

**Observations on the diseases of the army in Jamaica : and on the best means of preserving the health of Europeans, in that climate / by John Hunter.**

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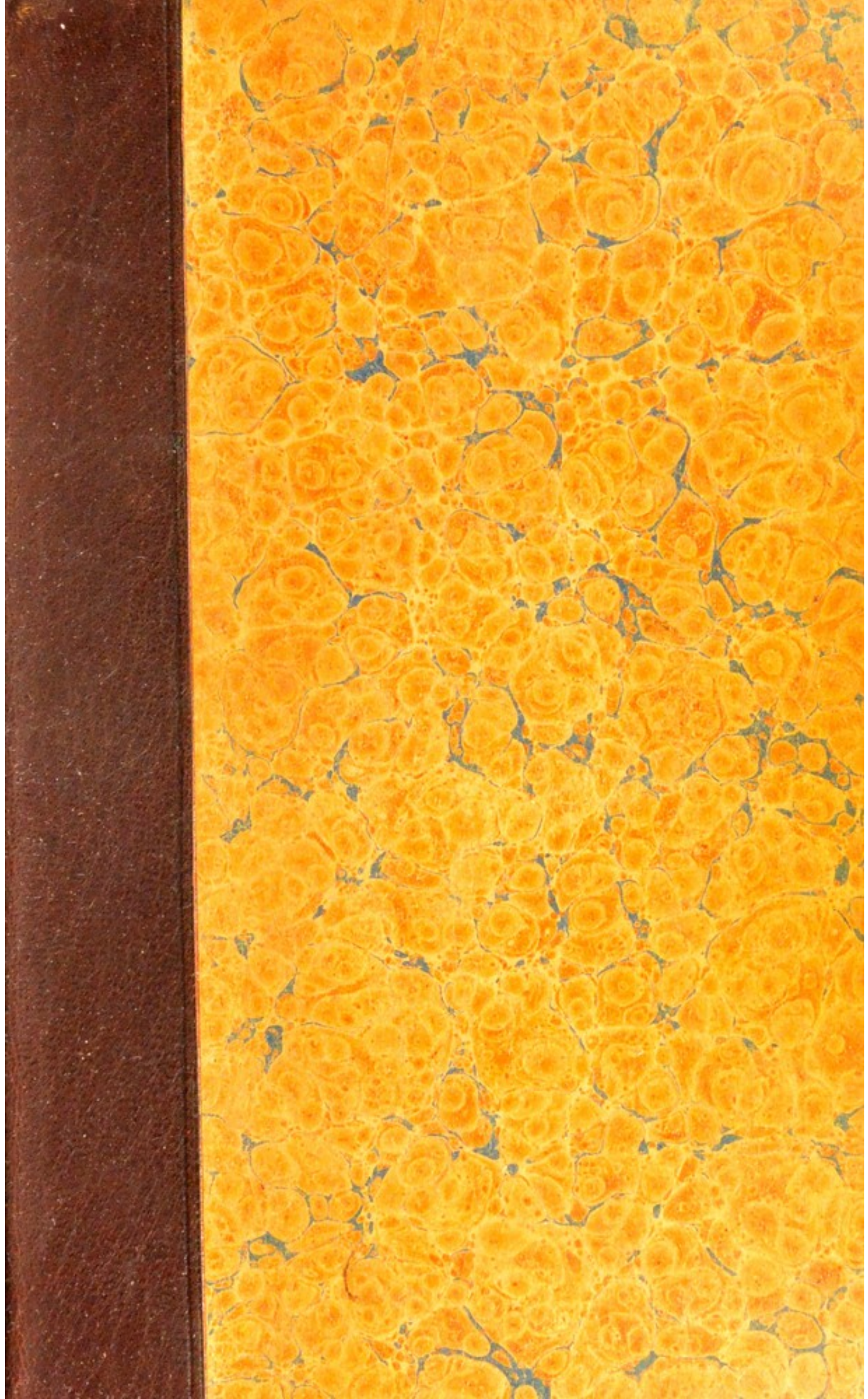
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OBSERVATIONS  
ON THE  
DISEASES OF THE ARMY  
IN  
JAMAICA.

CONSERVATIONS

OF THE ARMY

OF THE

OBSERVATIONS  
ON THE  
DISEASES OF THE ARMY  
IN JAMAICA;

AND ON THE  
BEST MEANS OF PRESERVING THE  
HEALTH OF EUROPEANS,  
IN THAT CLIMATE.

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BY  
JOHN HUNTER, M.D. F.R.S.  
FELLOW OF THE COLLEGE OF PHYSICIANS,  
AND PHYSICIAN TO THE ARMY.

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THE SECOND EDITION, WITH AN APPENDIX,

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LONDON:  
PRINTED FOR J. JOHNSON, ST. PAUL'S CHURCH-YARD

1796.

OBSERVATIONS

ON THE

DISEASES OF THE ARMY

IN JAMAICA

AND THE

MEANS OF PREVENTING THE

DEATH OF SOLDIERS

IN THE WEST INDIES

JOHN HUNTER, M.D.

PHYSICIAN TO THE ARMY

AND SURGEON-GENERAL

THE SECOND EDITION, WITH AN ADDITION

LONDON:

PRINTED BY J. JOHNSON, ST. PAUL'S CHURCH-YARD

1786

TO  
SIR GEORGE BAKER, BART.

PHYSICIAN TO THEIR MAJESTIES,  
PRESIDENT OF THE COLLEGE OF PHYSICIANS,  
AND F.R.S.

AND  
WILLIAM HEBERDEN, M.D. F.R.S.  
AND FELLOW OF THE COLLEGE OF PHYSICIANS.

GENTLEMEN,

THE interest you were pleased to take in my appointment to the office, in which I had an opportunity of making the observations contained in the following pages, will be deemed, I hope, a good reason for addressing you on the present occasion. It is indeed with the greatest pleasure, that I seize this opportunity of acknowledging the great obligations, which I owe to your friendship. The zeal with which

you have successfully laboured in the improvement of medical knowledge, is equally honourable to yourselves, and beneficial to the public. That you may long continue to set an example so worthy of imitation, must be the sincere wish of all who know you, and of none more than,

GENTLEMEN,

Your much obliged,

and most humble Servant,

Charles Street,  
April 3d, 1788.

JOHN HUNTER.

## PREFACE.

---

**T**HE following observations were made, while I had the care and superintendence of the military hospitals in the island of Jamaica, from the beginning of the year 1781 till the month of May 1783.

The dreadful mortality, that has always accompanied military operations in the West Indies, in consequence of sickness and disease, renders every attempt to point out the causes of such calamities, and the means of obviating them, an object worthy of the public attention. In treating of this subject, I have confined myself to an account of those things only, that fell under my own observation. This I have not done, as undervaluing the labours

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labours of others ; but from a conviction that in Physic, as in all other branches of natural knowledge, he who shall content himself with narrating what he has seen, will perform a work more likely to be useful towards the improvement of knowledge, than if he endeavoured to add to the value of his own labours, by collecting the opinions of others, which there is some danger of his mistaking, or misrepresenting.

There is much similitude among the diseases of warm climates ; and the *Remittent Fever* appears to be the disorder which prevails chiefly in all of them. That disease, as described on the coast of Africa \*, and on the banks of the Ganges †, would seem to be nearly the same as in Jamaica. It is therefore pro-

\* See Robertson's Physical Journal kept on board his Majesty's ship RAINBOW, Part I. cap. 1 and 2.

† See Clark's Observations on Voyages to the East Indies, p. 168, case VI et seq.

bable that the method of cure, which was found successful in that island, would answer equally well in those, or similar climates : but this can only be determined by experience.

March 10th, 1796.

In this second edition there is no material alteration from the first ; for that containing the result of my observations while in Jamaica, and not having had any opportunities, since I left the island, of extending my knowledge of the diseases chiefly treated of in this Volume by farther experience, it must be obvious that there can be no room for alteration. Such illustrations and additions as I have judged proper to make, I have subjoined in the form of notes in the Appendix.



# CONTENTS.

---

	Page
<i>INTRODUCTION. Of the Situation, Face of the Country, Climate, and Produce of the Island of Jamaica.</i>	1

## CHAP. I.

<i>SECT. I. Of the Causes of Sickness and Mortality, among Soldiers and Europeans, in Jamaica</i>	10
---	----

<i>SECT. II. Of the Precautions to be taken in sending Troops to the West Indies; and of the Means of preserving their Health in that Climate</i>	22
---	----

## CHAP. II.

<i>Of the Number of Men lost annually by the several Regiments in Jamaica; and of the various Degrees of Healthiness of the different Quarters</i>	32
--	----

## CHAP.

## CHAP. III.

	Page
<i>Of Fevers</i> - - - - -	62
SECT. I. <i>Of the Symptoms of the Remittent Fever</i> - - - - -	63
SECT. II. <i>Of the Cure of the Remittent Fever</i> - - - - -	86
SECT. III. <i>Of the Nature and Causes of the Remittent Fever</i> - - - - -	125
SECT. IV. <i>Of Intermittent Fevers</i> - - - - -	165
SECT. V. <i>Of the Cure of Intermittent Fevers</i> - - - - -	166

## CHAP. IV.

<i>Of the Dysentery</i> - - - - -	173
SECT. I. <i>Of the Symptoms of the Dysentery</i> - - - - -	ib.
SECT. II. <i>Of the Cure of the Dysentery</i>	178

CHAP.

## CHAP. V.

	Page
<i>Of the Dry-Belly-Ach</i> - -	193
SECT. I. <i>Of the Symptoms of the Dry-Belly-Ach</i> - - -	ib.
SECT. II. <i>Of the Cure of the Dry-Belly-Ach</i> - - -	198
SECT. III. <i>Of the Causes of the Dry-Belly-Ach</i> - - -	208
SECT. IV. <i>Of the distinguishing Symptoms of the Dry-Belly-Ach, the Cholera Sicca, and Colica Biliosa of Sydenham</i>	216

## CHAP. VI.

<i>Of Sores and Ulcers</i> - -	221
--------------------------------	-----

## CHAP. VII.

<i>Of some other Diseases to which Soldiers are subject</i> - - -	228
SECT. I. <i>Of the Venereal Disease</i> -	ib.

SECT.

	Page
SECT. II. <i>Of some Complaints arising from Insects</i> - - -	231
SECT. III. <i>Of Inflammatory Disorders</i>	236
SECT. IV. <i>Of Consumptions, Mania, and Prickly Heat</i> - - -	241

## CHAP. VIII.

<i>Remarks on some of the Diseases of Negroes</i>	244
---	-----

## CHAP. IX.

<i>Of the best Manner of taking Care of the Sick of Armies in Jamaica, and our other West India Islands</i> - - -	252
---	-----

APPENDIX - - -	264
----------------	-----

<i>Observations on the Heat of Wells and Springs in the Island of Jamaica, and on the Temperature of the Earth below the Surface in different Climates</i> -	265
--	-----

<i>Some Experiments made upon Rum, in order to ascertain the Cause of the Colic</i>	frequent
---	----------

# CONTENTS.

xv

Page

<i>frequent among the Soldiers in the Island of Jamaica, in the Years 1781 and 1782</i>	- - - -	285
NOTE A. <i>On the Time of sending Troops to the West Indies</i>	- -	302
NOTE B. <i>On the Elevation requisite to render a Situation healthy</i>	- -	305
NOTE C. <i>On the Utility and Mode of raising Negro, or Black Troops</i>	-	308
NOTE D. <i>On the Health of the Army in the present War</i>	- -	312
NOTE E. <i>On the Expectation of a na- tural Crisis in the Remittent Fever</i>	-	313
NOTE F. <i>On Bile as the Cause of Fevers</i>		315
NOTE G. <i>On the Yellow Fever</i>	-	318
NOTE H. <i>On Contagion in the Remit- tent and Yellow Fever</i>	- -	320
NOTE I. <i>On the different Degrees of Strength in the Poison producing Fever</i>		326
NOTE K. <i>On the Time which the Poison may remain latent in the Body</i>	-	329

NOTE

	Page
NOTE L. <i>On the Use of Calomel in Remittent Fever</i> - - -	336
NOTE M. <i>On Hepatitis, as a more frequent Disease in the East, than in the West, Indies</i> - - -	337
NOTE N. <i>On the Use of the Angustura bark in Dysentery</i> -	338
NOTE O. <i>On the Use of Mercurials in Dysentery</i> - - -	339
NOTE P. <i>On the Cause of Sores in the West Indies</i> - - - -	342

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### ERRATUM.

Page 216, line 5, from the bottom, for *Choliera* read  
*Cholera.*

OBSER-

# OBSERVATIONS

ON THE

DISEASES OF THE ARMY

IN JAMAICA.

## INTRODUCTION.

*Of the Situation, Face of the Country, Climate,  
and Produce of the Island of JAMAICA.*

THE island of Jamaica lies in north latitude, between  $17^{\circ} 44'$  and  $18^{\circ} 40'$ ; and in longitude west from London, between  $76^{\circ}$  and  $78^{\circ} 30'$ . It is of an oval figure, one hundred and fifty miles long from east to west nearly, and about fifty miles over, where it is broadest \*.

\* The length, breadth, and situation of the island are not ascertained with any tolerable degree of accuracy. There is a difference of twenty miles between the best maps that we yet have of the island. Vid. Craskell's Survey, Bellin, the West India Atlas by Jefferys, and Long's History of Jamaica.

B

It

It is very mountainous, like most of the other West India islands. There are flat lands towards the coast almost all round the island, but they seldom extend more than a few miles into the country, and the mountains rise with a steep ascent to a great height. They are covered in most places with woods to their summits. There is a chain of them that runs from one end of the island to the other. The appearance of them is singular, their sides consisting of prominent ridges and deep gullies, formed by the immense torrents of water that rush down them, after heavy falls of rain. Their tops are commonly covered with clouds, which often hang half way down their sides, presenting a most picturesque appearance. Towards the east end of the island, where they are highest, they are called the *blue mountains*. Their greatest height is 7,553 feet above the level of the sea \*. On the summit of the blue mountain peak, the highest land in the island, the ther-

\* Their height was determined by geometrical measurement by Mr. George Gould, in the year 1773, who was employed by the government at that time, in making surveys in that part of the world. In the measurement allowance is made for the curvature of the earth, &c.

thermometer was found to range from  $47^{\circ}$  at sun-rise to  $58^{\circ}$  at noon, in the month of August\*.

The heat is greatest in the low lands along the sea-coast, on the south side of the island. The thermometer, in the months of May, June, July, August, and September, ranges from  $85^{\circ}$  to  $90^{\circ}$  between one and two o'clock of the afternoon, which is the hottest time of the day. During the other months of the year the heat is about five degrees less in the day-time; but the difference in the temperature of the nights is much more considerable: for, in the hot months, the thermometer seldom falls lower than  $80^{\circ}$  in the night-time; whereas, in December, January, February, and March, the coldest months in the year, it often descends to  $70^{\circ}$ , and I once saw it as low as  $69^{\circ}$  about sun-rise, which is the coldest time in the twenty-four hours. These observations were made in the town of Kingston†.

As you ascend the mountains, the heat diminishes; at Stoney Hill, which is ten

\* Med. Comment. Edin. 1780, p. 248.

† The thermometers used were made by Mr. Ramsden, and divided according to Fahrenheit's scale.

miles from Kingston, and at no great height in the mountains, there is a difference of nearly ten degrees in the temperature; at Cold Spring \*, the difference is not much less than  $20^{\circ}$ . In the intermediate situations there is a delightful variety of climate, which few countries can boast of; and in the small valleys, that lie among the mountains, so temperate is the air, that apples, strawberries, and other European fruits are cultivated with success, and also the same vegetables that are produced in the gardens of England †.

The winds between the tropics, blow from east to west, as is well known, following the course of the sun. In the day-time they blow steadily in the island of Jamaica, making allowance for changes produced in their course

\* Cold Spring is about 4000 feet above the level of the sea; and the top of St. Catharine's mountain is 5050 feet, according to the geometrical measurement of Mr. George Gould.

† See a paper *on the Heat of Wells and Springs in the Island of Jamaica, &c.* published in the Philosophical Transactions for 1788, page 53.; which, from the immediate relation it has to the temperature of the island of Jamaica at different heights above the level of the sea, and also from its containing an easy and expeditious method of ascertaining the mean temperature of any country, I have re-printed in the Appendix.

by

by the shape and figure of the land; but during the night, the cold air condensed on the tops of the mountains rushes down, and forms what is called the land breeze. These alternate changes greatly refresh the air, and render the heat less insupportable. In the months of November and December there are north winds, which sometimes prevail for several days together, and blow all the way from the continent of North America. They are severely felt on the north side of the island, and even pass the lofty mountains, and blow for days together on the south side.

The months of August, September, and October, are called the hurricane months, as violent storms of wind and rain happen in them. In such storms the wind does not blow in one direction, but in furious gusts, and whirlwinds from every quarter; and the weight of water giving additional force to the velocity of the winds, they strip the trees of their leaves and branches, or tear them up by the roots; destroy the produce of the lands, throw down houses; and leave the country an uniform waste. It is almost incredible, what weighty and solid bodies are moved to great distances; and such examples

of this are produced as would not meet with belief, were they not authenticated beyond a doubt. In the year 1780, on the 3d of October, the west end of the island was rendered almost a desert by a storm of uncommon violence, which did little or no damage in the other parts of the island. Previous to that period, Jamaica had not suffered materially from storms during the space of thirty-six years; but from that time, for six successive years, excepting the year 1782, one quarter of the island or another was greatly injured by violent storms.

The year is divided into the dry and rainy seasons. The rains are expected in May, and October, but they are by no means regular. Of the annual rains much the greater proportion falls in the six months that elapse from the middle of May to the middle of November, and amounts probably to more than three quarters of the whole. The heaviest rains come from the sea, and sometimes continue incessantly one or more days, during which a prodigious quantity of water falls. The lighter showers come from the mountains, and for many days together return  
nearly

nearly at the same hour\*. The warm winds blowing from the sea, strike against the lofty mountains; the vapour with which they are loaded is condensed into clouds, which after accumulating for some time fall back upon the low lands, and there descend in showers. Much thunder usually accompanies this process, but it seldom does any mischief, for the summits of the mountains appear to serve as conductors in carrying it to the earth. The high grounds seldom suffer from want of rain, though along the sea-coast the country is often parched up.

There are many rivers running in all directions from the mountains, but none navigable except Black River. They are very rapid, and when heavy rains fall in the mountains, pour down an immense torrent of water. Some of them bury themselves suddenly under ground, and after a little break out as abruptly; though there are others that cannot afterwards be traced. There are also examples of large streams of

\* What is here said of the rains is to be understood as applying chiefly to Kingston, and that neighbourhood. The quantity that falls annually is between 60 and 70 inches.

water bursting all at once from the ground; and it is probable, that among such lofty mountains, there are many subterraneous passages for water. There are few places in the low lands, to which a stream of water might not be conducted; but this is not much practised as yet in the cultivation of the ground, and wells or tanks in most places supply water for domestic purposes.

The sky is rarely obscured with clouds, except during the rainy seasons; the nights are uncommonly clear, and the moon and stars shine with a brightness many degrees superior to what is seen in Europe. The rising and setting sun gilds the horizon with the most beautiful tints and colours, and exhibits a scene the most splendid in nature.

The soil, where it is not rocky\*, is in general fertile. The island is well supplied with provisions of every kind, and could easily raise more than sufficient for the inhabitants; but the cultivation of the sugar-cane is so

\* The bare honey-comb rock, which is every where to be met with, is calcareous; and the honey-comb appearance of the surface proceeds from the air and rain acting upon, and carrying off the softer parts, while they leave the harder.

lucrative, that every exertion is turned that way, and many articles are imported, which might either be raised in the island, or their room amply supplied by others the produce of the country.

The beef and mutton are good, and the pork is excellent. Greens, and esculent roots of various kinds, are plentiful, and in great perfection. The tropical fruits, wherever a little care is taken of them, are fine and delicious. Along the coast, and in the rivers, there is great variety of excellent fish. The poultry is of the best kind, and there is also plenty of wild fowl at particular seasons of the year.

## CHAP. I.

SECT. I. *Of the Causes of Sicknefs and Mortality, among Soldiers and Europeans, in Jamaica.*

FROM the first discovery of the West Indies to the present time, all expeditions and emigrations to that part of the world have been attended with great mortality. Columbus and his companions suffered severely, and succeeding adventurers have not been more fortunate. The first military expedition of any consequence, that went from this country to the West Indies, was sent against Hispaniola by Oliver Cromwell; but failing in an attempt upon that island, they attacked Jamaica with better success. The far greater part of them in a short time perished by sickness. The unfortunate expedition against Carthagera is still remembered, not less from the mortality that attended it, than from its failure: and though this country, in

in a subsequent war, was more fortunate in their attempts upon Martinique, Guadaloupe, and the Havannah, yet it is a melancholy truth that, there were few of the conquering troops alive six months after their victories.

Great losses of a later date have been sustained in the war just concluded\*, particularly at St. Lucia, Jamaica, and on the Spanish Main. Four regiments were sent from England in 1780 to Jamaica; they arrived there the 1st of August, and before the end of January ensuing, not quite six months, one half of them nearly were dead, and a considerable part of the remainder were unfit for service. Notwithstanding these repeated losses, and the West Indies having been a principal seat of war during the two last ruptures between this country and France, and being likely to become so again in case of another war, no steps have been taken to guard against the mortality, none at least adequate to the importance of the object; and the useful experience of one war has been lost before the commencement of another.

• It would seem to be a proper time, at the

\* In 1783.

conclusion of the present, to collect the useful lessons we have so dearly purchased, and to learn from them how to prevent similar misfortunes in future. The means of obtaining an object so desirable will be better understood, and may be more effectually carried into execution, from an acquaintance with the common causes of sickness, and mortality in the West Indies.

The disorders that prove fatal to soldiers, and Europeans in general in the West Indies, are of two kinds, namely fevers and fluxes. They are the concomitants of armies in all parts of the world, but in tropical climates they rage with peculiar violence. There appears to be an intimate connection between them, for they are frequently combined together, often interchange with each other, and it rarely happens that one is epidemic without the other. They would seem to depend upon the same cause, perhaps differently modified. The fevers are similar to what have been called marsh, and remittent fevers; but more formidable in their attack, quicker in their progress, and much more fatal in their termination, than what are seen in Europe. They proceed from the same cause,

cause, noxious exhalations from wet, low, and marshy grounds. That such vapours are a cause of fever, has been confirmed by repeated experience and observation, in all parts of the world.

Towards the production of such noxious vapours, there appears to be wanting the concurrence of three circumstances; heat, moisture, and decayed vegetable or animal matter. The heat of tropical climates, though generally reputed the cause of their unhealthiness, will not alone produce fevers, as is strongly exemplified in those living on board of ship, who remain free from fevers; and also in the inhabitants of certain dry sandy spots along the coast, in which the heat is uncommonly great, yet the situations are healthy, as Fort-Augusta, Port-Royal, and others.

Simple moisture is harmless\*, at least as far as relates to the production of fevers, of which the two last-mentioned places may likewise be given as examples, for they are nearly surrounded with water on all sides. It is true, the air is perfectly clear; yet it must

\* Vid. Med. Transf. vol. ii. p. 521.

be loaded with moisture, in consequence of the great heat of the sun acting upon the water. But the vapour arising from water is harmless, even when rendered more an object of our senses, by being condensed into fogs and clouds. Thus, the parish of St. Thomas's in the Vale is every night covered with a thick fog, owing to the rivers which pass through it sending forth vapours, which in the day-time are perfectly transparent; but towards evening, by the cool air coming from the neighbouring mountains, they are condensed, and remain visible till next day's sun disperse them, without however being at all unwholesome.

Dead vegetable and animal matter do not send forth noxious vapours, unless in a state of corruption, for which a certain degree both of heat and moisture is necessary. In northern climates, the heat is not sufficient till summer to raise noxious exhalations from swampy grounds; but in Jamaica such are produced all the year round from wet and marshy places, which are always found to be unhealthy, as are also those places lying to leeward of them. The dry part of the country continues healthy during the hot weather, but

but as soon as the rains set in it becomes unhealthy. After heavy falls of rain, every part of the flat country seems to exhale the same noxious vapours as marshes; for the moisture never fails to meet with sufficient quantity of decayed vegetable or animal matter, dried and preserved by the preceding heat.

In dry sandy spots, nearly surrounded by the sea, there is little or no decayed vegetable or animal matter; and there is no moisture, for the rain is immediately absorbed by the sand: such places therefore are healthy, and almost exempt from fevers. Elevated and mountainous situations are also healthy, for what there is of decayed vegetable and animal matter is washed away by the frequent rains, which do not penetrate the ground, but in running off carry whatever is light and loose along with them. What is thus carried off, is frequently deposited in the valleys among the hills; but those are so small, that they do not form a bottom large enough to emit vapours hurtful in any great degree: add to this, that the inhabitants never set down their houses in such bottoms, but constantly make choice of a lofty situation. How much  
it

it contributes to health, being raised even a little above the exhalations, may be judged from this, that in the flat part of the country the houses upon a level with the ground, or but little raised above it, are uniformly the most unhealthy.

If any doubts be entertained, that the exhalations from wet and marshy grounds are the causes of fevers in Jamaica, attention to the following facts cannot fail to remove them. Ships lying at Port Royal, with their men in perfect health, on moving higher up the harbour, either opposite to Kingston, Rock Fort, or beyond them, and taking their station in any of these places, have in a few days become sickly. The men have been seized with fevers, owing to the low swampy lands along the shore, and at the head of the harbour, from which last the exhalations are carried every morning towards the ships, when the regular sea breeze sets in, as is sensibly perceived by the bad smell which accompanies it. In the year 1782, two frigates moored at the head of the harbour, to guard against an attack in that quarter, were obliged to leave their station in a fortnight, on account of sickness, though  
few

few of their people had been permitted to go on shore during that time. The ships of war do not go so high up to take in their water, but, the place being wet and swampy, it commonly happens that the men employed in filling the water casks are taken sick, either at the time, or a few days after; and there are examples where, out of sixty or seventy men sent on that duty, not one has escaped a fever.

In this particular case however, there are concurring circumstances, that give additional force to the original cause, the principal of which is intoxication from rum. This has been remarked as so pernicious, that it has become an opinion with many, that it is the principal cause of sickness in the West Indies. But there is no good ground for this, for rum does not appear to possess any specific power of producing remittent fevers or fluxes, more than other ardent or rectified spirits, which of themselves are never known to occasion those diseases\*. It is further to be observed, that rum is drank with impunity as far as regards fevers, whenever the causes above-

\* Vide Pringle, *Dis. of Army*, ed. 7th, p. 87.

mentioned are not present, or the intoxicated person is not exposed to them. The men on board the two frigates drank as much rum while lying at Port-Royal, as when stationed at the top of the harbour; yet in the former situation they were perfectly healthy, and in the latter extremely sickly. The pernicious effects of rum are to be imputed to its weakening the powers of digestion in the stomach, and the constitution in general; but still more to its giving rise in a state of intoxication to excesses and irregularities, such as walking or running violently in the sun, lying down in the open air during the heat of the day or damps of the night, and going to sleep in those situations. Such things of themselves, without previous intoxication, concur powerfully in rendering fevers both more violent, and more frequent.

The following particulars are likewise found to have equally pernicious effects as rum; fatigue, hard labour, bad or scanty diet, long fasting, and distress of mind of all kinds. Every thing indeed that any how weakens or exhausts the body, would seem to co-operate powerfully in giving force to the original cause of fever. Exposure to rain,  
and

and thereby getting wet, by which the body is chilled, is found to be productive of fevers in Jamaica. All the circumstances, or the greater part of them, just mentioned, attend soldiers on actual service; and if we take into consideration the difficulty, nay often the impossibility of having proper care taken of the sick in such situations, some opinion may be formed of the causes of that dreadful mortality, that has uniformly attended the armies of Europeans in the West Indies.

It is farther to be remarked, that those who are just arrived from cool and healthy climates, are particularly subject to fevers, as is daily experienced by all new comers. A regiment always loses a greater proportion of men the first year than afterwards, supposing their situation to be the same. The great and sudden heat, which renders the body feeble and languid, no doubt contributes to this; but it is chiefly to be ascribed to this circumstance, that the human frame acquires by habit a power of resisting noxious causes, as is seen every day in the use of opium, ardent spirits, and almost all poisonous substances. Hence Europeans, after remaining some time in the West Indies, are less liable

to be affected by the causes of fevers than on their first arrival. Even in England it has been observed, that such as move from an healthy part of the country, into one that is low and full of swamps, suffer more than the original inhabitants. The negroes afford a striking example, of the power acquired by habit of resisting the causes of fevers; for, though they are not entirely exempted from them, they suffer infinitely less than Europeans. There was the strongest proof of this in the negroes who were sent along with the troops against Fort *St. Juan*, of whom scarcely any died, although few or none of the soldiers survived the expedition.

It is a circumstance universally remarked, that there is a great difference in the degrees of health enjoyed by the men, and the women, in the West Indies, I mean Europeans and their descendants. The life of a woman is at least twice as good as that of a man, to speak in the terms of those, who make such things matter of calculation. This is owing to their keeping much within doors, or going out only in the cool of the morning or evening, and even then in a carriage; and to their using no violent exertions in the open air, whereby  
they

they are little exposed to the causes of fevers, against which they are further guarded by their regularity and temperance in living. During the war there was a class of females, who had it not in their power to use some of the above precautions, and neglected others, that suffered as much as the men, I mean the wives of the common soldiers. The temperance of the women proving some security against fevers, it will naturally be supposed, that the intemperance of the men renders such disorders more frequent; and doubtless it is so. But an abstemious diet in men obliged to lead an active life, and to be much in the open air, is far from being a preservation against the diseases of the country: on the contrary, those who live well are observed to enjoy the best health; and it may be given as a general rule, that such as are not guilty of excess in this country, ought not to follow a stricter regimen on going to the West Indies, but rather make a small addition to their usual quantity of wine.

SECT. II. *Of the Precautions to be taken in sending Troops to the West Indies; and of the Means of preserving their Health in that Climate.*

IN treating of the means of preserving the health and lives of soldiers, I shall mention the circumstances conducive thereto, in the order they present themselves, in sending troops from Europe to the West Indies.

I. The troops to be sent should consist of well-disciplined and not new-raised men; for the latter being less orderly, and not accustomed to the life of a soldier, are more liable to disease from the necessary confinement on board the transports on their passage, and suffer greatly more from the climate than men habituated to discipline, as was observable in all the young regiments sent to that part of the world. Besides, it is almost impracticable to discipline men in a country, in which they have so many difficulties to encounter, and where the great heat renders it impossible to exercise them in the open air, except for a short time in the morning or evening; and there

there is even a considerable objection against the evening exercise, which I shall have occasion to mention afterwards.

II. The men should be embarked at a proper time of the year, that is, about the end of September \*; in order that they may arrive in the West Indies both at the coolest, and most healthy season of the year. The inconveniencies and difficulties, necessarily accompanying a change of country, will be felt much less, if it take place at an healthy than at a sickly season. By this precaution, the troops, when intended for a garrison to any of our islands, will get accustomed to the climate before the sickly season commences. If they are designed for an expedition, it becomes of the utmost consequence that they should be dispatched from England at the proper time; and they ought to proceed directly to the place of destination, without touching at any of our islands, where they seldom fail to contract much sickness. If however it be absolutely necessary to stop at one or other of the islands, to be supplied with labouring negroes, or for other purposes

\* See note A in the Appendix.

that the service may require, the troops should be kept on board the transports; and the transports should be anchored in an healthy station, that is, at a distance from, and not too leeward of, marshy ground. By neglecting the above precautions, expeditions otherwise judiciously planned, have proved unsuccessful from the sickness merely and consequent mortality, with little or no opposition on the part of the enemy.

III. When the troops are embarked, which they should be on board of roomy transports, the utmost attention ought to be paid by the officers, to keep the men clean both in their persons and berths. This is done by dividing them into two or more watches, and making them come regularly upon deck every day with their bedding; also by scraping, smoaking, and cleaning between decks daily, and by washing their cloaths once or twice a week. So great improvements have been made of late years by Captain Cook, Sir John Pringle\*, and others, in preserving the health of persons at sea, and the

\* Discourse upon some late improvements of the means for preserving the health of mariners.

knowledge of them is so generally diffused, that we seldom hear of such mortality raging on board our ships as formerly : yet there are not wanting instances of the dreadful effects of neglecting cleanliness, and other precautions, even in the war just concluded. It is no small advantage, in sending troops to the West Indies, to land them with their health unimpaired, and adds greatly to their chance of living in that climate.

IV. When the troops arrive in the West Indies, they should be quartered in barracks erected in healthy situations. Whenever there is not sufficient room in the barracks, which almost always happens in time of war, and houses cannot be hired that are healthy as to situation, the men should remain on board the transports, till some temporary buildings are erected ; for the air at sea is pure and healthy, and productive of none of the diseases of the country. It has always been found most fatal to encamp troops in the West Indies, and should never be done but on actual service.

In regard to healthy situations for barracks, there was occasion to mention, in speaking of the causes of sickness, such places as were found

found to enjoy particular advantages in respect to health. They are of two kinds in Jamaica, and are most probably the same in all the other islands; namely, dry sandy peninsulas or islands near the shore, and elevated situations in the mountains. As examples of the former may be mentioned Port-Royal, and Fort-Augusta. Port-Royal has always been considered as more healthy than either Spanish-Town, or Kingston; and has accordingly been resorted to by invalids from both those places. In the years 1781 and 1782, there was a striking proof of the salubrity of the air at Fort-Augusta. A corps of loyal Americans, under the command of Lord C. Montagu, were quartered there upwards of nine months, in which time they lost only two men, and their sick seldom amounted to twenty\*.

Of elevated and mountainous situations it may be observed, that they are more uniformly healthy than dry and sandy places upon the coast; for the neighbourhood of marshy ground, or stagnant water, often renders these last unhealthy. From a circumstance of this kind, the troops at Fort-Augusta became subject to fevers in the year 1783. The sea

\* Vid. Chap. ii.

rising higher than usual, overflowed the whole of the ground on which the fort stands, near a foot above the surface in some places, and on ebbing left much slime and ooze. A few days after this happened, many of the men were seized with fevers\*. At no great height in the mountains, there is a considerable improvement in the salubrity of the air, which cannot be imputed to the diminution of the heat, though that renders the climate more agreeable†. The station of this kind, of which the troops have had most experience, is Stoney Hill. In 1782 and 1783, the 19th and 30th regiments enjoyed a degree of health there, little if at all inferior to what might have been expected in any part of England‡. They seldom had more than 20 sick in hospital, and the proportion of deaths was altogether inconsiderable.

