbutic articles of diet, and that they may more easily be debarred from the use of their common provisions, of which this disease does not make them lose the relish.

CHAP. IV.

Of the WOUNDS received in the Actions of April, 1782.

oss in the Battle and from Wounds—Fatality of the locked Jaw—Treatment of it —Some Ships more subject to it than others—Different from other Cases of Tetanus—It is not cured by the Removal of the Part—It may come on after the Part is cured—Effect of Climate in producing it—Accidents from the Wind of a Ball—Accidents from the Explosion of Gunpowder—Means of preventing them—General Observations on Sores and Wounds.

Though surgery was not properly in my department, yet, having had a fair opportunity of collecting facts concerning this branch of practice, I thought it my duty to pay some attention to it.

The whole number of men wounded in the actions of April, 1782, amounted to eight hundred and ten.

Of these, sixty died on board before the end of the month, five in the course of the following month, and two in June.

There were ninety-seven wounded men sent to the hospital at Port Royal, of whom there had died twenty-one when the fleet left Jamaica on the 17th of July.

So that the whole loss of men in the battles of April, and their consequences, is as follows:

Killed outright	266
Died of their wounds on board	67
Died of their wounds at the hospital	21
Total	354

Of those who died on board, fifteen[124] were carried off with the Symptoms of the locked jaw; but of those sent to the hospital, only one. The reason that so few in proportion were affected with it in the hospital may have been, that none of the wounded were landed till near the end of the third week after the principal action.

The danger of this symptom was then, in a great measure, past, though I have known it to take place in every period from the second or third day till the fourth week.

Only three men in the whole fleet recovered from this alarming complaint; and as it is interesting to know every thing relating to so desperate a symptom, I shall give a short account of each.

The first was a seaman of the Montagu, who had his thigh wounded by a splinter which carried away part of the integuments and *membrana adiposa*, and lacerated in a small degree the *vastus externus* muscle. The wound did extremely well till the 23d day, when the jaw became almost entirely fixed, and the whole muscles of the wounded side were thrown into frequent spasms. Mr. Young, the surgeon, who was always anxious and assiduous in his duty, consulted with me, and we had immediate recourse to the warm bath, which gave a degree of instantaneous relief, and was repeated twice a day for half an hour. He was sensibly better every time; in nine days was entirely free of the symptom, and continued afterwards to do well. The only other means taken for this man's recovery, besides what were used with the other wounded men, were from three to five grains of opium, which he took every day, in divided doses.

The next was a seaman of thirty years of age, belonging to the Magnificent, who had the *humerus* broken and shattered by a splinter which entered the deltoid muscle. Several large portions of bone were extracted, and the artery was laid bare on the inside. On the fifth day there came on a large ichorous discharge, with a low quick pulse and depressed spirits, and the jaws began to close, with pain and stricture on both sides about the articulation of the lower jaw. He had every day since the accident taken half an ounce of Peruvian bark, combined with opium or rhubarb, according as it made him loose or costive. This was continued, and the part externally was kept constantly moist all round with volatile liniment, to which a fourth part of *tinctura thebaica* was added. Next day the jaw was almost entirely fixed, so that it was with difficulty that a little wine and water could be introduced with a spoon. Mr. Harris, the surgeon, now wisely determining to do something vigorous in this unpromising situation, beat up twelve ounces of opium moistened to the consistence of a cataplasm with the thebaic tincture, and applied one half to each side of the jaw. The patient this day swallowed a pint of the bark decoction with half an ounce of nitre, and took a diaphoretic draught of twenty drops of thebaic tincture and thirty of antimonial wine. He had also the smoke of tobacco thrown up his nostrils.

On the third day after the attack he could open his mouth half an inch. The cataplasms were taken off, beat up afresh with the tincture, and applied anew. The bark and other medicines were continued. On the fourth day the stricture and pain of the jaw went entirely off, but the cataplasm and volatile liniment were applied for three days longer. The wound produced a laudable discharge, every symptom became favourable, and he continued to recover.

The only other person who recovered from this symptom was a man in the Bedford. Several died of it on board of this ship; and as the same means of relief were skilfully employed in all the cases by Mr. Wickes, the surgeon, the success seemed owing more to something favourable in the man's constitution, than any thing peculiar in the treatment, which consisted in the administration of the warm bath, opium and camphor, with mercurial friction on the jaw.

This accident affected some ships remarkably more than others, particularly the Barfleur and Bedford, though their wounds had nothing peculiar, nor were in a greater proportion than in the rest of the fleet. Four were carried off by it in each of these ships. It has formerly been observed, that great ships acquire peculiar habits, or dispositions, which incline the constitutions of the men to one disease more than another. This complaint took a run in some particular ships last year also after the battle of the Chesapeak; and I have known it prevail in some particular hospitals more than others. In the present instance, it may have been owing either to something peculiar in the constitution, or air of the ships; or we can conceive it to be owing to some sort of nervous sympathy, just as the *epilepsy*[125] has been known to spread from one boy to another, at a school, in consequence of imitation, dread, horror, or some such delicate nervous or mental affection. We have in yawning an example of a spasmodic affection spreading from one person to another. If this is the case in the locked jaw, those affected by it should be removed from the presence of the other wounded men, lest the idea of the sufferings of others should be so fixed in their mind, or so impress them with the fear of the like, as to invite the attack of the same complaint.

Though the locked jaw, in consequence of wounds, resembles frequently in its symptoms the tetanus which arises without any external accident, yet there are many cases of the former which differ materially from the violent symptoms of the other, as described by authors. In most cases of the locked jaw from wounds the spasms are not so general, so violent, nor attended with such exquisite pain. It sometimes happens that the convulsive twitchings are even accompanied with a sort of pleasure, as in the case of a lieutenant of the Montagu, whose case was related to me by Mr. Young, the surgeon of that ship, a man of skill and observation in his profession, and upon whose fidelity and accuracy I could perfectly rely. This

officer had been wounded in the elbow at the battle of St. Christopher's by a splinter, whereby the capsular ligament of the joint was injured. On the ninth day, symptoms of the locked jaw came on, and soon after the whole muscles of the wounded side were affected with frequent convulsive twitchings, which, as he himself said, afforded a pleasant sensation, exciting laughing like an agreeable titillation. He died on the fourth day after it came on, and had no pain to the last.

The locked jaw from accident differs also from other cases of tetanus, in respect to its cure; for the latter has been successfully treated by cold bathing, as is related by Dr Wright[126] and Dr. Cochrane[127]; but it is acknowledged by the latter that this treatment did not answer when the complaint proceeded from a wound.

It is to be remarked, that the locked jaw did not take place in those cases in which the wounds had a foul and gangrenous appearance more than others; for those that digested and cicatrized favourably, were equally apt to be affected by it; and though amputations are most liable to this symptom, the slightest injuries, even a scratch, will sometimes bring it on.

It would be difficult, therefore, to establish any particular treatment that would tend to prevent accidents of this kind; but Mr. Bassan, surgeon of the Arrogant, one of the line-of-battle ships engaged on the 12th of April, mixed laudanum with the dressings of all the wounds, and no locked jaw occurred.

In the Bedford there occurred a curious circumstance concerning this complaint. In one of the cases that proved fatal, the symptoms did not come on till the wound was so far healed that all dressing had been laid aside.

Mr. Wood, surgeon of the hospital at Jamaica, informed me, that in cases of the locked jaw from injuries to small members, such as fingers, he had tried the effect of amputating the part after the symptoms had come on, but without any effect in putting a stop to them.

Would it not appear, from the two last mentioned facts, that this symptom is not kept up, nor even takes place in the first instance, from an immediate present irritation, but that the constitution comes to be so modified, or receives such an impulse, as it were, that the complaint runs its course independent of the presence of that *stimulus* which excites it?

It would be difficult to assign a satisfactory reason why this accident is more frequent in hot than in cold climates. The effect of external heat upon the living body is not to raise its temperature even when the heat of the air exceeds that of the body[128]; so that we are to seek for the effects of it in some of those affections

peculiar to animal life. And as the outward temperature of the air does not affect the general mass of the body, all the effects produced by it must depend on impressions made on the external surface of the body and lungs; and the skin, which may be considered as a large expanded tissue of nervous fibres endowed with universal sympathy and great sensibility, affects every organ and every function of the body, according to the state of the air in contact with it, whether cold or hot, moist or dry, pure or vitiated. This sympathetic sensibility of the skin is chiefly affected by the state of the perspiring pores on its surface; for it is only when these are open that the impression of the air on the skin produces catarrhs, rheumatisms, and internal inflammations in cold climates; and the external temperature in hot climates being such as to keep the pores almost always open, this seems to be a principal reason of that universal irritability prevailing there, and of the general sympathy that prevails between every part, particularly as connected with the organs of perspiration[129]. This readiness of one part to be affected by another in hot climates is well illustrated by the sudden translation of certain diseases. I have seen, for instance, a catarrh cease, and be converted, as it were, into a diarrhœa, and this as quickly disappearing, a pain in the foot would arise, like an attack of the gout. All this would happen in the space of a few hours.

But, in cold climates, wounds are by no means exempt from the locked jaw; for it sometimes occurs in England, where I have seen it even in the winter season[130].

Since my return to England I have received some new and useful information on this subject in conversing with Dr. Warren, physician to the King; and as any observations derived from so much acknowledged skill and sagacity must be valuable, I shall here relate what he was so kind as to communicate to me.

This eminent physician, in attending a case in which he was nearly interested, and in which his endeavours were rewarded with success, found the greatest benefit from opium and the warm bath. The opium was given in the form of tincture, in moderate, but pretty frequent, doses. The bath was composed of milk and water, and the addition of milk was, no doubt, an improvement; for there is something in this as well as oil extremely soothing to the human nerves. Dr. Warren had intended to make trial of a bath of oil in case this had failed. He mentioned the following observation, with regard to the external application of oil, which could only have been suggested by that anxious attention that was paid to the case. It was found, that the uneasiness arising from the spasm was allayed by constantly drawing a feather wetted with oil over the temples, which had an evident effect in lulling the pain and spasm; for when this operation was left off, there was an immediate recurrence of these symptoms[131].

It would appear, therefore, from this as well as the former cases, that opium and the warm bath are the only remedies yet known which are of service in this complaint, and much will depend on the judicious management of them. The method of administering the opium, recommended by Dr. Warren, seems to be the most judicious, especially in constitutions not habituated to this medicine.

There is a certain medium in giving opium, by which its best effects are obtained, for in an under dose it will produce disturbance instead of rest; and when it is given in large quantities it frequently defeats the very end for which it is given, by throwing the body into convulsions which terminate in death. The rule for judging of the proper limits of this dose is, by its effect in inducing that stupor or insensibility which renders the senses incapable of irritation; for in this, as well as in every other case of disease, the cure seems ultimately to be the work of nature, the effect of medicine being only a secondary operation, by which it removes some obstacle to the natural efforts of the constitution. Though a dose of opium greater than ordinary is required to produce this insensibility in cases of spasm, and though the constitution in that situation will bear more, yet even here it may be given to excess; and by beginning with small quantities, and giving it in frequent rather than large doses, the constitution will thereby be better reconciled to it, and it will also with more convenience admit of that gradual increase which is peculiarly necessary with this medicine. These ideas were suggested to me by Dr. Warren; and it may be farther added, in recommendation of his method, that the liquid form is preferable to the solid, as the effects of it will sooner be seen, and a better judgement can be formed how far it is proper to push it.

Great attention is also necessary in regulating the heat of the bath; for if it is not sufficiently warm, it will not have the effect of producing a due relaxation; and if it should be too hot, it will stimulate too much, and will have the farther inconvenience of making the patient very faint in a short time. It cannot be well regulated without a thermometer, and 93° upon Fahrenheit's scale is perhaps the best temperature. I have kept a patient in a bath of that heat for six hours, which he could not have endured for half an hour had the heat been three or four degrees higher.

The circumstance next in consequence, in the cure of this complaint, is the keeping up a moisture on the skin, and guarding the surface of the body from the access of the air. This is particularly necessary with regard to the part itself, which should be constantly enveloped in warm, anodyne, and emollient applications. The good effects of this is particularly exemplified in the case which recovered under the care of Mr. Harris, who gave the diaphoretic medicine, composed of antimonial wine and laudanum, and applied the anodyne cataplasm to the external *fauces*. It was

remarked, that the locked jaw was most incident to those wounded men who lay in parts of the hospital where they were exposed to a current of air; and the cases of tetanus that most usually occur in the West Indies, independent of wounds, are those of slaves who fall asleep in the night-time in the open air.

Since the first edition of this work, there has appeared an Essay on the Locked Jaw by Dr. Rush, physician to the American army in the late war, in which he recommends, from his own observation, Peruvian bark, wine, and blisters, and to dress the wounds with mercurial ointment, in the cure of this complaint. From some trials I have since made of the bark in St. Thomas's hospital, I have reason to think well of it as a remedy in this disease.

There is a singular species of accident to which engagements at sea are liable, the WIND OF A BALL, as it is called. If a cannon ball in its flight passes close to any part of the body, it renders it livid and numb for some time[132]. It is most dangerous when it approaches the stomach; and there was an instance of a man in the last battle, who, upon a ball passing close to his stomach, dropped down dead instantaneously, without the least visible marks of injury. Another, in consequence of a ball passing close to his belly, remained without sense or motion for some time, and a large livid tumor arose on the part, but he recovered. I attended a man at the hospital at Barbadoes, who had the buttons of his trowsers carried off by a cannon ball, without its having touched the body. The *pubis* was livid and swelled for some time after: he suffered exquisite pain from strangury, which seemed to proceed from a *paralysis* of the bladder, for he voided no water without a catheter for near three months, after which time he recovered. I know a brave young officer[133] in the army, who had his epaulette carried off by a cannon ball at Charlestown, in consequence of which the shoulder and adjacent parts of the neck were affected for some time. A like accident happened to a marine officer in one of the late engagements; but in neither of these was the head materially affected, nor is it so apt to be affected in this way as the stomach. I never knew death the consequence of the wind of a ball on the head; though an officer[134] in the Sultan, at the battle of Grenada, was so stunned by a shot passing near his temple, as to be insensible for some time, but he recovered entirely in a few hours[135].

The class of wounds most peculiar to a sea engagement are scorches from the accidental explosion of gunpowder; and in most of the campaigns in which I have served they have been very frequent and fatal. Few accidents, however, of this kind happened in the late engagements; so that we had but little experience of this sort of wounds in April, 1782. But on former occasions they were very frequent, and the best application to the burnt parts was found to be linseed oil, which some of the surgeons mixed with lime water, others with cerusse, and both compositions

answered well. Opium was found of great use in alleviating pain and procuring rest, care being taken to guard against costiveness by the use of clysters. In the battles of 1780 and 1781, one-fourth part of the whole killed and wounded was from this sort of accident; but on the 9th and 12th of April, 1782, only two accidental explosions of gunpowder happened in the whole fleet, by one of which one life was lost, by the other, two. This difference was owing partly to greater experience and habits of caution acquired in the course of the war, and partly to certain improved methods in working the artillery introduced by Sir Charles Douglas, which, like all his other valuable improvements, tend to give facility and expedition, as well as to save the lives of men. The circumstances which tend to prevent explosions are, 1st, The wetting of the wads, which prevents their inflaming and blowing back when they fight the weather side of the ship; a circumstance which, without this precaution, gives occasion to a number of accidents by the burning parts catching the loose powder, or setting fire to the cartridges. 2dly, The use of goose-quill tubes and small priming boxes, made of tin, instead of the large horns formerly in use, whereby great quantities of powder were scattered about and exposed to accidental fire. 3dly, The use of locks, which was practised with great success in several ships, and was found to make the operation both more safe and more expeditious.

It frequently happens that men bleed to death before assistance can be procured, or lose so much blood as not to be able to go through an operation. In order to prevent this, it has been proposed, and on some occasions practised, to make each man carry about him a garter, or piece of rope-yarn, in order to bind up a limb in case of profuse bleeding. If it should be objected, that this, from its solemnity, may be apt to intimidate common men, officers at least should make use of some such precaution, especially as many of them, and those of the highest rank, are stationed on the quarter deck, which is one of the most exposed situations, and far removed from the cockpit, where the surgeon and his assistants are placed. This was the cause of the death of Captain Bayne, of the Alfred, who, having had his knee so shattered with a round shot, that it was necessary to amputate the limb, expired under the operation, in consequence of the weakness induced by loss of blood in carrying him so far. As the Admiral, on these occasions, allowed me the honour of being at his side, I carried in my pocket several tourniquets of a simple construction, in case accidents to any person on the quarter deck should have required their use.

It sometimes happens, however, that no hæmorrhage arises from a limb being carried off by a ball. The surgeon of the Fame related to me an instance of this, in which the thigh was cut through by a shot near its upper part, all except a little flesh and skin, and yet not the least hæmorrhage followed. This may have been

owing to the limb being entirely severed, or nearly so, whereby the vessels contracted more easily than if they had been partially divided. All that was done for this man was to remove the limb, and to saw off the jagged end of the bone. He survived six days, still without bleeding, and died of the locked jaw.

I was informed by several of the surgeons, that the method of taking up the vessels by the *tenaculum* was found to answer extremely well; and many of them imagined that the locked jaw was not so apt to be brought on by this mode of operation as by that of the needle. But it is hardly to be attempted in time of action, for want of steadiness and a good light, and it was chiefly at the hospitals that this practice was found so successful.

Mr. Alanson's method of amputation by a great retraction of the muscles, so that the fleshy parts shall meet over the bone and unite in the first intention, was attended with great success in the West Indies, particularly at the hospital at St. Lucia, under the care of Mr. Bulcock.

It may be remarked, that though all sores and wounds in the foot and leg are difficult of cure in a hot climate, I have observed, that, where the constitution is good, those in the thighs, arms, trunk, and head, are rather more easy of cure than in Europe, and that parts divided by incision very readily unite by the first intention. In reasoning upon this, it may be said, that as healing depends on a certain degree of vigour in the powers of life, this should not err either on the side of excess or defect. If it is too great, as in the case of a hale, plethoric constitution in a cold climate, too much inflammation is apt to be excited; and if too feeble, as happens in a hot climate, in the lower extremities, which are far removed from the source of life and circulation, the salutary effort is not strong enough to generate new organised parts. But in the trunk of the body, in such a climate, the powers of the animal œconomy are in that just medium which is most favourable to this operation of nature.

THE END.

APPENDIX

TO

PART III.

It has been suggested to me, that it would add to the utility of this Work to subjoin a list of the remedies best suited to the practice of physic at sea, with their quantities, and to give a set of formulas for the direction of young practitioners. I have accordingly made out a gross computation of the requisite quantities of the most useful and necessary articles of the Materia Medica, and also a few of the most commodious and simple forms of administering some of the most efficacious remedies for the most common diseases.

It is of consequence every where, but especially on board of a ship, to simplify practice, as much as possible, with regard to the number, the preparation, and the administration of medicines. Where a great number of compound medicines are given, it is extremely difficult to ascertain, by accurate and satisfactory observations, what are their real effects; and as there are not conveniences at sea for great pharmaceutical nicety, the plainest forms should be adhered to. And as all operations are rendered more practicable and easy by being reduced to a stated method, this is an additional inducement for studying plainness and simplicity in preparing and administering remedies. This uniformity is more attainable in the public service than in private practice; for in the former all the patients are of one sex, they are all adults, and they are generally of robust constitutions.

In the list hereto subjoined the articles are distinguished into PRINCIPAL and SECONDARY; and when a surgeon considers how limited his funds are, I hope he will not think that I have made a disproportionate assortment in reducing the number and quantities of the latter, my view in this having been that he may better afford an ample proportion of such medicines as are really efficacious and indispensable in the cure of diseases. It may be affirmed, without vanity or arrogance, that the printed list of articles with which the navy surgeons are enjoined to supply themselves is very injudicious considering the present improved state of the medical art; and it is of great importance that the due proportion of each article should be ascertained as nearly as possible, that no unnecessary expence may be incurred, and that the chest may not be encumbered with unnecessary articles.

There are no simple distilled waters in the following list, as they are very corruptible, and too bulky to carry to sea. Their place is supplied by a small quantity of oil of mint, which may be occasionally added to common water, in the proportion of a drop to an ounce. There are no tinctures inserted, except laudanum, the traumatic balsam, and compound spirit of lavender, as the surgeon, having a proper supply of spirit of wine or rum, may make them on board of the ship.

In the following list the surgical articles are not enumerated. There is a new article which I beg leave to recommend, as it has lately been found extremely useful, and is now used in large quantities in the hospitals in London. This is linseed meal for poultices. The surgeon should also be provided with a sufficient quantity of linseed oil, as it has been found to be one of the best ingredients in dressings for scorches. See page 540.

The quantity of each article is adapted to an hundred men for one year, so that a calculation can easily be made for any number of men, and for any length of time.

ASSORTMENT OF MEDICINES

TO BE

CARRIED TO SEA,

FOR

ONE HUNDRED MEN, FOR ONE YEAR.

PRINCIPAL ARTICLES.

Peruvian bark, ten pounds, and if the ship is destined for a hot climate, twenty pounds. This article should be provided by the Public. See p. 359.—Calomel, two ounces and a half—*a* Emetic tartar, one ounce and a half—Ipecacoanha, four ounces—Opium, one ounce—*b* Purging salts, ten pounds—Senna leaves, two pounds.

SECONDARY ARTICLES.

Aloes, half an ounce—Ammoniacum, two ounces—Balsam of copaiva, three ounces—*c* Traumatic balsam, four ounces—Camphor, three ounces—Cantharides, one ounce—Capsicum, three drachms—Castor, an ounce and a half—Chamæmile flowers, or hops, two pounds—Cinnamon, an ounce—Prepared chalk, or oystershells, six ounces—Conserve of roses, half a pound—*d* Cordial confection, two ounces—*e* Cathartic extract, half an ounce—Extract of hemlock, three ounces—Extract of logwood, one ounce—Gentian, five ounces—Ginger, three ounces—Gum arabic, four ounces—Gum guaiacum, three ounces—Powder of jalap, one ounce and a half—*f* Laudanum, four ounces—Linseed, one pound—Magnesia, six ounces—Manna, eight ounces—Whole mustard seed, half a pound—Myrrh, four ounces—*g* Crude mercury, two ounces—

Names in the last Edition of the London Pharmacopœia.

a Antimonium tartarisatum.—*b* Either Glauber's salts, natron vitriolatum, or sal catharticus amarus, magnesia vitriolata. Glauber's salt answers better in a hot climate, being less deliquescent from the heat and moisture of the climate.—*c*

Balsamum benzoes compositum.—*d* Confectio aromatica;—*e* Extractum colocynthidis compositum.—*f* Tinctura opii.—*g* Hydrargyrus.

a Corrosive sublimate, an ounce—Nitre, eight ounces—Oil of almonds, one pint—*b* Castor oil, half a pint—Linseed oil, three pints—Essential oil of mint, one ounce—*c* Jamaica pepper, four ounces—*d* Blistering plaster, ten pounds—Quaffia, eight ounces—Salt of hartshorn, two ounces—*e* Salt of steel, half an ounce—*f* Salt of wormwood, ten ounces—Castile sope, half a pound—Sarsaparilla, three pounds—Serpentary, four ounces—Spermaceti, four ounces—Rectified spirit of wine, one pint—*g* Weak spirit of vitriol, half a pint—*h* Volatile aromatic spirit, half a pint—*i* Spirit of Mindererus, two pints, or the volatile salt and vinegar may be kept separately, and added occasionally—Spirit of turpentine, four ounces—Dried squills, half an ounce—Flowers of sulphur, one pound—Golden sulphur of antimony, half an ounce—Cream of tartar, one pound—Vinegar, six pints—*j* White vitriol, six drachms—Wormwood, one pound—*k* Flowers of zinc, two drachms.

ECESSARIES *to be put in charge of the Purser, and served out to the Sick in place of the common sea provisions.* *See page 358.*

BARLEY, three hundred pounds—Eggs, greased and put in salt, twenty dozen—Extract of spruce, twelve pounds—Lemon juice clarified, and preserved by adding to it a small proportion of ardent spirits, five gallons—Raisins, fifty pounds—Rice, two hundred pounds—Coarse sugar, one hundred pounds—Sago, twenty pounds—Salep, ten pounds—Portable soup, fifty pounds—Tamarinds, ten pounds—Best white wine, three hundred gallons—Best red wine, one hundred gallons.

Names in the last Edition of the London Pharmacopœia.

a Hydrargyrus muriatus.—*b* Oleum ricini.—*c* Pimento.—*d* Emplastrum cantharidis.—*e* Ferrum vitriolatum.—*f* Kali præparatum.—*g* Acidum vitriolicum dilutum.—*h* Spiritus ammoniæ compositus.—*i* Aqua ammoniæ acetata.—*j* Zincum vitriolatum.—*k* Zincum calcinatum.

FORMULÆ QUÆDAM MEDICAMENTORUM IN MEDICINA FACIENDA APUD NAUTAS ACCOMMODATIORES.

IN FEBRE CONTINUA.

PULVIS EMETICUS COMMUNIS.

. Pulveris radicis ipecacoanhæ grana decem, antimonii tartarisati grana duo, misce.

MISTURA CATHARTICA COMMUNIS.

. Foliorum fennæ uncias sex, aquæ ferventis libras sex. Macera donec pene refrixerit & adjice vel natri vitriolati vel magnesiæ vitriolatæ libram unam cum semisse. Dein cola & admisce tincturæ sennæ uncias octo. Dosis est ad uncias tres.—Interdum conducit adjicere singulis dosibus, vel pulpæ tamarindo um semunciam, vel mannæ semunciam, vel antimonii tartarisati semigranum, vel pulveris jalapìi grana decem.

ENEMA COMMUNE.

quæ marinæ tepidæ uncias duodecim.

POTUS COMMUNIS.

ecoctum hordei.—Conveniat adjicere singulis libris pro re natà, vel pulpæ tamarindorum unciam dimidiam, vel crystallorum tartari drachmam unam, vel nitri scrupulum unum, vel acidi vitriolici diluti guttas decem, vel succi limonum unciam unam, vel gummi arabici scrupulos duos, vel vini uncias quatuor, vel frustum panis tosti.

VINUM EMETICUM.

℞. Antimonii tartarisati scrupulos duos, aquæ ferventis uncias duas, vini albi uncias octo. Solve antimonium in aquâ & adde vinum. Assumatur drachma una omni quadrante horæ, donec vel vomitus cieatur, vel alvus moveatur. Deinde assumatur semi-drachma sextâ quâque horâ.

PILULA FEBRIFUGA.

. Pulveris antimonialis, (Pharm. Lond.) vel pulveris febrifugi Dris. James drachmam unam, conservæ rosæ quantum latis sit. Simul contunde & divide in pilulas duodecim. Deglutiatur una quartâ vel sextâ quâque horâ.

MISTURA SALINA ET ANTIEMETICA.

. Kali præparati drachmam unam, succi limonum, vel aceti, vel acidi vitriolici quantum satis sit ad saturandum salem, aquæ puræ uncias sex. Bibatur tertia

pars ter die.—Conducit pro re nata adjicere, vel pulveris antimonialis grana quinque, vel acidi vitriolici diluti guttas quinque, vel cretæ præparatæ scrupulum unum, vel aquæ menthæ semunciam.—Interdum conducit sumere hanc misturam statim postquam Kali & succus limonum mixta fuerit, scilicet in ipsâ ebullitione. Hoc imprimis utile est quando vomitus vel nausea molestus sit, & licet adhibere magnesiam vice Kali, & acetum vice succi limonum.