Such being the healthiness of particular situations in our West India islands, it may be matter of surprise, that the mortality should have been so great among our troops. But it is to be observed, that on actual service

\* Vid. Chap. ii.

† See note B in the Appendix.

‡ Vid. Chap. ii.

many of the precautions essential to health cannot be attended to, such as a proper choice of ground, and avoiding what is wet and marshy; though perhaps even in this way something might be done, if more were attempted. Whenever it is not inconsistent with the service on which soldiers are sent into that country, to keep them on board of transports, it would save the lives of thousands. Some regiments serving on board the fleet suffered very little, while others on shore were almost annihilated by the diseases of the country; so different is the air at sea from the air at land. In times of peace the health of the men kept in the islands for the support of civil government, and as a garrison for defence, has certainly not been made so much an object of attention as it deserved, considering the great importance it is of in two points of view. First, that it would save a large sum of money to the nation, expended annually in recruiting, disciplining, and conveying soldiers to the West Indies, to supply the room of those who have died: and secondly, that every step taken to preserve the lives of soldiers, may be considered as the best means of having always in that part of the world, a body of troops

troops seasoned to the climate, and therefore of more use in case of any emergency, than double their number sent from Europe.

It will often happen in time of war, that more troops must be sent to an island than there are barracks, or accommodation for; in which case it would be adviseable to send along with them from Europe, the frames of temporary wooden barracks, which might be speedily erected upon healthy spots. The expence of them would not be one third of what they would cost, if they were to be constructed in that country, where there is often both a want of materials and artificers.

V. When the troops are properly disposed of as to barracks, there should be a certain number of negroes attached to each regiment; or what perhaps would be better, a company of negroes and mulattoes should be formed in every regiment, to do whatever duty or hard work was to be done in the heat of the day, from which they do not suffer, though it would be fatal to Europeans. This regulation was adopted in part in Jamaica during the late war, and found extremely useful \*.

\* See note C in the Appendix.

VI. The soldiers should be supplied with provisions by government; for unless that be done, their subsistence will be very precarious in that country, and few things are more prejudicial to health than a scanty and irregular diet. They should be divided into messes, which should be inspected by an officer daily; and they should not be allowed to dispose of, or exchange their provisions on any pretence, for this leads to bartering them for rum, the most pernicious of all things.

VII. The men should be frequently out at exercise; and if it be in the morning, and not continued long, it will contribute to their health. The evenings are also cool, but there is an objection to exercising the men at that time, which I learned from an officer of much experience in that country. Motion even the most moderate is attended with profuse perspiration, in which situation the men exposing themselves to the cool air of the night, with wet shirts upon their backs, become liable to colds, rheumatisms, and other complaints. But after the morning exercise the heat of the day follows, and prevents any evils of that kind. It is true, such might be avoided,

avoided, were the men to put on dry shirts after the evening exercise; but this is seldom in the power of private soldiers, nor would it be an easy matter to make them take so much care of themselves, if it were.

## C H A P. II.

*Of the Number of Men lost annually by the several Regiments in Jamaica; and of the various Degrees of Healthiness of the different Quarters.*

A SHORT review of the losses sustained by the regiments in Jamaica, and of the various degrees of health which they enjoyed in the different quarters, will furnish materials from which many useful conclusions may be deduced. It will point out the principal and aggravating causes of mortality, and what is of more consequence, it will shew how in a great degree they may be avoided. It will besides furnish to a commanding officer, the means of ascertaining what proportion of men will be fit for service at the most healthy, and the most unhealthy, seasons of the year; and also what diminution in their number may be expected, after a certain time.

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The greatest part of the troops were quartered at the following places; the three towns, Kingston, Spanish Town, and Port Royal; the forts, Fort-Augusta, Rock-fort, Castile-fort, and the barracks at the battery called the Twelve Apostles. There were besides barracks at Up-park, and Stoney-hill.

All the above-mentioned places, except Spanish Town and Stoney-hill, are situated either upon, or at a small distance from, the banks of the great bason of water that forms the harbour of Kingston, and which with an inlet of little more than a mile, is above ten miles long, and in some parts four or five miles broad. Spanish Town is six or seven miles farther inland, and is situated in the flat and low part of the country, but without any marshes in the neighbourhood. Stoney-hill is in the mountains, about ten miles distant from Kingston, the three last of which are a steep ascent, though the road be not impassable for carriages. There are also barracks in the several parishes, but I am not in possession of facts to ascertain accurately, any thing respecting their different degrees of healthfulness; though it has always been found that a

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regiment,

regiment, sent in small detachments to the parochial barracks, suffers greatly.

The following observations are confined to a short space of time, from the year 1779 to 1783, when the regiments were reduced to the peace establishment. I am not in possession of materials to begin the enquiry earlier than the year 1779, which is a year and an half previous to my arrival in the island.

#### LX REGIMENT, 1st Battalion.

Taking the regiments in the order in which they arrived in the island, the 1st battalion of the 60th regiment comes first to be considered. It was 387 men strong the 1st of February 1780; and in the course of the year 243 were enlisted. The proportion of deaths upon those two numbers added together, rather exceeded 3-11ths of the whole; and of discharged men the proportion was rather more than 1-9th. The loss to the service in both was nearly 2-5ths of the whole, in the course of one year. The regiment was quartered at Spanish Town, had been already some time in the island, and  
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might be considered as seasoned. The great mortality proceeded from a detachment of nearly 200 men, who were sent upon the expedition against Fort St. Juan, of whom few or none ever returned.

The second year, the deaths were rather more than 1-6th, and the discharged did not quite amount to that number: the loss to the service in both was about 1-3d; and was in part still to be ascribed to the detachment sent on the expedition against Fort St. Juan. In the course of the year, the proportion of sick varied from 1-6th to 1-13th of the whole nearly. They were never more than the first-mentioned number, nor less than the last. Under the denomination of sick are included not merely those in the hospital, but also convalescents, and all such who from ailments of any kind are unable to do duty.

The third year, the deaths were about 1-8th, the discharged nearly 1-4th; and the loss in both about 3-8ths. It was six months from the conclusion of the third year, to the time of the regiment being reduced to the peace establishment, and taking the proportion upon those six months, and the preceding six months, which make the last year, they

are nearly the same; that is, the deaths are between 1-8th and 1-9th, and the discharged are above 1-4th. The great number of discharged men was owing to the recruits being bad that were sent from England, which must unavoidably be the case towards the end of a war; and was also preparatory to a reduction of the regiment to the peace establishment. The sick varied from 1-5th to 1-18th during the third year; and from 1-5th to 1-24th during the last year.

From the last returns it would appear, that Spanish Town may be considered as not an unhealthy quarter for soldiers. The deaths are in the proportion of one to eight, and it is computed that one in ten of the inhabitants dies annually. The difference of mortality in the first and last years, is in part to be imputed to the hospitals being better supplied with proper diet for the sick, and the medical attendance being more regular and frequent.

The loss to the service, the first year that a regiment is in the island, is almost all by deaths. The second year the deaths are considerably diminished, but the number of those who are enfeebled, or worn out by disease is increased,

increased, and therefore the discharged men form a large part of those who are lost to the service.

The sickly months are always determined by the fall of the rains. The mortality is not greatest at the most sickly time of the year, but about one or two months after, when the men, worn out by repeated attacks of fever and dysentery, sink under those diseases. Hence the greatest number of deaths are in October and November, though the sick are generally most numerous in August and September.

#### LXXIX REGIMENT.

The 79th regiment arrived in Jamaica in July 1779, 1,008 men strong. They were quartered in Kingston. The first year they lost nearly 2-7ths by death. The second year they lost 4-7ths by death, but 300 of those were men sent upon the expedition against Fort St. Juan; setting aside therefore that number, and taking the proportion upon the remainder, the deaths were nearly 5-18ths, which is not much less than that of the preceding year. The discharged men the second

year were 1-6th; and the loss to the service, including both dead and discharged, 4-9ths nearly. This great mortality was, among other causes, to be imputed to an unhealthy quarter. The proportion of sick, during the second year, varied from 1-half nearly to 1-5th of the whole.

The third year the regiment was very weak. There died 1-11th; there were discharged 1-8th; and the loss in both was nearly 3-14ths. The sick varied from 2-7ths to 1-6th.

The fourth year, the regiment was reinforced by men drafted from the regiments, that were sent home. They lost 1-4th by death, and 1-6th were discharged: in both the loss amounted to 5-12ths. The sick varied from 1-half to 1-5th. So great a difference in the mortality of this and the preceding year, while the obvious difference in the state of the regiment in the two years was, that in the first they were weak, and in the second strong, leads to a suspicion that the accommodation, number of officers, and other circumstances, were equal to the care of 350, but not of 700 men.

In four years there died 910 men, including those that were lost upon the expedition against Fort St. Juan; there were discharged in the same time above 200; and the loss in both exceeded their original number by 100.

## LXXXVIII REGIMENT.

The 88th regiment arrived in Jamaica, in March 1780, complete from England. In the first year there died about 1-3d. In the second year the deaths were nearly 1-5th, and the discharged 1-7th; and the loss in both about 1-3d. The sick varied the first year from 1-3d to 1-5th; in the second from 3-7ths to 1-6th. The regiment remained four months in the island after the conclusion of the second year, till they were drafted, and in that time lost by death 1-11th, and by discharged men 1-12th.

During two years and four months there died about 7-16ths; and including discharged men the loss to the service was 550 out of 791, which last number comprehends the original strength of the regiment, and also the enlisted men.

The great mortality in the regiment during the first year, was owing to their being quartered at Rock and Castile forts, two most unhealthy stations. After remaining there some time they were removed to Fort Augusta, but a detachment was left at their old quarters, which added greatly to the sick list, and to the mortality. It is also to be observed, that this was a new-raised regiment. The loss the first year was nearly all by death; the second year half the loss was in discharged men.

Taking the proportions for the last twelve months, during which the principal part of the regiment was at Kingston, and a detachment at Port Royal part of the time, there died 1-5th, there were discharged 1-7th, and the loss to the service was about 1-3d. From a comparison of the returns of the 60th regiment, and those of the two last regiments, Kingston appears to be a much less healthy quarter than Spanish Town.

The 85th, 92d, 93d, and 94th regiments were embarked at Plymouth nearly at the same time, and they all arrived in Jamaica about the end of July or beginning of August 1780. They were new-raised regiments, and  
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from the time of their embarkation to their being landed in Jamaica, there had elapsed about six months. They arrived at the most unhealthy time of the year, and there were no quarters for their reception, nor suitable hospitals for the sick. The mortality, from all these circumstances combining with the climate, was unusually great.

## LXXXV REGIMENT.

The 85th regiment were encamped in part, and quartered in part at Rock-Fort, for a short time; they were afterwards placed in barracks built at Up Park. It should be observed, that the regiment lost few men while on board the transports, owing to the great attention that was paid to cleanliness; yet they arrived sickly, and many were scorbutic from being so long at sea. There died in the first year 5-12ths; and the loss to the service, including the discharged men, was altogether nearly 1-half. The sick varied from 1-half to 2-9ths of the whole.

In the second year, or rather the next eleven months, for before the year was completed the regiment was drafted, the proportion

portion of deaths was rather more than 1-8th, and of discharged men 1-14th: the loss in both was nearly 1-5th. The sick varied from 1-3d to 1-8th.

The difference between this and the preceding year, is to be imputed to the regiment being seasoned, to their being lodged in good barracks, and to proper provision being made for taking care of the sick.

It may be laid down as a maxim, that no troops can stand encampment, even for a few weeks, in the low and flat parts of the West India Islands.

The quarters at Up-Park are scarcely more healthy than those at Kingston.

One cause of sickness in this regiment deserves to be taken notice of, as the other regiments were also exposed to it in their turn, that is, the duty of the prison guard. There were a great many prisoners brought to Jamaica at different times by the ships of war, and the place in which they were confined necessarily required a guard. The prison was at the distance of two miles from the quarters of the 85th regiment, and was low as to situation, being close upon the shore. It was  
found

found that a large proportion of the soldiers, sent on this duty, were seized with fevers.

## XCII REGIMENT.

The 92d regiment were quartered at Spanish Town; they were ill supplied with every necessary for their hospital, and they were much confined in their quarters. In the first year there died nearly 5-12ths; there were discharged 1-25th; and the loss in both was about 11-25ths. The sick varied from 1-half, or rather more, to 1-28th.

The second year, or more properly the next eleven months, the deaths were not quite 1-12th; and the discharged men were 1-14th: the loss in both was between 1-6th and 1-7th. The sick varied from 1-12th to 1-38th. This is a superior degree of health to that enjoyed by the 85th regiment at Up-Park; and though there may have been other circumstances that contributed to it, yet it no doubt depended principally on the quarters at Spanish Town being more healthy than those at Up-Park, as farther appeared, by the number of sick admitted into the hospitals being

being much greater in the latter, than in the former place.

When the 85th and 92d regiments were drafted, in the former there were 219 men fit for service; in the latter there were 277. The 85th regiment had enlisted 148, the 92d regiment 41; and they both arrived in the island nearly 600 men strong. Of the 85th regiment there remained of the original number 71, at the end of one year and eleven months from their arrival in the island; of the 92d regiment there remained 236. It is to be observed, that the last-mentioned regiment were sickly when they arrived in Jamaica, owing to their having been so long on board the transports; but they lost few or none on the passage, from the attention that was paid to keep the men, and ships clean.

### XCIH REGIMENT.

The 93d regiment were quartered at Kingston. They were sickly on board the transports, and many died on the passage. They landed with a great number of sick, and in all they amounted to 404 men. In the space of six months upwards of 1-half died; and of the remainder

remainder only 71 were fit for service, who were drafted into another regiment. At the end of six months the loss to the service, in dead and discharged, amounted to 9-11ths of the original number.

The causes of a mortality so dreadful, are to be found in their being new-raised and undisciplined men; being sickly and scorbutic from long confinement on board of transports; arriving in the island at the most unhealthy time of the year; being placed in bad quarters; and in their having no adequate provision made for their great number of sick.

#### XCIV REGIMENT.

The 94th regiment were very sickly on board the transports, and lost some men on the passage. They landed 531 men, and were immediately sent in small detachments to the different country quarters. By the end of the first year there were upwards of 1-half dead. In the second year there died 2-7ths of the remainder. At the end of two years and four months, there remained of the whole number 1-7th fit for service, who were drafted into another regiment. Thus,  
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the loss to the service was 6-7ths of the whole in two years and four months.

In the above four regiments there died, in the first six months, rather more than 2-5ths of the numbers landed.

It is with horror, that we thus see our fellow-creatures sacrificed in thousands to the dreadful vicissitudes of climate, joined with other causes of mortality: and if such be the case in our own islands, where there are no enemies to encounter, and where the evils of the climate are not aggravated by the fatigues and hardships unavoidably attending actual service, some idea may be formed of the dreadful havock, that must ensue among European troops, when those causes are combined.

The first expedition of any note, sent from this country to the West Indies, was that against Hispaniola under Cromwell. They failed in their attempt upon that island, but afterwards attacked Jamaica, where they met with little resistance. There were above 10,000 land forces sent upon the expedition, yet we find them calling for reinforcements, almost as soon as they were in possession of the island; and in a short time after, representing the  
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the disadvantages arising from sending new-raised men\*.

In the unsuccessful expedition against Carthageria, of the troops landed, and who remained on shore only ten days, the loss in that time was one fourth of the whole nearly, of whom by much the greater part fell a sacrifice to the climate. When they were embarked, the number of sick, compared with those that were well, was in the proportion of 2 to 5.

The dreadful mortalities attending the successful expeditions against Martinique, Guadaloupe, and the Havannah, are still fresh in the memories of many. It is sufficient to say, that a very small part of the victorious troops were alive, three months after their conquests.

In the late war, 5,000 of the bravest troops in the world took possession of the island of St. Lucia: their loss in killed and wounded, in the several unequal and desperate attacks that were made upon them by the enemy, was not considerable; but at the end of a twelvemonth, scarcely a man remained of the original number. The mortality continued

\* Letters in the public offices, Jamaica.

as great in the subsequent years. From the 1st of May 1780 to the 1st of May 1781, the number of dead was equal to the average strength of the garrison during the year. Of the troops sent upon the expedition against Fort St. Juan from Jamaica, scarcely a man ever returned.

The mind recoils with horror, from such scenes of destruction of the human species; in resuming however more immediately the subject of the health of the regiments in Jamaica, there is this consolation, that no examples of mortality occur equal to those already mentioned; and that the facts to be stated point out the means, by which a remedy may be provided against so great an evil.

#### DUKE OF CUMBERLAND'S REGIMENT.

The Duke of Cumberland's regiment, a provincial corps raised in America, and consisting of native Americans from the southern provinces, arrived in Jamaica in 1781. They were quartered in Fort-Augusta, and remained there nine months; in which time the deaths  
were

were 1-52th. Only one man was discharged, and the sick varied from 1-12th to 1-30th. Soldiers cannot be expected to enjoy better health in any country; and it was suspected, that having been used to heats not inferior to those of tropical climates, they were less liable to the diseases of the West Indies. But there was no good ground for this supposition, as appeared on the regiment being moved from Fort-Augusta, which happened in the end of April. They went to Stoney-hill, and remained there four months, in which time six men died, and four were discharged. The proportions taken for the thirteen months were in deaths 2-67ths; in discharged 1-108th; and the loss in both 1-26th, which for the year is not a loss of more than 1-28th.

The next year they were quartered at Kingston; there died rather more than 2-13ths; there were discharged 1-60th; and the loss in both was 4-23ths, that is, more than 1-6th. The sick varied from 1-7th to nearly 1-half of the whole. The mortality, though great, is still less than what other regiments suffered in the same quarters, which is to be imputed to two causes; first, that the men were in part seasoned to the

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climate;

climate; and secondly, that the Americans were more orderly, and less guilty of excess in drinking, than the British soldiers. The greatest mortality happened in the months of November and December, though the sick were more numerous in the preceding months.

#### XIV REGIMENT.

The 14th regiment arrived in Jamaica in April 1782. Five companies were quartered at Spanish Town, and five at Fort Augusta; and these last, after three months, were moved to Spanish Town, where the whole regiment remained. In the first year there died 1-6th nearly, and 1-10th were discharged\*; the loss to the service in both was 4-15ths, or more than a quarter. This regiment enjoyed most of the advantages that troops can have, that are sent to Jamaica.

\* This number of discharged men is greater than common for the first year, which is to be imputed to the regiment having been in Hilsley barracks previous to their embarkation, whereby many of the men had their health greatly injured, by the fevers produced by that unhealthy quarter. See note C, in the Appendix.

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It was an old regiment, in good order, and they arrived at an healthy time of the year. The quarters they were put into at Spanish Town, may be considered as a mean between the most, and the least, healthy. The sick were well provided with hospitals, provisions, and attendance; and their numbers varied from 1-7th to 2-7ths of the whole. Notwithstanding all these advantages the mortality is great, yet inconsiderable when compared with the numbers lost by the 92d regiment in the same quarters, during their first year. The deaths of the one were 5-12ths, and of the other only 1-6th. There is a circumstance that should be taken notice of here, as it sets in a proper light the degree of healthiness of the quarters at Spanish Town: a large proportion of the sick and of the deaths, both in the 14th regiment, and in the 1st battalion of the 60th regiment, during the last year, was owing to an out-post, eight or nine miles distant from Spanish Town, to which the two regiments sent detachments. The detachments were small, but in general almost all the men sent upon that duty were brought to the hospital, and many of them with fevers of the worst kind.

In the same quarters, the 14th regiment lost by deaths 1-6th, and the 60th regiment 1-8th; which difference is to be imputed to the latter being seasoned. It is to be taken into the account, that the 60th regiment had a considerable number of recruits sent from England, which increased the mortality. The 92d regiment, in the same quarters, during the second year lost nearly 1-11th: it may not therefore be unfair to conclude, that in similar circumstances, the mortality will be nearly twice as great the first year as the second.

#### XIX and XXX REGIMENTS.

Seven companies of the 19th and 30th regiments arrived in Jamaica in July 1782; and were quartered at Stoney Hill. In the six following months, which include the sickly season, they lost by deaths 1-26th.

The remainder of the 19th regiment arrived in January 1783, and were placed in the same quarters, where they remained eight months longer, till the regiment was reduced to the peace establishment; and in that time there died 1-27th.

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The remaining companies of the 30th regiment, arrived at the same time with those of the 19th regiment, and were quartered also eight months longer at Stoney-Hill, in which time there died 1-34th. The annual mean of deaths upon the whole was 1-17th nearly.

The discharged men in the first six months, were 1-94th from the seven companies; during the following eight months, they were 1-19th from the 19th regiment; and 1-32d from the 30th regiment: the annual average of discharged men upon these is 1-21th nearly. Taking therefore the loss by death and discharged men together, it is somewhat more than 1-10th. Small as this loss must appear, when compared with the mortalities before mentioned, there are several circumstances that deserve to be taken notice of, which give a still more favourable idea of the healthiness of this quarter. The whole number of dead in the returns, did not actually die at Stoney-Hill; several of them died before the two regiments joined those companies, that first arrived. The number of the dead in the surgeon's returns on the spot, do not much exceed the half of those in the general

return, which included those that died at Jamaica, as well as elsewhere. Of those that died at Stoney-Hill, several were taken ill either at Kingston, where they were upon leave, or on the road back to the barracks.

The 19th and 30th regiments were not seasoned to the climate, and they arrived at a sickly time of the year, yet their loss was greatly less than that of the regiments at Spanish Town that were seasoned, and where every possible care was taken both of the men that were well, and of the sick. Such are the superior advantages of the quarters at Stoney-Hill. The sick varied from 1-6th to 1-10th, but most of them were trifling sores that were not taken into the hospital. The sick in hospital varied from 1-22th to 1-36th only.

### XCIX REGIMENT.

The 99th regiment was very unfortunate, being nearly all captured on their passage to Jamaica. About three companies arrived in 1781, which were sent into country quarters, and the regiment did not assume any form till July 1782, when they were collected

all together at Fort Augusta. They remained there several months, and sent detachments to Port-Royal, and the Twelve Apostles; a considerable number were also embarked on board the men of war, to serve as marines; and they were afterwards quartered on the *Pallisades*, where temporary barracks were erected. The name of *Pallisades* is given to a long sand-bank, which separates the harbour of Kingston from the sea. The situation is of the same kind as that of Fort-Augusta. In the year they lost by deaths 1-11th; by discharged men 2-11ths; and by both 3-11ths. This loss may be considered as great, as they were in healthy quarters; but the men collected from the parochial barracks were sickly and worn out, and increased both the number of dead and discharged, but particularly the last; add to this, the recruits that composed one half of the regiment were not good men, as must be the case towards the end of a war.

III, LXIII, LXIV, and LXXI  
REGIMENTS.

These regiments, or rather the remains of them, arrived from Charlestown, South Carolina, in January 1783: they amounted in all to about 800 men.

The 3d and 63d regiments were quartered at Fort Augusta. In eight months there died of the 3d 1-23th. They arrived sickly, and many of the men were worn out by the fevers, under which they had laboured in South Carolina. The sick varied from 1-5th to 1-29th; they arrived with the former number, and when they left the fort they had nearly the same proportion, in consequence of the sea rising to an unusual height, overflowing the fort, and leaving stagnant water to putrefy, which produced many fevers both in this regiment, and in the 63d.

The 63d regiment arrived sickly; they had 2-7th on the sick list. The deaths in eight months were 1-10th nearly. The sick after a short time fell to 1-13th, and did not exceed that number, till raised by the inundation above mentioned.

The

The 64th regiment was quartered at Port-Royal, and in eight months time lost by deaths 1-123th. The sick varied from 1-8th to 1-16th. Port-Royal stands upon a bank of sand, in the same way that Fort-Augusta does, and is a healthy quarter; it would be more so, if the town were kept cleaner, and if there were fewer shops in it, that retailed spirituous liquors.

The 71st regiment was quartered at the Twelve Apostles, which is situated upon a rock, and is also an healthy quarter. In eight months the deaths were 1-65th; and the sick varied from 2-9ths to 1-7th.

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AN average of the number of sick during three years and an half, in which are included the convalescents, gives 1-3d of the army unfit for service, at the time of the greatest sickness, and 1-8th, at the time of the least sickness. The average of deaths annually upon the whole, is nearly one in four, and of discharged men about one in eight, which

which together make the loss 3-8ths of the whole.

In less than four years, there died in the island of Jamaica 3,500 men; those that were discharged amounted to one half of that number, which make in all 5,250 men, lost to the service in that short period of time, from the climate and other causes of mortality, without a man dying by the hands of the enemy.

The mischievous effects of sending new-raised men to the West Indies, are exemplified in the strongest manner, in all the young regiments. The mortality has likewise been greatly increased on many occasions, by the troops leaving England at an improper season, and arriving in the West Indies at the sickly time of the year. But what has the greatest influence, of all the circumstances that affect the health of soldiers in those climates, is the kind of quarters in which they are placed. Kingston and Up-Park are both bad quarters; and Rock-Fort, from the swampy ground in its neighbourhood, and on which it stands, is still worse. Spanish Town is better than Kingston, though greatly inferior to Fort-Augusta or Stoney-Hill; indeed these two last quarters

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$$1460$$

quarters would not be reckoned unhealthy, in any part of the world. Similar situations are to be found in all parts of Jamaica, and, I doubt not, in most, if not all, of the other West India islands. The situations are of two kinds; dry sand-banks, surrounded either wholly, or in part, by the sea, and out of the reach of noxious winds blowing from swamps and marshes; and elevated stations in the mountains. In places so circumstanced, the effects of the remittent fever are scarcely felt.

If we may be allowed to make the supposition, that quarters had been provided for the troops in such situations, of 5,250 men lost to the service, there would have remained, at the end of three years and an half, 3,500 fit for duty, supposing them to have been placed at Stoney-Hill, and to have suffered the greatest losses that have happened in that quarter.

No attendance or care of the sick can counterbalance the ill effects, arising from the quarters in which the troops have hitherto been placed. By professional skill, and diligence, the life of the individual may often indeed be preserved, but the *soldier* is lost to his country: and the national purposes, for which he is conveyed into those distant provinces, are

as effectually frustrated by the ruin of his health, as they would be by his death. Our humanity alone is not interested in the present case, though surely the object well deserves that it should; but the safety of the West Indies, and the saving of enormous sums to government. If the troops, sent for the defence of our islands, die as we have seen them, the mother country cannot long supply, during a war, such an incessant drain: besides, the mortality is sometimes so great and speedy, that a sufficient interval is not left to make known the want of men, and receive supplies in proper time. In April 1782, when Jamaica was expected to be attacked, though upwards of 7,000 men had been sent there in the three preceding years, there were not above 2,000 men fit for duty.

It may be permitted to point out another advantage, and not an inconsiderable one, that would result from placing the troops in the healthy quarters mentioned above. The nation would at all times have a body of seasoned men in the West Indies, which in military operations either offensive or defensive, in that quarter of the world, would be of more value than twice the number of the  
best

best troops, that could be sent from Europe. Such an object must be of consequence, as the West Indies have been a principal scene of action in the two last wars, and are likely to become so again in any subsequent war.

To conclude, the interest of government, the safety of our West India possessions, and the calls of humanity, are all equally concerned, in providing quarters for the troops in healthy situations. That such are to be found in the island of Jamaica, is proved by full and repeated experience; and there is this farther to be said in their recommendation, that they are in general favourably circumstanced for the defence of the country. Stoney Hill, of which mention has so often been made, was deemed by Sir John Dalling, and Sir Archibald Campbell, both officers highly distinguished for their military knowledge, a most advantageous post for the defence of the island\*.

\* See note D in the Appendix.

## C H A P. III.

*Of FEVERS.*

**T**HE fevers, that prevail in Jamaica, are either of the intermittent, or remittent kind. Of the former there are tertians, quartans, and quotidians, in all the various forms they occasionally assume. The remittent fevers are both the most frequent, and most fatal. There appears to be an intimate connection between them; the intermittent often running into the remittent; and the remittent sometimes terminating in an intermittent. It would seem that they proceeded from the same cause, acting with greater or less force at different times; for, in the more healthy season of the year, the fevers are chiefly intermittent, and in the most unhealthy, remittent.

SECT.

SECT. I. *Of the Symptoms of the Remittent Fever.*

PERSONS at all times of life, from infancy to old age, are subject to the remittent fever. It attacks, however, men oftener than women; young children, till they reach their third or fourth year, are not so liable to it as afterwards; and old people are likewise less subject to it. This, probably, is not owing so much to there being any thing either in age or sex that resists the fever, as to persons of the above description being less exposed to the causes of it. It is both most violent and most fatal, in those who are lately arrived in the island, and they are at their first coming more subject to it than afterwards.

The usual manner in which it shews itself is as follows. There is uneasiness with languor, followed by a sense of chilliness or cold shiverings, which are soon succeeded by great heat, particularly in the palms of the hands and forehead; head-ach, great loss of strength, sickness at stomach, and frequently violent vomiting. Phlegm, or what was eaten at  
the

the last meal unchanged, is first brought up, and afterwards bile, yellow, or greenish. The pulse is quick, and at first small; it soon becomes full but is seldom hard. There is not unfrequently much pain in the small of the back, or a sense of soreness in some of the limbs, which is sometimes diffused all over the body, as if it had been beaten and bruised. Restlessness, great anxiety, oppression at the breast, and frequent sighings, are common symptoms, and sometimes rise to such an height, that the sick appear to labour greatly in their breathing. There is not however any difficulty in distinguishing those symptoms, from laborious respiration depending upon a local affection of the lungs. In the latter the difficulty of breathing is uniform; whereas in the former, both the expirations and inspirations will for two or three times together be natural and easy, and immediately after become laborious and unequal, and so on alternately. The vomiting is sometimes constant and violent, especially in the worst kind of the disease; and the blood being frequently in a dissolved state, is forced into the stomach, and thrown up, forming what has been called by the Spaniards the *black vomit*. The blood

is said sometimes to tinge the urine and saliva, and even to issue from the pores of the skin; none of which appearances I have ever seen; though in the most unhealthy parts of tropical climates, when diseases are aggravated by the fatigue and hardships attending troops on actual service, they are reported to occur, and not unfrequently. As the heat increases the face gets flushed, the senses are more affected, and the patient often becomes either wild and delirious, or drowsy and lethargic. These symptoms, after a time, are succeeded by a sweat, which is often profuse, and gradually procures an abatement of the fever.

The length of the fit varies considerably. It sometimes terminates in six or seven hours, though its duration is more commonly from fifteen to twenty-four hours. In some instances it extends even to thirty-six and forty-eight hours; and I saw one example of it continuing three complete days, without any marks of remission. The several stages of the fit, known under the names of, the cold, the hot, and the sweating, vary likewise considerably in their duration. The cold stage is generally very slight, and often there is none at all, which I believe in some measure is

owing to the heat of the climate; for, I observed that the rigors and shiverings were more considerable in the cold, than in the hot months. I have, however, in a few instances, seen the cold fit last above half an hour, with severe rigors all over the body. The hot stage constitutes by much the longest part of the paroxysm, and is generally terminated by a sweat. This is not however always the case, for the fever sometimes remits gradually, without any sensible increase in the perspiration: nor is every sweat that occurs during the hot fit, even though profuse, critical as to a remission; for, a great perspiration will sometimes continue one or more hours, and go off without at all relieving the symptoms.

The tongue is at first white, and if the fever be violent, and consist of two or three fits, it grows brown and dry, and even becomes chopt. The thirst is commonly great, though in some cases it is not increased. The urine is little changed by the fever, being always high-coloured in warm climates. With the flushing of the face, the eye often becomes muddy, and even red, as if inflamed; and this appearance keeps pace with the progress of the paroxysm, the redness being  
greatest

greatest when the fever is highest, and gradually decreasing as the remission takes place.

Hitherto the difference between the fever of this island, and those occurring in other countries, is not very considerable; but the sudden aggravation of the symptoms, as appears in an immediate and almost total loss of strength, a great degree of stupor, and even total insensibility, followed by convulsive startings of the tendons and death, marks an extreme degree of violence, such as is rarely observed in the fevers of other countries at so early a period; for, all those symptoms will sometimes happen during the first paroxysm, and even in the space of twelve hours. One of the worst symptoms, which frequently occurs, is incessant retching or vomiting, with great pain at the pit of the stomach. It not only harrasses and weakens the patient, but by rendering it impossible to make use of any medicine, either for the immediate relief of the fever, or to prevent a subsequent paroxysm, is attended with the most imminent danger.

The remissions vary much in their duration; some do not last longer than one or two hours, though more commonly they continue ten or fifteen, and sometimes thirty,

and even thirty-six hours. The fever in some cases assumes the quotidian type, and has an exacerbation every day at nearly the same hour; but generally it observes no regularity in the times, either of access, or remission. The remissions are more or less complete; sometimes they amount almost to an intermission, though much more generally there is only an abatement of the symptoms. The pulse becomes slower, the skin cooler, and the head-ach, restlessness, and sickness diminish, or go entirely off. Yet it sometimes happens that the remission is not so strongly marked, and is only to be distinguished by an abatement of the head-ach and restlessness, with some diminution of the quickness of the pulse, and of the heat of the skin. In judging of the heat of the skin, the feel of the sick person's hand is not to be trusted to; for, the perspiration rising freely in vapour from every pore, gives a coolness to the hand, which would lead to an erroneous opinion. The feel of the cheek, and particularly the forehead, is what best marks the degree of febrile heat.

The sleep, during the remission, is disturbed, and procures but little refreshment.

The

The second fit is always more severe than the first, if nothing has been done to check the progress of the fever. It is commonly without any cold stage, or even sense of chilliness. All the symptoms run higher; the skin is hotter, the pulse quicker, the head-ach greater, the senses more confused, the thirst often intense, and a *delirium* or *coma* come on more quickly and with greater violence, and sometimes terminate in convulsions and death.

As the delirium approaches, the eyes look wild, the voice becomes quick, and it changes from the natural tone to a sharper; there is also extreme eagerness in every motion, with an incessant tumbling, and change of posture. Wild imaginations of impending danger, of dreaded evils, or of important business calling for immediate execution, seize the unhappy sufferers, and impel them to efforts and exertions equally violent and sudden. Restraint, though necessary, renders them outrageous, they tremble all over, and are shook with frequent momentary convulsions. From this state of excessive agitation, in which the recollection of persons and of things is equally confounded, the sick gradually sink into a

*stupor.* Articulation becomes difficult, the voice falters, and instead of speech there is only a muttering; they cannot be roused to give an answer, and the convulsive tremors and startings still continue. With all these symptoms, and with the pulse beating upwards of one hundred and thirty times in a minute, the fever will sometimes remit, the patient recover his senses, and if advantage be taken of the remission, life may often be preserved.

The sick sometimes sink into a lethargic state, without any previous delirium. They are roused with difficulty, and can only give an answer to the simplest questions, after which they immediately fall again into a state of insensibility. They can give no account of their feelings, or of the manner in which they were seized; and in general have not the smallest recollection, not even as of a dream, of any person or thing, that has been before them, while in that situation.

It is however to be observed, that though both delirium and coma are frequent occurrences, they are not essential to the fever, which often exists in all its violence, and proves quickly fatal, without the senses being materi-

materially affected. There is indeed a way in which the fever terminates fatally, and that often without raising even a suspicion of danger. The violence of the fit begins gradually to abate, the skin grows cooler, the pulse slower, and the senses, if disordered, become more clear and distinct. These are flattering symptoms, and in such a situation danger is scarcely apprehended; yet, if the strength be gone, if the countenance be languid and sunk, if there be a total indifference to food or nourishment, even though not rejected, and an aversion to every exertion even the smallest either of the mind or body, and if the pulse at the same time that it becomes slower is also weaker, though the patient complain of nothing, he is fast approaching to his end, and dies in a few hours; his pulse all the time indicating no danger, till excited by the pangs of death. When the recollection is tolerably distinct, which it often is, the patient is frequently the first to give notice of the approaching danger, from certain sensations of internal weakness which he feels. When such a termination happens, it is commonly after the second or third fit, particularly when the disease is very violent,

and affects those, who are lately arrived in the island.

When the fever is thus severe, a symptom often occurs, which has given a name to the disease, as if a distinct one; I mean a yellowness of the eyes and skin, from which it has been called the *yellow-fever*. This happens chiefly to new comers, their fevers being the worst; but it is not confined to them, for it appears sometimes in the natives, and in those who have resided several years in the island. It is produced by the addition of a jaundice to the other symptoms of the fever. I call it jaundice, because in no respect did the yellowness appear to differ from that, which usually accompanies that disease. It is first to be observed in the eyes, and next tinges the neck and shoulders, and afterwards the whole body. The urine is also of a very deep colour, and stains linen rag yellow, like to that of a person in the jaundice. There appeared no reason for suspecting a dissolution of the blood to be the cause of the yellowness, for it happened frequently when no marks of such dissolution were to be found; and when they were present, they were not necessarily accompanied with a yellowness of the skin.

They

They never indeed occurred to me together, from which I would not infer that they never are combined, but only that they are not connected as cause and effect. The fever was always violent, and generally accompanied with great pain at the pit of the stomach extending over the epigastric region, and with severe retchings. It was characterised by the usual exacerbations and remissions, and had no peculiar symptom, except the yellowness, to intitle it to be considered as a distinct disease.

This change of colour in the skin, though most common in the fevers of the West Indies, is not confined to them, being frequently observed in other warm climates. There are instances of jaundice accompanying the fits of intermittent fevers in England, and I have seen two examples of yellowness, or jaundice in the hospital or jail fever \*. The yellowness in the yellow fever appears sometimes towards the end of the first fit, though more commonly after the second or third; and the unexpected and fatal termination of the fever, mentioned above, happens both

\* Haller, *Opera Minora*, vol. III. p. 374, describes an epidemic fever in which the body turned yellow.

when

when this symptom is present, and when it is not. I will not attempt to give any explanation of it at present, meaning to confine myself to a plain narration of facts, and to reserve for another place whatever relates to matter of opinion or conjecture.

If the patient should survive even a third or a fourth fit, he remains almost totally deprived of strength, and frequently has still other evils awaiting him, as an attack of dysentery, which often proves fatal to such as have been previously reduced by the fever. It ought indeed to be observed, that it is no uncommon thing for the bowels to be affected with griping or purging, accompanied with dysenteric stools, during the fever. This combination of dysentery and fever would seem to depend upon something in the season, for in one year it shall be very common, and not so in another. At all times, however, the fever if neglected, or ill treated, is apt to terminate in dysentery, especially in soldiers.

Convalescents are subject to relapses, which happen often in this fever, and are no less dangerous than the first attack. They are most frequent during the sickly season, and are readily produced by fatigue, exposure to the heat

heat of the sun, or any irregularity. Sometimes they recur at various intervals, as six or seven days, fifteen or sixteen, or twenty-five and thirty days; and this for a long time together, but without any great exactness in their periods; and each return commonly consists of one, two, or more fits of the fever. Under such circumstances the disease often produces dropfy, and enlargements and indurations of the liver or spleen, which in many instances terminate in death.

The violence of the symptoms, and degree of danger, such as above described, take place chiefly, in those who are but lately arrived in tropical climates, and during the most sickly season of the year. In the natives, and those who have resided some time in the island, the fever is by no means so formidable, being neither so violent in its onset, nor so rapid in its progress. It often begins in slight feverish fits, one or two of which shall pass, and the patient pay little regard to them; yet a third or fourth shall not be much short of the violence of symptoms already described. It sometimes begins as a regular intermittent, and is changed into a remittent, by the fits  
gradually

gradually getting longer, and running into one another.

Though the fever be more gradual in its approaches in the natives and old inhabitants, yet when it rises to a great height, they are longer in recovering their strength, and in getting the better of the other ill consequences of the disease, than even new-comers. They are likewise more liable to relapses at various intervals, as two or three weeks, or as many months; but they are not so violent as in new-comers. They consist usually of one or two fits of fever, accompanied with sickness, retching, and frequently a copious discharge of bile; from whence such patients are commonly said to be bilious, the bile being supposed to be the cause of the disease. The attacks are generally preceded by loss of appetite, indigestion, and flatulence in the stomach and bowels. In the intervals they sometimes enjoy tolerable health, even for years together; more commonly, however, repeated attacks gradually weaken the powers of digestion in the stomach, and occasion a remarkable loss of flesh and strength. The complexion grows pale, fallow, and even of a lemon-colour, and the whites of the eyes  
are

are clearer than common. In this situation one fit, more violent than the others, shall perhaps put an end at the same time to the patient's life and the disease. Such is the usual manner, in which the disease proves fatal in the natives, and old inhabitants; yet both in them, and in new-comers, it often admits of a speedy solution after two or three fits, and the patient soon recovers compleatly his ordinary health.

It is worth remarking, that the fever sometimes appears in a very slight way, with languor, loss of appetite, some degree of head-ach, disturbed sleep, and whiteness of the tongue, the patient being able all the while to go about his usual employment. In symptoms so moderate the presence of a fever is hardly acknowledged, through the readiness with which they rise into a severe disease, on the least irregularity, or any anxiety or distress of mind, leaves no doubt of their nature.

To slight feverish symptoms, are sometimes superadded, small painful tumours in the skin, called *cat-boils*. They appear to be small carbuncles. There is first a pain felt in the skin, especially on being touched, which is soon followed by a slight swelling not unlike  
a common

a common pimple. They are sometimes as large as a nutmeg, and are exceedingly painful, especially if squeezed, or near a joint where there is much motion. They do not suppurate, but form a kind of core, which is discharged by one or more holes from the small tumour. Any violence offered to them, such as attempting to squeeze the matter out of them as in a common pimple, produces great swelling and pain in the surrounding parts. They are considered as favourable symptoms, being supposed to prevent a fever. That however did not appear to be true, for there were many instances of persons being troubled with them for some time, and yet having a fever before they got rid of them. The fever in such cases was not of the most violent kind, though it is not clear that this was owing to the small boils. What might with more certainty be inferred from their presence was, there being a disposition to fever in the constitution for the time. Like the affection of the bowels, they were in one season more prevalent than in another.

After describing the more usual appearances of the fever, it will not be improper to

to give some account of those, that were more uncommon.

In some cases the fever begins with fits, like those that happen to children at the eruption of the small pox; and it was only in children that I saw this symptom, though I believe it is not always confined to them. It began in an officer, on the expedition to the Spanish main, with a fainting fit. The jail fever has likewise been observed to begin with fits in children. This symptom in children, has often given occasion to suspect worms for the cause of the disease, which has led to a dangerous treatment: for what is proper to expel worms will do no good, but on the contrary harm, in the remittent fever.

There is sometimes a great coldness, with a sense of foreness, in a particular part, as the thighs, during the hot fit of the fever, while every other part is parched with heat. Such disagreeable sensations increase greatly the febrile anxiety, and restlessness.

An excruciating pain is sometimes fixed in one part, and follows the fever in its increase and abatement, and after some continuance the part mortifies. I have seen this in the *scrotum*, where I believe it always proves  
6 mortal;

mortal; and also in the foot, where it was accompanied with a disagreeable sense of coldness, and occasioned the loss of a toe.

In two or three instances the sick complained of a sense of numbness, proceeding sometimes from the head, and sometimes from the stomach, which diffused itself all over the body, and occasioned an extreme alarm while it continued.

Among the symptoms, which more rarely occur, may be mentioned the *tetanus*, and an effusion of water in the ventricles of the brain. The tetanus is of two kinds, one where it is an original disease, another where it is merely a symptom of the fever. It is the latter only of which I am to take notice. The examples of it, which fell under my observation, were few; in one it came after the fever was completely formed, in another it appeared as soon as the fever. The jaw was locked, and all the joints were rigid, so that the patient placed on his feet was as motionless as a statue. The contractions of the muscles are not equal and uniform at all times, for though they are never relaxed, there are fits of greater and less contraction, and in the former there is much pain. The skin is hot, the  
pulse

pulse quick, and the tongue white, when it can be seen; there is also much pain at the pit of the stomach, some degree of stupor, and profuse sweats, particularly about the face.

In one instance of fever, which began in the usual manner, except that the head-ach was greater than common, and appeared to be owing to exposure to the sun without any covering to the head, after two or three exacerbations a stupor seized the patient; the pupil became dilated, and was almost insensible to the impression of light; he rolled his head about much, and often put his hand to it, with frequent moanings. His pulse was about 90 in a minute, and feeble. He remained several days in this state before he died. The body was examined, and there was found about six ounces of limpid *serum* in the ventricles of the brain. The viscera of the thorax, and abdomen, were in a natural state.

Besides the symptoms which more rarely occur during the fever, there are some that follow it, that deserve to be mentioned, though they are not often to be met with. Parotids, or swellings and suppurations of the

parotid glands, are sometimes a consequence of the fever; as are also abscesses near the anus, and in other parts of the body. A numbness is at times felt in the arms, for a week or two after the fever; and sometimes flying pains all over the body, like those from rheumatism. There are not wanting examples even of the taste, and smell, being greatly impaired, and remaining so, for several months. In some cases, after a violent attack of fever, so much debility both of mind and body has remained, that the slightest causes would excite a fit of crying, and every exertion of the mind was accompanied with distressing agitation. Those so affected were said to be *nervous*.

It is not improbable that there may be many more singular, and uncommon symptoms of the fever, than those which have fallen under my observation; yet the sources, from which I derived my experience, must be allowed to have been of the most ample nature, for the space of two years and four months, while I remained with the army in the island of Jamaica, and had the care of the military hospitals there.

It

It is matter of some consolation, in the history of so grievous a disease, to be able to say with certainty, that it is not infectious. In the military hospitals, the sick admitted with fevers were above three quarters of the whole, and they were often much crowded together, yet there was no reason to believe, that a man with any other complaint, ever caught a fever in the hospital. There was no instance of the yellow fever proving more infectious, than the fever in its more ordinary form, when it was without any change in the colour of the skin. It will not be out of place to remark, that in all the time I was in Jamaica, I saw no instance of the common hospital or jail fever, although many of the military hospitals were very confined; and some of the best of them consisted of a double platform, on which the sick were placed as close together as they could lie. The two diseases are easily distinguished: the disposition to remit, which is constant in the fever of Jamaica, whether with, or without the yellow colour, and which generally shews itself in 36 or 48 hours, with few exceptions, is alone sufficient to discriminate it from the jail or hospital fever. That disease, on the con-

trary, when once formed, runs its course with great uniformity, and for many days together, there is not the smallest appearance of exacerbation, or remission. The reason why the jail fever was not generated in any of the hospitals in Jamaica, was very evident: the houses in the country are all constructed so, as to give free admission to the air, which the great heat of the climate renders necessary. In consequence of this a constant perspiration is kept up, and the air that is breathed by the sick changes every moment, and therefore never acquires, by stagnation and confinement, those noxious qualities, which prove the cause of the hospital fever.

As this subject comes to be more investigated, I doubt not but it will be found, that as an hot climate, by rendering ventilation pleasant and agreeable, prevents the jail or hospital fever; so a cold climate, by making it necessary to warm the air artificially, which requires it to be confined to a certain degree, gives rise to the jail or hospital fever; which is not known to proceed from any other cause, except the human species breathing the same confined air for some time\*, or from such

\* Vid. Med. Transf. Vol. III. p. 345.

articles of cloathing as retain the poison thus generated. There is no reason to believe, that the generation of the poison is either forwarded, or retarded by the heat or cold of different climates, any farther than as they may prove a cause of the confinement, or ventilation of the air, in the apartments of the sick, or of others that happen to be much crouded together.

*SECT. II. Of the Cure of the Remittent  
Fever.*

IN treating of the cure of the remittent fever, I shall give an account of the remedies, in the order in which they were administered, when the fever had its most usual appearance; I shall enumerate afterwards, the means that were found most successful in removing, or palliating particular symptoms; and add a few observations on some of the remedies, that have been either strongly recommended, or are in general use.

No disease requires more speedy assistance, for the efficacy of the medicines employed, depends in a great measure on their being given early. The disease gains strength by repeated attacks, and when allowed to have its course, is often fatal. It always greatly impairs the strength, and frequently injures materially the constitution. There is no regular progress in the fever, by going through which, the sick are to be restored to health,

health, and to wait for any *crisis* would be time irrecoverably lost\*.

If I see a patient during the first fit, I direct an ounce of Glauber's salt†, or the same quantity of the bitter purging salt‡, to be dissolved in half a pint of water, to which two drops of the oil of peppermint being added, four table spoonfuls of the solution are given every half hour, till it operate, or be all taken. As there is generally much sickness at stomach, it is given in small doses, lest it should excite vomiting. The essential oil covers the taste of the salt, and renders it less offensive to the stomach.

It is probably of no great consequence, what kind of purgative medicine is given, provided it operate effectually and without violence. Soluble tartar||, Rochel salt§, fena, vitriolated tartar\*\* and rhubarb, or cream of tartar and rhubarb may be used, if experience has shewn that they agree with a

\* See Note E. in the Appendix.

† Natron vitriolatum, Pharm. Lond. 1788.

‡ Magnesia vitriolata, Pharm. Lond. 1788.

|| Kali tartarifatum, Pharm. Lond. 1788.

§ Natron tartarifatum, Pharm. Lond. 1788.

\*\* Kali vitriolatum, Pharm. Lond. 1788.

particular constitution. The two purging salts that were first mentioned, were generally preferred on account of their certain, speedy, and easy operation. Glauber's salt keeps best in a warm climate; the bitter purging salt attracts moisture and deliquesces, whereby the dose becomes uncertain, and it is preserved with difficulty.

After a few stools have been procured, the patient generally finds himself much easier, and a remission often ensues. This is to be carefully watched for, and immediate advantage is to be taken of it, for administering the Peruvian bark. The common dose of this medicine is a drachm, which may be repeated every second hour; and as a general rule in giving it, this is perhaps the best; but both the quantity and intervals must often be varied, according to circumstances. Sometimes the stomach will neither bear so large a dose, nor so frequent a repetition; and therefore, that sickness and vomiting may be avoided, the quantity must be diminished to two scruples, or even half a drachm; and that reduced dose cannot perhaps be given oftener, than once in three hours. On the contrary, in cases of great urgency, where  
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the preceding fit has been severe, and there is reason to fear that the succeeding one will be still more violent, and where a long remission cannot be depended upon, the dose may be increased to two drachms, which may be given every hour. But few stomachs will bear so much, and sometimes the bark cannot be given at all in substance. In such a case recourse must be had to a decoction, or an infusion. I prefer the latter, but as the decoction is sooner prepared, I make use of that till the other can be got ready. The infusion is made with two ounces of the best bark, reduced to powder, in twenty-four ounces of cold water; it must be stirred from time to time, and should stand ten or twelve hours, in order to be of a proper strength. Two or three ounces of it are given every two hours, or as often as the stomach will bear it. This preparation taken liberally, has in some instances been more efficacious than the powder itself, for it has prevented a return of fever, when the bark in substance has not afterwards been so successful, in the same person. This I could not easily explain, though I was led to suspect that after one or two violent paroxysms of fever, the stomach  
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was sometimes so weak, that it could not act upon the bark in substance, at least with sufficient power; and that the infusion found a more ready entrance into the circulation. The infusion is less offensive to the stomach than the decoction, and it is also stronger, if one may judge from the taste; there is besides no decomposition of the component parts of the bark, which cannot be avoided in the decoction. Such decomposition, it would appear from experiments made by the late Sir John Pringle, much weakens the virtues of the medicine; for, he found that the extract of the bark was not of equal efficacy with the simple powder, when they were given in the same quantity.

In severe attacks of the fever, in which it is absolutely necessary to watch for the remission, in order to make the best advantage of it, whenever the pulse becomes a little slower, and the heat begins to abate, a dose, or two, of the infusion may be given, and the powder added afterwards as soon as the stomach will bear it. This, I found the most certain way of moderating, or preventing the next paroxysm.

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The vehicle, in which the bark is given, must in many cases be suited to the patient's stomach. It will sometimes sit easy on the stomach when mixed with coffee, with wine and water, or with wine alone, if the remission be considerable; in some cases it answers the same purpose to mix it with milk, or a weak infusion of chamomile flowers. By these expedients, the stomach is reconciled to the medicine, is enabled to receive a larger quantity of it, and to retain it better. If it be not known from experience, what vehicle is the most agreeable, I always make the first trial with the infusion of bark, as being the most efficacious; and if that disagree, recourse is had to the others, till experience teach us which is the best.

It will sometimes happen that the bark purges strongly, and passes through the body almost unchanged. This is not an unfavourable symptom, and the remedy is easy, for three or four drops of the *tinctura opii* added to each dose, soon put a stop to the purging.

When the method of cure laid down above, is carefully put in practice from the beginning, it will in many cases prevent a return of the fever; in general, however, a sufficient quantity

quantity of bark cannot be given in the first remission, nor is there time for it to produce its effects upon the body, so as to prevent a second paroxysm.

The heat, restlessness, anxiety, and indeed all the symptoms usually accompanying the second paroxysm, are more violent than in the first, if nothing has been done in the remission to stop the progress of the fever; but if the length of the remission, and the state of the stomach have admitted of the liberal use of the bark, it has a considerable effect upon the ensuing fit. The symptoms run high, but the strength of the patient appears more equal to the struggle; the paroxysm is sharp, but is of shorter duration, and the remission that follows is of the completest kind.

The medicine that I have found most considerably to relieve the symptoms during the paroxysms, and promote a remission, is James's powder. It is given in small doses, seldom exceeding five grains, and is repeated every three or four hours. If the stomach be in an irritable state, the dose is often not larger than half the quantity just mentioned; for, as has been observed before, no symptom  
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of the disease is more troublesome or dangerous than vomiting; in the cure therefore care must be taken to avoid every thing, that might induce or aggravate any tendency that way. The evil that arises from retching and vomiting, is not confined merely to the sufferings of the sick, but is most materially felt in preventing the use of such medicines, particularly the bark, as might stop the progress of the disease. The most salutary operation of James's powder is either to excite a sweat, or gently open the body. There is seldom occasion to give James's powder in the first paroxysm, that being occupied by the purgative medicine; but if the fit continue long, as forty-eight hours, and the purge has been given, and produced the full effect, and still there is no remission, James's powder may be given in the manner just mentioned; and by exciting a sweat, or further gently opening the body, it promotes a remission of the fever.

The second remission, as well as the first, is to be employed in administering the bark freely. In this way, above two ounces of the bark may in general be got down, before the period of the fever return, which will in most cases

cases be sufficient either to prevent entirely the next fit, or so far break the force of it, as to render it devoid of danger. In subsequent attacks the same course is to be followed; that is, small doses of James's powder are to be given during the paroxysm, and the bark in the remissions.

If James's powder do not keep the body open, which it seldom fails to do, laxative clysters are of use; for it is to be observed, that one or two stools in the twenty-four hours greatly relieve the sick, and promote the good effects of the bark. This is particularly the case in the fevers subsequent to the rains in September and October, which are of the worst kind. In such, it is frequently advantageous to join four or five grains of rhubarb, to each dose of the bark, in order to procure two or three motions in the day.

I have had occasion to mention, that no symptoms are more dangerous than violent retching and vomiting, and nothing can be more pernicious than the use of emetics in such circumstances. If there be sickness and vomiting in the beginning of the disease, chamomile tea, or warm water, are sufficient to cleanse the stomach. If the vomiting or  
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retching still continue after making use of these, which they will often do, and harrafs the sick even during a remission of the other symptoms, saline draughts in a state of effervescence, repeated every hour, or oftener, will frequently allay this distressing symptom. The stomach is also relieved by opening the body, which further tends greatly to check the vomiting; but as cathartic medicines would be immediately thrown up, purgative clysters are the only means that can be employed for that purpose, and it is sometimes necessary to repeat them several times. In this way the vomiting is often quieted, and the stomach enabled to retain the bark.

It will sometimes however happen in the worst fevers, that the retchings are not abated by the effervescent draughts, which are themselves thrown up. In such cases I have had recourse to opiates, and generally with success. From fifteen to twenty-five drops of the *tinctura thebaica* \* may be added to an effervescent draught, or given in a little Bristol water, and repeated in two or three hours, according to the urgency of the symptoms. In this irritable state of the stomach, Bristol

\* Tinct. opii, Pharm. Lond. 1788.

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water, either by itself, or mixed with Rhenish wine, or Claret, will often be retained when common water would not. It has been recommended to apply a blister to the epigastric region, when the means above mentioned have failed; but I have never had recourse to it, having always found the vomiting quieted either by the effervescent draught, or the opiate. It must be obvious, that this dangerous symptom will often be induced, and always greatly aggravated, by any method of cure that admits of the use of emetics. The vomiting being overcome, the bark must be given with diligence, yet with caution at first, by beginning with the infusion or decoction, and adding the powder as the stomach will bear it.

During the accession of fever there is commonly more or less of head-ach, which sometimes becomes extremely violent, and greatly distresses the patient. A blister applied between the shoulders, seldom or ever fails either to relieve, or entirely remove this symptom.

In the very low state that was mentioned sometimes to succeed violent paroxysms, especially in those fevers that were attended  
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with yellowness of the skin, nothing was so useful as cordials; for though the bark was not entirely laid aside, yet the quantity the stomach would bear, in any form, was so small, that little could be expected from it. Wine and nourishment were the best cordials, and far surpassed any from the shops. Claret and Rhenish wine were most grateful to the sick, and were generally preferred; Madeira was not however refused, if it was desired, and it was the only wine that could be administered in that climate, to the common soldiers. It did not become sour from that kind of treatment, which would have converted any other wine into vinegar. While speaking of this subject, it may be proper to say something of the nourishment to be given throughout the disease.

During the first attack there is generally a great loathing of food, and of wine; but in the remission this is not the case, and both become requisite in order to support the strength of the patient. Chicken broth, panada, sago, salep, thin gruels, and tea in which bread has been soaked, are the kinds of nourishment best adapted to the state of the stomach, and to the disease. To all of these,

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except the broth and tea, wine may be added with sugar and nutmeg, or any other spice that is more agreeable. Wine is seldom to be given by itself, but should be mixed with water. In almost every case, especially when the disease is violent, and the patient much reduced, it is highly grateful and cordial. It is of the utmost consequence in giving both nourishment and wine, that they be repeated often, and that only a little be swallowed at a time; for the stomach is easily overloaded, and provoked to vomit. After the fever begins to remit, it is better not to give the bark till some nourishment has been taken down, and of such things as are mentioned above, it is left to the sick to chuse what is most agreeable. By this means the bark sits easier on the stomach, and the sick can better persevere in the use of it. The same purpose is likewise answered by giving some food, or a little wine and water, between every dose of the bark, and the strength of the patient is thereby supported.

When the sick are greatly reduced, after two or more paroxysms of fever, wine and nourishment become more essential than medicine; for in such circumstances the bark  
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itself does little or no good, till the powers of life are in some degree recruited. If it be not entirely laid aside therefore, it should only be given in a cold infusion, to the quantity of three or four spoonfuls, and repeated once in two or three hours ; the powder is to be added gradually as the sick can bear it, and in such manner as not to oppress or load the stomach, which would impede the use of wine and nourishment. It is of the last importance, to give the sick in this way, proper nourishment from time to time ; for, though they have no call for it, if it be omitted for even a short time, they grow gradually weaker and weaker, the pulse often indicating no return of fever, and expire, as if the whole powers of life were exhausted by the preceding paroxysm.

It may be asked, in what quantity should wine be given ? It is difficult to give a precise answer to this ; the quantity, I believe, is best regulated by its effects, and I have generally been guided by the following circumstances. If it be not grateful to the sick, but on the contrary disagreeable, it will seldom do good ; nor is it attended with better effects, if it increase the heat, restlessness, or delirium. When it agreed well with the sick, I have in

general found the quantity, that had the best effects, much less than what is often recommended. I have rarely given above a pint in the twenty-four hours, and from watching it's effects, was well assured, that going beyond that quantity would have done no good, but on the contrary, harm. I do not speak of the jail fever, in which wine has been recommended, and given in very large quantities; although my experience even in that disease, has not furnished me with cases, where the quantity could be made with safety, much to exceed that mentioned above. It happens most unfortunately in physic, that we can hardly correct one error without rushing into another; not content with substituting wine and cordials in the room of evacuations, we must produce intoxication, without considering that in all cases, where the human body is greatly reduced or exhausted, the strength and quantity even of cordials must bear a direct proportion, to the remaining strength of the sick.

If the thirst be great, and not quenched by the thin liquors mentioned above, the sick are allowed to drink water, or toast and water. When the stomach is extremely  
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irritable and disposed to vomit, Bristol water is often more grateful than any other liquor, and frequently stays upon the stomach, when nothing else will. Acid, or acescent liquors, prepared from the fruits of the country have been extravagantly recommended, as highly grateful to the sick, and salutary in the disease; but such encomiums appear to be the result rather of hypothesis, than experience. The sick have in general no craving for them, and when given they frequently produce uneasiness at stomach. There is often indeed a disposition to sourness in the stomach, as appears from the green colour, and sour smell, of what is thrown up, and this symptom is aggravated by acescent liquors.

It sometimes happens during the paroxysm of the fever, that there is a considerable degree of *stupor* or *coma*, which, in some cases, rises to almost a total insensibility. This being a symptom of the fever, whatever is useful in procuring a remission, helps to remove it. For this particular purpose, I have not learned any thing more effectual than James's powder, which may be given more liberally in such cases, as in general the stomach is not in an irritable state. It may be given in the dose of

five grains, and repeated every second, or third hour, till the fever remit, or the medicine have some sensible operation. A stupor or coma is a mark of a severe disease, and strongly indicates the necessity of making the best use of the ensuing remission, by giving the bark in the most effectual manner, in order to check or moderate the next paroxysm, which otherwise might prove fatal.

In treating the sick, I have supposed the method of cure, to be put in practice from the beginning of the disease; but this cannot always be the case, as, for various and obvious reasons, a first or even a second paroxysm may have passed, before any thing is done towards the cure. In this situation, if there be a remission, and the preceding fit has been violent, and there is reason to suspect that the subsequent one will be more so, it is not advisable to lose three, or four hours, in giving an opening medicine, which must therefore be omitted, and the bark administered directly. In order, however, to prevent any sense of fulness, either in the stomach or bowels, which might arise from that medicine, and likewise to promote the operation of it upon the constitution, some opening medicine is  
joined

joined to it, so as to procure three or four stools in the twenty-four hours. With this view four, or five grains of rhubarb, may be added to each dose of the bark.

If a delirium, with a considerable degree of wildness and agitation, which sometimes prevail during the paroxysm, continue after the usual evacuations, an opiate given in a moderate dose, and repeated after two or three hours, will in some cases have a good effect in quieting it, and thereby promote a remission of the fever.

A large quantity of wind is sometimes generated in the bowels, producing considerable distension and pain. Clysters, and gentle laxatives, by promoting the expulsion of it, give relief. A drop of oil of peppermint upon a bit of sugar, or two or three spoonfuls of the *Mistura Camphoreta*, procure temporary ease. Though it be a desirable thing to remove this symptom, yet it is not of consequence enough to interrupt the use of the bark, and it will generally be sufficient to add as much rhubarb to that medicine, as will keep the body open.

In the history of the symptoms it was mentioned, that there was sometimes a fore-

ness of the flesh, as if beat or bruised. In one case this was particularly felt in the thighs, which were besides cold, even during the height of the fever, though the legs and feet were hot. The pain and uneasiness were considerable, and occasioned great restlessness and anxiety in the patient. A *femicupium* was used, but the patient's strength would not permit a continuance of it, so as to procure relief. Flannels wrung from boiling water were wrapt so hot round the thighs, that they could not be born by any other part of the body, yet they proved pleasant and gave great ease. A fomentation of this kind was continued for a considerable time, till the fever began to remit, which it seemed much to promote by the ease it procured.

It sometimes happens that there is a pain confined to one spot, with a sense of coldness in the part; and after one or more fits of fever the part mortifies, becoming livid and dead. Instances of this occurred in the *scrotum* and foot, as has been mentioned. Of those affected in the former, I knew of none that recovered; in a case of the latter, warm fomentations, and bottles filled with hot water applied to the part affected, gave considerable relief.

Opiates

Opiates did no good. When the part became livid and insensible, it was scarified, in order to discharge a thin ichorous matter, which procured some ease. The fever was checked by the use of bark, and the patient recovered, with the loss of one toe; but he was subject to relapses for a long time, and did not regain his strength for several months.

When a season proves unhealthy, more particularly at the most sickly time of the year, relapses are very frequent. They are sometimes slight, sometimes severe, but never devoid of danger; for repeated attacks undermine the constitution, and end in dropies, or indurations of the liver or spleen; or perhaps one fit, more severe than usual, puts an end to the life of the patient. In such cases the treatment, during the fever, is the same as is laid down above; that is, an opening medicine in the beginning, James's powder as occasion may require to hasten a remission, and afterwards the bark: for it is to be observed, that those relapses consist of two or more feverish fits, and remissions between. When the constitution becomes liable to relapses, which sometimes take place with a degree of regularity every two, three, or four weeks,

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it is of great advantage to procure a change of air, or what is still better, repeated changes of it by travelling. Easy journies in the cooler and mountainous part of the country, continued for some time, are very efficacious in restoring strength and vigour to the constitution; and in enabling it to resist future returns of the disorder.

The air of Port Royal, which stands upon a bank of sand, that is nearly surrounded by the sea, is pure and healthy, and is frequently of great benefit to invalids, from the neighbouring towns of Kingston and Spanish Town; though in the temperature of the air there be little difference between the three places. Port Royal would be still more healthy, were due attention given to remove dirt and filth from the streets.

Such however is the deep root that the fever sometimes takes, that the relief procured by a change of air is of short duration, and repeated attacks still threaten to prove fatal. Under such circumstances a sea voyage is highly beneficial, and will often accomplish what a change of air alone could not; especially if the time of being at sea can be prolonged to ten or twelve weeks. It was imagined

gined at one time, that this might have been turned to the advantage of the common soldiers, by sending the convalescents to make a cruize on board the ships of war; and some men, belonging to the 1st battalion of the 60th regiment, were accordingly sent to sea. But being unable to lay in sea stock, and not knowing how to take care of themselves on board of ship, they all returned with the scurvy, though free from fever; upon which the plan was laid aside.

The air at sea, in the West Indies, is free from all the pernicious qualities of the air on shore, and there is no climate where seamen enjoy better health, provided they remain constantly on board of ship, and attention be paid to keep the ship clean, and to supply the men from time to time with vegetables or fruits, to prevent the scurvy. The fineness of the weather makes it seldom necessary to shut the port-holes, and therefore they do not suffer from foul and confined air; and almost all the islands afford supplies of fruits, greens, and esculent roots. The ships of war, on the Jamaica station, often enjoy better health than in the English Channel. This being the case, it may be asked how it happens that we  
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lose so many of our seamen in the West Indies? It is owing to the following causes, as far as I could observe, on the Jamaica station, to which my remarks particularly refer, though, I doubt not, they will equally apply to the other islands.

Sailors when sent on shore, either for the purpose of taking in water, or on any other duty, are exposed to the causes that produce the fevers of the country; and in general they give additional efficacy to them, by their own irregularities. It would further seem, that coming from a pure air into one that is noxious, they are nearly in the same situation as new-comers, who are sooner affected, and suffer more from fevers than others, as was mentioned before. In taking in water at the watering-place for the navy, in the harbour of Kingston, it has frequently happened, that every man employed on that service has been seized with a fever, in the course of a few days; and although this be not always the case, it is very rare that the larger proportion do not suffer. Again, the men of war supply the deficiency of their complement by pressing the sailors from the merchant ships; to avoid which, many of the men leave their ships as soon

soon as they make the land, and lurk in the country or towns, till an opportunity offer of getting on board a trading ship, or till they fall into the hands of a press-gang. Those men, as well as the sailors employed in the pressing duty, are all exposed to the usual causes of sickness, and after going on board the king's ships, many of them are seized with fevers. This has been particularly remarked, in those ships that have been manned entirely in Jamaica; which happened, when ships taken from the enemy were bought into the service of government; and upon some occasions of this kind, the mortality has not been less among the officers than the men, owing, apparently, to the former having taken an active part in the pressing service. I am not ignorant that it has been supposed, that the foul state of the ships taken from the enemy, has produced contagious fevers, to which the mortality alluded to has been imputed. But it is worthy of remark, that there was no contagious fever among the enemies' men, while on board the same ships; and that though they were dirty, there was no confined air, and it is the latter only that is known to produce what are called contagious fevers. But what  
appears

appears to be of more force than either of those arguments is, that many of those who died had the yellow fever, which is sufficiently characteristic of the distemper of the country, and is an appearance rarely to be met with in contagious fevers.