[137]PILULA DIAPHORETICA.

. Opii purificati grana duodecim, antimonii tartarisati grana sex, conservæ rosæ semi-drachmam, farinæ glycirrhizæ, vel tritici quantum satis sit. Contunde simul & divide in pilulas viginti quatuor. Devoretur una horâ somni. Interdum prosit dare unam bis die.

[138]MISTURA SEDATIVA.

. Misturæ camphoratæ uncias sex, tincturæ opii guttas viginti Misce. Bibatur tertia pars ter die.—Aliquando conducit admiscere singulis dosibus aquæ ammoniæ acetatæ drachmas tres, vel vini emetici guttas triginta.

[139]BOLUS SEDATIVUS.

. Confectionis aromaticæ scrupulum unum, opii purificati grani quartam partem, castorei Russici grana decem, tincturæ opii guttas quatuor. Misce. Assumatur sextâ quâque horâ.

BOLUS SERPENTARIÆ COMPOSITUS.

. Pulveris serpentariæ Virginianæ grana decem, camphoræ grana quatuor, confectionis aromaticæ quantum satis sit. Assumatur ter die.—Interdum conducit addere pulveris corticis Peruviani drachmam dimidiam, vel superbibere decocti corticis Peruviani uncias duas.

ELECTUARIUM AD CONVALESCENTES.

. Pulveris corticis Peruviani, florum chamæmeli, singulorum unciam unam, pulveris zinziberis scrupulos duos, syrupi quantum satis fit. Dosis est circiter drachma ter die.—Interdum adjiciantur vel rubiginis ferri drachmæ tres, vel pulveris terpentariæ Virginianæ drachmæ duæ.

IN FEBRE INTERMITTENTE.

Adhibeantur in initio eadem medicamenta ac in initio febris continuæ. Deinde

Sumatur corticis Peruviani drachma una, secundâ vel tertiâ quâque horâ, vel etiam singulis horis, absente paraxysmo febrili.—Interdum confert dare singulas doses ex spiritûs vini tenuis (*rum* dicti) unciâ unâ.

Si cortex frustra adhibeatur fauste adhiberi possint medicamenta infra præscripta.

[0]℞. Zinci calcinati semi-drachmam, conservæ rosæ quantum satis fit. Contunde simul & divide in pilulas quindecim. Sumatur una ter die, augendo dosim si premerit morbus & si ferat ventriculus.

Vel,

. Zinci vitriolati grana duodecim aquæ puræ uncias tres Sumatur tertia pars ter die augendo dosim si opus fuerit & si ferat ventriculus.

Vel,

[1]℞. Tincturæ rhabarbari uncias duas, tincturæ sennæ drachmas sex. Misce. Sumatur paucas horas ante paroxysmum.

Vel,

[2]Cortice Peruviano frustra dato, aliquando conferat dare ægro quotidie, vel calomelanos, vel pilularum ex hydrargyro quantum & quamdiu sufficiat ad levem ciendum ptyalismum, & deinde instituere curam de integro cum cortice Peruviano.

Vel,

[3]Sumantur tincturæ opii guttæ viginti quinque, incipiente æstu. febrili, ex poculo potûs communis.

IN DIARRHŒA SIMPLICI.

BOLUS AD DIARRHOEAM.

. Cretæ præparatæ scrupulum unum, pulveris rhabarbari grana quindecim, pulveris corticis cinnamomi grana sex, opii purificati granum dimidium,

tincturæ opii guttas quinque, syrupi quantum satis fit. Semel sumatur.

. Misturæ cretaceæ (Pharm. Lond.) cum duplici gummi arabico libram unam, tincturæ opii guttas decem. Absumatur totum partitis vicibus nychthemero, incipiendo duodecim horas post datum medicamentum novissime præscriptum.—Interdum adjiciatur tincturæ cinamomi uncia dimidia.

IN CHOLERA MORBO.

. Decocti hordei vel avenæ libras tres, pulveris gummi arabici unciam unam cum semisse, tincturæ opii guttas triginta. Hauriatur quam primum libra una, & deinde libra dimidia omni horâ usque ad levamen mali.—Si parabilis fuerit caro vitulina, vel pullus, jusculum tenue ex altero utro factum vice decocti supra dicti adhibeatur.

IN DYSENTERIA ACUTA.

Sumat æger quamprimum emeticum commune.

. Decocti hordei libras duas, salis cathartici unciam unam cum semisse, antimonii tartarisati grana duo. Misce. Hauriatur tepide primò libra dimidia, & deinde unciæ quatuor omni horâ donec alvus copiose & iteratim dejecerit.

. Pulveris ipecacoanhæ grana duodecim, conservæ rosæ quantum satis fit. Contunde simul & divide in pilulas duodecim. Sumatur una ter die. Si æger vehementer febricitârit satius erit dare ter die vini emetici drachmam unam ex cyatho amplo decocti hordei tepidi.

℞. Pulveris ipecacoanhæ grana duo, pulveris opii purificati exsiccati granum unum, nitri grana octo. Misce. Sumatur horâ somni.

ENEMA EMOLLIENS.

. Amyli unciam dimidiam, aquæ puræ uncias decem. Coque ad idoneam spissitudinem.

Vel,

. Seminum lini drachmas sex, aquæ puræ uncias duodecim. Coque per quadrantem horæ & cola liquorem pro enemate.

ENEMA ANODYNUM.

. Enematis emollientis uncias quatuor, tincturæ opii guttas quadraginta. Misce.

IN DYSENTERIA CHRONICA.

BOLUS CATHARTICUS.

. Pulveris rhabarbari grana quindecim, calomelanos grana quinque, conservæ rosæ quantum satis fit ut fiat bolus. Mane sumendus, & repetendus post paucos dies si opus fuerit.—Vice hujus interdum conducat dare misturæ catharticæ communis uncias duas.

SOLUTIO CAMPECHENSIS.

. Extracti ligni Campechensis drachmam unam cum semisse, tincturæ cinamomi unciam unam. Tere simul & admisce aquæ puræ uncias quinque. Sumatur uncia una ter die.

DECOCTUM AMARUM.

. Corticis simaroubæ vel quassiæ drachmam unam, aquæ puræ libram unam cum semisse. Decoque ad libram unam. Absumatur totum quotidie tribus vicibus. Adjici possint singulis dosibus pro ratione symptomatum, vel cretæ præparatæ scrupulus unus, vel pulveris ipecacoanhæ granum unum, vel tincturæ cinamomi drachmæ duæ, vel tincturæ opii guttæ quinque.

[145]In casibus rebellibus confert illinere quotidie hypogastrium unguenti ex hydrargyro drachmâ dimidiâ.

Sit pro potu communi in hoc morbo aqua pura, frusto panis recens tosti adjecto, & pauxillo spiritus vini tenuis (*rum* dicti) admixto. Sit pro victu communi salab, vel farina tritici in pulmentum tenue ex aquâ purâ cocta.

IN INTESTINIS INFLAMMATIS.

[146]SOLUTIO SALIS CATHARTICI.

. Decocti hordei libram unam, magnesiæ vitriolatæ uncias duas. Misce ut fiat solutio. Bibatur, post sanguinis missionem, uncia una omni semihorâ donec alvus bis dejecerit.

Adhibeantur hypogastrio cucurbitulæ cruentæ, vel hirudines plures. Applicetur ibidem epispasticum satis amplum. Injiciatur enema cum oleo & pauxillo sale cathartico.

IN ILEO, vel COLICA PICTONUM, vel morbo in regionibus æstuosis *DRY BELLY ACHE* dicto.

[147]PILULÆ CATHARTICO-ANODYNÆ.

℞. Extracti colocynthidis compositi drachmam dimidiam, opii granum unum & dimidium, olei menthæ guttam unam. Contunde in massam & divide in pilulas decem. Sint pro una dosi. Paucas post horas, si alvus non rite responderit, exhibeantur misturæ catharticæ unciæ duæ, vel[148] olei ricini uncia una, & repetantur ut opus fuerit.—Interdum in hoc malo divexat vomitus cui auxilio est, mistura antiemetica. Vide page 551.

Perfricetur hypogastrium oleo tepido.

Ineat æger in balneum tepefactum ad 93° therm. Fahren. per horam unam vel etiam diutius.

Denique suffletur in anum fumus nicotianæ.

Vel,

℞. Nicotianæ drachmas duas aquæ puræ ferventis libram unam.—Fiat infusum & cola pro enemate.

IN HÆMORRHÖIDE.

BOLUS HÆMORRHOIDALIS.

℞. Florum sulphuris drachmam dimidiam, conservaæ rosæ, vel pulpæ tamarindorum quantum satis fit. Assumatur bis die.

Si sanguinis ex ano profluentis magna fuerit vis, & præcipue si ex alto fonte effluxerit, valde proderit medicamentum infra præscriptum.

℥R. Olei lini recens expressi drachmas sex, tincturæ rhabarbari drachmas duas. Misce. Sumatur bis die.—Vice olei lini adhibere licet olei amygdalæ unciam dimidiam, cum mucilaginis gummi arabici drachmis duabus.

IN ALVO ASTRICTA.

PILULÆ LAXANTES.

. Aloes socotrinæ drachmam unam, syrupi quantum satis sit. Contunde & divide in pilulas viginti. Sumantur duæ pro re natâ.—Aliquando conducit adjicere vel pulveris zinzberis vel pulveris capsici grana quindecim, vel olei menthæ guttas decem.—Vice aloes licet adhibere extractum colocynthidis compositum.

ELECTUARIUM ECCOPROTICUM.

. Pulveris jalapii unciam dimidiam, pulpæ tamarindorum unciam unam, pulveris zinziberis semi-drachmam, syrupi *melasses* dicti quantum satis sit. Sumatur circiter drachma pro re natâ.—Interdum prosit adjicere crystallorum tartari drachmas duas.

IN CATARRHO.

LINCTUS.

. Conservæ rosæ unciam unam, mucilaginis gummi arabici unciam dimidiam, olei amygdalæ drachmas duas, succi limonis, vel acidi vitriolici quantum satis sit ad gratum saporem conciliandum. Misce. Sumatur pauxillum sæpius.—Interdum adjiciatur vel salis nitri drachma una, vel tincturæ opii guttæ decem.

Sit pro potu communi decoctum hordei in quo coquatur uvarum passarum uncia una, & sub finem cocturæ seminum lini drachmas duas pro singulis libris decocti.

Si febricitârit æger, sumantur mistura salina & pilula febrifuga ter die.

IN PLEURITIDE ET PERIPNEUMONIA.

. Decocti hordei libras duas, pulpæ tamarindorum quantum satis-fit ad gratum saporem, nitri drachmam unam. Misce. Hauriatur affatim pro potu communi. N. B. Si tamarindi moverint alvum sæpius quam semel aut bis die adhibeatur vice ejus syrupus *melasses* dictus.

Sumatur mistura salina & pilula febrifuga sextâ vel quartâ quâque horâ.

IN HÆMOPTÖE.

Hauriat æger infusi rosæ uncias tres quater die. Interdum adjiciatur vel tincturæ opii guttæ quatuor, vel nitri grana decem.

HAUSTUS OLEOSUS.

℞. Olei amygdalini, aquæ menthæ simplicis singulorum unciam unam, manræ drachmas tres. Misce. Sumatur ter die. Sæpe conducit adjicere singulis dosibus tincturæ opii guttas quatuor vel quinque.

IN TUSSI ASTHMATICA.

PILULÆ PECTORALES.

℞. Gummi ammoniaci drachmas tres, saponis Hispaniensis drachmas duas, pulveris radicis scillæ grana sex opii purificati grana tria, syrupi *melasses* dicti quantum satis sit. Contunde simul & divide in pilulas quadraginta octo. Sumantur quatuor bis die.

IN ASTHMATE A DIATHESI HYDROPICA PROVENIENTE.

PILULÆ SCILLITICÆ.

. Radicis scillæ aridæ grana duodecim, conservæ rosæ quantum satis sit. Contunde simul & divide in pilulas duodecim. Sumatur una vel duæ bis vel ter die.

Vel,

HAUSTUS DIURETICUS.

. Aquæ puræ unciam unam & dimidiam, pulveris scillæ aridæ grana duo, tincturæ lavendulæ compositæ guttas trigintæ, kali præparati grana decem. Misce. Sumatur bis vel ter die.—Interdum adjicere liceat haustui vespertino tincturæ opii guttas viginti.

Vel,

BOLUS CÆRULEUS CUM SCILLA.

℞. Pilularum ex hydrargyro grana quinque vel usque ad decem, pulveris radicis scillæ grana duo. Misce. Sumatur horâ decubitûs, per tres vel quatuor noctes

consequentes.

IN RHEUMATISMO ACUTO.

MISTURA DIAPHORETICA.

. Aquæ puræ uncias tres, aquæ ammoniæ acetatæ unciam unam & dimidiam, pulveris antimonialis grana quindecim. Sumatur tertia pars ter die.—Interdum adjiciantur nitri grana quinque singulis dosibus.

Bibatur affatim decoctum hordei tepidum, cum nitri scrupulis duobus in singulis libris.

HAUSTUS SUDORIFICUS.

. Misturæ camphoratæ unciam unam & dimidiam, aquæ ammoniæ acetatæ unciam dimidiam, vini emetici guttas quadraginta, tincturæ opii guttas viginti. Misce. Sumatur horâ somni, vel etiam sæpius sed cum dimedia tinctura.

IN RHEUMATISMO CHRONICO.

. Tincturæ guaiaci volatilis drachmas duas. Sumatur ex cyatho potûs communis ter die. Vel sumatur gummi guaici semidrachma super bibendo haustum ex salis cornu cervi serupula aquæ unciis tribus.