Besides the pressing and the watering services, there are many smaller matters that render it necessary to send boats ashore, and without particular care the men will straggle into the country, or about the towns, which is rarely done with impunity, especially at the unhealthy season of the year. Ships may likewise become unhealthy, though none of their men go on shore, if stationed near to marshy ground, and to leeward of it. To those causes, which introduce fevers into the fleet, may be added another source of the mortality, which prevails among our sailors in the West Indies, that the surgeons of the navy are not supplied with the most essential medicine for their cure, at least in proper quantity; I mean the Peruvian bark: nor can they afford to purchase it in that part of the world\*.

\* It sometimes sells for two guineas a pound.

Having thus stated shortly, the principal causes of mortality, in the fleet in the West Indies, it will not be deemed digressing too far, to mention in a few words the remedies that may be used to counteract them.

I. Sailors should not be allowed to go on shore, when it can possibly be avoided.

II. Negroes should be employed for the watering service.

III. The surgeons should have an allowance of bark from government, while upon that station.

In order the better to reconcile the sailors to remain on board of ship, while in harbour, market boats under proper regulations should not only be allowed, but encouraged to come to the ship, that they may have an opportunity of laying out their prize-money, in whatever articles they please, that are not pernicious to them.

The purchase of Negroes for the watering service would be a considerable expence, but nothing when compared to the loss sustained by the death of so many seamen, rating them merely at the sum they cost government, and laying aside such considerations as are derived from humanity. The life of a sailor in the  
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West Indies cannot be rated at less than fifty pounds; and even at that computation, which is much too low, the number lost in watering a few line of battle ships, far exceeds the expence of purchasing negroes. But a sufficient number might be provided with no additional expence, if every ship were to have a certain proportion of negroes, according to their complement, as one in twenty or twenty-five. They might be hired of their masters, or entered if free, and turned over by the ships leaving the station, to those that arrived there. A similar practice is found very useful in the army. All the negroes, on board the ships in the harbour, might when needful be employed in filling water; nor would they, like Europeans, suffer from fevers; for, though not entirely exempted from that disease, they are but slightly affected by it.

The expence of supplying the navy surgeons with bark, is too inconsiderable to be any just bar to a plan, which has for its object, a matter of ~~so~~ much consequence, as that of saving the lives of our seamen.

To return to our subject; a voyage to sea often entirely restores the health, and seldom or ever fails to procure a considerable temporary

rary amendment. Should however the fever still return in a formidable way, there is but one thing remaining to be done, which is, to go to a colder climate, either in Europe or North America. The health is generally much improved during the voyage, and in a cooler and more healthy climate, is often completely re-established in a few months. But this is not always the case, for the constitution is sometimes so materially injured, as not to admit of a speedy restoration. The sick remain subject to returns of fever, at various intervals, for the space of six, twelve, or even eighteen months after their arrival in Europe. The attacks, it is true, are neither so violent, nor so frequent as they would have been in the West Indies, but still they are considerable enough to prevent the recovery of strength, and to keep the sick in a state of great languor and dejection. During the feverish fits the stomach and bowels are often much disordered, and if vomiting be excited, more or less of bile is brought up, and from this circumstance such persons are said to be bilious. The salutary influence of a cold climate will, in most cases, gradually restore health; the good effects of it are however promoted by gentle

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exercise, in the open air when the weather is fine, as riding on horseback; by opening medicines of an easy operation, during the attacks of fever; by the occasional use of bitters, bark, and chalybeate medicines to strengthen the stomach, and constitution; and by sea-bathing during the warmer months.

To return to the treatment of the fever in Jamaica, it was mentioned that the bowels were at times affected with dysenteric symptoms: if they were slight, they sometimes yielded to the purgative given in the beginning; but when they did not, something of an opening nature, as a few grains of rhubarb, was added to the bark. If the affection of the bowels did not give way to this, and the dysentery might be said to constitute the principal disease, the method of cure was the same as will be mentioned, in treating of that disease.

When there was a combination of cat-boils with fever, the former required no particular treatment; care however was to be taken that no violence was offered to them; for if an attempt was made to squeeze them, or if they were near a joint that was necessarily much in motion, as the elbow-joint, they became excessively

cessively painful, inflamed all round, and formed a real carbuncle.

Of the tetanus, as a symptom of fever, I have little to observe. The methods of cure hitherto recommended in every species of this disease, are at least uncertain, if not altogether inefficacious. A new remedy answered well in one case, and although little can be inferred therefrom, it may deserve to be noticed in a complaint, where our knowledge is so limited. It consisted of an electuary made of the flower of mustard \* and common syrup, of which one or two tea spoonfuls were given every two hours, or even every hour if the throat and stomach would bear it. In two days the symptoms yielded, the patient could open his jaw, and the rigidity of his limbs and body went off; the medicine was therefore laid aside. But in less than two days the symptoms recurred, the electuary was given as before, and again the disease seemed to yield to it. Whether this was to be ascribed to the medicine, or was merely fortuitous, must be determined by future trials. Hippocrates

\* I was led to make trial of this in consequence of a conversation with the late Dr. H. Saunders, who said he had heard it had done good in tetanus.

orders black hellebore and pepper in this disease\*.

In the case of hydrocephalus, that was a consequence of the fever, blisters to the forehead, temples, and back were ineffectually applied; and it was intended to have given *calomel* in small doses, as the most probable means of promoting an absorption of the water, but the patient died before a trial of it could be made.

The fever has many intermediate degrees of violence, between the severe attack that puts an end to life in one or two days, and a form so slight, that the presence of a fever is hardly suspected. There is lassitude, a want of the usual appetite for food, disturbed sleep, and, what is chiefly characteristic of the fever, a white tongue. Such symptoms will continue for several days, without giving any alarm, though they are always ready to be converted into a severe illness, when aided by an additional cause. A dose of physick will often remove them all, and a gentle emetic will frequently have the same effect; but the former was commonly preferred, as being

\* De Morbis, lib. iii.

fully more effectual, and easier in its operation. James's powder, given in the quantity of eight or ten grains at bed-time, and repeated for two or three nights, will often restore the health, without producing any sensible operation. One particular advantage derived from it, is to take off the heat and restlessness, which are extremely troublesome in the night. Travelling by easy journeys, or making short excursions from the usual place of residence, are highly beneficial, and will often completely re-establish the health.

Before I conclude, it may be allowed to observe, that the practice had two leading objects in view; to procure a remission; and to prevent a return of the fever. The first was obtained chiefly by opening medicines, and James's powder; the second was accomplished by the bark in different forms. The advantages of this practice over that, in which more time is spent in cleansing the *primæ viæ*, as it is expressed, and where the first remission is usually sacrificed to that purpose, are, that the fever is sooner checked, the constitution of the patient suffers less, the recovery of strength is quicker and more complete, and relapses happen less frequently. The longer

the fever continues, the more mischief is done; nor is there the smallest appearance of its having a regular progress towards a crisis, to wait for which would be time irretrievably lost. The means of cure are few and simple; the greatest difficulty is in watching the proper times of using them, and in administering them with diligence and assiduity. I found them so seldom disappoint me, that there were few besides of the long list of medicines, usually recommended in fevers, to which I had recourse. As the practice however was not reduced all at once to so much simplicity, but at first trials were made of several of the remedies in common use, it may not be improper to mention shortly the results of them.

Blood-letting well deserves to be considered in the first place. In such cases as seemed most to require it, for example, where the patient was young, strong, of a full habit, and lately arrived from Europe; where the pulse was quick and full, the face flushed with great heat and head-ach, and all these at the beginning of the fever, bleeding did no good. It neither diminished the symptoms for the time, nor procured a speedier remission. I  
cannot

cannot say, however, that it did that mischief that has been imputed to it by some; for, provided it were in a moderate quantity, it could hardly be said to produce any ill consequences. But if it were copious, or repeated a second time, it was always hurtful, and rendered the recovery of the patient extremely slow, if not attended with worse consequences. This effect it had in the inflammations of the lungs that sometimes happened, in which it was necessary to bleed freely. It will not be considered as a recommendation of bleeding to say, that there were some cases in which it did little or no harm, if used moderately; yet such is the conclusion, to which the observations, I had an opportunity of making, lead me. The general use of copious bleedings in fevers, in which there is no local inflammation, would indeed appear to have been introduced into practice upon hypothetical principles. A fever was supposed to depend upon a fermentation in the blood and humours, whereby great commotions were excited, like to what happens in fermenting liquors, and by drawing off part of the blood, it was intended there should be more room for the remainder, to go quietly through the process of fermentation,

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tation, and despumation. Sydenham \* gave some sanction to these ill-founded opinions, and they were afterwards carried to greater lengths, and wrought into a system by the genius of Boerhaave †, in whose school it was an axiom, almost without exception, to bleed in the beginning of fevers,

Vomits are much used in fevers in the present practice, but I did not find them of advantage in the Remittent Fever of Jamaica; on the contrary, when that disease is violent, the worst symptom is a retching or vomiting, which is greatly aggravated by emetics; and under such circumstances they are inadmissible. But when the stomach is not in an irritable state, and there is little or no disposition to vomiting, it is easily excited by an emetic, and often allayed with difficulty. In all cases a vomit ruffled and fatigued the patient more than a purge, without procuring equal relief; and if a vomit were given during the paroxysm of the fever, it was generally deemed necessary afterwards to give a purgative, before the bark could be administered; by which a whole remission was often lost. The notion enter-

\* Sydenham, Febr. Contin. an. 1661, 62, 63, 64.

† Boerhaave Aphorism. 615.

tained by some, that bile is the cause of the fever, led to a frequent use of vomits, and sometimes with the most pernicious effects; for the stomach was rendered so irritable thereby, that wine, nourishment, or even a glass of water could not be retained, but were thrown up almost as soon as swallowed. Emetics given in small doses, and repeated at short intervals, so as to excite and keep up for some time a nausea or sickness at stomach, were not less pernicious than when employed for the purpose of evacuating the bile. In both cases the stomach was rendered incapable of receiving the bark, the only medicine we are yet acquainted with, that possesses power to stop the progress of the fever.

I did not find, that I could by any means contrive to give the emetic tartar so, as to produce the same effects as James's powder; the peculiar advantage of which is, that it does not so readily affect the stomach as emetic tartar, but operates chiefly by purging, or sweating. These effects probably depend upon its being a calx, and not a saline preparation, of antimony. A saline preparation being in a state of perfect solution affects the stomach directly, whereas a calx acts slowly,  
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and passes into the bowels before it produces its full operation. James's powder appears, however, to be superior to any preparation of the *antimonium calcinatum*, that we are yet acquainted with, which is probably owing to the process by which it is made, being of that kind that determines exactly the degree of calcination, upon which the virtues of antimonials are known chiefly to depend.

The red Peruvian bark was not found more effectual than the common kind; on the contrary, there were considerable objections to the use of it in the cure of the remittent fever. It frequently affected the stomach and bowels, producing sickness, and sometimes vomiting, with flatulence, griping, and purging. Those effects were often troublesome, and retarded the cure; the common bark was therefore, after making comparative trials, preferred to the red bark. The prejudices, that formerly existed against the Peruvian bark, are no longer in being. They were founded in idle speculations, and originated with the learned, from whom they descended to the great body of the people; but even with the vulgar they are now extinct. Any attempt to prove, that the obstructions  
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of the *viscera* are the effects of the disease, and not of the medicine, would at this time be deemed impertinent. The greatest and indeed the only evil arising from the bark, that has fallen under my observation, has been to excite sickness, nausea, and vomiting, when it has disagreed with the stomach. Those effects it generally produces, if it be given during the paroxysm of the fever. A desire to administer early this great specific, sometimes led to a practice of this kind, but nothing was gained by it, as it was almost always rejected by the stomach. Nay, there was some danger of raising a disgust in the patient to the medicine, which might continue during the remission.

Blisters were often applied by some in the cure of the fever. It will be obvious, that there must be a degree of uncertainty, in appreciating the effects of a remedy, which does not complete its operation in less than twelve or fifteen hours, in a disease that consists of remissions and exacerbations, following each other at no fixed or regular periods. Under such circumstances, remissions must often occur during the operation of the blisters, but there was no reason to think that they were promoted

promoted by them ; and the blisters certainly had no effect in preventing future attacks of fever. In cases of great stupor and insensibility, where it might have been expected they would have been most useful, they did no good. When the fever was violent, and the paroxysms long, it frequently happened that the blisters rose well, and produced their full effect, yet the fever went on, as if no such application had been made. Finding that they neither shortened the fit, nor prevented future returns ; that the discharge from them was often so considerable, from the dissolved state of the blood, as greatly to weaken the sick ; that they frequently produced ulcers that were healed with much difficulty, and sometimes mortifications that proved fatal ; I laid aside the use of them entirely, unless the sick were distressed with a bad head-ach, for which symptom they were in some sort a specific. The same objections were found to hold good against sinapisms.

The class of alexipharmic and cordial medicines, I made little or no use of, having found wine to be not only more grateful to the sick, but also much more effectual in answering all the purposes, for which such medicines are given.

SECT. III. *Of the Nature and Causes of  
the Remittent Fever.*

I HAVE purposely avoided conjectural, or speculative reasoning on this disease, and have confined myself to a simple narrative of symptoms, appearances, and effects of medicine, as learned from observation and experience. Theoretical disquisitions into the nature and causes of diseases have often done much mischief, and seldom any good. Our knowledge of the animal economy is hitherto so limited, that it enables us to make little or no progress in such undertakings; and analogies from chemistry, mechanics, and other sciences, however well imagined, or speciously decorated, have been found unequal to the explanation of the *phænomena* of living bodies. It may be a question, whether all such investigations should not be excluded from the study of physic; and there are many that would not hesitate to answer in the affirmative. But there is considerable difficulty in this; the mind cannot make observations without comparing

paring them, without tracing their resemblances, and marking their relations; and unless restrained by the laws of true philosophy and just induction, it hastens to conclusions that must be erroneous, because derived from inadequate *data*. To this impatience of the human mind under doubt and uncertainty it is to be imputed, that, from the earliest annals of Physic, various doctrines, generally derived from the prevailing philosophy of the time, have been adopted as principles, from which the nature and causes of diseases have been attempted to be explained. With how little success, but too plainly appears from the discordant opinions of Writers, Teachers, and Physicians on such subjects. It is far however from being my intention to suggest, that the human mind is altogether unequal to such inquiries; on the contrary, whenever they shall be conducted in the same way, that has so much extended science in other branches of natural knowledge of late years, there can be no doubt of their ultimate success. But that physicians in general have been tardy in adopting, and reluctant in applying to their art, the rules of just reasoning by sober induction, is a reproach from which, I fear, we cannot be vindicated. |

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In investigating the nature and causes of the remittent fever, I deem it of more importance to examine the opinions of others, than to advance notions of my own; and if it be considered, that the received idea of the cause of a disease has generally great influence in directing the practice, the present inquiry will not be thought altogether useless.

That the bile is the cause of the remittent fever, is an opinion more commonly received than any other; it is of the highest antiquity. In a disease that usually begins with sickness and vomiting, the discharge of a fluid possessing such peculiar properties, both as to taste and colour as the bile, could not fail to make a strong impression on the first observers. It was natural for them to conclude that, that fluid, which they had seen nothing of while the body continued in an healthy state, was the cause of the disease; and the relief the sick are sensible of, from the sweating that usually follows the retching and vomiting, and the consequent discharge of bile, would confirm them in this opinion. It could not be long, however, before they would learn that the bile was a natural secretion, which was constantly going on in an healthy state, and there-

therefore that the fever could not be imputed simply to the presence of bile, for then nobody would be without a fever. It was supposed, that the bile was in fault either in quantity, or in particular acquired qualities. It was either acrimonious, putrid, or in too large a quantity; or perhaps faulty in all those respects. Such are the opinions delivered by the oldest medical writers, and they are received by many of the present day with little variation, and considered as applying particularly to the remittent fever.

That the bile in a natural state is perfectly harmless, at least as far as relates to the production of fevers, we have daily proofs, in its being most intimately diffused all over the body in jaundice, without exciting any febrile disorder. The proofs of this fluid being in a putrid, or acrimonious state, are taken from the changes it undergoes in colour and consistence. The natural colour of it is yellow, but it is often vomited green, and sometimes of a dark brown colour, or almost black, and of a ropy consistence. The quantity has generally been supposed to exceed what is natural; yet I apprehend it is not an easy matter to ascertain, how much bile is secreted

in an healthy person, and unless that could be done, it is difficult to say, at what point the quantity discharged, exceeds that of the healthy secretion.

The green colour of the bile is known to depend upon an acid in the stomach; for experiments have taught us, that the most healthy bile would acquire a green colour, if mixed with an acid liquor. That an acid is often generated in the stomach we have daily proofs, both in the sour taste of what is brought up from the stomach, and in the teeth being set on edge by it. I have seen an instance of fever, in which it was necessary to give from half an ounce to six drachms of the powder of oyster-shells, to destroy the acid that was generated in the course of the day, which otherwise occasioned great pain and retchings. The green colour therefore is not to be imputed to any acrimony, or other bad quality in the bile, but to disease in the stomach.

The dark brown colour of the bile, and ropy consistence, are nothing more than natural changes, produced by its stagnating for some time in the gall-bladder and biliary ducts. The thinner parts of the bile are absorbed,

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and what remains becomes both of a deeper colour, and thicker consistence, as happens in other secretions.

The bile is not a fluid that has a strong tendency to putrefaction, but the contrary; and there are no facts to prove that it is ever thrown up from the stomach in a putrid state; it is not therefore consistent with the rules of just reasoning, to suppose such a state for the purpose of explaining the *phænomena*.

The great quantity of bile, that is often discharged, is to be attributed to the retching and vomiting. In sea-sickness the quantity of bile that is thrown up, is often as considerable as in the remittent fever, yet it cannot be supposed to be the cause of sea-sickness or vomiting, but, on the contrary, is the effect of them; and, though discharged most profusely, is never accompanied with any fever. A vomit, that operates strongly, never fails to bring up a large quantity of bile, which does not appear till after repeated strainings and retchings: the usual contents of the stomach are first discharged, and after a time the bile. The progress is the same in the remittent fever, the contents of the stomach are first thrown up, and if the vomiting  
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continue, the bile afterwards makes its appearance. So far, therefore, is it from being the cause of the sickness and vomiting, that it does not even find its way into the stomach, till the straining has continued some time. The large quantity thrown up may depend on two causes; the violent vomiting, which in all cases excites a most copious flow of bile; and the operation of digestion being at a stand, the flow of the bile into the duodenum is not promoted; for the distension of the stomach by the food occasions a compression of the gall-bladder, which not taking place, the bile is collected in a large quantity, and when vomiting comes to be excited, is of course more copiously discharged. It is in this way that Morgagni \* explains, why the gall-bladder is often found distended with bile after death; but I am inclined to think that there are other circumstances, that should be taken into the account. Glands, and excretory ducts have their peculiar *stimuli*, which excite their actions, and produce a copious flow of their secreted liquors. Thus, the saliva flows as soon as any thing sapid or grateful is taken into the mouth; and tears run from the eyes

\* Morgagni de Sedibus & Causis Morb. Ep. 68. § 3.

when certain pungent effluvia fill the nostrils, such being sufficient to excite the action of the lachrymal glands. There is reason to think that the same principle holds in the more internal glands, whose operations we cannot so well observe; and that the food taken into the stomach excites the secretion of the gastric juices, and after passing through the pylorus proves a stimulus equally powerful, in promoting the flow of the pancreatic juice and bile into the duodenum, there to be mixed and blended together, for purposes in the animal œconomy, which we do not yet understand. It is probable therefore, that this natural action contributes more to the evacuation of the gall-bladder, than any mechanical pressure of the stomach; and when digestion is at a stand, the bile of course will accumulate, till it be discharged by vomiting or purging. The collection and stagnation of the bile produce the deep colour and ropy consistence, which it sometimes acquires. It deserves to be remarked, that in the stage of the fever which is most commonly imputed to bile, the first marks of the disease are loss of appetite and slight sickness at stomach\*,

\* Vide p. 76.

which

which are often present for a whole day before the attack of fever, and during that time the bile is collecting, and accumulates in the ducts and gall-bladder.

Thus, the quantity of the bile, as well as its supposed bad qualities, depending upon causes that have no necessary connection with the remittent fever, and occurring wherever those causes are to be met with, even where there is no fever, it is not allowable to impute to bile, or any change it is yet known to undergo, the production of remittent fevers. There are not wanting other proofs to shew, that the discharge of bile is merely an accidental symptom; for cases frequently occur where no bile is thrown up at all, and yet the fever is as regularly formed, and as violent, as when that fluid is discharged in large quantities. Indeed the discharge of bile is often intirely owing to the use of emetics, and is always greatly increased by them. It would be of little moment to investigate this subject, did it not involve opinions productive of the worst consequences, in the treatment of the disease. If bile, whether putrid, acrid, or superabundant, be the cause of fever, can any thing be so proper as to promote the discharge

and evacuation of it by vomits? Emetics, therefore, upon this ground are given, and repeated; and as bile is discharged every time, an argument is thence deduced for their future repetitions; without reflecting that while life remains, a strong vomit will always bring up bile, in the same manner that any irritation upon the eye would produce a flow of tears. But in the remittent fever of Jamaica there is not room for many repetitions of vomiting, except in slight cases indeed; for the irritability of the stomach peculiar to the disease, if increased by an emetic, renders it impossible for a time, to administer any medicine to check the progress of the fever, and a second or third attack under such circumstances will generally prove fatal\*.

While it has been generally agreed to consider the bile as the cause of the remittent fever, a symptom of the disease so remarkable as to give rise to a new name, I mean the yellowness of the skin, in consequence of which it is called the *yellow fever*, has been derived from another source, and not imputed to the bile; though that be the only cause

\* See note F in the Appendix.

we are hitherto acquainted with, which produces a yellowness of the skin. The colour of the skin, in the yellow fever, has been supposed to arise from a putrid and dissolved state of the blood.

In speaking of the symptoms of the disease, it was observed, that the yellowness first appeared in the eyes, then upon the neck and shoulders, and at last all over the body, holding exactly the same progress as in the jaundice. At the same time that the skin becomes yellow, the urine is voided of a deep colour, and tinges a bit of linen rag yellow, as in the jaundice. When the sick recover from the fever, the colour gradually disappears as in that disease. The progress of the symptoms, as far as respects the yellow colour, being exactly similar in the remittent fever and the jaundice, it is consistent with reason to believe, that the colour proceeds from the same cause in both, that is, from the bile being absorbed, and carried by the lymphatic vessels into the general mass of circulating fluids. In jaundice the bile is absorbed when the ducts, that should convey it into the duodenum, are obstructed. The most common cause of obstruction is undoubtedly biliary *calculi* or concretions,

and sometimes scirrhus tumours compressing the ducts. It is not so obvious, what the cause of obstruction is in the remittent fever; but before hazarding any conjecture upon that head, it may not be improper to consider, what foundation there is for the opinion, that the yellow colour depends upon a putrid or dissolved state of the blood.

Without examining whether the term *putrid* can be applied with propriety to the blood, while in the living body, the present question may be confined to this point; how far the yellow colour can be produced by any change of the blood, whether induced by putrefaction, or a dissolution of its substance. A putrid and dissolved state of the blood, as it is commonly expressed, occurs chiefly in the advanced stages of sea-scurvy, in certain fevers, and in some morbid and undescribed conditions of the body. In all those the blood is known to be in a dissolved state, by oozing through the vessels, and sometimes through the pores of the skin, and producing spots of various kinds upon the skin. There is perhaps no disease, in which the blood is in a more dissolved state, than in the sea-scurvy; yet it never produces a yellow colour of the  
skin

skin in that disease. The discolouring is not uniform, but in spots or wheals, which are at first red or a purplish black, or of some intermediate shade, the colour being more or less deep according to the quantity of blood that is effused. The same thing is observable in the dissolved state of the blood, that happens in fevers; and in neither is the colour of the eye affected. When the spots begin to disappear they leave indeed a yellow tinge in the skin, like to what happens after a bruise; but this yellowness is confined to the spots, has a marbled appearance, and is not generally diffused over the skin. The dissolved, or as it is called, putrid state of the blood, being incapable of producing the yellow colour in the eyes and skin, and the absorption of the bile being the only cause we are hitherto acquainted with that can produce those effects, there is no reason to doubt, that it is the cause of the yellowness, and that the yellow fever is in no other respects to be distinguished from the remittent fever, than in having a jaundice superadded\*.

Next to the opinion that the fever proceeds from bile, none is more prevalent than

\* See note G in the Appendix.

that

that it is of a putrid nature; and that the whole mass of humours are running violently into putrefaction. If it be asked what is meant by the term *putrefaction*, it will doubtless be answered, that species of fermentation or change, which dead animal matter in a certain degree of heat and moisture, joined to an admission of air, spontaneously undergoes. That such is the acceptation of the term cannot be doubted, when it is observed that in reasoning on this subject, whatever is found to check putrefaction out of the body, is supposed to have the same effect taken internally, and is therefore recommended in diseases believed to be putrid; and whatever promotes putrefaction out of the body, is supposed to be noxious, and is therefore avoided. Putrefaction dissolves bodies, and the dissolution is accompanied with an offensive smell. In the fever, the blood is sometimes in a dissolved state, and there often proceeds from the body of the sick a peculiar smell, extremely disagreeable: so far there is a resemblance, but it goes no farther. In the dead body the first signs of putrefaction are an offensive smell, and change of colour in the skin of the abdomen, which becomes greenish.

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There is no similar change in what is called the putrid fever. It may be alledged, that putrefaction is a different thing in the living, and in the dead body. But if this be admitted, and putrefaction in a living and in a dead body are allowed to be different processes, inferences drawn from one can never be applied to the other, and the greater part, if not all, of the reasoning adduced on this subject, must fall to the ground.

Were it to be granted, that the dissolved state of the blood was the effect of putrefaction, there would still be no good ground to infer, that it was the cause of the fever. It is consistent with reason, that the magnitude or intensity of the cause, should be proportioned to the greatness of the effect. In all cases, therefore, of the fever there should be some marks of putrefaction, and a violent degree of the disease could not be supposed to exist without them; yet this is by no means agreeable to observation. In many of the worst cases of fever, and which suddenly prove fatal, there are no appearances of the blood being in a dissolved state, nor are there any other marks of putrefaction. How then can putrefaction be supposed to be the cause of a disease,

disease, which often exists in the most violent degree, and frequently puts an end to life, without the faintest traces of the existence of such a process?

If we examine more minutely into this subject, it will appear, that the opinion of the putrid nature of the disease is founded on a vague analogy, which will not stand the test of experiment, or observation. The dissolved state of the blood has been considered as the most unequivocal mark of the presence of putrefaction; but the dissolution of the blood in scurvy has been found not to proceed from putrefaction, for such blood does not putrify sooner than any other, which it ought to do, if already in a putrid state, when taken out of the body\*. If the dissolved state of the blood in scurvy do not depend on putrefaction, there is little reason to suppose, that in fevers it is owing to that cause. The dissolution often takes place in the course of a few hours, which cannot be explained from any thing observed to happen in putrefaction, which is a process that goes on slowly and regularly. The offensive smell proceeding from the persons of the sick, which is believed to depend upon

\* Lind on the Scurvy.

putrefaction, is very different from that which arises from dead subjects in a dissecting room, as will be readily admitted by any one that has had experience of both; yet they ought not to differ, if they both depended on the putrefaction of an animal body. But farther, it often happens that the dead bodies have so little of an offensive smell, that it has been matter of surprise to those that have opened them\*. There appears indeed to be no foundation for believing, that putrefaction is the cause of the remittent fever, or of any of its symptoms, either when in the mildest, or most fatal form. The hypothesis, though not productive of equal mischief in the treatment of the disease, as a belief of its bilious nature, is neither of use in explaining the symptoms, nor in the cure; besides, it gives rise to some ill-founded notions, one of the worst of which is a belief, that as the fever is of a putrid nature, so it must be infectious.

There is hardly any part of the history of a disease, which it is of more consequence to ascertain with accuracy, than its being of an infectious nature, or not. Upon this de-

\* See Mr. M'Colme's Dissections, which are given p. 160.

pende the propriety of the steps that should be taken, either to prevent it, or to root it out. It is productive of great mischief to consider a disease as infectious, that really is not so; it exposes such as labour under it to evils and inconveniencies, which greatly aggravate their sufferings, and often deprive them of the necessary assistance. They are neglected, if not shunned; and at the time they require the greatest care and attention, they are in danger of being deserted. I have had occasion to observe that the remittent fever, whether with its usual or more uncommon symptoms, with the yellow colour of the eyes and skin or without them, was never found to be infectious. The strongest proofs of this, in my opinion, were to be met with in private families, where the son, the brother, or the husband, labouring under the worst fevers, were nursed with unremitting assiduity by the mother, the sister, or the wife, who never left the sick either by day or by night, yet without being infected. That such near relations should take upon them the office of a nurse, is matter of the highest commendation in a country, the diseases of which require to be watched with greater care and attention, than

than can be expected from a servant. They are under no fears of the fever being infectious, and I never saw any reason to believe it to be so, either in private families, or in the military hospitals. There appears not to be any necessary connection between infection and putrefaction, even supposing putrefaction to exist in a living body; infectious diseases are not necessarily putrid, nor are diseases, supposed to be the most putrid, as the scurvy, in the smallest degree infectious. The operation of a cause, generally diffused, is often mistaken for the effects of infection\*.

Some have attempted to explain the *phenomena* of fever, by deducing them from one or other of the symptoms. The appearances have been supposed to depend upon the cold fit, and a constriction, or spasm, of the blood-vessels of the skin: but in the remittent fever there is often no cold fit, and it happens frequently, that the sick have the most profuse sweats without any abatement of the symptoms. The use of emetics in small doses, with a view to remove the spasm from the vessels of the skin, by producing sickness, and thence a disposition to perspire, is evidently

\* See note H in the Appendix.

liable to the same objections, as when had recourse to for the purpose of procuring a discharge of bile. Though the intention be different, the effect is the same upon a stomach highly irritable from the nature of the disease, and thence easily thrown into violent contractions.

Some have alledged the cause of the fever to be seated in the stomach. It cannot be denied that, in general, that organ suffers as early, and in as violent a degree in fevers, as any other in the human body ; but it must be a vain attempt, to seek for the cause in any one of the symptoms, when every function of the whole frame is deranged.

The voluntary, and involuntary motions are equally affected, as are also the senses, and operations of the mind. The muscular fibre cannot contract with its usual force, and thence a general loss of strength ; the motion of the heart is too quick, and often irregular ; the respiration is interrupted with frequent sighings ; the stomach loaths food, and is unable to digest it ; and the bowels are either too slow, or irregular in their action. The secretions, as of the mucus that lines the mouth, the urine, and the sweat, all undergo a change.

Vision

Vision is neither clear, nor distinct; objects dance before the eyes, and even the impression of light is painful. The sense of hearing is either disagreeably acute and offended with all kinds of impressions, or very dull. The taste is changed, what was sweet before is perhaps salt, and what was highly grateful is become nauseous. The sense of smelling is equally perverted. The touch no longer judges of the degree of heat with truth, and the distressing symptoms of restlessness and constant change of posture, are in part owing to a morbid sensibility of every part of the body.

The operations of the mind are no less deranged than those of the body. An exertion either of the memory or judgement is fatiguing and painful, and after a short continuance impracticable. Mental impressions are indistinct, or erroneous. The imagination is wild and confused, and paints to itself a thousand scenes full of error and delusion; and that faculty, by which the mind distinguishes the objects that pass in the imagination from the real impressions, is weakened, sometimes destroyed, and thence delirium, at one time like a fit of madness, at another like a waking dream. The sleep neither brings rest

to the body, nor quiet to the mind; and after a time the whole faculties of the soul are overwhelmed by stupor, and general insensibility.

Such being the *phænomena* of fever, it is impossible to derive the symptoms from an affection of the brain and nervous system; for we often find all the functions of the brain and nerves deranged by local causes, as in palsy, mania, and other diseases as much as in fevers, yet the motion of the heart, and operations of the stomach, go on as in health, with little variation. Again, the pulsations of the heart are often as quick and irregular as in fever, from diseases of the heart, and surrounding parts, as ossifications of the valves, and dropsies of the thorax; yet the other functions are but little deranged, and there is no fever. The same reasoning will apply to the stomach; the functions of which, from local diseases, as scirrhus, and cancer, are often as much affected, as in the remittent fever, yet without producing that disease.

If it should be asked what explanation can be given of the *phænomena* of fever, I am ready to acknowledge my own ignorance; yet as it is impossible to give due attention to  
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the appearances of fever, without this question presenting itself to the mind, I will state shortly, what would seem to be a proper mode of investigating the subject.

The cause of the remittent fever is evidently the exhalations of wet or marshy ground, which may be considered as a poison to the human body \*. The examination of those exhalations is the first step in the inquiry. It is easier to point out what are not, than what are the noxious parts of those exhalations. Simple moisture in the air is perfectly harmless, in so far certainly as relates to the remittent fever. Marshy ground is known to produce inflammable air, which is found to be fatal when breathed of a certain strength, but when mixed with common air, it is not known to produce any mischief †. Were inflammable air the cause of fevers, they would be frequent in mines, which is not the case. Though the cause of fevers is not found in the inflammable air, yet the offensive smell of marshes is in a great measure owing to it. Experiments made upon mixtures of mould and small proportions of de-

\* Cullen's First Lines, Vol. I. § lxxxiv, ci.

† Philos. Trans. Vol. LXIX. p. 337.

caying vegetable and animal matter, kept moist, and in a certain temperature, might throw some light on the subject. The different kinds of elastic vapour arising from such mixtures, should be carefully examined; and the various species of *Mucor*es that come upon their surface, and the insects that breed in them, should be noted. This investigation must be extremely delicate, but considering the great progress that has lately been made in the examination of all kinds of air, or elastic vapour, it is not to be despaired of.

The next question is, how does the poison gain admission into the body? It may be by the lungs in respiration; by the absorbing vessels of the skin; or, by adhering to the *fauces* in respiration, it may be swallowed with whatever is carried down into the stomach.

Late experiments give reason to believe, that there is a portion of the air which enters the lungs in inspiration, absorbed by the blood passing through the blood-vessels\*. This portion would appear to be chiefly, if not altogether, the dephlogisticated air, which constitutes about a fifth part of atmospheric air. This air therefore uniting with the

\* Priestley on Air, Vol. III. Sect. 5.

blood and entering into the circulation, may carry along with it any poison diffused through the atmosphere. The lymphatic vessels in the lungs may, possibly, absorb any poison that is mixed with the air.

There are numerous proofs of fevers being occasioned by the absorption of poisons from the surface of the body. In mortifications of the lower extremities, the absorption of a poison has been traced by inflamed lymphatics, and consequent swelling of the glands in the groin, which have been followed by a fever of some days continuance. An elderly woman, with an old sore in her leg, was subject to fevers, which held her several days; they were preceded by pain and swelling in the groin of the side on which the sore was; and there were red lines observable on the skin, running from the sore to the groin, the marks undoubtedly of the poison passing through the lymphatics. In such cases there is an evident source of the poison; but I have met oftener than once with the same swelling in the groin, followed by a considerable, sometimes a violent degree of fever, and the course of the poison could be traced by the inflamed lymphatics to the leg, where, however, there was no sore.

Similar cases are, I doubt not, frequent; but the language of the sick is apt to mislead the inquirer, for in general they say the fever has fallen into the leg, as if the affection of the leg were a consequence of the fever; whereas, the swelling of the glands of the groin will be found to have preceded the fever, and indeed it is commonly the first symptom to which attention is paid. Some fevers of this kind are very violent, and begin with severe rigors, which are followed by great heat, delirium, and other alarming symptoms; but what the poison is, I have not yet met with any case from which I could form a conjecture. Many more facts might be adduced to shew, that fevers often arise from the absorption of poisons from the surface of the body; it is probable that the plague is communicated in this way, and that the buboes are not critical, but traces of the route by which the poison gets into the circulation.

The loss of appetite and sickness at stomach, which are common in the beginning of fever, may give reason to suspect that the cause of fever is first conveyed into the stomach, being mixed with the saliva and the mucus that lines the fauces, and so swallowed; and this suspi-

suspicion may appear to some to be confirmed, by the good effects of such medicines as evacuate the stomach and bowels, upon the first attack of fever. But it ought to be recollected, that in the inoculated small pox, a febrile disorder evidently depending on a poison entering by absorption, the first symptoms are loss of appetite, and sickness at stomach.

The poison having got admission into the body, the laws that regulate its operations are next to be inquired into. The violence of it would appear to depend upon two circumstances, which are found to have great influence upon the operation of many other poisons; the quantity and virulence of the poison; and the body having been more or less habituated to it\*. The poison appears to be strongest as it rises from the ground, and becomes weaker as it is more diffused, and mixed with a larger proportion of air. Houses on the ground are more unhealthy than those that are elevated†. The neighbourhood of marshes is also unhealthy, particularly such places as lie to leeward of them; and as you recede from the marsh there is less sickness, till at

\* See note I in the Appendix.

† Bontius, Med. Ind. cap. xii.

last you get beyond its sphere of action, and that at no great distance. Fort Augusta is seated on a bank of sand, behind it is an inlet of the sea, and beyond that a considerable extent of marshy ground. The land wind blows every night from the marshes towards the fort, and they are not in a direct line three miles distant, yet they are not productive of fevers. How much less than three miles might be sufficient to do away the noxious effects of the exhalations, I am not in possession of facts to determine. It is probable that the distance may be affected by various circumstances; as the extent of the marsh, or the disposition of the hills in the neighbourhood, which may confine as in a funnel the streams of air, and give them a particular direction.

After the human body has been exposed to the poison, sometimes a longer, sometimes a shorter period elapses, before a fever is produced. The men on the watering service are not all taken ill at the same time; some fall sick the first or second day, and others not till several days after they have ceased to be exposed to the cause of fever, by returning on board of ship. The poison, it would appear,  
may

may lie dormant some time in the body, although it is difficult to determine accurately how long. Some have embarked on board of ship in good health, and have been seized after ten or fourteen days with the remittent fever. Examples in this way have come to my knowledge, of the fever appearing three weeks after ceasing to be exposed to the cause of it; how much greater the interval may be, I know no facts to determine\*. We may venture to lay it down as an axiom, that the poison will be more or less mischievous, as it is more or less concentrated; a property that is not found in what may be called specific poisons, as that of small pox, the venereal disease, and others.

The power of habit, in counteracting the effects of the poison, is universally acknowledged. New-comers are not only more subject to the disease, but in them it is of the worst kind. A first attack is called in common language a *seasoning*. In this respect it is like many other poisons, to which the human body gradually accommodates itself. Opium may be swallowed in large quantities by those accustomed to it. The same is true

\* See note K in the Appendix.

of ardent spirits, and of most, if not all the substances that produce intoxication. The negroes, who live in marshy parts of the country, afford the most striking example of the power of habit in resisting the poison; they are very little subject to the fever, and in them it is almost always slight. In the expedition against Fort St. Juan, not one in twenty of the soldiers returned, whereas none of the negroes died of fevers. The history of the Buccaneers furnishes many striking examples of Europeans becoming so habituated to the climate of the West Indies, that they were enabled to bear the greatest hardships and fatigues, without suffering from disease.

Another circumstance before noticed deserves to be more particularly investigated, as it renders the poison both more certain, and more violent in its effects; that is, being exposed to it when fatigued by hard labour and long fasting. The poison gains admission more readily into the body, and produces immediately the worst kind of fever. It is in this way that soldiers suffer so much, on actual service, in the West Indies. The few cases of fever which proved fatal in 24 hours,  
that

that occurred to me, were all contracted in a similar manner. A soldier taken ill on a march, and under the necessity of walking five or six miles, has scarcely a chance of recovering; and if he do not expire on the way, seldom survives the completion of the march many hours. In a fatigued and exhausted state of the body, the vessels on the surface both of the skin and lungs, probably come to be in an inhaling state, and thus give freer admission to the poison; and the quickened circulation of the blood conveys it more speedily, and more intimately, to the minutest vessels of the body.

The most important question, after the poison has gained admission into the human body, is; How does it produce the symptoms of the fever? Our ignorance of the animal economy absolutely precludes us, from giving any adequate answer to this question. But when we consider, that every function of the human frame is deranged; that the blood is often in a dissolved state, and that there is a total loss of strength, we may conclude, that the poison affects the principles of life in every part of the body; and in fact we find that parts of the body do actually mortify, and die.

What

What the principles of life are, we cannot yet form a conjecture, and to push our inquiries further on that side, would afford no satisfaction.

The illustrations, that apply best to our subject, are borrowed from the operations of poisons. Sickness and vomiting are the first effects of most poisons, animal as well as vegetable, and also of morbid poisons \*, and are likewise common at the commencement of fever. It is true some poisons, if sufficiently concentrated, as the laurel-water, poison of the Ticunas, and others, produce convulsions, and almost instant death †: analogous to this, the remittent fever often begins in children with fits, and sometimes also in adults. The blood comes to be in a dissolved state from many poisons, as that of the viper; and the same poison is known to produce a jaundice, preceded by great loss of strength, and sometimes fainting fits. Here then are several of the symptoms of the worst kind of remittent fever, particularly the jaundice. I do not know of any instance of the body having been

\* According to Mr. Hunter's distinction. Vid. *Treat. Ven. Dis.* p. 9.

† Fontana, *sur les Poisons*, Vol. II. p. 82, 125, 137.  
examined

examined after death, occasioned by the bite of a serpent; but when the bodies of those, who have died of the yellow fever, have been opened, if there were any morbid appearances, for often there were none, they consisted chiefly in the internal coats of the stomach and duodenum being in an inflamed state. The gall in the bladder and ducts is generally foundropy and viscid, as if it had stagnated for some time, though no cause of obstruction appear in the duct. It is probable that the inflammation in the coats of the duodenum and stomach, and the violent contractions they suffer from repeated vomiting and straining, may produce a spasm of the gall ducts, sufficient to interrupt the course of the bile\*. That the *ductus communis* possesses naturally a power of contraction in an healthy state cannot be doubted, for, without such a contraction in some part of it, the bile could never regurgitate so, as to fill the gall-bladder. That jaundice may proceed from other causes, besides a stoppage to the flow of the bile by *calculi* or mechanical pressure, must be allowed,

\* Fontana, sur les Poisons, Vol. I. part 5. ch. 13. p. 69.

as an examination of the body after death has often shewn no such causes to exist \*. In the body of a person who died of pulmonary consumption, I had lately occasion to observe some things not altogether foreign to the present subject. A few days before death, to the common symptoms of the disease, was superadded a jaundice. The lungs were found diseased in the usual manner; there were adhesions to the pleura, tubercles, indurations, and suppurations in their substance. In the abdomen there were marks of superficial inflammation all over the liver, and the lower surface of it was united to the stomach by adhesions. The gall-bladder was full, but no bile could be squeezed out of it. On laying the *ductus communis* open from the *duodenum*, it was found filled with bile of a brown colour, and of a thick and ropy consistence, as were also the *ductus hepatici*. Part of the *ductus cysticus* was laid open, and the gall-bladder was pressed with considerable force, but still no bile flowed. Through a blow-pipe introduced into the duct, the air at last with

\* Morgagni, de Sed. et Caus. Morb. Ep. 53. § 16, 17. Ep. 37. § 10.—Sir John Pringle, Dis. of Army, Appendix, p. cxix. edit. 7th.

some difficulty was forced into the gall-bladder, after which by pressing again, a coagulum of bile was squeezed out, and what followed was ropy and black, like melasses. On laying the duct open all the way to the bladder, there appeared no other obstruction to the bile than the coagulum, which, as well as the thick and ropy state of that secretion, appear rather to have been the effects of stagnation, than a cause of obstruction in the first instance. Did the inflammation in the neighbourhood of the ducts, and perhaps extending to them, excite such contractions in them as obstructed the bile, in the same way that a suppression of urine, is sometimes a consequence of inflammation, in the urinary passages?

The cause of the jaundice, in the remittent fever, deserves to be farther investigated in the dead body, and I have to regret that I did not attend to it more while in Jamaica. The following letter, containing an account of the dissections of 23 bodies, was written to the late Sir John Pringle by Mr. John M'Colme, a man of veracity and observation, who served as a regimental surgeon in the West Indies, in the years 1741 and 1742.

“ ANATO-

“ ANATOMICAL FACTS *from the*  
 “ *opened Bodies of 23 Officers and Soldiers,*  
 “ *who died of the Bilious, or Yellow Fever,*  
 “ *in the West Indies.*

“ IN all the cases the liver was changed  
 “ in part (and sometimes almost the whole)  
 “ to be more pale, and hard, than natural;  
 “ and in such parts there was a less propor-  
 “ tion of blood, than in those of a more na-  
 “ tural colour.

“ In such as greatly differed in colour and  
 “ hardness, there were found obstructions in  
 “ the larger branches of the vena porta re-  
 “ sembling what are called *polypi*.

“ The bile in the gall-bladder, of a deeper  
 “ colour, much thicker and more viscous,  
 “ than common; small in quantity, never  
 “ exceeding an ounce; oftener from half an  
 “ ounce to six drachms.

“ The spleen larger, softer, and whiter,  
 “ than common.

“ The internal part of the stomach and  
 “ duodenum sometimes reddish, or yellow,  
 “ but often blackish; the tunica villosa very  
 “ easily

“ easily separating, even with the touch ; the  
“ other guts much in the same state : but in  
“ general the two first most affected.

“ In the stomach often a thick mucus,  
“ with the same black stuff that is thrown  
“ up by vomit : if the villous coat is not  
“ much affected, the mucus prevails ; but if  
“ otherwise the *black vomit*.

“ Farther down the guts the black stuff is  
“ thicker, and more viscid, almost resembling  
“ tar ; and in the great guts it is often mixed  
“ with clotted blood.

“ The cellular and other membranes much  
“ distended with blood ; the tendinous part  
“ of the diaphragm and pleura look as if  
“ injected.

“ In one person who had been troubled  
“ with a violent hickup, there was an ulcer  
“ on the tendinous part of the diaphragm,  
“ that discharged sanies into the thorax.

“ The lungs were often blackish next the  
“ pleura, and interspersed in many places with  
“ large livid spots.

“ In the right ventricle of the heart, *sinus*  
“ *venosus*, and *vena cava*, there was less blood  
“ than common.

M

“ The

“ The urine in the bladder commonly  
 “ yellow.

“ One thing was remarkable, that not-  
 “ withstanding the bodies both before, and  
 “ after death, had a very disagreeable stench;  
 “ yet upon opening the abdomen and the  
 “ guts, there was not near so cadaverous or  
 “ foetid a smell, as there is generally in  
 “ Europe. They were indeed opened soon  
 “ after death; and generally had been purged  
 “ during their illness.

“ It is worth while to observe, that two  
 “ bodies were also opened; each of which  
 “ formerly had the bilious fever; but died  
 “ some time after from other causes. None  
 “ of them had obstructions in the liver, and  
 “ the bile in the gall-bladder was larger in  
 “ quantity, and more fluid than common.

“ All these bodies were opened by the di-  
 “ rection of Dr. Robert Dalrymple, physician  
 “ to the army, in the years 1741, 1742. At  
 “ the opening of many of them I was present;  
 “ the rest the doctor told me were similar to  
 “ what I saw.”

The morbid appearances mentioned in the  
 letter, are nearly all referable to two causes;  
 the

the absorption of the bile into the general mass of circulating fluids, and more or less of a dissolution of the blood. The pale colour of the liver and spleen, depended on the bile that had been absorbed, and mixed with the blood; under which circumstances it tinges those *viscera*, and almost every part of the body, of a yellow colour, as is seen in common cases of jaundice. The black matter, found in the stomach and bowels, appears evidently to have been the blood, that had oozed through the vessels; and this, as well as the livid spots upon the lungs, are proofs of the dissolved state of the blood. Similar livid spots are often found upon the lungs of animals that die of poisons, and proceed from the blood being in a dissolved state\*.

Though a comparison of the effects of other poisons with those of the exhalations of marshes, promises to throw more light on the subject of the remittent fever, than any other mode of investigation that presents itself, yet the inquiry cannot be pushed a great way. There is something uncommonly subtle and abstruse in the operations of poisons, as may

\* Vid. Fontana, sur les Poisons, Vol. I. part. 3. chap. 3.

be deduced from this, that of the various poisons of which we have daily experience, there is none of whose effects we can give any good explanation. Most of the morbid poisons are confined to one species of animals, yet we can see nothing in the poison, or in the species, to account for this. The small-pox, measles, plague, and many other diseases affect the human species only, though no reason appears why it should be so; and any explanation of those diseases, whether derived from fermentation, putrefaction, or a peculiar action of vessels, contains nothing to instruct us, why they should not affect other animals as well as man, which is in itself a full proof how nugatory such explanations are. Putrefaction is the same nearly in all animal matter; and we have not yet learnt from physiology or anatomy, any peculiar properties or actions that our blood-vessels possess, which are not to be found in many other animals. But although the investigation of the operation of poisons on animal bodies be a subject of extreme difficulty, it is not to be despaired of; nor are we, in any case, to set limits and boundaries to the advancement of human knowledge, by experiment and observation.

SECT.

SECT. IV. *Of Intermittent Fevers.*

INTERMITTENT fevers, as quotidians, tertians, quartans, and all the variations of them usually mentioned by writers, occur frequently in Jamaica. The fevers that prevail most, during the more healthy part of the year, are intermittents; whereas, during the rains, and for some time after, they are chiefly remittents: as if both depended upon the same cause, acting at different times with more or less violence. The almost endless varieties of intermittent fevers, described by the ancients, have ceased in a great measure to be the objects of attention, since the Peruvian bark has been discovered, to be the most efficacious remedy against them all, whatever type they assume. While it was believed, that the various forms of the disease required peculiar modes of treatment, it was deemed a matter of the last consequence to distinguish them rightly.

In the history of intermittent fevers in Jamaica, there is little to be observed that is peculiar to the climate. The cold fit is

generally less severe than in more northern latitudes, and during its continuance it is not uncommon for the sick, to expose themselves to the direct rays of the sun, taking in this an example from the negroes, who thereby more effectually relieve the painful sensations of cold, than by sitting over the fire, or covering the body with a load of bed-clothes, as practised in colder countries.

The quotidian is the most dangerous form of the disease, and is more or less so, as it approaches to, or recedes from, a remittent fever. The tertian is less dangerous, and the quartan least of all; though there, as well as in other countries, it is extremely obstinate and difficult of cure.

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#### SECT. V. *Of the Cure of Intermittent Fevers.*

WHEN the intermissions were compleat, the bark was given directly, without any previous evacuations, in order to cleanse the  
 stomach

stomach and bowels, which is to be considered as rather recurring to an old, than giving into a new practice \*. There was no inconvenience arose from omitting the vomiting and purging, usually made to precede the bark; on the contrary it was so much time gained. The bark was given in the dose of one or two drachms in wine, or any other vehicle that was more agreeable to the sick, and repeated every two hours, or oftener, according to the urgency of the case, and the state of the stomach.

After the progress of the disease was stopped, it was still proper to give a dose of the bark twice or thrice a day, for five or six days, in order to prevent a relapse. If the bark rendered the body costive, half an ounce of the tincture of senna, or of rhubarb, or an aloetic pill was given at bed-time; or a few grains of rhubarb were added to one or more doses of the bark.

Although the bark be not less efficacious in the cure of intermittents in Jamaica, than in other parts of the world, yet it happened that there were cases which did not yield to it, though given liberally, and for a length of

\* See Sydenham, *Processus integri*, de Feb. Intermitt.

time. In such cases various means were tried, and to some of them the fever commonly gave way; although it was difficult to determine to which a preference was due, as sometimes one appeared more successful, sometimes another. Chamomile flowers reduced to a fine powder, and given in the dose of half a drachm, or even a drachm, and repeated every three hours, often stopt the fever after the bark had failed. A warm purgative, as six drachms of the tincture of rhubarb, and as much of the tincture of senna, was sometimes given six or seven hours before the fit, and the bark as usual, after it was over. This as well as the chamomile flowers sometimes failed, and sometimes succeeded.

The cold bath, in the river at Spanish Town, was effectual in subduing old intermittents in many instances. The bath was taken in the morning, when the temperature of the river might be from  $75^{\circ}$  to  $80^{\circ}$ .

Sal ammoniac, or alum, were sometimes added to the bark, and the former was given in some instances by itself, but their power did not appear great, though they stopped the fever in some cases.

For

For some years past, intermittents have been more frequent in, and about London, than formerly. Since my return from Jamaica, I have often joined mercurials \* to the bark in the treatment of such fevers, when they have proved obstinate, and with good success. The preparation made use of was *Calomel*, which was sometimes given in the quantity of 3 or 4 grains along with 15 or 20 grains of jalap, so as to prove purgative; but more commonly in smaller doses, and by itself at bed-time, so as to keep the body only moderately open. For this purpose one or two grains every night, or every other night according to circumstances, were generally sufficient, while the bark was given in the usual way, during the intermissions of the fever. The mercurial gave new efficacy to the bark, and this treatment often proved successful. It is probable a similar practice might succeed in the West Indies, though I have no experience of it †.

Towards the end of the war some red bark was sent to Jamaica, which given in the same dose with the common bark affected the

\* Vid. Med. Transf. Vol. III.

† See note L in the Appendix.

bowels, producing sickness and vomiting, or griping, purging and flatulence. The dose was therefore restricted to half a drachm, which was repeated every three hours, and cured many intermittents that had resisted the common bark. The great tendency which it had to affect the stomach and bowels, rendered it less proper than the common bark in the remittent fever, and on that account, after a few trials, it was laid aside in that species of the disease. Whether it would have been more efficacious in curing intermittents, if given in the first instance, than common bark, is a question that I had not an opportunity of bringing to a fair decision; for though it often cured fevers that resisted the common bark, yet nearly as much might be said of the chamomile flowers, though that would not be good ground for supposing the latter medicine a better than the former. If the red bark, and the common bark, were given in the first instance in a number of intermittents, that would doubtless be deemed the best medicine, which cured the greatest proportion of the sick. In order to form a just judgment, the number of cases ought to be considerable, certainly not less than ten for each

each

each of the medicines. Simple as this experiment is, I do not know that it has yet been tried. In the mean time we may safely conclude, that we are in possession of a valuable medicine, which will often succeed, after the common bark has failed.

It has been already observed, that the remittent fever, after repeated attacks, often produces dropsy, or swellings of the liver or spleen, and frequently a complication of these disorders; the same thing holds true of intermittents. Those labouring under such accumulated distempers, are hardly to be restored by any means that can be employed, while they remain upon the island and continue exposed to the same noxious causes, which originally affected their health. The constitution, broken down in every part, can only be repaired by hastening to a colder climate, and a more salubrious air; and even these are often deferred till it be too late. The air of the mountains, and a frequent change of it in travelling by easy journeys, together with bitters to strengthen the stomach, and occasionally small doses of mercurials, will often procure a temporary amendment. The mer-  
 6 curial

curial given for the swellings of the liver \* or spleen, was the mercurius dulcis, which was exhibited in small doses. In cases of dropfy, quicksilver, rubbed down with an equal quantity of honey or conserve of hips, was given; the dose was from five to ten grains of the mass, to which half a grain, or even a whole grain of the dried squills was added, to render it diuretic; and it was repeated every other night for ten days, or a longer or shorter time, according to circumstances. If advantage, however, were not taken of any favourable change in the health, from the means just mentioned, and the sick sent to a more healthy climate, the disease generally recurred in a short time with greater violence, and soon proved fatal.

\* See note M in the Appendix.

## CHAP. IV.

*Of the* DYSENTERY.SECT. I. *Of the Symptoms of the Dysentery.*

IN treating of the dysentery, I have confined myself to such observations, as more particularly apply to the climate, or have not hitherto been made; not judging it necessary to enter minutely either into the history of the disease, or the method of cure, which have been so fully treated by much abler hands.

The dysentery, as it appears in the island of Jamaica, is the same disease that is so well described by Sydenham, Sir John Pringle, Sir George Baker, and others; and is not distinguished by any peculiar symptoms from the dysentery, that was epidemic in London, in the summer and autumn of the years 1779, and 1780.

There

There subsists an intimate connection between the remittent fever and this disease, in Jamaica; the one frequently changes into the other, and the two diseases are often complicated with various degrees of violence. In some cases the dysentery ends in a fever, though it happens much oftener that the fever terminates in a dysentery, especially among the common soldiers.

In some seasons the dysentery is much more frequent than in others, which was the case in 1782; the cause of this is not so obvious. It was hotter than common in the month of June by three or four degrees, the thermometer rising many days to  $90^{\circ}$ , an unusual heat in that climate. An higher degree of heat than common, in our summers in England, has been observed to be productive of dysenteries, as was the case in the summers above mentioned; but, in Jamaica, the coolest month in the year is at least  $12^{\circ}$  hotter, than the hottest month in our summers: if the cause therefore depended upon any absolute degree of heat, the dysentery should prevail all the year round. How far it may arise from a comparative increase merely in the heat, though there is some ground to suspect it

it may be so, I have not sufficient experience to determine.

There are various degrees of violence in the disease, from slight gripings with frequent slimy stools, to the most excruciating pains in the bowels, incessant straining, profuse discharge of blood, great fever, and sudden prostration of strength. Between these extremes are numerous intermediate degrees, and though the slighter cases may be called by the name of diarrhœa, yet there are no specific marks of distinction; they run into one another by an insensible gradation, and therefore should not be distinguished by different names\*.

There are some of the quarters, such as Fort Augusta, and Port Royal, subject to a mild kind of dysentery, especially when the soldiers first take possession of them. It is probably owing to the water in both places, or as they are situated upon sand-banks

\* The antients apply the terms Dysentery, Diarrhœa, Cholentheria, Tenesmus, &c. to the several stages or symptoms of this disease, and consider them as separate and distinct distempers. Some of the symptoms of fever they have also treated as distinct diseases, as phrenitis, and methargus, which are the delirious and comatose stages of fever. Vid. Cœl. Aurelian.

nearly

nearly furrounded by the sea, they have no fresh water but what is brought to them, commonly from the mouth of the Spanish Town river. This water becomes extremely putrid, especially if put in casks that formerly contained rum, and in such a state is undoubtedly hurtful to the bowels. There are other circumstances in the management of the water, that deserve to be noticed; it is sometimes kept in cisterns, in which millions of insects, particularly musquitoes, breed; the negroes likewise employed in taking up the water, do not always proceed far enough from the mouth of the river, to get clear of all admixture of salt water, so that it is sometimes brackish. That such water should produce complaints of the bowels, will not appear surprising, and it is probably the sole cause of them\*. It were to be wished that Fort Augusta, and Port Royal were supplied with good water, such as that of the watering-place for the royal navy, and that it were kept in proper casks: for, by these means it would be ascertained beyond a doubt, what share the water had in producing the flux.

\* Bontius de Med. Ind. dialog. 3<sup>to</sup>.

A symptom that frequently occurs in the disease, and is not taken notice of by the authors above quoted, is an immediate call to go to stool, upon swallowing any thing either solid or liquid, accompanied with a feeling, as if what was just swallowed, were running through the bowels. This sensation is often so strong, that the sick imagine that the food they have taken has really passed through them, and are not convinced of the contrary, till they find that the discharge has been slime or mucus, without any resemblance to what they had swallowed. This symptom shews great irritability in the bowels, by which a motion excited in the stomach, is propagated almost directly to the anus.

The dysentery did not appear to be infectious in the hospitals in Jamaica, nor in the epidemic that prevailed in London in the years 1779 and 1780. I am far from meaning to say, that the dysentery is never infectious; but there is some difficulty in determining a question of this kind, for unless the proofs of infection are clear and decided, they may be easily confounded with the effects of a cause, that is generally diffused, and operating upon all more or less, such as the cause of dysentery must be.

SECT. II. *Of the Cure of the Dysentery.*

THE dysentery, like the fever, requires to be taken care of early, for the means that will either overcome, or greatly mitigate the disease at the beginning, will not be able to make any impression upon it, after it has continued some time. The first medicine that was given was a purgative. The kind of purgative most commonly made use of was the bitter purging salt\*, or Glauber's salt†, sometimes with manna, and always with one or two drops of the oil of peppermint, added to the solution of the salt. An ounce of salt, and half that quantity of manna, dissolved in half a pint of water, with the addition of the oil of peppermint, were divided into two parts, which were given with an interval of half an hour, or a whole hour between them, according to the state of the stomach. The operation of the physic is promoted by drinking plentifully of thin water-gruel, whey, chicken

\* Magnesia Vitriolata, Pharm. Lond. 1788.

† Natron Vitriolatum, Pharm. Lond. 1788.

water,

water, tea, or any diluting liquor that is most agreeable to the sick. In this way several copious stools are procured, whereby the griping and other symptoms are greatly relieved. After a favourable operation of the ophyfic, an opiate, from fifteen to twenty drops of the tinctura thebaica, was given at bed-time. The purgative in almost all cases procures a truce with the disease, and the opiate prolongs it.

It is in slight cases only, and at the commencement of the disease, that one dose of ophyfic is sufficient to stop its progress; a respite merely is in general all that is obtained. When the symptoms recur, the same medicines are to be repeated. The sick are not weakened by the operation of the purgatives, at least as long as they procure relief from the griping pain. When the disease is violent however, and the purgatives have been frequently repeated, and the symptoms still recur at the same time that the strength is greatly impaired, there is a period beyond which purgatives cannot be longer given with advantage. In this situation I have repeatedly made use of the following medicine with great benefit; two table spoonfuls of a strong de-

coction or infusion of the bark, and the same quantity of strong chamomile tea, were made into a draught, to which as much rhubarb was added, as would procure two or three copious discharges from the bowels in the twenty-four hours. The quantity of rhubarb usually added was about five grains, the draughts were given every three hours, and the rhubarb was either increased, diminished, or altogether omitted according to its operation. It may deserve to be noticed, that the sick can readily distinguish the motions proceeding from the disease, from those produced by a purgative medicine. I first gave this medicine in cases where there was a considerable degree of fever, together with the dysenteric symptoms; but I have since given it, and with good effect, when there has been little or no fever, but the strength of the patient has been too much reduced to bear purgatives\*.

The griping pains of the bowels, which are often excruciating, are relieved by fomentations applied to the abdomen, and still more effectually by blisters on the same part.

It is sometimes impossible to begin the cure with a purgative, owing to great sickness

\* See note N in the Appendix.

at stomach and vomiting. Under such circumstances, the evacuation of the stomach is promoted by giving warm water, or weak chamomile tea; and nothing more powerfully emetic is administered. As soon as the stomach is quieted, one or two drachms of the purging salts are given at a time, and repeated every hour, till they have had the desired effect. The treatment is afterwards the same as mentioned above.

After getting over the first attack, the chronic stage of the disease often follows. This consists of frequent returns of the griping, straining, and purging, with short intervals of ease. The intervals seldom exceed one or two days; the strength and flesh waste, hectic fever comes on, and more perish in this stage of the disorder than by the first attack. The remedies here are nearly the same as those above mentioned; nothing procures equal relief with a medicine gently opening, and the opiate must now be given more freely; the use of it indeed can hardly be dispensed with for one night. It may appear liable to objection to give an opening medicine at a period of the disease, which is supposed to depend upon a laxity of the

bowels, and to require astringents. That the chronic stage of the disease may sometimes proceed from a mere laxity, I have no doubt; but such cases are neither very frequent, nor, I apprehend, dangerous. Nine out of ten, at least, of the chronic dysenteries depend upon obstructions, and a diseased state of the bowels, as the dissection of the dead bodies demonstrates. The morbid appearances of the bowels, after death, throw great light on the disease, I shall therefore mention them shortly.

Upon a first view the bowels, particularly the colon, appear irregularly contracted, and redder than natural at the contracted parts. Upon a nearer inspection, by cutting out portions of the gut and examining the internal coats, the appearances of disease become more evident. There are to be seen small tubercles, like pustules, sometimes in a smaller, sometimes in a greater number; and they are to be found in different stages, so that their progress can only be collected from several observations combined. The same subject will frequently furnish, in different portions of the gut, examples of the several stages. Their progress appears to be nearly as follows; there

there is first a small round tubercle of a reddish colour, and not more than one tenth of an inch in diameter; it increases gradually till it be near a quarter of an inch in diameter, and becomes paler as it grows larger. In this stage there appears a small crack on the top with a slight depression, which gradually increase; and on examining the contents of the little tumour, I have generally found them to be a cheese-like substance. The pustule, for though it contain no *pus*, I do not know any name more expressive of its appearance, is seated under the villous coat, between that and the muscular coat. As the opening enlarges, the edges become prominent, and the base grows rough and scabrous, from which matter oozes out, that is sometimes tinged with blood. Such is the progress of one, but they are often in clusters, and become confluent, so as to form a rough unequal ulcerated surface, with an hard and thickened base. Sometime, they appear like a small eating ulcer in the gut, in which the prominence of the edges give an appearance of a loss of substance, or as if the villous coat were intirely removed.

These morbid appearances probably take place more or less, in all cases of epidemic

dysentery. They were first taken notice of, as far as I know, by Mr. Hewson\*, and afterwards by Dr. Woolaston†. Whether they are constant and invariable, remains to be determined by future observations: they were found in all the dysenteric subjects that I have examined, but that number is not considerable, and we are not warranted to conclude, that there may not be various morbid appearances, peculiar to the disease under different circumstances. SIR JOHN PRINGLE has indeed mentioned mortifications, gangrene, and abrasions of the villous coat, none of which I have ever seen; and there is reason to suspect, that the black colour arising from extravasated blood has been taken for mortification, or beginning gangrene, which I the more readily mention, that the learned author acquainted me in his lifetime, that he put but little confidence in any of the dissections of dysenteric patients, which were made in the military hospitals, as the bowels were not inspected minutely. Sentiments, not much

\* Vid. Pringle, *Dis. of Army*, ed. 7th. p. 243. p. iii. ch. 6. § 2.

† Baker's *Libellus de Cat. & Dys.* sub finem.

different from these, are to be found in his stool \*. The tubercles are most frequently found in the great guts, but they are also sometimes to be met with in the *ileum*; and there is an appearance of more or less of inflammation in their neighbourhood. It is perhaps unnecessary to mention, that the tubercles with their various stages cannot be observed without washing off the mucus, blood, and matter, that cover the inner surface of the gut.

Several of the symptoms may be illustrated from the morbid state of the parts, as they appear upon dissection. The small grains of cheese-like matter often voided by the sick, most probably proceed from the tubercles upon their first opening; the thin watery stools, with a mixture of blood, like the *lotura carni*, arise from the serum discharged from the numerous little ulcers; and if the blood be in a dissolved state, or the inflammation great, much red blood may ooze out, and give the evacuations the appearance of consisting almost entirely of blood, an occurrence not unfrequent in the worst, and most fatal kind of Dysentery. When the disease is violent, it is probable

\* Page 250, 7th ed.

that

that the whole surface of the gut may be covered with tubercles; in which case great inflammation joined to violent spasms and contractions of the bowels, excited by so many irritating causes, must soon prove fatal. Should however the sick have strength to bear up against the first attack of the disease, they will often have to struggle against the evils arising from numerous small ulcers in the bowels, the consequences of the tubercles, which bring on what has been called the chronic stage.

The tubercles and consequent small ulcers, when in clusters, occasion a considerable contraction of the passage, not so much by their projecting into the cavity, as by the spasms they excite in the muscular coats of the gut. The diminution of the canal obstructs in part the passage of the contents of the bowels, which accumulating must at last be propelled by greater efforts, and when forced through the contracted parts they occasion pain, griping, and frequent calls to go to stool, which recur from time to time, and characterise the chronic stage of the disease. It is also accompanied in general by an hectic fever, proceeding from an absorption of matter from  
the

tubercles or little ulcers; for it deserves to be remarked, that the glands in that part of the mesentery, which corresponds with the diseased gut, are not in a sound state, but much enlarged and of a softer texture than natural.

In the chronic stage, laxatives rather than purgatives are to be used, as the sick have not strength to bear a strong medicine, though they require the passage to be kept open. Two or three drachms of the purging salts will often have the desired effect, or a few grains of rhubarb, or a spoonful of the *oleum ricini*. The opiate must be repeated after their operation, and indeed it will commonly be necessary to give it every night. A light nourishing diet, consisting chiefly of milk, broths, and gruels, contributes to the cure.