. Pulveris ipecacoanhæ compositi (Pharm. Lond.) scrupulum unum. Sumatur hora somni alternis noctibus.

In casibus rebellibus pro remedio efficaci compertum est dare quotidie calomelanos granum unum vel grana duo.

IN HYDROPE.

PULVIS HYDRAGOGUS.

. Crystallorum tartari unciam dimidiam, pulveris jalapii grana quindecim, pulveris zinziberis grana quinque. Misce fiat pulvis, fumatur alternis diebus.

MISTURA DIURETICA.

. Infusi gentianæ uncias decem, spiritus vini tenuis uncias duas, kali præparati drachmam unam. Misce. Hauriamur unciæ tres bis die.[154]Vice infusi gentianæ

licet adhibere infusum absynthii.

TINCTURA SCILLÆ. Pharm. Lond.

Sumatur drachma una bis die ex haustu potûs communis.

PILULA EX ELATERIO.

. Elaterii grana duodecim, syrupi quantum satis sit. Dividatur in pilulas sex. Sumatur una bis die.

[155]Ægro licet, imo prodest hoc morbo laboranti bibere ad libitum ex liquore aliquo siti extinguendæ accommodato, veluti aquâ hordei cum crystallis tartari.

IN ERYSIPELATE.

[5]℞. Pulveris corticis Peruviani drachmam unam. Sumatur omni horâ vel interpositis duabus vel tribus horis.

IN MORBO VENEREO.

1. IN GONORRHOEA.

Hauriatur ad libitum infusum lini, vel decoctum hordei cum gummi arabici drachmis sex in singulis libris.

Sumantur calomelanos grana duo quotidie per viginti circiter dies.

[7]℞. Aquæ puræ distillatæ uncias octo, hydrargyri muriati granum unum. Misce. Injiciatur pauxillum in urethram bis vel ter die.

IN GONORRHOEA BENIGNA.

. Balsami capaivæ drachmam unam, tincturæ lavendulæ compositæ guttas triginti. Misce. Sumatur bis die.

2. IN ULCUSCULIS.

In initio feliciter adhibetur causticum.

. Calomelanos drachmam dimidiam, conservæ rosæ quantum satis sit. Contunde in massam & divide in pilulas triginta. Sumatur una quotidie, vel interdum dimidia ter die, ut cieatur ptyalismus modicus. Perstet æger in usu medicamenti hujus per dies acto postquam sanata fuerint ulcuscula.

Pro medicamento topico, utile erit inspergere ulcusculum cum pulvere hydrargyri nitrati.

3. IN BUBONE.

Illinatur artus lateris affecti infra inguen cum unguenti ex hydrargyro drachmâ dimidiâ quotidie.

Si abierit bubo in ulcus mali moris omittatur pro tempore usus hydrargyri & sumatur quotidie [158]opii purificati granum unum primo semel, dein bis, denique ter die vel etiam sæpius, & pulveris corticis Peruviani drachma una ter quaterve die.—Interdum conducit sumere pulveris sarsæparillæ drachmas duas ter die, vel extracti cicutæ grana tria ter die, augendo paullatim usque ad grana decem.

4. IN VERA LUE, anginâ scilicet osteocopiis, exostosibus & defædatione cutis.

Illinantur membra quotidie cum unguenti ex hydrargyro drachmis duabus quotidie usque dum cieatur ptyalismus[159] per dies triginta ad minimum vel donec evanuerint symptomata.—Interdum vice litûs adhibere conveniat vel calomelanos granum unum ter die, vel pilularum ex hydrargyro grana quinque bis die, vel

. Hydrargyri muriati grana octo, spiritus vinosi tenuis libram unam. Fiat solutio, & sumatur uncia dimidia bis die. In ulceribus tonsillarum pernotabili est auxilio suffitum ex cinnabare in fauces inhalare semel vel bis quotidie.

Si ulcera mali moris exorta fuerint in quavis corporis parte, eadem, ut jam de bubone dictum est, fiant.

IN SCORBUTO MARINO.

Sumat æger quotidie succi limonum unciam unam ter quaterve die.

. Aquæ puræ paullulum tepefactæ congios triginta, syrupi *melasses* dicti libras sedecim pondere, extracti pini uncias octo pondere, spumæ vel fæcis cerevisiæ libras duas mensurâ. Misce & agita valide cum baculo, dein sinatur abire in fermentationem, ut fiat cerevisia, deinde servetur in vase clauso. Ut diutius servari potest, proderit admiscere spiritûs vini tenuis Gallici, vel qui *rum*

dicitur, libras duas aut tres. Si infirma fuerint viscera adjicere juvabit vel lupuli vel summitatum absinthii vel quassiæ, vel zinziberis quantum satis sit. Hauriat æger libras duas quotidie.

. Farinæ avenaceæ libras tres, aquæ puræ congios quatuor. Misce. Macera donec liquor fiat acidulus, dein effunde dimidium & adjiciatur par copia aquæ puræ, & coque ad idoneam spissitudinem, ut cogatur in pulmentum. Sit pro victu assiduo cum vini & sacchari non purificati, vel syrupi *melasses* dicti quantum sufficiat ad gratum saporem conciliandum.

Ad alvum solvendam commode adhiberi potest electuarium eccoproticum cum crystallis tartari. Vid. p. 556.

THE END.

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FOOTNOTES:

1 These were the Conqueror, the Cornwall, and the Boyne, which were so damaged in the battles, that they were obliged to bear away for St. Lucia.

2 The following may serve as a specimen of these returns:

STATE of HEALTH of His Majesty's Ship ALCIDE. Carlisle Bay, Barbadoes, 1st June, 1781.

Sick now on Board.		Died in the course of last Month.		Sent to the Hospital in the course of last Month.	
Fevers	4	Of Fever	1	Ill of Scurvy	35
Flux	5				
Scurvy	26				
Catarrh and Rheumatism	7				
Total	42				

REMARKS.

During the course of last month we had one hundred and fourteen of the men, who contracted the scurvy in the late long cruise, recovered by the use of limes, which were procured at Montserrat. A pint of wine, with an equal quantity of water, made agreeable with sugar and tamarinds, is served to each patient daily. The regimen is exactly the same as mentioned last month.

Since we came into port, very few have been seized with scurvy, but several complain daily of fluxes and feverish complaints, none of which seem at present to be of any consequence.

Four patients have last month complained of an almost total blindness towards evening, accompanied with head-ach, vertigo, nausea, and a sense of weight about the precordia. The pupil is then extremely dilated, but contracts readily when a strong light is presented to it. Two of them had the scurvy in a high degree, one of them slightly, and the other seemed entirely free from it. I am not well acquainted with the nature or cure of this disease, which I believe is called Nyctalopia by some systematic writers.

I gave those who were affected with it an emetic, which brought up a great deal of bile, and relieved the symptoms both of the head and stomach. This encouraged me to a repetition of it, which seemed also to be attended with benefit. I likewise applied blisters behind the ears, and gave bark and elixir of vitriol, with the antiscorbutic course, to those that required it.

I can form no probable conjecture concerning the cause of this disease. I have observed a dilation of the pupil in scorbutic patients, and they complained of a cloud before their eyes, with imperfect vision, which disappeared as the scurvy went off.

WILLIAM TELFORD.

To Dr. BLANE,
Physician to the Fleet.

3 Although this hurricane, in itself and its consequences, was so destructive to the lives and health of men, yet, with regard to the inhabitants on shore, it had a surprising and unexpected effect in mending their health. I wrote an account of this hurricane to the late Dr. Hunter, who communicated it to the Royal Society, and the following passage is extracted from it:

“The consequences of this general tumult of nature, on the health of man, was none of the least curious of its effects. I made much inquiry on this head, not only of the medical gentlemen who had the charge of hospitals, and of the physicians of the country, but of the inhabitants, and every one had some cure to relate either of themselves or their neighbours, in a variety of diseases. Nor could I find that either those who were in health, or those who were ill of any disease whatever suffered from it, otherwise than by its mechanical violence; but, on the

contrary, that there was a general amendment of health. This is a fact, which I could neither credit, nor would venture to relate, were it not supported by so many concurring testimonies. It had a visible good effect on the acute diseases of the climate. The chronic fluxes, of which there were then some at the naval hospital, were cured or much relieved by it. But the diseases upon which it had most evident and sensible effects, were pulmonic consumptions. Some recent cases of phthisis, and even the acute state of pleurisy, was cured by it; and in the advanced and incurable state of it, the hectic fever was removed, and remarkable temporary relief afforded. A delicate lady of my acquaintance, who was ill of a pleurisy at the time, and passed more than ten hours in the open air, sitting generally several inches deep in water, found herself free of complaint next day; had no return of it; and when I saw her a few weeks after, was in much better health and looks then usual. The people observed that they had remarkably keen appetites for some time after, and the surviving part of them became uncommonly healthy; some of both sexes, whom I had left fallow and thin a few months before, looking now fresh and plump.

It is very difficult to account for this, as well as every thing else in the animal œconomy; but it was probably owing in part, at least, to the very great coldness and purity of the air from the upper regions of the atmosphere. Great agitation of mind sometimes also produces a revolution in health; and we know that the effect of external impressions in general is very different when the mind is vacant, from what it is when occupied and interested by objects, whether of pleasure and satisfaction, or of danger and suffering."

4 In order to ascertain more exactly the degree of sickness in each month, a column was afterwards added to the form of the returns, expressing the number taken ill of the several diseases in the course of the month.

5 I was informed by Captain Caldwell, that when he commanded the Hannibal, of 50 guns, his crew was so much afflicted with the scurvy, in a passage of nine weeks from St. Helena to Crookhaven, in Ireland, that ninety-two men were confined to their hammocks in the last stage of that disease, though they had been supplied with sugar at St. Helena, and served with it on the passage. They remained three weeks at Crookhaven; at the end of which time every man was fit for duty: and though they had fresh provision, they had no fresh vegetables, so that their cure is to be ascribed to the use of lemons and oranges, which the

Captain very humanely ordered to be purchased for them from on board of a foreign ship that happened to put into the same harbour.

6 See Appendix to Part II.

7 They were the Formidable and Namur, of 90 guns; the Arrogant, Conqueror, Marlborough, Hercules, and Fame, of 74 guns; the Yarmouth, Repulse, Prothée, Anson, and Nonsuch, of 64 guns.

8 These were the Prince George, of 90; the Bedford, Canada, and Royal Oak, of 74; the America and Prudent, of 64 guns.

9 This is a term in use for the different articles of seamen's cloathing, particularly shirts and trowsers.

10 The mortification in the shoulder, mentioned above, was somewhat singular. It happened to a man in the Yarmouth, who, after being for a week ill of a fever and flux, was one day, early in the morning, seized with a pain in the upper part of the right arm, which immediately began to mortify. He soon after became convulsed, and died the same day about two o'clock.

11 Earthquakes are frequent in the West Indies, and perhaps proceed from a weaker operation of the same cause that originally produced the islands themselves, which seem all to have been raised from the sea by subterraneous fire. There are evident vestiges of volcanoes in them all, except Barbadoes; but there are other unequivocal marks of this island having been raised from the bottom of the sea; for it is entirely formed of coral, and other sub-marine productions, of which the strata are broken, and the parts set at angles to each other, as might be expected from such a cause. There is, perhaps, at all times in the caverns of the earth, elastic vapour struggling to vent itself, and when near the surface, it may sometimes overcome the incumbent masses of matter, and produce certain convulsions of nature. In the account of the hurricane which I wrote to Dr. Hunter, I gave reasons for believing, from the testimony of the inhabitants, that hurricanes are attended with earthquakes; and if a conjecture might be advanced concerning the cause of this, it might be said, that as the atmosphere is lighter at that time, by several inches of the barometer, the elastic vapour, confined by the weight of the incumbent earth and atmosphere, being less

compressed, may exert some sensible effects, producing a sort of explosion.

12 Since the publication of the first edition of this work I have been informed that this complaint is not so rare on shore as in the fleet, which may be partly owing to the greater coolness of the air at sea, and partly from the seamen not having been a sufficient length of time in the climate to be affected with this disease, as few of them had been more than two years from England. But as this affection of the liver was very common in the fleets and naval hospitals in the East Indies, it is evident that there is a great difference of the climates in this respect. It is worth remarking, that it sometimes breaks out in the West-India Islands like an epidemic. The complaint, for instance, was very little known in the island of Grenada, till about the year 1785, when it became very frequent in a particular quarter of the island; and the gentleman who sent the description of it to England alledged, that there were the most unequivocal proofs of its being contagious. It was most successfully treated by very copious bloodletting, and in exciting a salivation by mercury. See Dr. Duncan's Medical Commentaries, Decad. 2, vol. I.

13 Dr. Lind, on the authority of Mr. Ives, surgeon to Admiral Matthews.

14 London Gazette, *June*, 1781.

15 This is well illustrated by the manner in which Captain Nott, of the Centaur, was killed in Fort-Royal Bay. This brave man, having carried his Ship nearer the enemy than the rest of the line, but nevertheless at a great distance, had his signal made to keep the line, and having gone into his cabin, as it is said, to examine the import of the signal, a cannon ball struck him in the groin, and it was so far spent, that it stuck in his body. It tore away a whole plank of the ship's side, the splinters of which killed a young gentleman, the only person near him.

16 I have seen an account of the diseases of the army at St. Lucia for a whole year, kept by Mr. Everard Home, an ingenious gentleman belonging to the army hospital, and it appears, that, during ten months out of the twelve, the dysentery was the predominant disease. This seems to contradict the opinion, that the land air is more apt to occasion fevers than fluxes; but it is to be remarked, that the sickness of the soldiers on this island was not so much owing to the malignant

influence of the air, the situation of the garrison being high and airy, as to the bad accommodations and provisions, together with hard labour.