When the stools are frequent and copious, and without griping or pain, astringents may be used with advantage; but such cases are not very numerous. The extract of the *lignum Campechense*, is a good astringent in such cases, as are also the *cortex granati*, and *terra Japonica* \*. One of these will sometimes succeed after another has failed, though I have not learned what the particular cases

\* More properly *catechu*, Pharm. Lond. 1788.

are to which they are peculiarly adapted. I have generally made trial of them in the order in which they are mentioned.

If the disease terminate in a *tenesmus*, or if that symptom prove troublesome, it is often entirely removed, and always greatly relieved, by an anodyne clyster consisting of thirty or forty drops of the *tinctura thebaica* in three or four ounces of linseed tea, or a thin jelly of starch. SYDENHAM leaves this symptom to itself, though it is often extremely troublesome.

I shall conclude the subject of dysentery, with some observations on the remedies usually employed against that disease.

Blood-letting has been strongly recommended by some, and condemned by others. The appearance of inflammation in the bowels on dissection, would seem to shew the propriety of that evacuation. Yet it must be allowed that there may be an inflammation, that is, redness, swelling, and pain in a part, for which it would be highly improper to let blood, as is the case in all erysipelatous inflammations. The question, however, can only be determined by experience; and all that I have learned on the subject amounts

to

to this, that in slighter cases, or when the disease is treated early, purgatives have proved so effectual, that I have never had recourse to bleeding: and when the disease has been more violent, the strength of the patient has been so much reduced of a sudden, that I have not dared to make use of that evacuation. Possibly there may be circumstances under which it would not only be safe but highly advantageous, and it were to be wished these were accurately ascertained.

Vomits are strongly recommended in this disease, and it has been common to give them as the first step in the cure. The sick are generally relieved by them, but the benefit is not so great as that derived from a purgative, which is both more easy and more effectual in its operation. The sickness produced by an emetic is often very distressing, and it is most beneficial when it proves purgative. Upon these grounds therefore recourse was had in the first instance to the purgative, as the more certain and speedy means of procuring relief.

There are various purgatives recommended by different authors. The bitter purging  
salt,

salt \*, or Glauber's salt †, as mentioned before, were found the best. They operated easily, speedily, and effectually. It is probable there is nothing specific in any purgative, and that they are more or less beneficial, as they possess in a greater or less degree, the properties just mentioned. Rhubarb and calomel ‡, infusion of senna, castor oil, soluble tartar ||, or any other purgative, may be given that experience has shewn to agree with particular constitutions.

There is scarcely any part of the practice concerning which authors are more divided, than in the use of opiates against the dysentery. SYDENHAM in many cases is disposed to trust the cure entirely to them, while others of almost equal authority, condemn them universally in this disease. SIR JOHN PRINGLE recommends them strongly, with this precaution, that they should not be given till a free evacuation has been procured by a purgative. In his manner of treating the disease, an opiate cannot be given till the end of

\* Magnesia vitriolata. Pharm. Lond. 1788.

† Natron vitriolatum. Pharm. Lond. 1788.

‡ See note O in the Appendix.

|| Kali tartarificatum. Pharm. Lond. 1788.

the second day, as the first is employed in giving an emetic. In the method recommended above, an opiate is given in ten or twelve hours, or as soon as the purgative has operated freely. If the griping and other symptoms are relieved by the physic, an opiate never fails to do good by prolonging the truce thus obtained with the disease; but if no relief be obtained, which however never happens except in the very worst cases, the opiate does little or no good. It is objected that the truce obtained by the opiate is fallacious, and of short continuance. That the disease commonly recurs, except in the slighter cases, must be admitted, but this cannot be laid to the charge of the opiate, which considerably retards its return: and if any objection is to be made to the use of this medicine, it should be that it is not able so completely to subdue the disease, that it shall not return. But although neither that, nor any other medicine we are yet acquainted with, possess a virtue so much to be wished for, it is still of great importance, in a disease that so severely harasses and debilitates the sick, to procure even a temporary relief to their sufferings, whereby they are better enabled to bear the opera-

operation of medicines afterwards necessary, and to support themselves against the disease.

Opiates were sometimes combined with an emetic or purgative medicine, as ipecacuanha, emetic tartar, or rhubarb; and this practice had often good effects in the chronic stage: but upon the whole I preferred their alternate use to combining them; as the emetic, if in sufficient quantity to produce sensible effects, occasioned a distressing nausea, and the opiate too much checked the effects of the purgative. It did not appear of much consequence, whether the opiate was given in a liquid, or a solid form. In some cases the Dover's powder\*, in the dose of ten or fifteen grains, had good effects. It happened in this disease, as in others where opiates are given, that the head or stomach were sometimes disagreeably affected by them the next day. To obviate this various means were tried, none of which succeeded so well, as giving one or two spoonfuls of lemon-juice along with the opiate, though that often failed.

\* Pulvis ipecacuanhæ comp. Pharm. Lond. 1788.

## C H A P. V.

*Of the Colic, or Dry-Belly-Ach.*SECT. I. *Of the Symptoms of the Dry-Belly-Ach.*

THE dry-belly-ach was formerly much more frequent in Jamaica, than it is at present. It is not confined to any particular season of the year, but prevails sometimes in one, sometimes in another ; and at such times it cannot be said to be epidemic, as it is frequently confined to one place, and to persons of a particular description. In the months of April, May, and June, 1781, it was very frequent among the men of the 92d regiment at Spanish Town, while the better sort of the inhabitants were not at all affected by it. In the year following, there was occasion to make the same observation at Kingston, where the

colic was prevalent among the private men of the 79th regiment. It proceeded from a cause, whose operation was confined almost entirely to the common soldiers, and which affected in an inconsiderable degree the lower class of inhabitants.

The disease began with slight uneasiness in the bowels, which was soon followed by great pain, accompanied with dejection, anxiety, and restlessness. The pain was of a dull kind, and generally confined to one part of the abdomen, which distinguished it from gripings of the bowels. It was aggravated by pressure on the part more immediately affected, though the sick sometimes thought themselves relieved by a general compression of the abdomen. After a time the pain increased, and often became excruciating, in so much that men of great resolution could not lie quiet a moment, but were constantly rolling about, and complaining even aloud of their sufferings. Nature indeed seemed unable to support the torments of the disease, and there were many instances of the sick falling into strong convulsions, and epileptic fits, and of their remaining in a state of total insensibility for many hours. After the pain had continued

At some time, sickness at stomach generally came on, together with vomiting and violent retchings; a glass of water, in some cases, would not remain even a few minutes upon the stomach.

The pulse was not quicker than natural, nor was there any heat upon the skin at the beginning of the complaint; but in its progress the pulse generally became more frequent, which appeared to proceed more from the pain and sufferings of the sick, than the presence of fever. During the whole of the disease there prevailed a most obstinate constipation of the bowels, and there was often more or less of strangury. The duration, and also violence of the symptoms, admitted of great variety; but as means of relief were immediately had recourse to, and the disease was not allowed to run its course, it is not so easy to say what its natural progress would have been. The strength of the disease was broken as soon as a free passage could be obtained. In some cases this was effected in the course of twenty-four hours, though more commonly not before the end of the second or third day; and in some instances, where the

disease was very bad, it was the tenth or eleventh day before evacuations were procured.

Those, who have once had the disease, remain liable to relapses, which are generally more violent than the first attack; and their recovery becomes every time more slow, and less complete. The strength decays, the flesh wastes, particularly the muscles of the arms, and in a most remarkable degree the ball of the thumb; the complexion becomes pale and fallow, and the countenance expressive of much dejection. In this state, and commonly after a second or third attack of the colic, they become paralytic.

The palsy may be considered as the second stage of the disease. It seldom follows the first attack of colic, and not often the second, unless it has been violent; but few escape more or less of it after a third, or fourth fit. The palsy comes on as the pain of the bowels abates; the sick complain of pain and soreness in the arms, especially about the wrists, and they find themselves unable to move the arms, and particularly to perform those motions that depend upon the wrist. This is the slightest degree of palsy, but it is often more severe, and the sick cannot move either the arms, hands,

hands, or fingers. The palsy is most commonly confined to the upper extremities, though there are numerous examples of the lower being affected also: there are not indeed wanting instances of an almost total palsy, which followed some colics of unusual violence, and long duration. The sick lay on their back without motion in their legs or arms, with little or no power over the muscles of the neck and head, with a voice no louder than a whisper, and in two cases to these symptoms was superadded almost a total loss of sight, and hearing. Their recovery from such a situation is always extremely slow, and often incomplete; yet there were few to whom the disease proved fatal; for of several hundreds that were ill not more than four or five died, and those were not in the paralytic stage of the disease, but in the convulsions and fits produced by the colic. Yet, though few died, many were lost to the service; for some never recovered the use of their wrists at all, and many more never acquired any strength either in their wrists or arms, and became of course unfit for soldiers.

It must be obvious, that in giving this short description of the colic, that was prevalent

among the soldiers at Kingston, and Spanish Town, I have been describing a disease exactly similar in its symptoms, progress, and consequences, to the *colica pictorum*, or painter's colic; and I might perhaps with propriety have referred to the full descriptions, and accurate accounts of this disease, which have been published by some able and learned authors\*; but I was willing to enable every one, by a short history of the dry-belly-ach, to draw his own conclusions respecting the identity of the two diseases.

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SECT. II. *Of the Cure of the Dry-Belly-Ach.*

THE principal and leading object in the cure is, to procure a free passage, by removing or overcoming the spasms and contractions of the bowels, that occasion the obstinate costiveness. Till this can be done, the

\* Vid. Med. Transf. Vol. II. p. 68. — Vol. III. p. 407.

sick have no relief from their sufferings. If there be no sickness or vomiting, a strong purge is given directly; but that cannot be done if the stomach be irritable and out of order, for without much precaution any purgative, even the gentlest, becomes an emetic. The purgative that was found upon the whole to answer best was, two scruples of rhubarb, and five grains of *mercurius dulcis*\*, made into twelve pills with a little syrup, of which four were given at a time, and they were repeated every half hour, or every hour, according to the state of the stomach. A second quantity, and even a third, were often necessary, but in that case the *mercurius dulcis* was diminished, or entirely omitted, lest it should affect the mouth.

To relieve the pain, fomentations were applied to the abdomen, or recourse was had to a warm bath. The ease obtained by these means was of short duration. A large blister, applied to that part of the abdomen where the pain was greatest, more effectually procured relief, as soon as it began to rise; and it was further of great use in promoting the

\* Calomel, vel Hydrargyrus Muriatus mitis, Pharm. Lond. 1788.

operation of the purgative, for in general it was observed, that soon after the pain became easier free evacuations followed.

Purgative clysters were thrown up from time to time, in order to promote the operation of the purgative. Of the various compositions used for this purpose, none appeared better than a solution of common salt in water, consisting of half an ounce, or even a whole ounce, to a pint of water. The addition of other articles, often considered as more stimulating, appeared to do but little good.

If there were much vomiting or retching, warm water, or an infusion of chamomile flowers, was given; and after the stomach was quieted a little, the purging pills were administered as before, but with the addition of one or two grains of opium, to prevent their being thrown up. If it were necessary to repeat the pills, the opium was omitted in a second or third quantity.

In general, by the means already mentioned, stools were procured, and the disease was overcome; yet this was not always the case, for the pain and costiveness would sometimes remain, after every thing recommended above had been carefully put in practice. Under  
such

Such circumstances recourse was had to other purgatives, as jalap, the *extractum catharticum* \*, the purging salts, and the *oleum ricini*. It may seem that some of these, as the jalap, and *extractum catharticum* should have had a trial before the rhubarb and *calomel*, as they are known to be more powerful purgatives. But those substances appear to have their virtues much impaired by keeping, in a warm climate; for they were found not to possess the same strength as in Europe. The rhubarb also is less powerful, but with the addition of the calomel it formed a purge, which more commonly than any other had the desired effect. When this failed, of the purgatives mentioned above, the purging salts were perhaps the best, if the state of the stomach admitted of their use. An ounce and an half of bitter purging salt † were dissolved in three gills of water, to which were added a drachm and a half of the *spiritus lavendulae compositus*, and three drops of the oil of peppermint, and of this three or four table spoonfuls were given every half hour. The castor oil was a good medicine, when the stomach would retain it;

\* Extract. Colocynthis comp. Pharm. Lond. 1788.

† Magnesia Vitriolata, Pharm. Lond. 1788.

a table spoonful was given for a dose, in a little broth, and it was repeated every hour. It may be observed in general, that whatever purgative was employed, regard was not had to the common dose, which would not have been strong enough; but it was repeated from time to time, either till it disagreed with the stomach, or till it operated.

If the pulse became quick from the violence of the pain and the severity of the disease, provided it were the first attack, and the patient were full and plethoric, a small bleeding, from six to eight ounces, promoted in several instances the solution of the disease.

It became an object of much consequence in the treatment of the colic, to prevent, if possible, the palsy. That, as far as it could be effected, appeared to depend intirely on the speedy cure of the colic; for, the more violent it was, and the longer it continued, the greater reason was there to fear a palsy would ensue. The remedies, given against the colic, have sometimes been accused of producing the paralytic affection; but certainly without foundation. The only effects they could have, either in preventing or producing that stage of the disease, must depend upon their  
being

being more or less efficacious in removing the colic.

After the first evacuations by stool were procured, though the strength of the disease was broken, there still remained in many cases a disposition to costiveness, with more or less of pain in the abdomen; for the removal of which, it was proper to give opening medicines from time to time, as the *oleum ricini*, aloetic pills, gum guajacum dissolved in spirits, or any other that agreed with the patient. Those often brought away small balls of hardened *fæces*, several days after the passage of the bowels appeared to have been opened.

Bitters, as an infusion of chamomile flowers, or gentian\*, were given to strengthen the stomach.

The second stage of the disease, the palsy, is always a most obstinate complaint, and in many cases the sick never recover completely, neither the strength, or motion, of the arms, or wrists. The Bath † waters have long been

\* Infusum gentianæ comp. Pharm. Lond. 1788.

† There is in the parish of St. Thomas's in the East, in the island of Jamaica, a warm mineral water of nearly the same temperature as the waters of Bath in Somersetshire. The heat of it is about 123° of Farenheit, and it is extremely beneficial in the palsy.

celebrated for their virtues in this stage of the disease: by bathing in them many have had the use of their limbs restored\*. There is reason to think, that their good effects depend entirely upon their virtues as a warm bath; and this opinion has been confirmed, by such trials as I have made of the warm bath, in the cure of the palsy. It was nearly as effectual as the Bath waters; but the difficulty of preserving a proper and uniform degree of heat, in an artificial warm bath, for any length of time, must always give a decided preference to natural warm springs. It may frequently happen however that those cannot be come at, in which case warm bathing forms an excellent substitute. The temperature of the sea, near the shore in the West Indies, is not less than  $84^{\circ}$  about the middle of the day, and bathing in it would probably be as efficacious in the cure of palsy as the Bath waters. But in this particular my experience is very limited, for the paralytic men were all sent home with the invalids, as there was hardly a chance of their ever being again fit for soldiers.

There was frequently much pain in the paralytic limbs, and at times puffy swellings

\* Vid. Charlton on Bath waters,

in particular parts, which appeared and disappeared suddenly. Both those symptoms were relieved by the *linimentum volatile*\*; and when the pains were violent, ease was procured by opiates.

In some few cases the pain in the bowels shifted suddenly to the head, the misery of the patient became extreme, and in one instance a temporary madness ensued. In this state nothing procures equal relief with blisters, applied to the back, behind the ears, and to the temples, successively, as the violence or duration of the pain may require. Opiates also procure a slight mitigation of the sufferings of the sick.

I shall conclude these observations, with some remarks on the remedies usually recommended in this disease. The French†, among whom the disease is frequent, give emetic tartar; but in all the examples of the disease that have fallen under my observation, the vomiting was a troublesome symptom, and a great impediment to the cure; and therefore whatever was likely to excite it, was carefully avoided. The practice would appear to be

\* *Linimentum Ammoniacæ*, Pharm. Lond. 1788.

† Vid. Med. Transf. Vol. II. p. 459.

bad, but as I have no experience of it, I dare not decide upon its merits.

Physicians have been much divided with respect to the use of opiates in this disease; some of great note advise, to trust chiefly to them in the cure of the colic, asserting that they allay the pain, remove the spasms of the bowels, and contribute greatly to a speedy solution of the disease, by rendering the operation of purgatives more easy and certain; while others, of no less name, entirely forbid the use of opiates, till a free passage has been procured. I must own that my experience, as well in this country as in Jamaica, coincides with the latter opinion. The relief procured by opiates was inconsiderable, till the body was opened, and some of the worst cases that I saw had been treated with opiates in the beginning. A desire to allay the excruciating pain is the cause that they are frequently given; but the only circumstances under which I have found them of advantage were, when the stomach was very irritable, and they were united to a purgative, to prevent it from being thrown up.

It is not probably of much consequence what purgative is given, provided it operate effectually.

effectually. In this country the *extractum*  
*arthaticum* \* with the *mercurius dulcis*, and  
 if necessary a small proportion of opium, are  
 very effectual; and I prefer a composition of  
 this kind to the rhubarb and *mercurius dulcis*.  
 Half a drachm of the extract, with five grains  
 of calomel, and a grain and a half of opium,  
 are made into eight pills, of which two are  
 given every hour, or every two hours, accord-  
 ing to the state of the stomach, till they ope-  
 rate. A second quantity is often consumed,  
 and sometimes a third, in both of which the  
 opium is generally omitted, before an evacu-  
 ation is procured. The calomel could not  
 be given so freely in the West Indies, for five  
 grains of it were oftener than once productive  
 of much inconvenience, by exciting salivation,  
 with considerable swelling, pain, and inflam-  
 mation about the mouth and throat. The  
 constitution in that climate is peculiarly sensi-  
 ble to the effects of mercury, contrary to what  
 might have been expected, were the opinions  
 usually entertained on this subject true; for,  
 if a determination of the humours to the skin  
 could prevent mercury from affecting the

\* *Extractum Colocynthis compositum*, Pharm. Lond.  
 1788.

mouth,

mouth, it ought to be a difficult thing to excite a salivation in Jamaica, where the perspiration is at all times profuse.

Clysters of various kinds were made use of at different times. Warm water with some oil relieved the strangury. Common salt was more stimulating than either the Glauber's, or bitter purging salt. Some trials were made of throwing up the smoke of tobacco, but the dreadful sickness it occasioned, so much aggravated the sufferings of the patient, that it was laid aside, perhaps before we had found out the best manner of managing it.

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SECT. III. *Of the Causes of the Dry-Belly-Ach.*

IT will not be deemed necessary, to enter into any detail on this part of the subject, after what I have advanced in another place\*.

\* The paper here alluded to, containing experiments to ascertain the cause of this colic, is published in the 3d volume of the Medical Transactions of the College of Physicians in London; and as being intimately connected with the present subject, I have given it in the Appendix.

That lead taken into the body, in all its various forms, produces colic and palsy, is a fact as well established as any in physic. Nor is it material whether the lead be in vapour, as among smelters; in a metallic state, as among glaziers and plumbers; in a calx, as among painters, and the manufacturers of white lead; or in a saline state, as in wine and cyder: under every form it is equally productive of the disease in question. The quantity of lead requisite to produce the disease admits of considerable variation, for there are clear proofs of its arising from a few grains of *Saccharum Saturni*\*, and also well authenticated cases, in which that salt has been given liberally, and without any immediate ill effect. But what is to be inferred from this more, than that there are some constitutions affected in a shorter time, and by a smaller quantity of this poison, than others†? An observation applicable not only to every poison, but every active medicine, with which we are acquainted.

That the dry-belly-ach is the effect of lead, some how introduced into the body,

\* Med. Transf. Vol. I. p. 304.

† Ibid. p. 257.—Vol. II. p. 419.

cannot reasonably be doubted; and the new rum, distilled in improper vessels, appears to be the vehicle in which it finds admission. I have not yet met with any facts or observations, to induce me to change the opinion I advanced on this subject. It were to be wished however that the matter were prosecuted further, by examining the rum as it comes from the still, and also by ascertaining the contents of the sediment that is found in the vessels, in which new rum has been kept some time. Such inquiries cannot so well be made in this country as in the West Indies.

I cannot deny myself the pleasure of inserting in this place, a letter from Dr. Franklin to his friend Mr. Vaughan, in which the opinion I have advanced, respecting the cause of the colic in the West Indies, is illustrated and confirmed in some degree, by what happened in New England. Though several of the facts mentioned in the letter are already before the public, I have not chosen either to abridge it, or to give it in other words than those, in which the doctor so clearly expresses himself.

*Philadel-*

*Philadelphia, July 31, 1786.*

“ Dear Friend,

“ I recollect that when I had the great  
“ pleasure of seeing you at Southampton,  
“ now a twelvemonth since, we had some  
“ conversation on the bad effects of lead taken  
“ inwardly ; and that at your request I pro-  
“ mised to send you in writing a particular  
“ account of several facts I then mentioned  
“ to you, of which you thought some good  
“ use might be made. I now sit down to  
“ fulfil that promise.

“ The first thing I remember of this kind,  
“ was a general discourse in Boston when I  
“ was a boy, of a complaint from North  
“ Carolina against New England rum, that  
“ it poisoned their people, giving them the  
“ dry-belly-ach, with a loss of the use of  
“ their limbs. The distilleries being examined  
“ on the occasion, it was found that several  
“ of them used leaden still-heads and worms,  
“ and the physicians were of opinion that the  
“ mischief was occasioned by that use of lead.  
“ The legislature of the Massachusetts there-  
“ upon passed an act, prohibiting, under se-

“ vere penalties, the use of such still-heads  
“ and worms thereafter.

“ In 1724, being in London, I went to  
“ work in the printing-house of Mr. Palmer,  
“ Bartholomew-Close, as a compositor. I  
“ there found a practice, I had never seen  
“ before, of drying a case of types, (which  
“ are wet in distribution) by placing it  
“ sloping before the fire. I found this had  
“ the additional advantage, when the types  
“ were not only dried but heated, of being  
“ comfortable to the hands working over  
“ them in cold weather. I therefore some-  
“ times heated my case when the types did  
“ not want drying. But an old workman  
“ observing it, advised me not to do so, tell-  
“ ing me I might lose the use of my hands by  
“ it, as two of our companions had nearly  
“ done, one of whom that used to earn his  
“ guinea a week could not then make more  
“ than ten shillings, and the other, who had  
“ the dangles, but seven and sixpence. This,  
“ with a kind of obscure pain that I had  
“ sometimes felt as it were in the bones of  
“ my hand when working over the types  
“ made very hot, induced me to omit the  
“ practice. But talking afterwards with  
“ Mr.

“ Mr. James, a letter-founder in the same  
“ close, and asking him if his people, who  
“ worked over the little furnaces of melted  
“ metal, were not subject to that disorder; he  
“ made light of any danger from the effluvia,  
“ but ascribed it to particles of the metal  
“ swallowed with their food by slovenly  
“ workmen, who went to their meals after  
“ handling the metal, without well washing  
“ their fingers, so that some of the metalline  
“ particles were taken off by their bread, and  
“ eaten with it. This appeared to have some  
“ reason in it. But the pain I had experienced made me still afraid of those  
“ effluvia.

“ Being in Derbyshire at some of the  
“ furnaces for smelting of lead ore, I was  
“ told that the smoke of those furnaces was  
“ pernicious to the neighbouring grass and  
“ other vegetables; but I do not recollect  
“ to have heard any thing of the effect of  
“ such vegetables eaten by animals. It may  
“ be well to make the enquiry.

“ In America I have often observed that  
“ on the roofs of our shingled houses, where  
“ moss is apt to grow in northern exposures,  
“ if there be any thing on the roof painted

“ with white lead, such as balusters, or  
“ frames of dormant windows, &c. there is  
“ constantly a streak on the shingles from  
“ such paint down to the eaves, on which no  
“ moss will grow, but the wood remains con-  
“ stantly clean and free from it. We sel-  
“ dom drink rain-water that falls on our  
“ houses; and if we did, perhaps the small  
“ quantity of lead descending from such paint,  
“ might not be sufficient to produce any  
“ sensible ill effect on our bodies. But I  
“ have been told of a case in Europe, I forget  
“ the place, where a whole family was  
“ afflicted with what we call the dry-belly-  
“ ach, or *colica Pictonum*, by drinking rain-  
“ water. It was at a country seat, which  
“ being situated too high to have the advan-  
“ tage of a well, was supplied with water  
“ from a tank which received the water from  
“ the leaded roofs. This had been drank  
“ several years without mischief; but some  
“ young trees planted near the house, grow-  
“ ing up above the roof, and shedding their  
“ leaves upon it, it was supposed that an acid  
“ in those leaves had corroded the lead they  
“ covered, and furnished the water of that  
“ year with its baneful particles and qualities.  
“ When

“ When I was in Paris with Sir John  
“ Pringle in 1767, he visited *La Charité*, an  
“ hospital particularly famous for the cure of  
“ that malady, and brought from thence a  
“ pamphlet, containing a list of the names of  
“ persons, specifying their professions or  
“ trades, who had been cured there. I had  
“ the curiosity to examine that list, and found  
“ that all the patients were of trades that  
“ some way or other use or work in lead;  
“ such as plumbers, glaziers, painters, &c.  
“ excepting only two kinds, stone-cutters  
“ and soldiers. In them, I could not recon-  
“ cile to my notion that lead was the cause of  
“ that disorder. But on my mentioning this  
“ difficulty to a physician of that hospital, he  
“ informed me that the stone-cutters are  
“ continually using melted lead to fix the ends  
“ of iron balustrades in stone; and that the  
“ soldiers had been employed by painters as  
“ labourers in grinding of colours.

“ This, my dear friend, is all I can at  
“ present recollect on the subject. You will  
“ see by it, that the opinion of this mischie-  
“ vous effect from lead, is at least sixty years  
“ old; and you will observe with concern how  
“ long a useful truth may be known, and

“ exist, before it is generally received and  
 “ practised on.

“ I am, ever,

“ Yours most affectionately,

“ B. FRANKLIN.”

The law above alluded to forbids the use of leaden heads or worms, under proper penalties; it further prohibits the artificers who make such from using any lead in their composition; and it appoints assay-masters, with power to examine and report upon all heads and worms, employed in the distillation of rum, or spirits\*.

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SECT. IV. *Of the distinguishing Symptoms of the Dry-Belly-Ach, the Cholera Sicca and Colica Biliosa of Sydenham.*

I HAVE not thought it necessary to treat of cholera, because though a frequent disease

\* The act was passed in 1723 (10 Geo. I. c. 2.)

in the beginning of the sickly season in Jamaica, it is no way different from the same complaint that appears in this country in the months of July and August, if the summer prove hot. The method of cure also is the same as delivered by Sydenham. But this disease, the *colica biliosa* of Sydenham, and certain cases of incipient dysentery, have been confounded by some writers with the *colica Pictonum*, or dry-belly-ach, which could never have happened, if they had been conversant with the last mentioned disease. (On this account I have here given the distinguishing marks of these diseases. They are indeed so different, that it may seem extraordinary that they should be taken for one another. The mistake has happened in this way; in the beginning of the sickly season in warm climates, and in the months of July and August in England in hot summers, choleras, colick pains of the bowels, and dysenteries, are prevalent. Of those diseases there are certain cases, in which with excruciating pain in the epigastric region there is great vomiting, but no purging, at least for some time. Sydenham with his usual fidelity has taken notice of these forms of those diseases, and speaks of

218 *Of the distinguishing SYMPTOMS of*  
of the *cholera sicca* \*; and states the case of  
dysentery in which there is no evacuation  
whatever downward †. Such cases, as also  
the *colica biliosa* ‡, have been mistaken for  
the dry-belly-ach, or *colica Pictonum*; but  
as they are very different diseases so it is easy  
to distinguish them.

The *colica Pictonum* is not a disease of any  
particular climate, or any season, but occurs  
indiscriminately in all places and at all seasons,  
whenever the human body is exposed to the  
poisonous action of lead. Whereas the  
*cholera*, the *colica biliosa*, and dysentery with-  
out stools, occur in the hot months, or in the  
sickly seasons in hot climates; and they are  
most frequent at the commencement of such  
seasons; and affect with great violence those  
who are suddenly exposed to their causes,  
which is the case chiefly with Europeans,  
who immediately change, on their arrival in

\* Sect. iv. Cap. ii. Cholera Morbus, an. 1669.

† —Primo quo invasit autumno (de dysenteria loquitur),  
quam plurimi nullis omnino dejectionibus molestabantur;  
torminum vero quod spectat atrocitatem, aliaque sympto-  
mata, insequentium annorum dysenterias longo intervallo  
post se relinquit. Sydenham. Op. Sect. iv. Cap. iii. de  
Dysenteria partis an. 1669, &c.

‡ Sydenham Op. Sect. iv. Cap. vii. de Colica Biliosa,  
an. 1670, &c.

in warm climates, the pure air of the sea for the  
 air of an harbour loaded with exhalations from  
 the land; and choleras, diarrhœas, and dysen-  
 teries are often the immediate consequences.  
 In some of these, there is at first no evacua-  
 tion downwards, and thence some resemblance  
 in the symptoms to the *colica Pictonum*. But  
 the manner of attack, the progress of the  
 symptoms, and the terminations are totally  
 different. In *cholera sicca*, *colica biliosa*, and  
 the form of dysentery above mentioned, from  
 the beginning of those diseases there are symp-  
 toms of fever: the skin is hot, the pulse quick,  
 and the tongue white. In the *colica Pic-*  
*tonum* there is no fever in the beginning, and  
 it is only excited by the long continuance of  
 the pain. The *cholera sicca*, and *colica biliosa*  
 are extremely acute diseases; often going thro'  
 their course in a few hours, seldom extending  
 beyond a day or two; whereas the *colica*  
*Pictonum* comes on slowly, increases gradually,  
 and continues many days, seldom yielding  
 even to medicine in less than two or three,  
 and sometimes extending to ten, or twelve  
 days. In the *cholera*, and *colica biliosa*, the  
 great difficulty in procuring stools is to get  
 the purgative to stay on the stomach; for if  
 it

it is not thrown up, stools are soon procured; and the first evacuation is generally followed by many more. The case is quite different in the *colica Pictonum*; the constipation is obstinate even after large quantities of cathartic medicines have been swallowed and retained; and when they do operate, it is seldom copiously; the bowels are still disposed to constipation, and opening medicines are from time to time necessary, to preserve a passage through the body. The cholera is almost always accompanied with spasms of the thighs and legs, which I never saw in the *colica Pictonum*. What however may be considered as peculiarly characteristic of the *colica Pictonum*, is the paralytic affection that follows it, particularly of the hands and wrists. Such a termination of *cholera*, *colica biliosa*, or any kind of dysentery is never seen, but it is a frequent occurrence in the *colica Pictonum*, and no means have hitherto been discovered by which it can be prevented.

## CHAP. VI.

*Of SORES and ULCERS.*

**S**ORES and ulcers in the lower extremities were frequent at all seasons of the year, and in all the different quarters where the soldiers were stationed. They, together with fevers and fluxes, amounted to 19-20ths of the sick received into the hospitals, all other complaints not being more than 1-20th, if particular times be excepted, when the dry-belly-ach or small-pox were prevalent. The proportion of sores in the hospitals, though always considerable, admitted of great variation. At Spanish Town and Kingston they were often 11-3d, at Fort-Augusta 1-half, and at Stoney Hill 2-3ds of the whole number in hospital. They arise from the most trifling causes; a scratch, an hurt, or bruise in the lower extremities, are sufficient to produce a sore, which it is always difficult to heal, and sometimes impossible. Old sores often break out anew, and prove equally obstinate.

A com-

A common cause of sores is an insect called a *chiger* \*. It is of the flea kind, and extremely small. It lays its eggs in the skin in an uncommon manner, for it is said to bury itself in the flesh, and become a *nidus* for its own *ova*. The part, where it has thus deposited itself, after a little time swells, becomes red, and itches much. At this period, it is the common practice, to pick out of the skin with a fine needle the bag formed by the body of the parent insect, in which are contained the rudiments of the young. If this be neglected, the inflammation increases, suppuration takes place, and an ulcer is formed. The insect harbours most commonly in dust upon the floor or ground, and generally deposits its *ova* in the toes and feet; and many of the men lost one or more of their toes, by ulcers arising from this cause.

Sores, in whatever way produced, spread quickly, and form a large ulcerated surface. They give little or no pain, which appears to be owing in a great degree to the warmth of the air, for cuts and wounds are found to give much less pain in a warm, than in a cold climate. The appearances of the ulcers are

\* *Pulex penetrans*, Linnæi Syst. Nat.

constantly varying; at times they acquire the look of an healthy sore, send forth strong and luxuriant granulations, and begin to skin over; but one night will often put an end to this flattering prospect. The granulations turn flaccid, or even mortify in part, the portion skinned over ulcerates afresh, and the sore becomes larger than ever. After a time it will again put on an healing appearance, and repeatedly run through the same stages. The bones at last become carious, and if the limb be not either amputated, or the patient sent off the island, he becomes hectic, and after lingering a considerable time, dies.

The extreme difficulty, indeed almost impossibility, of healing an ulcer in the lower extremities, after it had become of a certain size, necessarily produced an accumulation of such cases in the hospitals. Various means of cure were attempted, the principal of which it will be sufficient to mention shortly, as none of them were attended with considerable success.

It was supposed, as the soldiers arrived in the island after being a long time at sea, and as they had salt provisions after landing, that they might have more or less of scurvy in their habit,

habit, which would render the ulcers difficult of cure. On this supposition they were put upon a vegetable diet, which for a time had good effects upon some, but in the end failed.

The powers of the constitution having evidently suffered, it was imagined they might be restored by the use of bark, with a full and nourishing diet. This plan was accordingly tried, and produced at first favourable changes, but was not finally more successful than the former \*.

Alterative medicines, as small doses of calomel, were given, but they did no good. The changes, which the ulcers of themselves underwent, occasioned for a time some degree of deception as to the good effects of the treatment made use of; for the favourable appearances of the ulcers, coinciding as to time with the medicines directed, raised expectations at first, which, in the end, were disappointed. But it must be allowed, that in many cases the means employed produced a temporary amendment, and promoted to a certain degree the efforts of nature to effect a cure; yet the powers of the constitution were

\* See note P in the Appendix.

so feeble, that with all the assistance that could be given, they could not bring it to a completion. They advanced a certain way, but soon fell back again.