17 See Essay on the Yellow Fever, by Dr. Hume, in a Collection of Essays published by Dr. D. Monro.

18 Campbell's Lives of the Admirals, Vol. IV.

19 The late Dr. William Hunter.

20 See Appendix to Part II.

21 Captain Samuel Thompson.

22 As my own stay at different ports was short, and as my own knowledge could not extend beyond that period, Dr. Farquarson, First Commissioner of Sick and Wounded Seamen, very politely gave me leave to inspect the books of the different hospitals at his office, and I collected from them the fate of all the men that were landed.

23 It is proper to mention, that the name of the disease in the hospital books being taken from the ticket sent on shore with each sick person, great accuracy is not to be expected, as this is frequently done in a careless manner. My returns were made with great exactness; and, in the latter part of the war, the hospital books may also be depended upon in this respect, the tickets, at my request, having been made out with accuracy.

24 In this, and the other tables, the smaller fractions are neglected.

25 See the last chapter of Part III.

26 In the year 1741, the fleet under Admiral Vernon was at Jamaica at the same time of the year; and the following is the account of the men sent to the hospital in May and June:

DISEASES.	Admitted.	Died.	Proportion. NEARLY ONE IN
Fevers	957	255	3½

Fluxes	267	73	3½
Scurvy	314	41	7½
Other Complaints	167	26	6
Total	1703	395	4

There was on board of this fleet about two thirds of the number of men that was on board of the fleet in 1782. I cannot ascertain how many died on board of the ships in Admiral Vernon's fleet; but the deaths at the hospital alone are somewhat more than what happened to our fleet both on board and at the hospital.

27 I was enabled, after coming to England, to ascertain the deaths in that part of the squadron from which I happened at any time to be absent, by having leave from the Navy Board to inspect the ships' books deposited at their office.

28 See Appendix to Part II.

29 The mortality of the army in the West Indies is much greater; for it appears by the returns of the War Office, that there died in the year 1780, two thousand and thirty-six soldiers, which being calculated by the numbers on the station, and those who arrived in the convoy in March and July, the annual mortality is found to be one in four. The greatness of this mortality will appear in a still stronger light, when it is considered that those who serve in the army are the most healthy part of the community. When I was at the encampment at Coxheath in the year 1779, I was politely favoured with a sight of the returns, both of the general officers and physician, and it appeared that in an army of ten thousand and eighty-nine men, there died, from the 10th of June to the 2d of November, forty-three, exclusive of twelve who died of small pox. This being calculated, is equal to an annual mortality of one in a hundred and nine; and it was not half so much in the encampment of the former year. It appears by Mr. Simpson's tables, that the mortality of mankind in England, from the age of twenty to forty-five, which includes the usual age of those who serve in the navy and army, is one in fifty.

30 See Table II.

31 See Table II.

32 None are comprehended but those who were killed or wounded in battles in which the whole fleet was present, this account not including those who fell in single actions in frigates or other ships.

33 It would appear, that, anciently, though the slaughter in battle was greater than in modern times, yet that disease was still more destructive than the sword. One of the oldest testimonies to this purpose is in the History of Alexander's Expedition, by Arrian—τους μεν ἐν ταῖς μαχαις ἀπολωλεκασιν, ὀι δε ἐκ των τραυματων ἀπομαχοι γεγενημενοι, ὀι πλειοῦς δε νοσω ἀπολωλεσαν.—Arrian. Hist. Alex. Exped.

Lib. v. cap. 26.

34 Upwards of three thousand were also lost at sea in ships of war belonging to the same fleets in the hurricane of October, 1780, and in the storm in September, 1782, in which the Ville de Paris and the other French prizes were lost on their passage to England.

35 The authors from whom I have borrowed have been chiefly Dr. Lind and Capt. Cook. To the former we are indebted for the most accurate observations on the health of seamen in hot climates; of the improvements made by the latter, an excellent compendium may be seen in Sir John Pringle's Discourse before the Royal Society, on the occasion of adjudging a prize medal to Capt. Cook for his paper upon this subject.

36 In the late war sickness alone was not the cause of want of success in any instance, except in the last action in the East Indies, in which so many men were ill of the scurvy, that there were not hands enow to manage the guns.

There is another fact in history, which, though not so applicable to this subject as those above recited, forcibly evinces how important a study the health of men ought to be in military affairs. When Henry V. was about to invade France, he had an army of fifty thousand men; but owing to a sickness which arose in the army, in consequence of some delays in the embarkation, their number was reduced to ten thousand at the battle of Agincourt. The disease of which they chiefly died was the dysentery.

Rapin.

37 It is not meant by this to insinuate that every commander is absolutely accountable for the health of his ship's company, and censurable when they are sickly; for this may depend on his predecessor in command, or a stubborn infection may have prevailed from the original fitting out or manning of the ship which he may not have superintended.

38

> Οὐ γαρ ἐγωγέ τι οἶδα κακώτερον ἄλλο θαλάσσης,
> Ανδεά τε συγχεῦαι, εἰ καὶ μάλα καρτερὸς εἴη.
>
> ΟΜΗΡ. ΟΔΥΣ. Θ.

> Dire is the ocean, dread in all its forms!
> Man must decay, when man contends with storms.
>
> POPE.

39 Wherever causes are obscure, superstition naturally ascribes them to some preternatural influence; and what seemed farther to have encouraged this, anciently, was, that violent epidemics occurred most frequently in camps and at sieges where great political conjunctures were likely to arise, in which superior powers were supposed to interest themselves. Thus we read in Homer of fatal diseases being sent as punishments by the gods. But the pestilential diseases so often mentioned by poets and historians as prevailing in cities and armies, were probably nothing else but fevers, produced partly perhaps by the scarcity and bad quality of provisions, but probably still more by corrupted human effluvia, which was very apt to he produced by the want of personal cleanliness, to which the mode of cloathing among the ancients would more particularly subject them, especially in camps and besieged towns.

40 If the experiments of modern philosophy are to be depended on, they go a certain way to account for the unwholesomeness of air from woods in hot climates, and in wet weather; for Dr. Ingenhousz found that the effluvia of plants in the night time, and in the shade, are more poisonous in hot than in cold weather; but though there is a salubrity in the effluvia in sunshine, the heat of the weather makes no difference

with regard to this. He found also that vegetables, when wet, yield an unwholesome air.

It is difficult to ascertain how far the influence of vapours from woods and marshes extend; but there is reason to think that it is to a very small distance. When the ships watered at Rock Fort, they found that if they anchored close to the shore, so as to smell the land air, the health of the men was affected; but upon removing two cables length, no inconvenience was perceived. I was informed of the following fact, in proof of the same, by the medical gentlemen who attended the army in Jamaica:—The garrison of Fort Augusta, which stands very near some marshes, to which it is to leeward when the land wind blows, was yet remarkably healthy; but it became at one time extremely sickly upon the breaking in of the sea in consequence of a high tide, whereby the water which was retained in the hollows of the fort produced a putrid moisture in the soil, exhaling a vapour offensive to the smell, and with all the noxious effects upon health commonly arising from the effluvia of marshes.

41 Dr. Hendy has lately published an ingenious treatise upon this disease.

42 See Sydenham's Works.

43 See Part I. Book II. Chap. VI.

44 We have a proof of this fact in particular, in the account of the jail distemper, which broke out at the Old Bailey in the year 1750.

45 See Martin's History of the Western Islands, and Medical Communications, Vol. I. page 68.

46 There are some contagious diseases which cannot be propagated but by their own peculiar infections, as has been before observed, just as the seeds of vegetables are necessary to continue their several species; so that if the infectious poison were lost, so would the disease. Of this kind are the small pox, and the other diseases to which man is subject but once during life. There are other diseases which produce infection without having themselves proceeded from it. Of this kind are fevers and fluxes.

But there is no infection of any kind, however virulent, that affects indiscriminately all persons exposed to it. If a number of persons, who

never have had the small pox, are equally exposed to it, some will be seized, while others will escape, who will be affected at another time, when they happen to be more susceptible. It is doubtful how far the habit of being exposed to such specific infections renders the body insensible to them, as was said with regard to fevers; but there is another principle of the animal œconomy laid down and illustrated by Mr. Hunter, which goes at least a certain length in explaining this variable state of the body with respect to its susceptibility of infectious diseases. This principle is, that the body cannot be affected by more than one morbid action at the same time. If a person is exposed to the small pox, for instance, while he labours under a fever, or while he is under the influence of the measles, he will not catch the first till the other has run its course. It may happen, therefore, that people escape the effect of contagion in consequence of being at the time under the influence of some other indisposition, either evident or latent: and supposing the body to be exposed to a number of noxious powers at the same time, one only could take effect. But it seems difficult to explain why some of those who are actually seized, and who have previously been to all appearance in equally good health, shall have it in a very mild degree, while in others it will be malignant and fatal. This is very remarkable with regard to the small pox, which are in some cases so slight, that they can hardly be called a disease, while in others they are so malignant, as hardly to admit of any alleviation from art. May not this, in some measure, be explained from some of the principles above mentioned, in the following manner:—The small pox, in their mildest form, are attended with little or no fever, which, therefore, is not essential to them; and when we see them attended with various forms of fever, and thereby prove fatal even in the most hale constitutions, we ought not to attribute this to any thing in the nature of the small pox, but rather to say, that they have served as an agent in exciting a fever, for which there happened to be some previous latent disposition, that would not otherwise have exerted itself, and that this disposition, or contamination, as it may be called, may have been induced by some past exposure to morbid effluvia, which either from habit, or some other circumstance, may not have been sufficiently powerful to excite the constitution to fever without some such stimulus. Any other occasional circumstance producing disturbance or irregularity in the functions of the body, may, in like manner, excite any particular kind of fever to which the body may at that time be disposed. Thus the amputation of a limb will have this effect; also exposure to cold or fatigue, and intemperance in eating or drinking.

It would appear from these considerations, that there are certain circumstances, or temporary situations of constitution, which invite infection, and render its effect more certain and violent in one case than another. There are artificial methods, however, of obtruding it, as it were, upon the constitution, though not particularly disposed, or even though averse to receive it; and may not this, in some measure, account for the greater safety of some diseases when communicated by inoculation, than when caught in the natural way?

But these, as well as many other facts in animal nature, do not admit of a satisfactory explanation upon any principle as yet known. Even the most common operations of the body, such as digestion and generation, when considered in their causes and modes of action, are so obscure and mysterious, as to be almost beyond the reach of rational conjecture. A little reflection will teach us the utmost modesty with regard to our knowledge of such things; for nature seems to have innumerable ways of working, particularly in the animal functions, to which neither our senses can extend, nor perhaps could our intellects comprehend them. Had we not, for instance, been endowed with the sense of sight, nothing could have led us even to suspect the existence of such a body as light; and there may be numberless other subtile and active principles pervading the universe, relative to which we have no senses, and from the knowledge of whose nature and exigence we must for ever be debarred. We have, indeed, become acquainted with electricity by an operation of reason; and animals have lately been discovered to which the electric fluid serves as a medium of sense through organs calculated to excite it, and to receive and convey its impressions.

But there are few subjects we can study that are more subtle and obscure than the influence of one living body on another. There is a familiar instance of the great subtilety of animal effluvia, and also of the fineness of sense in a dog’s being able to trace his master through crowds, and at a great distance; and we can conceive that infectious matter may adhere, and be communicated in a similar manner. We have endeavoured to illustrate the great obscurity of its operation by an allusion to generation, digestion, and other animal functions, with which it is equally obscure and inexplicable. It is similar to generation in this, that its influence does not pass from one species of animal to another; for the poison of the plague, that of the small pox, that of fever, and the venereal disease, do not affect brutes[47], nor do the

infectious diseases of brutes affect different species of them, nor the human species. The only exception to this, that we know of, is the bite of a mad dog.

From these facts, and also from what was formerly mentioned of contagion not affecting indiscrimately all that may be exposed to it, it would appear that some nice coincidence of circumstances is necessary to modify an animal body, so as to receive its action. There must be a sort of unison, as it were, or sympathy, betwixt different living bodies, so as to render them susceptible of each other's influence.

It is none of the least curious facts with regard to infection, that there are some species of it by which the body is liable to be affected only once in life. When this is considered, it is indeed conformable to what happens in the course of the disease itself; for, unless there was in the body a power of resisting it, there could be no such thing as recovery. Where the disease actually exists, the continued presence of the poison, which is also infinitely multiplied, would infallibly prove fatal in all cases, unless the living powers were to become insensible to it[48].

47 Hunter's Experiments.

48 Mr. Hunter's Lectures.

49 It is sincerely to be wished that this were adopted, and it is surprising that an article so salutary and necessary, and so difficult to be procured on foreign stations, should not have been the object of public attention, rather than a mere article of luxury, such as tobacco. But in order that it might not be a matter of choice with seamen, it would be worth while to supply them with it at prime cost, or even as a gratuity, and then they might be compelled to use it for the purpose of cleanliness. There are other articles of less importance, but being necessary to enable men upon foreign stations to keep themselves neat and clean, deserve to be made the object of public instruction. These are handkerchiefs for the neck, thread, worsted, needles, buckles, and knives.

50 At the time I am writing this, (March 8th, 1785) there has occurred a fact which proves the effect of time in generating infection. There now prevails a contagious fever in several of the hospitals in London, and, among others, in that to which I am physician. In another hospital it has been so violent, that there has been a vulgar report that the plague

had broke out in it. The same fever also prevails among the poor at their own houses. The cause of it seems to be, that the cold weather has been uncommonly long and severe; for the frost began early in December, and the cold has hitherto been more like that of winter than spring. The thermometer all this month has varied from 30° to 35°. Cold is favourable to infection, by preventing ventilation; for people exclude the air in order to keep themselves warm, and the poor in particular do so on account of their bad clothing, and their not being able to afford fuel to make good fires. Heat is the great destroyer of infection, and seems to act by evaporating, and thereby dissipating it; and the effect of fires in apartments is to produce a constant change of air, thereby preventing its stagnation and corruption, and the accumulation of unwholesome effluvia. With this view, a chimney is of great use, even though no fire should be kept in it, as it serves for a ventilator. But if an aperture were to be made in an apartment merely with a view to ventilation, it should be placed in that part of the wall next the ceiling; for foul air naturally tends upwards, and the external air entering at the top of a room, would not be so apt to subject those within to the effect of cold, as it would not blow directly upon them. There would also be this advantage in jails, that apertures in this situation would not be so liable to be forced for the purpose of escape as if they were nearer the floor; and in hospitals they would be out of reach of those who, wishing to indulge in warmth, at the expence of pure air, might be induced to shut the windows. But an external communication with the air any where is of the utmost importance; and it is observable in Mr. Howard's account of prisons, that the jail distemper was most frequently to be met with where there was no chimney.

51 It is of some consequence to attend to the materials of the seamen's beds; for, instead of flock, they are frequently fluffed with chopped rags, which, consisting of old clothes, emit a disagreeable smell, and may even contain infection.

52 By a *berth* is understood the interval between two guns, or any space between decks, which is sometimes formed into a sort of apartment by means of a partition made of canvass.

53 It is remarkable that this method of purifying was practised in the most ancient times, as we learn from the following passage in Homer, where

Ulysses is represented fumigating the apartments of his palace in which the suitors had been slain:

> Τὴν δ᾽ ἀπαμειζόμενος προσεφη Πολυμητις Ὀδυσσευς
> Πυρ νῦν μοι πρώτιστον ἐνὶ μεγάροισι γενέσθω.
> Ως ἔφαθ᾽. ουδ᾽ἀπιθησε φιλη τροφος Ἐυρυκλειος
> Ἠνεγκεν δ᾽ ἄρα πυρ και θηιον. αυταρ Ὀδυσσευς
> Ἓυ διεθέιωσεν μέγαρον και δῶμα και ἀυλήν.
>
> ΟΜΗΡ. ΟΔΥΣ. Χ.

> Bring sulphur straight, and fire, the Monarch cries;
> She heard, and at the word obedient flies.
> With fire and sulphur, cure of noxious fumes,
> He purg'd the walls and blood-polluted rooms.
>
> POPE.

This practice was probably founded in superstition, rather than the knowledge of nature. That some divine influence should be ascribed to fire was very natural, as the principal deities of the ancients were only personifications of the elements; and it is worthy of remark, that their name for sulphur signifies *something divine* το θεῖον, which was probably owing to its being found in those chasms of the earth, in Sicily and Italy, which were supposed to communicate with the infernal regions; for the whole Greek mythology relating to these was taken from the phænomena attending the subterraneous fires in those parts. It is curious farther to remark, in other instances, how facts useful to mankind, the truth of which has been confirmed in later times by the more enlightened knowledge of nature, were first suggested by some superstitious circumstance. Thus the wound received by Sarpedon could not be cured, according to the Poet, till, by divine intimation, he was desired to apply to it the rust of the spear with which it had been inflicted, in consequence of which it healed. But the weapons in those days were made of brass, so that the rust of the spear must have been the *ærugo æris*, which has been found by the experience of modern surgery to be one of the best detergents in ill-conditioned sores. It is probably, from a false analogy, founded on some such incident, that an idea prevails among the vulgar, which has

become proverbial, that some part taken from the offending body is good in all external injuries. Thus some part of a mad dog is said to have a virtue in curing his bite. Herein may be seen the difference of that knowledge which is suggested by superstition, and that which is acquired by the observation of nature.

54 A loggerhead is a large round mass of iron, with a long handle to it.

55 A fact, related in Anson's Voyage, is also strongly in proof of the same opinion. When the rich Spanish prize was taken, it was necessary to crowd the prisoners into the hold, for fear of an insurrection, which was to be dreaded from their numbers; yet, when they arrived in China, none of them had died, nor had any disease broke out. They suffered only in their looks, being wan and emaciated to a great degree.

56 It may be brought as a farther proof of a warm climate being unfavourable to every sort of infection, that though the itch is very common in ships and hospitals in Europe, I do not remember ever to have met with it in the West Indies, except in ships newly arrived from England.

57 This circumstance, in the character of the English, is only of modern date; for we learn from Erasmus, who was in England about two hundred and fifty years ago, that they were then extremely slovenly. The following passage is extracted from a letter he wrote to a physician in York, after his return to Holland:—"Conclavia solâ fere strata sunt argillâ, tum scirpis palustribus, qui subinde sic renovantur ut fundamentum maneat aliquoties annos viginti sub se fovens sputa, vomitus, mictum canum et hominum, projectam cerevisiam et piscium reliquias, aliasque sordes non nominandas." He adds, that the windows were very ill calculated for ventilation, and imputes to the closeness and filthiness of the houses the frequent and long continued plagues with which England was infested, and particularly the sweating sickness, which, he says, seemed peculiar to this country. He mentions that his own country had been freed from the pestilence by certain changes that the State had made in the houses, in consequence of the advice of some learned man. Erasm. Lib. xxii. Epistol. 13.—It is probable that the greater number of those epidemics, called plagues, were only bad infectious fevers. What would contribute still more to the production of infection was the want of linen, which was hardly in use in those days. The disappearance, or at least the great diminution of

such complaints in modern times, particularly in London, has been ascribed to the great increase in the proportion of vegetable food; but it is certainly more owing to the improvement in personal cleanliness, and to the greater spaciousness and neatness of houses. As a farther proof of this, it may be mentioned that in the charity, called the Charterhouse, in London, founded by Henry the Eighth, for the maintenance and education of poor boys, their sustenance is all animal food, as it was at the original institution, yet they are extremely healthy. The same observation applies to Winchester school, which was founded some ages before that.

There are some passages in ancient history in confirmation of the same opinion. Herodotus relates, that the ancient Egyptians were the most healthy of all the nations, except the Libyans, and he imputes this to the invariableness of their weather, and the serenity of their sky. But he mentions in another part of his works, that they were also the most cleanly of all people, not only in their household utensils, but in their persons, and that their clothing was chiefly of linen, which it was one of the principal studies of their life to wash and keep clean—ἑιματα δε λινεα φορεουσι ἀιει νεοπλυτα ἐπιτηδευοντες τουτο μαλισα. Herodot. Euterp. 37.—It is remarkable that he makes no mention of the plague, though he gives a very minute account of the country from his own observation, from whence it may be naturally inferred, that it did not then exist there, though Egypt is now so subject to it, that the plague is supposed by many to be an endemial disease in it. It would appear also from another passage in this historian, that he uses the word λοιμος, which we translate *plague* in a loose sense to signify any violent acute distemper; for he relates that a great part of the army of Xerxes, in their retreat from Greece, perished by the *plague* λοιμου and dysentery, in consequence of famine. Herod. Lib. viii. cap. 115.

58 It is proper also to observe here, that those ships which are built of winter-felled timber are much drier than those built of what is summer felled; and this circumstance should have been mentioned with regard to the Montague, for the cause of her healthiness, notwithstanding her being a new ship, was probably from being built of winter-felled timber. It should, therefore, be strictly enjoined to fell the wood in winter; for those who are employed to do it have an interest in doing it in summer, on account of the value of the bark.

59 A windsail is a long cylinder of canvass, open at both ends, kept extended with hoops, and long enough to reach from the lowermost parts of the ship through all the hatchways into the open air.

60 It is not necessary that seamen should have chests, for bags or wallets answer their purpose equally well, and are much more convenient in respect of stowage.

61 Since the first edition of this work, I have met with a fact in confirmation of this principle, with regard to the cutaneous complaint called the *ring-worm*. This had prevailed in a private school in the neighbourhood of London, which I visited, but it had to all appearance become extinct; yet it nevertheless affected those boys who were newly sent to the school.

62 It is mentioned by Thucydides, that while the plague raged at Athens, the people were affected with no other disease; from which it would appear that those persons who would otherwise have been attacked with some particular indisposition, were seized with the plague in place of it. Vide note p. 247.

63 Part I. Book II. Chap. VI.

64 It is related by the travellers into Turkey, that the Christians save themselves from it, merely by shutting themselves up in their houses, and the inhabitants, who sleep on the open roofs of the houses, do not catch it even from those of the adjacent buildings, though the wall that separates them is of no great heighth.

65 Vide Opera Ambrosii Parei.

66 See Essay on Sea Diseases.

67 Limes, shaddocks, and perhaps all the other fruits of that class, possess the same virtues; but I have most frequently observed good effects from lemons.

68 In the course of the passage from England to the West Indies in February, 1782, the following directions for using the sour krout and melasses were given in public orders by the Admiral to the different ships of the squadron:

"The allowance of sour krout made by the public boards in England, is two pounds to each man every week; and the Admiral orders that from a pound and a half to two pounds (beginning with the lesser quantity, and increasing as the men may find it palatable) be boiled with every gallon of pease on a pease day. The cooks are desired not to wash it, nor to put it into the coppers till the pease are sufficiently broken. "Half a pound is directed to be issued raw to each man on beef days, and a quarter of a pound on pork days. It is recommended that the allowance of vinegar be saved, particularly on meat days. When sour krout runs short, the pease and beef days to have the preference; when shorter still, the pease days. Melasses having been allowed in lieu of part of the oatmeal, in the proportion of eleven pounds to two gallons, the Admiral directs, that a pound of melasses be boiled with every gallon of oatmeal on Mondays, Wednesdays, and Fridays, mixing it and stirring it round with the burgoo immediately after it is drawn off. He directs that half a pound of melasses be issued with every three pounds of flour over and above the common proportion of raisins; and to prevent any abuse, it is directed that the purser's steward pour it into the platter with the flour of which the pudding is made. The Admiral forbids the use of pease in lieu of oatmeal, as has sometimes been the practice."

These rules were suggested by Sir Charles Douglas, captain of the fleet, whose benevolence is equal to his known professional skill; and he had ascertained the utility of the preceding directions when captain of the Duke in the former part of the war.

69 In the French ships of war there is an oven large enough to supply not only all the officers and sick, but part of the crew, with soft bread every day. The advantages attending the use of flour in place of bread are so great and obvious, that the former will probably, in time, be substituted entirely for the latter. There is a proof of its being practicable to use it in place of bread in British ships of war, even with their present conveniences, communicated to me by Captain Caldwell. When he commanded the Agamemnon, of 64 guns, at New York, in the end of 1782, there happened to be no bread in store to supply that ship on her passage to the West Indies, and flour was given in place of it. The men, without any inconvenience, were able to bake it into bread for themselves, and it proved so salutary, that Captain Caldwell ascribed the uncommon degree of health which his men enjoyed to the use of the flour. The only objection that can be made to it is the greater

consumption of wood occasioned by baking; but this may be obviated by adopting the grates invented by Mr. Brodie, in which the ovens are heated by the same fire with which the victuals are boiled.

70 Mr. Napeane, afterwards Under Secretary of State, was at that time purser of the Foudroyant, and acted a very benevolent and disinterested part, by being instrumental in introducing this reform in the navy victualling.

71 Half a pound of cocoa, and as much sugar, was allowed in place of a pound of butter.

72 TABLE, exhibiting the daily Allowance of Provisions for each Man in the Navy.

	Biscuit.	**Beer.**	**Beef.**	**Pork.**	**Pease.**	**Oatmeal.**	**Butter.**	**Cheese.**
	lbs.	**galls.**	**lbs.**	**lbs.**	**Pint.**	**Pint.**	**ozs.**	**ozs.**
Sunday	1	1		1	half			
Monday	1	1				1	2	4
Tuesday	1	1	2					
Wednesday	1	1			half	1	2	4
Thursday	1	1		1	half			
Friday	1	1			half	1	2	4
Saturday	1	1	2					

This has continued from the last century till the alterations above mentioned, all of which, except the introduction of vinegar, have been made in the three last years of this war. When the stock of small beer is exhausted, half a pint of spirits is allowed daily, diluted with four or five times its quantity of water. When wine is supplied, the daily allowance of it to a man is one pint.

73 Instead of leaving this to the management of the men themselves, it might be done with greater advantage to them by instituting short allowance in the following manner:—Let a certain proportion, suppose one third, of the salt provisions, bread, and pease, particularly the first, be stopped, and let the amount of this, for the whole crew be thrown into one estimate. Let the agent victualler pay into the purser's hands

the value of these provisions in money, at the contract price, with such a discount as will allow for the use of the money. Let the purser, in return, give him a receipt, as if for so much provisions checked. This money, being distributed in the name of short allowance, will enable the men to purchase vegetables, and the provisions will be saved for a time of want, or for a cruise.

74 The sailors in the squadron of Commodore Anson never murmured more under any of their hardships than when they were fed with fresh turtle for a length of time in the South Sea.

75 Since the first edition of this work was printed, I have met with a book published by Mr. Fletcher, a navy surgeon, in which he mentions that spices, being antiseptic bodies, might be substituted for part of the salt in curing provisions, and this would, no doubt, be an improvement in the sea victualling. The quantity of spice he proposes for every barrel of beef or pork is four ounces of black pepper, and as much allspice, and also eight ounces of nitre in powder. It may be farther alledged as an advantage of spice over salt, that it would be less apt to run into brine, which robs the meat of the greater part of its nourishment.

76 This accident happened in the Cyclops frigate in September, 1780. Mr. Gordon, the surgeon, favoured me with the following account of it:

"Mr. Smith, an officer, John Barber and Anthony Wright, seamen, having eat some victuals prepared in a foul copper, complained soon after of violent gripes, giddiness, and vomiting, and they had a few loose stools. There was intense heat; the pulse was quick, full, and hard; a tremor of the hands and tongue, and wildness of the eyes. The looseness was soon succeeded by obstinate costiveness, tension of the abdomen, difficult breathing, and loss of deglutition. In the night, towards the morning, there came on insensibility, with an increase of all the symptoms, except the heat. The body was violently convulsed, with cold clammy sweats and coldness of the extremities. The abdomen subsided a short time before they died, and, before they expired, a small quantity of greenish matter, mixed with phlegm, issued from the mouths of two of them.