External applications of various kinds were tried, and what has been said of the internal remedies will equally apply to them; they often produced a favourable change at first, but it was not permanent. Among the different dressings that were made trial of were ointments, sometimes stimulating, sometimes emollient, fermenting poultices, the common bread and milk poultice, and dry lint. An application common among the inhabitants deserves to be taken notice of, as it sometimes had better effects than any of those just mentioned, I mean roasted limes.

An horizontal position with quiet did good as in other countries, and if neglected, the progress of ulcers became extremely rapid.

The general result of all my experience was, that ulcers of some standing, and of a considerable size, in the lower extremities, could not be healed in that country by any means that we were acquainted with. Instead therefore of wasting time in fruitless trials, every opportunity was taken of sending home

the men with ulcers, along with the other invalids. The change of air and climate produced great effects; many of the ulcers healed on the passage, and all of them soon got well after their arrival in England, unless where the bones were carious; and of these last many recovered, after losing large portions of the *tibia* by exfoliations, or were finally restored to health, by an amputation of the diseased limb. This operation was indeed sometimes performed in Jamaica, but never except under the most urgent circumstances, for it seldom succeeded, owing to the locked jaw, which generally came on in a few days, and proved fatal. I cannot help therefore concluding, that humanity as well as the good of the service require, that all bad ulcers should be sent home without loss of time from the West Indies, unless some more effectual means of cure should be discovered, than those with which we are hitherto acquainted.

Although ulcers can seldom be cured in the West Indies, they may often be prevented. The chigers get to the toes and feet by the men going without shoes or stockings; who, from the same cause are also more exposed to scratches and bruises in those parts, which

quickly become ulcers, [if not treated directly with great attention. If care were taken, that they should never go without shoes and stockings, or trowsers in the room of stockings, it would prevent many ulcers, particularly at Stoney Hill, where the chigers are very numerous, though in other respects it be the most healthy quarter in the island. At Fort-Augusta, Port-Royal, and other quarters near the sea, the men in fishing or wading in the water for their amusement, often cut their feet upon the stones and rocks, and so give rise to ulcers, which it would not be difficult to prevent,

## C H A P. VII.

*Of some other Diseases to which Soldiers are  
subject.*

OF the following diseases, which all together form a very inconsiderable proportion of the sick list, there are few peculiarities, either in their history or treatment, depending upon the climate; yet such as there are, I thought it might not be without use to take notice of shortly.

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SECT. I. *Of the Venereal Disease.*

OF the few things peculiar to this disease, in the West Indies, it is perhaps the most singular, that it should, at the present day, be much less frequent in a country supposed originally to have produced it, than in any part of Europe. This will not be considered  
as

as a proof, that the venereal disease had its origin in the West Indies. In 331 patients admitted into the hospital of the 2d regiment, there were only two with venereal complaints; and in the other hospitals, the disease was not more frequent. Though less common than in Europe, it is not milder; on the contrary the proportion of cases, in which the disease is violent and the symptoms run high, is greater. This is probably to be imputed to the bad habit of body, which not only makes it difficult to heal sores in the extremities, but also renders the progress of inflammation in many cases unfavourable, and tedious. In gonorrhœa, the inflammation of the urethra often extends to the bladder, producing strangury, and the usually concomitant symptoms. Chancres often produce *phimosis* and *paraphimosis*, and consequent mortification. Such unfavourable symptoms are found to happen in patients, who are of a bad habit of body, in all countries. In one case the venereal blotches ulcerated, and three or four large sores were formed upon the arms and shoulders, which could not be healed by any means that were tried; they remained after there was reason to believe, that all traces of

the infection were eradicated. The patient was sent home to England, and soon after he sailed, the sores began to heal, and were all well before he got to an end of the voyage.

The great sensibility of the constitution to the effects of mercury, in the West Indies, often proves a considerable obstacle to the cure of this disease. A salivation is frequently excited, before a sufficient quantity of the medicine can be thrown in. Bark, in the quantity of three or four drachms a day, and the free use of opiates, together with an astringent gargle, made of a decoction of oak bark, to which some alum may be added, prevent the mouth from being either so quickly, or so violently affected. Of the several preparations of mercury, the *hydrargyrus calcinatus* was found to be the best for internal use.

It is worth remarking, that mercury had no effect upon the constitution to render it less susceptible of fevers; for persons under a course of that medicine were seized with the remittent fever; which however did not appear to be aggravated by the presence of the mercury in the body.

SECT. II. *Of some Complaints arising from Insects.*

BESIDES the chiger, there are other insects that produce very troublesome complaints, and none perhaps occasion greater distress than musquitoes \*. They breed in water, and of course low marshy grounds, and their neighbourhood, are particularly infested by them. They are most troublesome in the morning and evening, during the calm that takes place between the land and the sea breezes; they dislike the wind. Their bite produces violent itching, inflammation, and sometimes sores in consequence of scratching, from which it is difficult to refrain. When the proboscis of a musquito is examined with a microscope, it is found to consist of a sheath containing small pointed bristles, with which it penetrates the skin while it sucks, and when the insect is brushed off suddenly, they are probably in part broken, and remain sticking in the skin, and thereby contribute greatly to produce the tormenting itching, that is the

\* *Culex pipiens*, Linnæi Syst. Nat.

consequence of the bite of those insects, and which is always aggravated by scratching.

Lime juice, or rum, are the applications commonly made use of, and they both allay the itching. A mixture of them, in equal parts, appeared to be more efficacious than either separately. It has been proposed by a writer \*, who has examined the history of this insect with the greatest accuracy, to wash the face and hands, or such parts as are exposed to the bites of musquitoes, with the juice or decoction of certain herbs, which might possibly prevent them entirely from making their attacks upon the skin. It is probable experiments might in this way discover the complete means of prevention, and among other applications deserving of trial, the writer above referred to, recommends an infusion of pepper, wormwood, or rue; verjuice, pomatums, &c.

There is a large fly that produces often a dreadful disease, by depositing its *ova* in the mouth or nose. It happens frequently to negroes, and we had several examples of it among the common soldiers. While they are sleeping in the open air, the fly deposits

\* Reaumur, Hist. des Insects, vol. iv. p. 624.

its *ova* most commonly in the nose, but sometimes in the mouth. The pain, swelling, and inflammation about the face, after the maggots are formed and ready to break forth, are very great; and the poor sufferers are almost distracted. The number of living maggots that come away is often considerable, and they are of a large size, being nearly half an inch long.

The usual remedy in such cases is, inhaling the steam of a strong decoction of the leaves of tobacco, through the mouth or nose, according to the seat of the disease. It procures great relief. The tobacco is used on the supposition that it kills the maggots, but whether the good effects of it depend upon any power of that kind, or simply on the vapour and steam, I did not see a sufficient number of cases to determine. If the virtues of the tobacco have a considerable share in the cure, it is probable that a weaker decoction or infusion of the leaves, thrown up the nose by a syringe, or used to wash the mouth with from time to time, would prove more effectual in destroying the maggots than the vapour or steam.

WHILE

WHILE speaking of the diseases produced by insects, it will not be out of place to mention some singularities respecting the itch, a disease which arises from a particular species of insect \*. It has been doubted whether this disorder really depends upon an insect, but I have frequently seen them picked out of the skin, and examined them with a microscope. They were first observed by *Bonomo* †, and the figure given by him conveys a tolerable idea of the insect.

In this country the itch commonly appears between the fingers, about the wrists, and in such parts of the body, as by a duplicature of the skin, are in some degree defended from the action of the air, and are of course warmer than the other parts. But this is not the case in the West Indies; the disease spreads almost uniformly over the skin, which is probably to be imputed to the heat of the climate. In a temperature of the air between 80° and 90°, the insect is not impelled to seek for shelter in the folds of the skin.

The itch is a disorder productive in general of effects, which, though troublesome and

\* *Acarus siro*, Linnæi Syst. Nat.

† Phil. Transf. Vol. xxiii. p. 1296. an. 1703.

disagreeable, can seldom be called dangerous ; yet in certain situations I have seen it occasion alarming symptoms, which have so far disguised the disease, that it could not for a time be known to be the itch. The small pointed watery vesicle, or pustule, which characterises the itch, has been changed into an eating sore, that in part destroyed the substance of the skin. Such effects, it was not at first imagined, could arise from the itch ; but when it was observed to infect others, and produce in them the common appearances of the disease, it occasioned a suspicion of the nature of the complaint, which was confirmed by the readiness with which all the symptoms yielded to the external application of sulphur. I have never seen the effects of the itch just mentioned, except in children, and those under the following circumstances ; either in the confined apartments of a workhouse, where children are always unhealthy ; or where, by mistake, the disease has been allowed to remain a long time, in consequence of which ulcers have been formed, the sleep broken, and the general health greatly impaired. Under all circumstances, however, the cure is equally easy and certain, for the  
disease

disease yields as readily to the sulphur ointment, when attended with the unusual symptoms, as in its more common form.

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SECT. III. *Of Inflammatory Disorders.*

INFLAMMATORY diseases are very rare in Jamaica, though not always slight when they do occur. Catarrhs, coughs, inflammations of the breast, and of the lungs, are uncommon; yet in the months of March and April, when there is the greatest difference between the temperature of the air in the day and in the night, they are sometimes to be met with; and oftener at Spanish Town than Kingston. Several of the soldiers were seized with inflammations of the breast, in consequence of a storm of wind and rain, which happened in the night-time at Spanish Town, and by destroying part of the roof of the barracks, exposed the men to the cold and wet. One of them died, and the others recovered slowly; for, though the disease was soon overcome by bleed-

bleeding and the usual remedies, yet it was a considerable time before they regained their strength, which was probably to be imputed to the necessary loss of blood.

Inflammations of the eyes are frequent, obstinate, and full of danger, for they often terminate in opacities of the *cornea*. The glare and heat of the sun, strongly reflected by the ground, devoid at certain seasons of verdure; and the dust rendered light and dry by heat, and put in motion by the trade wind, which often blows with violence during part of the day; are to be considered as the causes of the frequent inflammations of the eyes.

The bad habit of body, that prevails almost universally among Europeans, renders such inflammations obstinate, and in the end productive of opacities, and loss of sight. Having before mentioned a bad habit of body, and assigned it as a cause why ulcers in the lower extremities are so easily produced, and healed with so much difficulty; and having again considered it as the cause, which renders inflammations of the eyes obstinate, and productive of the worst consequences; it may be asked wherein this bad habit of body consists, in order that too much may not be ascribed

ascribed to a cause, of which we have only a vague or ill-defined idea? To this I would answer, that the bad habit of body shews itself chiefly in a weakness of the powers of nature, in healing even trifling sores from external injuries, and also in the readiness with which inflammation of all kinds takes an unfavourable course. The powers of life, upon which the repair and support of the simple solids of the body depend, appear to be weakened, though there be no evident diminution either of muscular strength, or animal spirits. It may be a question, whether this weakness depend upon the heat of the climate, which at first produces a great sense of lassitude from the smallest exertions, and may still operate unfavourably upon the body, after time and habit have got over the first disagreeable feelings: or, whether it arises from the cause of fever, which prevails more or less at all times of the year, and may therefore operate insensibly on the constitution, without producing the disease; like to what sometimes happens in the jail fever \*. Facts and observations might be produced, some in favour of, and others adverse to, each of the opinions

\* Med. Transf. Vol. III. p. 357.

above stated. It is not improbable, that there may be some foundation for both; but I forbear to enter farther on a subject, on which I am not provided with materials, from whence any certain conclusions can be drawn\*.

Inflammations of the eyes, having often fatal terminations, ought not for a moment to be neglected, even though trifling at first; and the means, usually employed against such complaints, should be put in practice with the utmost diligence. It would be superfluous to enter into a detail upon this head, for I have not learned any thing peculiar to the treatment of the disease in that country.

The common sore throat occurs now and then, and is almost always a slight disease.

It may deserve to be taken notice of, that the measles is commonly a mild disease in Jamaica. It was frequent among the Duke of Cumberland's regiment in 1782-3, which consisted of Americans, of whom many had never had that disease. Few of them were so ill as to be taken into the hospital, and in those the fever was very slight; and none of them were troubled either with complaints of their breast, or bowels, the usual concomi-

\* See note P in the Appendix.

tants or consequences of the measles. The disease appeared to be greatly mitigated by the warmth of the climate, which lessened the disposition to inflammation, particularly in the chest. Something analogous to this is to be observed in England; the measles are milder in the warmer months, and are much less apt to affect the lungs dangerously at such times, than in the winter or spring. From some few cases however that fell under my observation among the inhabitants, the measles may become a formidable disease, in consequence of a subsequent dysentery. Under those circumstances, the practice so strongly recommended by Sydenham, that is bleeding, will rarely, if ever, be admissible in patients, whose constitutions are exhausted both by the climate and the disease. The alternate use of opening medicines and opiates, as recommended in treating of the dysentery, succeeded well; and there was room for employing astringents sooner than in common cases of dysentery.

SECT. IV. *Of Consumptions, Mania,  
and Prickly Heat.*

PULMONARY consumptions rarely originate in the island, but those who come from England with that complaint already begun, are not benefited by the warmth of the climate; on the contrary, the disease is precipitated, and proves sooner fatal than it would have done in a more temperate air. Of this we had repeated examples among the soldiers, several of whom arrived in the island with beginning consumptions, and were all quickly carried off by that disease.

It deserves to be mentioned, that several examples of *mania* occurred among the troops. In such cases as fell immediately under my observation, the disease was evidently owing to an intemperate use of spirituous liquors; and some, while they could be prevailed upon to abstain from spirits, were in a great measure free from the disease; but others, after being once attacked, continued for years to labour under that deplorable distemper.

Before I dismiss this subject, I may be permitted to take notice of a disease, if so trifling an affection deserve that name, that is very common, I mean the *prickly heat*. Some are troubled with it all the year round; others only during the warmer months. Such as have fair and delicate complexions are more subject to it than others, insomuch that they are not free from it at times either night or day. Some are incommoded by it only when exposed to the heat of the sun, or on making bodily exertions.

The prickly heat consists of a small red rash, chiefly upon such parts of the skin as are covered. It scarcely appears to the eye to be raised above the skin, though it gives a slight roughness to the feel. It is attended with a disagreeable sensation of heat and pricking in the skin, as is well expressed by its name. It is supposed by some to be a salutary effort of the constitution, and the disappearance of it is therefore dreaded as portending mischief. I cannot say that I ever met with any facts to confirm this opinion. In the beginning of fevers, it is common for it to disappear, if they are preceded by a chilly or cold fit, and to return again with the hot fit, but without appear-

appearing in either case to aggravate, or alleviate the disease.

The prickly heat probably depends upon a two-fold cause; the irritating action of the heat upon the skin, and the concentrated state of the salts in the perspirable matter. The rays of the sun in warm climates are capable even of raising blisters on the skin; and the perspiration always being profuse, the thinner parts soon fly off, and the remainder becomes more loaded with the animal salts, and is of course more irritating.

It requires no medicine, and the troublesome effects arising from it, are best remedied, or prevented, by quiet and rest.

## C H A P. VIII.

*Remarks on some of the Diseases of NEGROES.*

THE diseases of negroes fell seldom under my observation; what I have to say of them therefore will be very short, and chiefly with a view of calling the attention of others to the subject: for we are hitherto much in the dark respecting several disorders, that are in a great measure confined to the negroes, in that part of the world. A better history of them would enlarge our knowledge of pathology, and teach us, I doubt not, many new and interesting facts in the animal œconomy. It is much to be regretted, that a work of this kind is not attempted by some of the profession in Jamaica or our other West India islands, in which there are many men of observation every way equal to such an undertaking.

The *yaws* is perhaps one of the most remarkable diseases, that prevail among negroes.

It is infectious, and, like the small-pox, never attacks a person a second time. It is communicated by contact, most commonly in the same way that the venereal disease is; for it is seldom caught without some close connection, or intimate communication. It is distinguished by numerous superficial sores of no great size, in each of which are small spherical prominences, in appearance like a raspberry. There is general soreness, and lassitude at their first eruption, but no fever. The discharge from the sores is more of a slimy mucus than matter. The length of the disease is various, extending from four or five, to fifteen or twenty months. If a negro, that has contracted the disorder, be put in circumstances favourable to general health; if he be not obliged to work, if he be allowed a good diet, and if he be kept clean by frequent washings, it will run its course, and after a time entirely disappear. We are not acquainted with any means of eradicating the poison, for though mercurials will put an entire stop to the disease, may remove every morbid appearance, yet it is only for a time: the disease is suspended, not subdued, and it soon recurs again. It is the opinion of some, that there is much

danger from thus interrupting the course of the disease by mercury, and that it becomes afterwards more obstinate and productive of new disorders, as violent pains, known under the name of the *bone-ach*. Some admit the use of mercury, provided it be not early in the disease, and say that the disorder does not then return. The period of the disease, when it can be given with benefit, is not ascertained with any degree of precision.

Respecting this disease there are many *desiderata*; we are unacquainted with the local effects of the poison when it is first applied, and also with the interval of time, between the application and the first appearance of the disease upon the skin. Both those points would be ascertained by inoculation, a practice which has been proposed, and appears to be well deserving of a trial, in this disorder. It would be of great consequence to ascertain, the earliest period at which mercury might be given with advantage. The bone-ach, and other disorders, the effects either real or supposed of the yaws, are undescribed. These are some of the most obvious heads of inquiry on this subject.

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The yaws is a disorder not peculiar to negroes, for several of the soldiers were affected with it.

*Cacabay* is a negro name for a disease not known among Europeans or their descendants, as far as I could learn. It begins in whitish spots upon the skin, near the ends of the extremities. Those spots turn to ulcers commonly upon the fingers and toes; there is much swelling with pain, and the joint affected drops off, without any mortification. The fore afterwards heals up, and remains well even for months; but returns again, affects the next joint, which after a time drops off; and the disease, attacking one joint after another, in the end reduces the miserable sufferer to a mere trunk. It continues often several years before it prove fatal.

No remedy has been found either to cure it, or much retard its progress. Mercurials have been tried, but with little or no advantage. It were greatly to be wished, that the symptoms of a disease so formidable and so singular, were detailed at full length.

The last disease I shall mention is no less singular than either of the preceding, and much more frequent and destructive. It

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appears to be more a disorder of the mind than of the body, and shews itself by a very uncommon depravity of the appetite in *eating dirt*. *Dirt-eaters*, as they are called, can seldom or ever be corrected of this unnatural practice, for their attachment to it is greater, than even that of dram-drinkers to their pernicious liquor. They have a predilection for particular kinds of earth at first, but in the end will eat plaster from the walls, or dust collected from the floor, when they can come at no other. They are fondest of a kind of white clay, like tobacco-pipe-clay, with which they fill their mouths, and allow it to dissolve gradually; and express as much satisfaction from it, as the greatest lover of tobacco could do. This practice is common at all ages, even almost as soon as they leave the breast, the young learning it from the old.

Besides the pleasure they have in this practice after it has become habitual, they are supposed to give into it at first from other motives, such as discontent with their present situation, and a desire of death in order to return to their own country, for they are well aware that it will infallibly destroy them. It is supposed, that a diseased state of the stomach  
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may give rise to the depraved appetite, but of this there is no good evidence; and as was observed before, it appears to be more a disease of the mind than of the body. Whatever the motives may be that induce them to begin the practice, it soon proves fatal if carried to great excess. There are instances of their killing themselves in ten days, but this is uncommon; and they often drag on a miserable existence for several months, or even one or two years. The symptoms that it induces are those of a dropfy; the appetite fails, the face becomes bloated, the extremities swell, and effusions of water take place under the skin, and in all the cavities of the body.

On examining the body after death, there are frequently found in the colon large concretions of the earthy matter, which they have swallowed, lining the cavity of the gut, and almost completely obstructing the passage. The mesenteric glands are always swelled. The blood is thin, and with few red globules, as is common in dropfies; and there are large *polypi* in the left ventricle of the heart, and in the aorta. They are very strong and firm, and pulled out give the representation of an injection of the aorta, subclavian, and carotid arteries.

arteries. In order to ascertain, whether they were formed before or after death, the body has been opened a few minutes after the patient expired, and they have been found already strong and firm \*. They are no doubt formed, when the motion of the heart becomes feeble and languid, just before death.

No means of preventing the horrid practice of *eating dirt*, as it is called, nor any method of remedying the destructive effects of it, have hitherto been discovered: a negro labouring under the malady is considered as lost. On many estates, half the number of the deaths, on a moderate computation, are owing to this cause. They are not to be deterred from it by stripes, promises, or threats; nor have stomachic medicines, magnesia and absorbents, or a good and full diet ever done much good. What could not be effected by any of the means just mentioned, has been in part accomplished upon some estates, as I have been informed, by cutting off the heads from the dead bodies of those, who have died of this vicious practice. The negroes have the ut-

\* The observations made upon the dead body were communicated to me by Dr. Thomas Clarke, botanist of the island of Jamaica.

most horror and dread of their bodies being treated in this manner, and the efficacy of this expedient, which can only operate upon the mind, is a strong proof, that the disease in its origin is more a mental than a corporeal affection.

## C H A P. IX.

*Of the best Manner of taking Care of the Sick  
of Armies in Jamaica, and our other West  
Indian Islands.*

**F**ROM what has been said in the foregoing pages, it must appear that the far greater part of the diseases, to which soldiers are subject in the West Indies, are of such a nature as to require immediate care, and attention. Time lost in procuring admission into a general hospital is irretrievable. It is still worse if the hospital be at a distance, and the sick are to be sent to it; for besides the delay, they are exposed to fatigue, which never fails greatly to aggravate the disease; and both together diminish in an high degree the chance of recovery. Wherever soldiers are, there also should be the means of taking care of the sick; not only every regiment, but every detachment, should have an hospital. Were the troops to be placed in the healthy quarters  
already

already pointed out, as it would greatly reduce the number of sick, so it would be productive of considerable savings both in the quantity of medicines, and in the number of attendants; but till that be done, we must consider them as remaining in their present situation, and requiring suitable provision. The observations I have to make may be arranged under the heads of *attendance, medicines and hospital stores, and subsistence.*

There has been occasion to observe, in examining the returns of the sick, that it is no uncommon thing for their number to amount to one third of the whole, and therefore provision should be made for that proportion. Fifty sick, supposing fifteen or twenty of them to be convalescents, are as many as one person, whether a regimental surgeon or mate, or an hospital mate, can take care of; and if the proportion of fevers and fluxes among the sick, and the close attention they require be adverted to, it must be allowed that one person should be possessed both of diligence and assiduity, to do justice to that number. At that rate, therefore, there ought to be a surgeon to every 150 men. As there is sometimes more sickness in one regiment than another, it is for  
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the good of the service to have the assistant surgeons upon the staff establishment, and not attached to any particular corps, that they may be moved more readily from place to place, as the number of the sick may require. A surgeon, that would do justice to the men under his care, must be very frequent in his visits to the hospital; for unless he watch assiduously the remissions of the fever, and be ready to take immediate advantage of them, he will not be able to check the disease speedily, without which both the constitution and life of the patient will be in imminent danger. A man that has three or four fits of the fever, is in greater danger of dying, than one that has only one or two: but laying the risk of death out of the question, a man that has his fever stopped after the first or second fit, will generally be restored to health in a few days, whereas if he have four or five fits, it will often require as many weeks to recover the same degree of strength in the latter case, as days in the former.

It must therefore be obvious, how much the diligence and attention of the surgeon importeth; of which a very striking proof occurred in the first battalion of the 60th regiment,

regiment, which consisted of twelve companies. The regiment was provided with two hospitals and two surgeons, each of whom took charge of the sick of six companies. It was presently found that one hospital was much fuller than the other, which did not appear to proceed from a greater sickness among one division of the companies than the other, for there was no material difference in the number of sick sent from the several companies. In order to bring the sick in the two hospitals to an equality, a company was taken from one division and annexed to the other. The sick of the five companies were, however, still more numerous than that of the seven; and after a short trial, they were divided into four and eight companies, and then the sick in the two hospitals were nearly equal, and varied from forty to sixty in each. It may be supposed, that so great a difference depended upon the method of treatment being entirely different in the two hospitals. That however was not the case; the general plan of treatment was nearly the same in both, and not materially different from what has been mentioned in speaking of the cure of the remittent

remittent fever \*. It was owing to the following circumstances: one surgeon visited his hospital four or five times a day, the other only twice a day; the first seldom allowed any remission to pass without taking advantage of it, the latter often; one was always at hand to palliate the untoward symptoms, as vomitings, or purgings, proceeding either from the medicines or the disease; the other, not. Add to these, that vigilance in the surgeon at the head of an hospital extends itself to the servants, and nurses under him, and thence a greater degree of attention, both in administering nourishment and medicines. The effect of all those causes was, that the men recovered in half the time in one hospital that they did in the other, and therefore the hospital for eight companies had no greater number of sick, than that for four.

A book was kept in every hospital, in which was entered the name of each patient, his age, the time of his admission, the disease under which he laboured, and the medicines which were daily given to him. This was found equally useful and convenient to the surgeons,

\* This appeared from the medicines entered in the hospital book, to be taken notice of afterwards.

and to the physician or inspector of the hospitals: and from this book a weekly return was made of the sick admitted, discharged, and remaining in the hospital.

I cannot help suggesting that an hospital book or register, kept in the manner recommended, in each regiment, and on board every ship of war, would afford the best proofs of the diligence and abilities of the surgeons; and if annually transmitted to those, to whose superintendence the care of the health of the navy and army is committed, would have the good effect of making industry and abilities known at the greatest distance. A plan of this kind would greatly contribute to improve our knowledge of diseases, in all the various climates to which the possessions of the British empire extend; and, by enabling us to take better care of the health of our seamen and soldiers, might prove a national benefit.

The subsistence of the sick in *general hospitals* has always been found extremely expensive, yet on actual service they appear to be indispensable. In our West India islands they are not only unnecessary, but would be pernicious to the troops in garrison; and the use of them was discontinued in Jamaica, by direc-

tions from the inspector general of hospitals, with the best effect.

The mode of subsisting the sick, in regimental hospitals, must vary according to local circumstances; in Jamaica it was ordered so, that while justice was done to the sick, they were hardly a greater expence to government than the men who were well. Of the *rations* or provisions issued to the soldiers, bread only was given to the sick. In the room of the salt meat, rum, and other articles, they had five shillings *currency* \* a week, which was the value that the commissaries put upon them, and which they paid weekly in lieu of the provisions. To the sum of five shillings per week was added one shilling and eight pence *currency*, out of the soldiers pay. The subsistence of the sick therefore consisted of the usual allowance of bread, and six shillings and eight pence *currency* per week. This money was laid out in purchasing fresh meat, vegetables, coffee, sugar, milk, and other articles necessary for the sick. It was amply sufficient for all those purposes, and even for the payment of *orderly* men, who acted as nurses;

\* Five pounds sterling are equal to seven pounds *currency*.

for there were few or no female nurses in any of the hospitals; they ruined their health by drinking, and could not be depended upon so much as the men. An account of the money above specified was kept in a book in the hospital, open to the inspection of the officers of the regiment, and of the physician or inspector of the hospitals. The subsistence of the sick so far cost government no more than that of the men in health; but it was necessary to allow wine as a medicine, and that in considerable quantities; wine therefore and medicines were the only extraordinary hospital expences. For the purchase of wine ample provision was made by the island: and it ought to be mentioned, that the GENERAL ASSEMBLY of Jamaica, both in this and in every thing else appertaining to the accommodation of the troops, shewed at all times a most laudable disposition to make the greatest exertions.

Besides medicines and wine it was necessary to have among hospital stores, bedding, cooking utensils, and several other articles that are wanted in furnishing an hospital; for soldiers are allowed no bedding in the West Indies, and generally have none except a blanket.

Medicines must necessarily be provided by government in that country, for what is called the medicine money of a surgeon, would not purchase one twentieth part of the requisite articles. Bark alone would cost some hundred pounds; it is often sold in the country for three pounds currency *per pound*, and at a moderate computation, one pound annually is necessary for each man. From this article alone a judgment may be formed, how much it is beyond the power either of a surgeon of a ship of war, or of a regiment, to furnish medicines for the men in that country; and unless government interpose, the sick must remain destitute of many things, that are often indispensably necessary for their preservation. Ample provision has always been made for the army, and why equal care should not be taken of our brave seamen, it will be difficult to assign any good reason.

It has been an object of principal consideration, in allowing medicines to the army, to prevent the abuse of them. The high value, which they bear in those countries, has been believed in some cases to prove a temptation to those, through whose hands they passed. It is an easy matter to establish proper checks upon  
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the expenditure of medicines, and it was done in this manner. An exact state of the medicines, wine, and other articles in store, was taken; and the store-keeper, purveyor, or other person having charge of them, was directed to issue none without a written order from the physician, inspector of hospitals, or one having authority to give such orders. Those orders, with a receipt upon them from the surgeon of the regiment, or person in whose favour they were granted, were vouchers to the storekeeper. By these means, no abuses could exist without detection; and that they might more easily appear upon the face of the account, a quarterly return of the expenditure of medicines was regularly made. The orders for medicines are necessarily granted by a person, whether physician, or inspector, who superintends the care of the sick in general, and to whom the weekly returns of the sick in hospital are made. He will therefore at all times be a judge of the quantities of medicines necessary for particular regiments or detachments, as the state of their sick must be known to him. If any abuses are suspected to take place, after the medicines come into the hands of the surgeons, or others

having charge of the sick, it is an easy matter to ascertain what grounds there are for such suspicions, by examining the hospital book, in which is an account of all medicines ordered for the sick. I should trespass on the patience of my reader, to enter farther in detail upon this subject, where it must be obvious, that the means of preventing, or detecting abuses, are equally simple and effectual.

In consequence of the men being rendered unfit for service, by repeated attacks of fever, flux, dry-belly-ach, and by sores, the number of invalids accumulated daily in the hospitals, and in the regiments. Humanity as well as the interest of government required, that such should be sent home from time to time. While they remained in the island they were a burden upon the army, without any chance of their ever being useful; but upon being sent to a cooler and more healthy climate, many of them recovered; particularly those who were broken down by fevers, or laboured under sores.

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## APPENDIX.

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APPENDIX.

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OBSERVATIONS ON THE HEAT OF WELLS  
AND SPRINGS IN THE ISLAND OF JA-  
MAICA, AND ON THE TEMPERATURE OF  
THE EARTH BELOW THE SURFACE IN  
DIFFERENT CLIMATES.

Read at the ROYAL SOCIETY, Dec. 20, 1787.

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TO THE HON. MR. CAVENDISH.

SIR,

**T**HE following observations on the heat  
of springs and wells, and their applica-  
tion towards determining the mean tempera-  
ture of the earth in different climates, were  
suggested by you in some conversation on that  
subject, previous to my going to Jamaica in  
1780. If you think them deserving the at-  
tention of the Royal Society, I must beg the  
favour of you to lay them before that learned  
Body.

I have the honour to be, &c.

JOHN HUNTER.

Charles-street,  
Dec. 11, 1787.

THE great difference between the temperature of the open air, and that of deep caverns or mines, has long been taken notice of, both as matter of curiosity and surprize. After thermometers were brought to a tolerable degree of perfection, and meteorological registers were kept with accuracy, it became a problem, to determine what the cause was of this difference between the heat of the air, and the heat of the earth; for it was soon found, that the temperature of mines and caverns did not depend upon any thing peculiar to them; but that a certain depth underground, whether in a cave, a mine, or a well, was sufficient to produce a very sensible difference in the heat. In observations of this kind, there was perhaps nothing more striking, than that the heat in such caves was nearly the same in summer and winter; and this even in changeable climates, that admitted of great variation between the extremes of heat in summer, and cold in winter. There is an example of this in the cave of the Royal Observatory at Paris. The explanations, which have been attempted of this phenomenon, have turned chiefly upon a supposition, that

that there was an internal source of heat in the earth itself, totally independent of the influence of the sun\*. M. DE MAIRAN has bestowed much labour on this subject, and by observation and calculation is led to conclude, that of the  $1026^{\circ}$  of heat (by REAUMUR'S scale), which he finds to be the heat of summer at Paris,  $34^{\circ},02$  only proceed from the sun, and the remaining  $991^{\circ},98$  from the earth, by emanations of heat from the center†. The proportion therefore of heat derived from this latter source is to that of the sun, as 29,16 to 1. It must be evident, that an hypothesis of this kind, which renders the influence of the sun of small account, is directly contrary to the general experience and conviction of mankind. Without entering, however, into any discussion at present of the *data* from which M. DE MAIRAN draws his conclusions, it will be more satisfactory to consider what the effect of the operation of those laws of heat, with which we are acquainted, would be.

And first, it is well known, that heat in all bodies has a tendency to diffuse itself equally

\* Vid. Martine's Essays, p. 319.

† Memoir. de l'Acad. des Sciences, An. 1719 et 1765.  
through

through every part of them, till they become of the same temperature. Again, bodies of a large mass are both cooled and heated slowly. Besides the mass of matter, there are two other considerations of much importance in the slow or quick transmission of heat through bodies; these are their different conducting powers, and their being in a state of solidity or fluidity. The conducting powers of heat are well known to be very various in different bodies; nor are they hitherto reducible to any law, depending either upon the density, or chemical properties of matter. Metals of all kinds are good conductors of heat, while glass, an heavy, solid, homogeneous body, is an extremely bad conductor, even when a metallic calx enters largely into its composition, as in flint glass. A state of fluidity greatly promotes the diffusion of heat; for a body in a fluid state, by the particles moving readily among each other from their different densities or other causes, has the warm and cold parts mixed together, which occasions a quick communication of heat. To apply these observations to the present subject; the surface of the earth being exposed to the great heats of summer, and the colds of winter, or more properly

properly the low degree of heat of winter, will receive a larger proportion of heat in the former season, and a smaller in the latter; and being further of a large mass, and of a porous and spongy substance, and therefore not quickly sensible to small variations of heat, it will become of a mean temperature at a certain depth, between the heat of summer, and the cold of winter, provided it contain no internal source of heat within itself. This conclusion is strictly agreeable to the experiments and observations hitherto made, in heating and cooling bodies, or in mixing portions of matter of the same kind of different temperatures \*. Water, though in a large mass, follows in some degree the heat and cold of our summer and winter, from the mobility of its parts occasioning a more speedy diffusion of heat. Air is quickly susceptible of heat, and from the expansions produced in it, and consequent motions in the whole mass, the temperature is soon rendered uniform.