Thirty three other men were put upon the sick list with similar symptoms in a less degree, and some of them continued on the list for five or six weeks before they perfectly recovered."

It is not said what means were attempted for the recovery of these men; but, besides emetics and milk, or oil, a dilute solution of the fixed alkali in water has been recommended against this poison.

77 I was furnished by Dr. Clephane, physician to the fleet at New York, with the following fact, as a strong proof of the excellence of this liquor:

In the beginning of the war two store ships, called the Tortoise and Grampus, sailed for America under the convoy of the Dædalus frigate. The Grampus happened to be supplied with a sufficient quantity of porter to serve the whole passage, which proved very long. The other two ships were furnished with the common allowance of spirits. The weather being unfavourable, the passage drew out to fourteen weeks, and, upon their arrival at New York, the Dædalus sent to the hospital a hundred and twelve men; the Tortoise sixty-two; the greater part of whom were in the last stage of the scurvy. The Grampus sent only thirteen, none of whom had the scurvy.

78 We have a remarkable proof of this in comparing the fleet under the command of Admiral Byron with that under the Count d'Estaing, when they both arrived from Europe on the coast of America in the year 1778, some of the British ships having been unserviceable from the uncommon prevalence of scurvy, while the French were not affected with it.

79 See an article in Rozier's Journal de Medicine for July, 1784, by Dr. Ingenhousz.

80 Since I came to England I have met with a pamphlet published by Mr. Henry, of Manchester, in which an ingenious method, founded on chemical principles, is proposed for separating the quick lime from water; but I fear it is too nice and complex to be brought into common practice. It would certainly be worth the trouble; but there are so many duties in a ship of war to call off the attention of the men, and they are so little accustomed to nice operations, that it would be difficult to persuade officers to attend to it and enforce it. If a sufficient quantity should not be precipitated by the air in the water, and by the accidental exposure to the atmosphere, it might be more effectually exposed to the air by Osbridge's machine, to be described hereafter, or by a long-

nozzled bellows, and if a small impregnation should be left, this is rather to be desired than avoided.

81 See Dr. Lind on the Health of Seamen.

82 The want of this apparatus may be supplied, in case of exigency, by a contrivance mentioned by Dr. Lind, consisting of a tea-kettle with the handle taken off, and inverted upon the boiler, with a gun barrel adapted to the spout, passing through a barrel of water by way of refrigeratory, or kept constantly moist with a mop.

In this place I cannot help mentioning also, that in case of great extremity it has been found that the blood may be diluted, and thirst removed, by wetting the surface of the body even with sea water, the vapour of which is always fresh, and is inhaled by those pores of the skin whose natural function it is to imbibe moisture, of which there is always more or less in the common air of the atmosphere.

83 When we consider that linen was not in use among the ancient Romans, we might be apt to wonder that they were not more unhealthy; but their substitute for this was frequent bathing, which not only served to remove the *sordes* adhering to the surface of the body, but to air that part of the clothing which was usually in contact with the skin. The washing of the bodies of men suspected of infection upon their first entrance into a ship, has already been mentioned, and I have known some commanders who made their men frequently bathe themselves with great seeming advantage.

84 A coarse woollen stuff so called.

85 He makes the following computation of the additional expence for each man in some of the articles that have been mentioned:

	£.	***s.***	***d.***
For 3 handkerchiefs, at 1s. 6d.	0	4	6
For 12 pounds of sope, at 6d.	0	6	0
For 1 knife, at 1s.	0	1	0
For 1 pair of buckles, at 9d.	0	0	9
	0	12	3

Suppose 3 shirts a year, the difference	0	2	3
Suppose 3 pair of trowsers, ditto	0	2	3
Suppose 1 milled cap	0	2	0
Total £.	0	18	9

86 See Part I.

87 Had I then known the salutary effects of porter and spruce beer, of which I have since been convinced, I should have proposed them as substitutes for rum.

88 The authenticity of this fact, as well as every other assertion in this work relating to the mortality in the fleet, may be proved from the ship's books, deposited at the Navy Office.

89 I fancied that my reasoning on this subject was in a great measure new; but I lately met with the following passages in Celsus and Hippocrates, which seem to be illustrative of the same idea:—Quibus causa doloris, neque sensus ejus est, his mens laborat. Celsus, Lib. ii. cap. vii. which is nearly a translation of the following aphorism of Hippocrates:—[Greek hOkosoi poneontes ti tou sômatos, ta polla tôn ponôn ouk a sthanontai, touteoisin hê gnômê noseei]. Hippoc. Aphor. Lib. ii. Aphor. 6.

The same principle is ingeniously explained by Mr. Hunter in his Lectures.

90 See page 181.

91 See pages 125 and 126.

92 The form of administering this medicine was to add twenty drops of thebaic tincture, from half a grain to a grain of emetic tartar, and from five to ten grains of nitre, to two ounces of water or camphorated julep, of which one half was given about two hours before the common hour of rest, and the remainder at that hour. If spiritus Mindereri is preferred to the nitre, it may be given from two drachms to half an ounce for a dose, and it is better to administer it separately; for if it should not be exactly neutralized, it may decompose the antimonial, and render it inactive.

93 Since the publication of the first edition of this work, there has appeared a small tract on the treatment of low fevers, by Dr. Wall, of Oxford, and as his ingenuity and learning give him a just claim to the high rank he holds in his profession, attention is due to what he advances. The principal scope of the work is to recommend, from his own observation, the early use of opiates in those fevers, and the Doctor's authority, as well as my own experience, convince me of the propriety of this practice in many cases occurring in this country, particularly among the lower sort of people, for whom spare diet and hard labour render evacuations less necessary than among the better sort. The inferior class of people are also more subject to this sort of fever from their houses and persons being less clean, and their apartments being worse ventilated; so that practice in these, as well as other cases, is to be varied according to the constitution and previous habits of life.

94 I first learned this, as well as many other useful and practical facts, from Mr. Farquhar, Surgeon in London, who has laid me under the greatest obligations by communicating many of his observations, derived from the most extensive experience and a truly penetrating sagacity.

95 I owe this piece of instruction, as well as many others, to Dr. Cullen's Lectures.

96 In a review of Haslar hospital made in person by that excellent officer, Vice-admiral Barrington, in 1780, it was very judiciously proposed, among other salutary improvements, that there should be two apartments for the reception of the sick upon their first landing; one wherein they should be stripped of their dirty clothes, and another in which they should go into the warm bath, and put on the hospital dress, that they might not carry infection into the wards.

97 The following is the form of it, and it was first introduced by Mr. Whitfield, apothecary to the hospital, under the name of Bolus Sedativus:—℞. Confection. Damorat. [dram]ss. Castor. Russic. pulv. [scruple]ss. Tinct. Thebaic. $g^{tt.}$ iv. Syr. sim. q.s. Fiat bolus sexta quaque hora sumendus.

98 Great nicety is required in all cases with regard to the times and doses of cordials; for it by no means follows that these should be in

proportion to the lowness and loss of strength. This is well illustrated by Mr. Hunter in his Lectures, where he explains the distinction between the powers of the body and its *actions*. There must be a certain degree of strength to bear the excitement occasioned by stimulating and strengthening medicines or diet; for nothing is more pernicious, or even fatal, than that any part or function should make exertions beyond its strength; and there is the more danger in ill-timed remedies of this kind, as a state of weakness is generally a state of irritability.

99 See a method proposed for obviating this, page 358.

100 Page 381 et seq.

101 Sailor's fever.

102 See pages 161, 181, and 380-1.

103 I have in the whole of this work been extremely cautious in reasoning concerning causes, from an opinion that they are very obscure, and that the theoretical part of physic is very imperfect and fallacious. This is perhaps in no instance more remarkable than in those opinions that prevail concerning the nature and influence of bile in producing diseases. An increased secretion of bile commonly attends the feverish complaints of hot climates, and those of the hot seasons of temperate and cold climates. It is not unnatural, therefore, to impute the disease then prevailing to this redundancy of bile: but, upon considering the matter more closely, it will appear to be rather a concomitant symptom, or effect, than a cause of those fevers; for, in the first place, in those cases in which there is the greatest secretion of bile, as in the *cholera morbus*, there is no fever. The only danger in this disease arises from the violent irritation produced in the bowels by such an extraordinary quantity of this secretion which commonly passes downwards; though I have seen it prove fatal when it flowed into the stomach, and produced perpetual retching and excoriation of the fauces; but in this case also without any fever. Secondly, in the most fatal of all fevers, in the West Indies, there are no marks of an increased secretion of bile, but, on the contrary, a preternatural defect of it, as appears by its not being evacuated either by stool or vomiting, by the white stools which sometimes attend the yellow fever, and by its not appearing in the first passages, nor in its own receptacles after death. Perhaps also that state

of the bowels which renders it so difficult to procure stools may be in part owing to the want of this natural stimulus. It is nevertheless true, that in the intermitting and remitting fevers of hot climates and seasons there is perhaps always an accumulation of bile at the beginning, and an increased secretion of it during their course. It is farther true, that this adds to the patient's uneasiness, and aggravates the symptoms, and that the cure consists partly in the evacuation of the bile. But it is also true, that in the very worst sort of fevers in hot climates it is a favourable symptom where the secretion of the liver is restored and increased, a bilious diarrhœa being one of the most auspicious symptoms that can occur in a yellow fever; and in those that are protracted and afford hopes of recovery, there is generally a gush of bile from time to time.—We may therefore lay down the following positions: 1. That in cases in which bile is most freely and copiously secreted no fever exists, as in *cholera morbus*. 2. That in the worst sort of fevers there is no preternatural secretion of bile, but, on the contrary, a defect of it. 3. That nevertheless there is an uncommon quantity of bile secreted in most of the fevers of hot climates, and that part of the cure consists in evacuating it.

I am extremely diffident, as I have said, in all matters depending on our supposed knowledge of the animal œconomy; but the preceding circumstances seem to countenance the following reasoning:—The bile, according to Dr. Maclurg, who has given one of the best dissertations on its nature and properties, is composed of two parts; the gross part, which is coagulable by acids, and that part in which the bitter principle resides. The first constitutes the principal part in point of quantity, and seems to be that portion of the mass of fluids which loses the property of sound healthy blood, by a tendency to putrefaction, and is thrown out by this secretion. I will not undertake to vouch for the truth of this, but shall assume it as true in the following reasoning:—According to this theory, therefore, the greater part of the bile is what may be called the effete part of the circulating mass, or perhaps only of the red globules or gluten, the watery and saline part, which passes off by urine being the corrupted part of the serum. This part of the bile being very liable to putrefaction, the bitter part is considered by Dr. Maclurg as intended to correct this, and also to answer some good purpose in digestion. One of the effects of the bile in this operation is to extinguish acidity, whether proceeding from substances taken in, or generated in the stomach. The blood in all climates, and in all situations of life, is subject to have part of it thus

corrupted, which, being separated from the common mass by the liver, is mingled and discharged with the common *feces*; but external heat continued for any length of time tends to augment this corruption of the fluids, and therefore to increase the secretion of bile; and it has been observed both by myself and others, that the bile found in those bodies that have been inspected after death, in consequence of fevers in hot climates, is less bitter, and not so penetrating to the fingers, being therefore deficient in the antiseptic principle. But since external heat makes no alteration in the degree of temperature of the fluids themselves, this effect must take place through the medium of the solids, in consequence of that general languor and want of energy which too much external heat induces in the functions, particularly in that power by which the living body preserves itself from putrefaction. Now if this portion of the blood, thus altered and depraved, is readily secreted and speedily thrown out, as in *cholera morbus*, no harm befals the constitution, nor any inconvenience but what arises from the irritation of the *primæ viæ*. But this may not take place if the body should be otherwise deranged; for the removal of this noxious matter from the mass of blood depends upon a due irritability of the blood vessels, the liver, and the bowels, whereby they are stimulated to contract, and thereby expel it. According to the principle of Mr. John Hunter, (whose deep and industrious researches into the animal œconomy place him high in the list of those few on whom nature has bestowed real genius, and who are capable of adding something new to the stock of human knowledge,) there is in a state of health a relative habitude or mutual harmony existing between the solids and fluids, whereby they stimulate and produce actions in each other, in which the healthy state of the functions consists, whether employed in the formation of what is found, or the expulsion of what is noxious: so that where it happens that the solids have a morbid insensibility to the impressions of corrupted and acrimonious fluids, the retention of these adds still more to the general derangement. To illustrate this, it may be observed, that the stomach and bowels, when they are endowed, as it were, with their natural perception, immediately expel any preternatural accumulations of bile that may take place; but when they are insensible to this stimulus through disease, no effort is made to relieve nature till it is excited by medicine. The same reasoning may be applied to the various vessels and ducts. Thus when we see the liver gorged with bile, without any free excretion of it into the gall bladder, as I have sometimes found to be the case upon inspecting the body in some of the worst cases of fever, would it not appear that the gall ducts

have lost that natural irritability whereby the bile is expelled? Or, in consequence of a depraved state of action, connected with febrile affection, may it not happen that the absorbents, which, in their natural state, only absorb particular substances, and in a given quantity, will suffer a change in this natural action, and absorb whatever happens to be applied to their orifices? In case of jaundice, the bile, which is perhaps not at all absorbed in a state of health, is taken up in large quantities, and mingled with the mass of blood, which proves a seasonable relief in the state of accumulation and distension occasioned by the obstruction. This may happen in cases of fever, not indeed as a relief to nature, but from a depraved state of irritability in the lymphatics, induced by disease. Though no increased quantity of bile, therefore, is found in the gall bladder, there may have been an increased excretion of it, a preternatural absorption having been excited. So that it may admit of a question whether the colour of the skin, in the yellow fever, is owing to this, or if the idea of it given in the text[104] is more just; but in either case it seems probable that the extreme tendency to putrefaction in the whole body is owing either to the presence of bile, in consequence of absorption, or the retention of something in the blood from a defect of its secretion.

This reasoning concerning the bile in hot climates may, in some sort, be illustrated by what happens to the urine in cold climates. The urine is the vehicle of an excrementitious part of the blood, of which an increased proportion is generated in certain fevers, and if it is thrown out in the form of high-coloured, turbid urine, the fever will most probably be slight and short; but if it becomes pellucid, or *crude*, as it is called, the general derangement will be increased, the fever will be more violent and dangerous, and the first sign of returning health will be a turbid appearance and sediment.

If the reasoning in the above discussion should appear to some readers unsatisfactory, or ill connected, I can only say that if it is deserving of this character, I am willing to have it considered not only as an illustration, but an example of the nicety and fallacy of theoretical disquisitions.

104 See page 437-8.

105 I have been very cautious of admitting any theory into this work; but I cannot help adopting the doctrine of my much-valued master, Dr.

Cullen, on this point, viz. that a great part of the symptoms of fever arise from reaction, or that effort which nature makes to overcome the morbid cause. I am happy in any opportunity of acknowledging my obligations to this learned professor, to whom the medical world in general is so much indebted, as well for the rational views of the animal œconomy, which he teaches, as for that spirit of study and inquiry which he infuses into the minds of his pupils.

106 M. Desportes, who wrote a treatise on the diseases of St. Domingo.

107 There is a difference in the appearance of the blood when sizy, perhaps not sufficiently insisted on by practical writers; for though there should even be a very thick buff, yet, if the surface is flat, and the *crassamentum* tender, no great inflammation is indicated, in comparison of that state of the blood wherein the surface is cupped, the *crassamentum* contracted so as to afford the appearance of a large portion of *serum*, and where it feels firm and tenacious, though perhaps but thinly covered with buff. This is a distinction well worth attending to in practice; for it is in these last circumstances that blood-letting gives most relief, and where the patient will bear the repetition of it with most advantage.

108 See the same observation in Mr. Hume's Essay on this Disease, published by Dr. Donald Monro.

109 The state of the stomach is very much affected by that of the external surface of the body; and it is sagaciously observed by Sydenham, that the stomach being commonly very irritable in the plague, the most effectual means of making it retain what was administered internally was to excite a sweat.

110 The red bark was brought to England in a Spanish prize in the year 1781, and a very accurate account of its medical and chemical properties was published the year after by Dr. William Saunders, of Guy's hospital. None of it had been brought to the West Indies before the peace, so that I had no opportunity of trying it in that climate.

111 Mr. Telford related to me, that he had cured several intermittents that had baffled the bark, by means of white vitriol, whilst he was surgeon of the Yarmouth in 1779. He gave it in doses of five grains every four

hours in the intermission, and was successful in every case except two, in which the patients were far advanced in the dropsy.

He met with several cases of the same kind in the Alcide, in 1782, in which he was successful with the flowers of zinc, after having given large quantities of bark to no purpose. He preferred, however, the white vitriol, as being milder in its operation, and less apt to disagree with the patient's stomach.

He did not employ either of them in the recent state of the disease, nor does he assert that they are universal or infallible remedies; but only alledges, that he has experienced the most evident good effects from them in an advanced stage of the disease, and a reduced state of the patient, where the common remedy had failed.

112 Dr. Huck Saunders, whose recent loss the world has reason to regret on account of his experience and sagacity as a physician, as well as his virtues as a man, communicated to me, in conversation, some observations on the cure of obstinate intermittents, which deserve to be mentioned here. When he was physician to the army at the Havannah he cured a number of agues which had resisted the bark, by giving two ounces of the vinous tincture of rhubarb and six drams of the tincture of sena seven or eight hours before the fit. This being repeated two or three times, carried off the disease. He also informed me, that he had met with agues in England which did not yield to the bark; but, upon leaving it off, and putting the patients on a course of mercury, they were cured upon returning to the use of the bark.

Arsenic has also been found to be an effectual remedy in intermittent fevers. I was informed by Dr. Huck Saunders, that when he was in North America, in the war before the last, there was an expedition undertaken against the Cherokee Indians, whose country is extremely subject to agues; and as an adequate quantity of bark would have been very cumbersome where light service was necessary, Mr. Russel, who had the medical management of the expedition, provided a great number of pills, containing each one eighth part of a grain of arsenic, by the proper use of which he was enabled to cure the intermittent fevers with which the troops were seized.

I shall here mention another unusual remedy in intermitting fevers; and though I can bring only one instance in proof of its efficacy, yet this is

so strong as to make it deserve farther trial. A man, on board of the Sandwich, had an obstinate intermittent which had resisted the bark, and was stopped by applying to the stomach a plaster, composed of gum plaster, epispastic plaster, and opium, in proportions which I do not now recollect.

113 Sir John Pringle on the Diseases of the Army.

114 This is elegantly expressed as follows, in Sir George Baker's learned Dissertation on this disease:—"Primo neglectus tractatu asperior occurrebat: etenim corpus extenuatum atque confectum ut morbo fervido impar erat, ita ipsi impar curationi. Itaque optimum erat occurrere ipsis principiis atque auxilia mature præripere. In hoc enim corporis affectu aliquod certe in medicina opus est, haud multum in naturæ beneficio."

115 In Dr. Griffith's form of his medicine for the piles, six drachms of fresh-drawn linseed oil are joined with two drachms and a half of the vinous tincture of rhubarb, and given twice a day in a draught. I commonly used oil of almonds at the hospital. This may be considered as another instance of those useful combinations of medicines, which experience alone sometimes discovers. I have found it of use also in other internal hæmorrahages.

116 See Diseases of the Army, p. 273. 6th Edit.

117 Since coming to England, I have been informed by Dr. Garden, a learned and ingenious practitioner from South Carolina, that this medicine, in order to produce its proper effect, should be given in a very weak decoction; for that after having almost abandoned it in consequence of its failure when he gave it in strong decoctions, and in substance, he was again convinced of its efficacy by using it in a very weak decoction, a scruple being boiled in a pint of water to half a pint.

118 See page 345. A fact mentioned in Capt. Cooke's Voyage to the North Pacific Ocean, may be also alledged in favour of this opinion. He remarks, that the Kamschadales, who were habituated to hard labour, were free from scurvy, while the Russians and Cossacks, who were in garrison in their country, and led indolent lives, were subject to it.

119 I was informed of this fact by Mr. Cairncross, an ingenious surgeon belonging to one of the battalions that served there during the siege.

120 I imagined that this was a new practice; but I find, since the first edition of this work was printed, that it has been recommended by Pere Labat in his voyage to the Antilles.

121 There is a symptom which takes place when men are beginning to recover from scurvy, (particularly when the cure is rapidly effected by the use of lemon and orange juice) upon which I have frequently reflected, but for which I have never been able to account. This consists in acute pains, which are felt in the breast and limbs, resembling rheumatic pains. I once knew the crew of a ship which was much affected with scurvy, and had about ninety men under cure by lemons and oranges, who were most of them affected with this symptom in one night, and made such a noise by crying out as to alarm the officers who were upon duty.

122 See the Medical Essays of Edinburgh. Sennertus, lib. iii. part i. sect. ii. —Haller Elem. Physiolog. lib. xix. sect. ii.

123 In the Princessa, 1781, and the Nonsuch, Prince George, and Royal Oak, in 1782.

124 Since this was first written, the melancholy tidings have arrived of another case to be added to this fatal list. It is that of the amiable and gallant Lord Robert Manners, who commanded the Resolution on the 12th of April, and having lost his leg, besides receiving a wound in his arm and breast, died of this untractable symptom on his passage to England; and though he shared a fate to be envied by every lover of true glory, his loss can never be enough deplored by his country and friends, being formed by his great virtues and accomplishments, joined to the lustre of his rank, to hold out an example of all that was good and great as a man and an officer.

125 See Kaau Boerhaave's account of this epilepsy in a school at Harlaem, in a book, entitled Impetum faciens dictum Hippocrate per corpus consentiens (page 355.) A fact of the same kind is also related in a pamphlet, entitled Rapport des Commissaires chargés par le Roi de l'examen du Magnetisme Animal.

126 London Medical Observations and Inquiries, Vol. VI.

127 Medical Commentaries, Vol. III., and a Thesis printed at Edinburgh, 1784.

128 See experiments on a heated room. Philosophical Transactions, 1775, Vol. LXV.

129 That species of locked jaw, called by authors the *Trismus Infantium*, to which children are liable the first week after birth, is probably owing to the contact of the external air upon the skin, which is accustomed in the womb to a moist and warm medium.

130 Aretæus Cappadox says, that tetanus in general is even more apt to occur in winter than in summer. De Cauf. & Sign. Morb. Acut. lib. i. cap. vi.

131 There are several valuable practical remarks on this complaint in some of the ancient authors, especially Aretæus. Their principal means of cure consisted in the application of warm oil to the whole surface of the body, particularly of the part affected. This author also recommends clysters of warm oil, occasionally combined with a medicine called *hiera*, which consisted of certain spices and gums, with some purgative, such as aloes or colocynth. Aretæus Cappad. de Curat. Morb. Acut. cap. vi. Celsus, lib. iv. cap. iii. Goræaus in vocabulum,ἱερα.

132 This is a fact which does not admit of doubt; but the manner in which the effect is here produced is a matter of conjecture. It is most probably owing to the compression and tremor of the air in consequence of its resistance to the motion of the ball. We can also conceive, that, with regard to an yielding part, such as the stomach or abdomen, a body flying with great velocity may even, for a moment, displace a portion of it by passing through the same space, without any other mechanical injury than contusion, in a manner similar to what happens to two balls in the act of collision in philosophical experiments made to illustrate the nature of elasticity; or the compressed air may even, in this case, act, as it were, like a cushion, preventing the sudden impulse and contact of the ball. This explanation furnishes a reason why the parts of the body above mentioned should be more liable to be affected by accidents of this kind than the head. Perhaps this difference may also, in part, arise from the principle laid down by Mr. Hunter, that the stomach is more essential to life, and more immediately the seat of it, than the head or any other member or organ of the body, and that an injury to this part is more immediately destructive of life than any other.

133 The honourable Captain Fitzroy.

134 Colonel Markham.

135 Animals are affected by these accidents as well as men. A cow in one of the ships was killed in one of the actions in April, by a double-headed shot passing close to the small of her back.

136 Hæc formula ex Pharmacopœia Nosocomii Sti. Thomæ excerpta est.

137 Hæc formula ex Pharmacopœia Nosocomii Sti. Thomæ deprompta est.

138 Vide pag. 408.

139 Vide pag. 409. Hæc formulæ ex Pharmacopœia Nosocomii Sti.Thomæ excerpta est. sed vice confectionis Damocratis hodie obsoletæ, adhibentur confectio aromatica & opium purificatum, ratione habitâ ad portionem fingulorum adeo ut parem edant effectum ac in vetere formulâ.

140 Vide pag. 456.

141 Ex auctoritate Cl. Huck Saunders.

142 Ex auctoritate Cl. Huck Saunders.

143 Ex auctoritate Cl. Lind.

144 Vide pag. 479.

145 Vide pag. 489.

146 Ex auctoritate Cl. Heberden apud Cl. Pringle in opere suo de morbis castrensibus.

147 Hæc formula ex Pharmacopœiâ Nosocomii Sti. Thomæ, excerpta est.

148 Vice olei ricini dare licet olei amygdalæ unciam unam cum tincturæ sennæ unciâ dimidiâ. Vide Pharm. Nosoc. Sti.Thomæ.

149 Hæc formula ex auctoritate Cl. Griffiths. In periculis a me ipso factis felicissimum successum ex hoc medicamento percepi.

150 Hoc medicamentum speciatim his hæmorrhagiis accommodatum quæ ex aliquo viscere læso vi externa exoriantur quales in nave sæpius quam alicubi accidere solent, ex præcipitiis & ex corpore colliso a molimine machinarum & tormentorum.—Prodest quoque in his casibus pulvis ipecacoanhæ compositus.

151 Hæc formula ex Pharmacopœia Nosocomii Sti. Thomæ deprompta est.

152 Hæc est quam proxime formula a Cl. Mead legata Nosocomio Sti. Thomæ ubi olim munere medici functus est, & ibi ex eo tempore usque hodie feliciter in hydrope adhibita est.

153 Cl°. Huck Saunders qui dyspnœâ hydropicâ laboravit ipse, auxilio notabili erat hoc medicamentum. In talibus malis interdum summopere prodest decoctum digitalis purpureæ, ut medicus supra memoratus in suo casu compertus est.—Vid. Medical Transactions, Vol. III.

154 Vide Cl. Pringle in opere suo de morbis castrensibus.

155 Hujus doctrinæ auctor est Hippocrates, quæ restaurata est auctaque a Cl. Milman in opusculo suo de hydrope.

156 Hæc methodus medendi quæ æque efficax ac simplex est, primo excogitata fuit a Cl. Georgio Fordyce medico nosocomii Sti. Thomæ, ubi & ipse felicissimo cum successu eandem expertus sum, in muneribus meis ibi fungendis.

157 Vide opus Cl. Johannis Hunter de morbo venereo.

158 Vires opii in isto morbo primo innotuerunt ex experientiâ Cl. Nooth, dum præfuit nosocomiis militaribus in America, & pro optimo remedio a peritissimis medicis & chirurgis jam habetur.

159 Non hic intelligitur ptyalismum veram esse causam quâ efficitur medela morbi, sed præcipitur ut pro argumento sit hydrargyrum in vasa minima permeasse adeo ut effectum edat in subigendo morbo. Vide Opus Hunteri.

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