The changes in the heat of the air are what we have measured, and we are to be understood to speak of them, when we talk of the

\* Vid. De Luc Modifications de l'Atmosphere, Vol. I. p. 285.

temperature of summer and of winter. It may be asked then, is the heat of the sun first communicated to the air, and thereby to the earth? No, the air is susceptible of a very small degree of heat from the rays of the sun passing through it; for it is well known, they produce no heat in a transparent medium, and consequently, that the air is only so far heated as it differs from a medium that is perfectly transparent. The heat produced by the rays of the sun bears a proportion to their number, their duration, and their falling more or less perpendicularly; and it takes place at the points where they strike an opaque and non-reflecting surface. The surface of the earth may therefore be considered as the place, from whence the heat proceeds, which is communicated to the air above, and the earth below. That this is really the case is evident from the superior degree of heat, produced by the action of the rays of the sun upon an opaque body, which will often be heated to  $150^{\circ}$  (FAHRENHEIT), while the temperature of the air is not above  $90^{\circ}$  \*. It may seem, therefore, that to measure the heat communicated to the earth, it should be done at the

\* Martine's Essays, p. 309.

surface,

surface, where the action of the rays immediately takes place. But though the heat be produced at the surface, it is communicated freely to the air as well as the earth; and though the apparent intensity of heat be greater in the earth, from the rays of light acting for a longer time upon the same parts of matter, yet there is little doubt that much the greater part is carried off by the air, which as it is heated flies off, and allows a fresh portion of cold air to come in contact with the heated surface. But still it is immaterial, whether the heat of the sun be excited more in the earth or in the air; for whichever has the larger proportion will in the end communicate a part to the other, and so restore the balance. The same observation applies to such causes of cold as may operate at the surface of the earth, as evaporation, and that taken notice of by Mr. WILSON\*. The air, therefore, near the surface of the earth will shew by a thermometer in the shade nearly, if not exactly, the same degree of heat that the sun communicates to our terrestrial globe; and if a mean of the heats thus shewn

\* Vid. Phil. Transf. Vol. LXX. p. 451. and Vol. LXXI. p. 386.

be taken for the year round, and we penetrate into the earth to that depth, that it is no longer affected either by the daily, monthly, or annual variations of heat, the temperature at such depth should be equal to the annual mean above mentioned. To ascertain this with the utmost precision, it must be obvious, that numerous observations should be made every day, corresponding to the frequent changes of temperature, which are known to happen in the course of the twenty-four hours in all climates; and upon these a daily mean should be taken, and the annual mean deduced therefrom. This has not yet been done, but where we have observations from which a mean temperature can be deduced with any degree of certainty, it will be found not to differ greatly from the heat of deep caves, or wells in the same climate. If further experience and observation should confirm the above opinions, it will be attended with this advantage, that we shall be possessed of an easy and ready method of ascertaining the mean temperature of any climate; which, with a few observations of the extremes of heat and cold at particular seasons, will teach us as much of the country, with regard to  
heat

heat and cold, as the meteorological observations of several years.

For obtaining the temperature of the earth the best observations are probably to be collected from wells of a considerable depth, and in which there is not much water. Springs issuing from the earth, although indicating the temperature of the ground from whence they proceed, are not so much to be depended upon as wells; for the course of the spring may be derived from high grounds in the neighbourhood, and it will thence be colder; it may run so near the surface as to be liable to variations of heat and cold from summer and winter; or it may be exposed to local causes of heat in the bowels of the earth. Wells seem also better than deep caverns, for the apertures to such are often large, and may admit enough of the external air to occasion some change in their temperature. Wells are not, however, to be met with in all places, and in that case we must remain satisfied with the temperature of the springs.

The following observations were made in the island of Jamaica, where there are flat lands in many parts towards the coast, but all the interior part of the country is mountain-

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ous. The heat is greatest in the low lands, and decreases as you ascend the mountains. The town of Kingston is supplied with water from wells. The ground on which it stands rises with a gentle ascent as you recede from the sea. In the low part of the town the wells are but a few feet deep, and many of them brackish. The heat of the water in some of them I have found as high as  $82^{\circ}$ ; but they were evidently too near the surface not to be affected by the heat of the seasons. As you ascend, the wells are deeper, and the temperature is nearly  $80^{\circ}$  in all of them. What variations there are, come within one degree, that is, half a degree less than  $80^{\circ}$ , or half a degree more. They are of different depths, and some not less than 100 feet; though, after they are of half that depth, the temperature is nearly uniform. At the *Governor's Pen*, which is also in the low part of the country, a well, which is above 60 feet deep, is  $79\frac{1}{2}^{\circ}$ . There is a well at Half-way-Tree, 243 feet deep, which is  $79^{\circ}$ . Half-way-Tree is two miles from Kingston, with a very gentle ascent. Near Rock-Fort is a spring, immediately at the foot of the long mountain, which throws out a great body of water;

water; the heat of it is  $79^{\circ}$ . All the places mentioned are but very little above the level of the sea, probably not more than the depth of the wells at the respective places; for near Kingston there are springs that appear just below the water-mark of the sea, and those that supply the wells are probably upon the same level.

The temperature of the air at Kingston admits but of small variation. The thermometer, at the hottest time of the day, and during the hottest season of the year, ranges from  $85^{\circ}$  to  $90^{\circ}$ ; in the coolest season, and observed about sun-rise, which is the coldest time in the twenty-four hours, it ranges from  $70^{\circ}$  to  $77^{\circ}$ . I have seen it once as low as  $69^{\circ}$ , and two different times as high as  $91^{\circ}$ . The annual mean temperature cannot, therefore, either much exceed, or fall much short of,  $80^{\circ}$ , as indicated by the wells.

The following springs were examined with much accuracy by the Hon. Mr. SEWELL, Attorney General of the island.

Ayscough's spring, on the road from Spanish Town to Pufey's, in St. John's parish,  $75^{\circ}$ .

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Pufey's

Pufey's spring, still higher in the mountains,  $72^{\circ}\frac{1}{2}$ .

A spring near the barracks at Points Hill in St. John's parish,  $70^{\circ}$ .

The thermometer in the shade at Pufey's, during part of the month of June, was found to range from  $69^{\circ}\frac{1}{2}$  to  $79^{\circ}\frac{1}{2}$ . It was observed both late at night, and early in the morning before sun-rise.

The spring in Brailsford Valley, about ten miles above Spanish Town, is  $75^{\circ}$ . The spring at Stoney Hill is  $71^{\circ}$ . These were examined by Mr. HOME.

Mr. WALLEN's house, at Cold Spring, stands the highest of any in the island. By a measurement, said to have been made by Mr. M'FARLANE, it is reported to be 1400 yards above the level of the sea. On the road to it, and about a mile below Mr. WALLEN's house, there is a spring that issues from the side of the hill, of the temperature of  $65^{\circ}$ . Cold Spring, which gives a name to the place, is about fifty feet below the house, and the heat of it is  $61^{\circ}\frac{1}{2}$ . The thermometer in the shade at Mr. WALLEN's house, for some days in the month of April, ranged from  $57^{\circ}$  to  $67^{\circ}$ . It may be remarked, that the higher  
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the springs the colder they are ; and, as far as a conjecture can be formed from so few observations, they would appear not to differ much from the mean temperature of their respective places\*.

It will not be out of place to add some observations made in England, relative to the same subject. The wells in and about London are either of no great depth, or are full of water, which are both considerable objections to their giving a mean temperature. The want of depth will make them subject to the variations of the seasons; and a large quantity of water, even in a deep well, will take the temperature of the air more or less: for any change of temperature communicated at the surface will, from the fluidity of the water, be readily diffused through the whole. I suspect it is owing to this cause, that the wells in the neighbourhood of Brighthelmstone vary from  $50^{\circ}$  to  $52^{\circ}$ , for those were the highest that had most water in them. My observations were made in summer. These wells are of various depths, from 15 to 150 feet. That which I always found the coldest is not more

\* The thermometers made use of were all made by Mr. RAMSDEN.

than 22 feet deep; I never found its heat greater than  $50^{\circ}$ . It is near the beach, and is a tide well, that is, the water in it rises and falls, and in so doing does not correspond exactly with the tides, but follows them with an interval of about three hours. At the lowest there is not more than a foot of water in it; and it may be considered as a subterraneous spring running through the bottom of the well. There are in fact numerous springs that break out upon the sand, a few feet above the low-water mark, which are doubtless the same that supply the wells. As we are not acquainted with any cause that produces cold in the bowels of the earth, we must necessarily, in every climate, consider the lowest degree of heat as approaching nearest to the mean temperature; and therefore we cannot conclude the mean temperature at Bright-helmstone to be more than  $50^{\circ}$ . The mean temperature of London is computed about  $52^{\circ}$ \*; but Brighthelmstone is nearly fifty miles farther south than London, and is immediately upon the sea, and must therefore be at least as warm as London. It is evident, that the observations from which the mean is

\* Kirwan's Temperature of different Latitudes, p. 73.  
taken,

taken, must generally contain more of the extremes of heat than of cold, as the former happen in the day-time, and the latter in the night, in consequence of which they will often escape notice. There is a table constructed by Dr. HEBERDEN \*, expressing the heat in London for every month in the year, from a mean of ten years beginning with 1763, and ending with 1772. The mean temperature is given both at 8 A. M. and 2 P. M. There is further in the table, a column of the mean of the greatest monthly colds in the night, observed during the same ten years by Lord CHARLES CAVENDISH, in Marlborough-street. There will not probably be any great error in considering the heat observed at 2 P. M. as the greatest daily heat; and taking a mean between the greatest heats of the day, and greatest colds of the night, they give  $49^{\circ}, 196$  for an annual mean, which is much lower than is commonly supposed. At the house of GEORGE GLENNY, Esq. near Bromley, there is a well seventy-five feet deep, which I found in November  $49\frac{1}{2}^{\circ}$ . M. DE MAIRAN has given a table of the greatest heats and greatest colds observed at Paris for

\* The table alluded to follows this Paper.

fifty-six years, beginning from 1701; and a mean of them is  $10^{\circ}$  above freezing, or  $1010^{\circ}$ , of REAUMUR's scale\*. The temperature of the cave of the Observatory where those observations were made, is  $10^{\circ}\frac{1}{4}$  above freezing, by the same scale of REAUMUR. There appears not therefore any necessity for an internal heat; on the contrary, it is matter of demonstration, that were there any source of heat in the earth which was not equally in the air, the heat of the interior parts ought to be higher than a mean: and did the *central heat* bear as high a proportion to that of the sun as M. DE MAIRAN alledges, the heat of the earth itself ought to be a great deal above the mean temperature of the air, which from observation there is no ground for believing. It is easy to see the source of M. DE MAIRAN's error; he has founded his calculations upon the scale of REAUMUR, and considers the degrees of his thermometer as marking the real proportions, and absolute quantity of heat†. It is a matter that cannot be denied, that we know nothing of the absolute quantities of heat; and that the degrees of our

\* Mem. de l'Acad. des Sciences, An. 1765, p. 202.

† Ibid. p. 143.

thermometers are only to be considered as a few of the middle links of a chain, the length of which we are totally ignorant of, and therefore in no condition to compare its proportional parts. It deserves, however, to be remarked, that observations of a late date have shewn, that the notions of cold upon which REAUMUR's scale was constructed, and upon which M. DE MAIRAN's calculations are founded, are imaginary and without foundation \*.

Hot springs and volcanos may be produced as proofs of the existence of an internal source of heat in the earth; but their operation appears to be limited to a very small extent, and scarcely deserving of notice in the present discussion. It is no uncommon thing to find springs of the usual temperature close by hot springs; and no volcano, with which we are yet acquainted, appears to have raised the temperature of the country immediately adjoining to it.

The sea admits of change of temperature more quickly than the earth, particularly near the shore. The mean heat of the sea

\* Vid. Phil. Transf. Vol. LXXIII. p.\*303. 303 and 329.

at Brighthelmstone, during the months of July, August, September, and October, was as follows :

July	$63^{\circ}\frac{3}{7}$
August	$63^{\circ}\frac{1}{2}$
September	$58^{\circ}$
October	$53^{\circ}$

The observations were made with a view to ascertain the temperature of the sea as a bath, and therefore the heat was taken about nine in the morning, and near the shore, the usual time and place of bathing. The water gets hotter towards three o'clock in the afternoon, so that it not only follows the monthly, but even the daily changes of the temperature of the air. In the four months just mentioned, the extremes of heat and cold are considerable : I have seen it as hot as  $71^{\circ}$ , and as cold as  $49^{\circ}$ . In the month of August last, Sir HENRY ENGLEFIELD examined the heat of the sea at the same time that I did, and we both found it  $71^{\circ}$  : it was about 4 P.M. of a very hot day. I may be allowed to remark, that sea-bathing is a very different thing at different seasons of the year, and requires an acquaintance with the variations of the

the temperature, to adapt it to particular cases.

It were to be wished, that the heat of wells and springs were examined at different seasons of the year, in order to ascertain the effect of summer and of winter upon them. The wells at New York are from 32 to 40 feet in depth, and Dr. NOOTH found them to have an annual variation of two degrees from  $54^{\circ}$  to  $56^{\circ}$ . There are few countries, in which the annual range of the thermometer is greater than at New York, and the neighbouring parts of America. In the summer it is often as high as  $96^{\circ}$ , and in winter it has been observed several degrees below the zero of FAHRENHEIT's scale.

We may, I think, from all the observations we are yet in possession of, conclude, that there is at present no source of heat in the earth, capable of affecting the temperature of a country, which is not derived from the sun; and that the earth, whatever changes of temperature it may be conjectured to have undergone in former periods, is now reduced to a mean of the heat produced by the sun in different seasons, and in different climates.

*A Table of the mean Heat of every Month for Ten Years in London, from 1763 to 1772 inclusively. By William Heberden, M.D. F.R.S. and A.S.*

Read at the ROYAL SOCIETY, Jan. 31, 1787.

		At 8 A.M.	At 2 P.M.	Mean.	Night.
12	January	35 <sup>o</sup>	39 <sup>o</sup>	37 <sup>o</sup>	34.7 <sup>o</sup>
10	February	38	43	40.5	36.6
9	March	39	45	42	37.1
7	April	44	52	48	41.3
5	May	51	59	55	46.4
3	June	57	65	61	52.4
2	July	59	68	63.5	55.6
1	August	60	68	64	55.1
4	September	55	63	59	51.7
6	October	48	55	51.5	45.5
8	November	43	48	45.5	40
11	December	39	42	40.5	37.3

### EXPLANATION OF THE TABLE.

The first column of figures denotes the order of the months according to their degrees of heat, beginning with August, in which the heat is greatest.

The second, and third, are the heats marked at the hour expressed at the top of each column, and the fourth is the mean between these two.

The last column is the mean of the greatest cold at night, observed in Marlborough-street for twenty years, by the late Right Hon. Lord CHARLES CAVENDISH.

*Some*

*Some experiments made upon Rum, in order to ascertain the cause of the Colic, frequent among the soldiers in the Island of Jamaica, in the years 1781 and 1782: by JOHN HUNTER, M.D. Physician to the Army. Communicated by Sir GEORGE BAKER.*

Read at the COLLEGE, March 16, 1785.

IN the year 1781, a colic, resembling in all its symptoms and consequences the painter's colic, or *colica Pictonum*, became frequent among the soldiers of the 1st battalion of the 60th regiment, and those of the 92nd regiment, both of which were quartered in Spanish Town. The year following, the 79th regiment, quartered at Kingston, suffered much from the same disease, while other regiments in and about that town felt little or nothing of it, and the troops in Spanish Town had it only in such as had been ill before, and relapsed. Every circumstance respecting this disease, particularly such as might tend to discover the cause of it, became an object of importance, both on account of  
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the violence of the symptoms, and the great number that were seized with it. In the 92nd regiment almost all the private soldiers had one or more fits of the colic, which terminated in not a few in palsies of the extremities. The same happened in the 60th and 79th regiments, from both of which, as well as from the 92nd, a considerable number of men were discharged, that were rendered incapable of service by this disease; for, though in most instances, the sufferers recovered the motion of their limbs, yet they had little or no strength in them, and were subject to relapses. Among the practitioners of medicine in the island, different causes were assigned for this disease; in general however they might all be reduced to the three following, *bad water, acid fruits, and bile*. The inhabitants of Spanish Town used the same water as the soldiers, both being supplied from the river; yet neither they, nor the officers suffered from the colic like the private soldiers, as they most undoubtedly would have done, had the cause been in the water. The 79th regiment at Kingston, were supplied with water from a well in their barracks, and while the colic was most common among them, they changed  
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their water, but with no advantage. There appears to be no better reason for believing the acid fruits to be the cause of this disease. Both they, and the water, seem to have fallen under suspicion, from affecting the bowels at times. Impure and brackish water will occasion gripings and purgings in persons unaccustomed to it; large quantities likewise of acid fruits are apt to produce the same effects, especially when first eaten: but in both these cases the affection of the bowels is attended with a looseness; whereas, an obstinate costiveness is the most characteristic symptom of the colic in question. It's attacking one regiment, while another, similarly situated, almost intirely escaped it; and it's prevailing among the soldiers in Spanish Town at one time, and in Kingston at another, while in both places the officers and better sort of people suffered not at all; are further proofs that it is not to be imputed to any common cause, as the air, or water. The only ground upon which bile was charged with being the cause of the colic, was, as far as I could learn, that it was frequently brought up by vomit during the disease. But this appeared to depend upon the sickness  
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and retchings, the usual concomitants of the colic ; for it is well known that strong vomiting, from whatever cause it proceed, will bring up, in almost every case, large quantities of bile, especially if the vomiting continue some time. Bile might with equal justice be supposed to be the cause of sea-sickness as of the colic. The term, like some others that we have in physic, is too often used without meaning, or as a cover to our own ignorance.

There being nothing satisfactory in any of the above causes, and the strict resemblance between this disease and that to which the workers in lead are subject, affording a strong presumption that they were owing to the same cause, as is observed by Sir George Baker, in the Medical Transactions ; I was led to enquire in what way this poisonous metal could get into the constitution. I examined the utensils used by the Soldiers in cooking, but found no reason to suspect them. It being an old established opinion among the inhabitants of the island, that drinking new and bad rum was the cause of the colic, I was induced to make the following experiments on two specimens of rum, taken from the barracks of the 60th and 79th regiments.

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I put a little of each in a wine glass, and added a few drops of the liquor I used for a test to them. The test was prepared by infusing one part of orpiment, and two parts of quick-lime, in about twelve parts of rain water. The rum in the glasses became of a darker colour, and deposited, after some time, a brownish sediment. That I might be the less liable to deception, in judging of the change of colour, I poured a little of both kinds of rum into two other glasses, to which I added none of the test, but compared them with the rum to which the test had been added, and the change of colour was very evident. I used this precaution in all the trials I made afterwards. In one of the glasses the colour was darker than in the other; and the *residuum*, after the rum was allowed to evaporate, was also of a deeper colour.

I was willing to try the effects of mixing pure spirits and the test together; and therefore added a few drops of it to spirits of wine, which in strength is nearly the same as Jamaica rum. It produced somewhat of a milky appearance, and soon after a light-coloured sediment. The spirit being allowed

to evaporate, the *residuum* was of a light colour.

I took indiscriminately from a great number, four specimens of different kinds of rum, which had all been made within the eight preceding months. On examining them with the test, one was not changed, the other three became all of a darker colour, but of different shades. After a little time they deposited a sediment, and the rum being allowed to evaporate, the *residuum* in the first mentioned was whitish like that of the spirit of wine, in the other three of a dark brown colour, approaching in the worst to black.

After these trials, I could not doubt that there was often a slight metallic impregnation in new rum, in whatever way it was produced. With a view to ascertain how far spirits, coming in contact with lead, are able to act upon it, I put two grains of that metal, cut in small bits from a bright surface, into two ounces of spirit of wine. They remained about ten weeks in a bottle with a glass stopper, and on adding the test to some of the spirit poured into a glass, it became of a dark colour. The small bits of lead had lost their metallic splendor, and part of the metal appeared

appeared to have been dissolved by the spirit\*.

From the above experiment it would seem probable that, in distilling rum, the spirit may act upon the worm, which is spiral and of great length, and made of a composition, of which lead sometimes forms a part. Perhaps this may be the only way in which rum is impregnated with lead; yet, on that supposition, why is not British spirits equally impregnated with the noxious metal, the same kind of worm being used in distilling both?

In the process of making sugar, the juice of the canes comes frequently in contact with lead. On running from the mill, it is commonly received into a cistern lined with lead, from which a leaden guttering carries it to the boiling house. The boilers are of copper, but the bed in which they are set is covered with lead, and there is a leaden guttering for conveying the skimmings of the liquor to a reservoir, from which they are taken to make part of the mixture to be fermented for making rum. The leaden gutterings often pass without cover from the mill to the boiling

\* The temperature in which the spirits and lead stood together, was, from 80° to 90° of Fahrenheit's scale.

house, exposed to the action of the open air, which is known to corrode lead in some degree. The mixture fermented for the purpose of making rum is composed of skimmings or molasses, water, and what is called *dunder*, a name given to the liquor that remains in the still after the process of distillation. Supposing therefore there was an impregnation of lead in the mixture when set to ferment, it was a matter I wished to try, whether any of it would rise with the spirit in distillation. Not being able, at the time of making the experiments, to procure glass or earthen vessels for distilling, I could not satisfy myself in this particular. I have since made the following experiment. I dissolved some *saccharum saturni* in weak rum, which I knew to be genuine, and distilled it in glass vessels. Any impregnation of lead, that may happen to be in the mixture from which rum is distilled, must be similar to *saccharum saturni*; and, as the rum is almost always distilled a second time, I thought the experiment would be more decisive made with spirit, than if the *saccharum saturni* had been added to a fermenting mixture. The spirit which came  
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over, was perfectly free from any impregnation of lead.

This experiment makes it necessary to revert to the first supposition, that the impregnation proceeds from the worm. I procured several specimens of worms, and found some of them to contain a considerable proportion of lead, as appeared by their specific gravity, and softness. Part of an old one, which seemed to have as much lead in its composition as any I have seen, was covered on the inside with an earthy crust, which shewed evidently that the spirit had acted upon it. I was informed by a reputable manufacturer of worms for distilling, that he never used any lead himself in their composition, but made them of pure tin, to which a small proportion of copper had been added, to render the metal tougher, and to make it work better. He added, that he sometimes had old worms sent to him, from the West Indies, of a base metal. If it be considered how much cheaper lead is than tin, and that a mixture of the two metals works better than tin alone, it will not be wondered at, that lead often makes a part of the composition. It is well known to distillers, that worms made of lead would

quickly be corroded by the spirit; and it is probable, that, in proportion as that metal enters more or less into their composition, they will be a shorter or a longer time in wearing out. This circumstance, together with the knowledge of the pernicious effects of lead being of late more universally diffused, may probably have rendered adulterations of the metal of the worms both less frequent, and less considerable. This may be one reason, why the colic is now not near so common among the inhabitants of Jamaica as formerly, though the chief cause of that happy change is imputed, by the people at large, and I believe with justice, to there being much less rum drunk now than formerly, and that almost always of a good age. A practice however that prevails, of using the old worms for solder, renders it probable that the adulteration with lead is still not uncommon. Solder is made of a mixture of lead and tin; and I suspect the old worms would scarcely answer that purpose, without lead in their composition. In the more precious metals, much care is taken by the establishment of assay-masters, and other precautions, that the public may not suffer in their property by any adulte-

adulterations; and it is a pity that equal care were not taken, by similar regulations, that health might not be injured by adulterations in the baser metals.

The difficulty started above recurs here; if the impregnation depend upon the worm, why is not home-distilled spirits equally affected with rum? I am not minutely enough acquainted with all the circumstances attending the two distillations, to be able to say positively on what such a difference depends. The following particulars, however, may be worth attending to, and may give some assistance towards, a solution of the question.

To the infusion of malt, from which the home-distilled spirit is procured, is added yeast, for the purpose of promoting the fermentation. With the same view, the liquor called *dunder*, which is almost always more or less acid, is added to the mixture from which the rum is to be distilled, and will, no doubt, impart a considerable degree of acidity to the fermenting liquor. This acidity will be further increased, by the fermentation being carried on in a climate, the medium temperature of which is about 80° of Fahrenheit's scale, which must render it very difficult to prevent the

fermentation from running more or less into the acetous stage. The acid, or vinegar thus produced, will rise in part with the spirit in distillation, and act strongly upon any lead that may be in the composition of the worm. What I have observed of some rum, which I know to be unadulterated, would seem to put it beyond a doubt, that the acid does rise with the spirit. It is this: expose the rum in a glass to the open air, and in a short time the spirit flies off, and leaves an acid liquor behind. That such an acid would dissolve some part of the lead, provided that metal entered into the composition of the worm, can hardly be doubted. The distillation of vinegar is directed, in the Edinburgh Pharmacopœia, to be performed in glass vessels; and from neglecting this precaution, I have seen the distilled vinegar of the shops impregnated with metal.

There are two other material circumstances, in which the malt spirit and rum differ. The malt spirit undergoes, in general, more distillations than the rum, and is kept also a longer time before it come to market. The malt spirit passes from the hands of the malt distiller into the rectifier's; whereas the rum

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is often taken from the still and carried directly to market; and it is this new spirit that is peculiarly noxious; for, according to the general opinion of the inhabitants of the island, it becomes free from any bad qualities by keeping. The sequel of my experiments corresponded with this observation, for when I came to examine the specimens of rum mentioned above, three or four months after my first trials, the test produced no change in any of them, except in that which had formerly given the darkest colour, but it was not near so dark as before. The spirit of wine also in which the lead had been put, after being poured off the lead about three months, was not affected by the test. In this spirit, as well as in the specimens of rum, there was a very small blackish-coloured sediment. The greater length of time, therefore, the home-made spirit is in coming to market, would help considerably to do away any impregnation of lead, supposing such to exist. The good effects of repeated distillations will be obvious from the experiment mentioned above, by which it appeared that a solution of lead mixed with the spirit would not rise in distillation.

lation. Rum, in general, is never put oftener than twice through the still; whereas the home-made spirit goes frequently three or four times.

Upon the whole, I am inclined to impute the impregnation in the rum, to the worm's being often of a baser metal than those used in the home-distillery, to more acid rising in the distillation, to the distillations not being repeated so often, and to the rum finding its way into immediate use. It may be a question, whether the empyreumatic oil which rises with spirits in distillation may not have some action upon the lead in the worm?

In whatever manner the spirit becomes contaminated with lead, it is a fortunate circumstance, that by keeping it entirely deposits that metal. What time is necessary for this deposition is not accurately ascertained; it is probably different as the impregnation is stronger or weaker. The common opinion of the inhabitants is, that the rum loses its noxious qualities in one year. Agreeably to this, the contract made for supplying the troops with rum, specified that it should be one year old. There was no reason to suppose

pose that the agreement was not complied with; nor could the soldiers, either from the quantity or quality of the rum supplied in this way, have suffered as they did. What they purchased themselves, at the small retail shops, was most probably the sole cause of the colic; for there new spirits of the worst quality were sold, and the soldiers liked such the better for being new, as they tasted both hotter and stronger. The deposition of the lead from the spirits by keeping, is most probably owing to the spirit attracting and uniting with the acid that dissolves the lead, and thereby precipitating the metal. I was led to this opinion by the following experiment. As much *saccharum saturni* was dissolved in spirit of wine as it would take up. The solution was set in a quiet place, and it soon deposited a sediment, which was not soluble in spirit of wine, but readily dissolved in distilled vinegar.

As it is not likely that the retailers of this noxious spirit, even if convinced of its pernicious effects, would desist from their trade; or that the soldiers would give up drinking it, though well assured of its being the cause  
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of the worst diseases, it becomes of consequence, to ascertain a cheap, easy, and effectual method of doing away the impregnation of lead, without at the same time injuring the spirit. The *vitriolic* and *muriatic* acids both precipitate the lead, uniting therewith, and forming insoluble compounds. The vegetable *alkali* will also precipitate it, if dissolved by an acid. From the trials I made, the *vitriolic* acid appeared to be the best substance for this purpose, as it precipitates the lead most quickly, and most effectually. One drop of the oil, or strong spirit of vitriol, will precipitate rather more than three grains of *saccharum saturni*, three drops precipitating about seven grains. A very small quantity therefore, will be sufficient to do away the strongest impregnation of lead, that is ever found in spirits. I cannot suppose that the rum, on which I made my experiments, contained more than three or four grains in a gallon, conjecturing from the deepness of the colour. Three drops would, therefore, do away the impregnation in two gallons; but, allowing that a little more was added than necessary, it would neither injure the

the taste, nor quality of the spirit. The exact proportion of the vitriolic acid might be ascertained, by a previous trial made upon a small quantity of the spirit.

Charles-street, St. James's-square,  
Feb. 9, 1785.

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Note A. page 23.

If troops be sent to the West Indies for a garrison to any of our islands, it will be sufficient to dispatch them from this country so, that they may arrive there any time in the months of December, or January. Six or seven weeks may be allowed for the voyage, and therefore they ought to sail in the beginning of November or December. But if troops are to be sent upon an expedition, they ought to leave this country earlier, and should sail about the end of September. The reasons for making a difference of this kind will be

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There is but a limited time in which military operations can be carried on, if due regard

gard be paid to the health of the troops. This time commences with November, and is terminated by April: in some of the islands, and in particular seasons, the period may be a little longer, or a little shorter, but the variation is not considerable. In all countries there are times of the year more or less favourable for military operations, but if this observation be supposed to apply in the same limited sense to the West Indies as to other countries, a very erroneous notion will be formed. A campaign during the unhealthy season is not embarrassed merely with the greater part of the troops being sick, but implies a total destruction of the army by disease in a few months. It would be foreign to the present subject to enter into any discussion, whether the nature and urgency of military service can ever require such sacrifices; or, whether any conquest, that involves the destruction of the victorious troops, can be worth obtaining at such a price: but as a fact, confirmed by repeated experience, it ought to be known to officers, and merits the most serious consideration of those who direct military operations in the West Indies, that the destruction of European soldiers is the inevitable consequence of a campaign

campaign in the sickly months; which generally begin with May, and seldom terminate before October. It is of importance that this should be known, not only for the sake of weighing against the certain mortality, the value and magnitude of the object aimed at; but also that the necessary reinforcements may be sent from Europe in time, to preserve such acquisitions as may be made; for the mortality has been such in some expeditions, that in a few months there has not remained of all the troops, a number sufficient to form a garrison capable of maintaining their conquests. The destruction of the troops, therefore, being unavoidable, if military operations are carried on at certain seasons of the year, it must evidently be of the greatest importance that no part of that time, in which an army can act, should be lost. It may appear to some that November is too early to begin military operations, for in October and November there are often many sick. But this proceeds from the human body having been exposed to the causes of sickness and disease during the preceding months; for the air in November ceases to be prejudicial to new comers; of the truth of which I have had many proofs in the arrival

arrival of the ships of the East India Company in the river Ganges, in the months of October and November from Europe, the crews of which have remained very healthy. On this account, therefore, instead of fixing the time of sailing for an expedition from this country to the West Indies, to the beginning of November, as I did in my first edition, I have changed it to the end of September. Allowing six or seven weeks for a fleet to perform the voyage, they will not arrive much before the middle of November, from which time there will be nearly six months for the campaign.

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Note B, page 27.

THE general fact, that elevation greatly diminishes the effects of the noxious exhalations from the ground, is commonly known and admitted; but the subject has not yet received such particular investigation as it seems to merit, more especially as it promises to afford some instruction how we may avoid

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the causes of sickness. It has been mentioned that houses raised on pillars or arches, or in any other manner, are healthier than those upon the ground. How much a circumstance of this kind may be productive of disease was seen in the barracks at Spanish Town. They consisted of two floors, the first upon the ground, and the second over the first. The difference in health of the men on the two floors was so striking as to engage the attention of the Assembly of the island, and upon investigation it appeared that three were taken ill on the ground floor for one on the other. The ground floor was not therefore used as a barrack afterwards.

Prince Rupert's bay in the island of Dominica is a very unhealthy place, owing to the marshes at the bottom of the bay. One side of the bay is formed by a projecting head land, called Prince Rupert's head, which is elevated ground, but of unequal heights. There are several barracks, or stations for troops upon it, which are more or less healthy in proportion to their elevation. Douglas bay barracks are 110 feet above the level of the sea, and are the most sickly; Fort Shirley is 150 feet, and the royal engineers quarters 165 feet,

feet, and are less sickly; the inner Cabrite, and the outer Cabrite, the first 430, and the second 590 feet high, have been found very healthy. These are small elevations to produce effects so considerable; but the ascent is steep, and to that in part it may be owing; for a gradual ascent by a sloping plain to a much greater height, would not probably produce an air so salubrious.

The town of St. George in Grenada lies low, and there is marshy ground in the neighbourhood; the troops in such situations have always been unhealthy. But the high grounds adjoining have been found very healthy. *Morne Cardigan* is about 500 feet high; and *Richmond heights* 730 feet. These stations are very healthy, though their height be inconsiderable for a West India island\*.

The great improvement in the healthiness of such situations depends, on the noxious vapours and exhalations being so weakened by diffusion in a great mass of air, that they lose their deleterious effects.

\* For these facts and observations respecting the stations mentioned in this note, and also for the measurements of their heights, I am indebted to Captain Finlay of the Royal Engineers.

In order that troops may reap the full benefit of such situations, care should be taken that they be not permitted to go down to the low grounds, for if they are, they will infallibly carry fevers up with them. One great advantage of negro troops would be, to remove all necessity or even pretence of sending the European soldiers from stations of this kind; for by employing the negroes on such occasional duty as might occur in the low ground, the Europeans would not be at all exposed to the causes of disease.

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Note C, p. 29.

NEGROES suffer little from fevers or fluxes; nor do those disorders arise in them from labouring, or working hard, while exposed to the sun, even in marshy situations. Their health would not suffer from military duty of any kind in the West Indies. Were therefore black troops formed, they would be a principal means of preserving the health and lives of the European soldiers, by doing all  
duty

duty of fatigue ; all duty in the sun ; by taking all guards in unhealthy situations ; and by doing every kind of military service, that was destructive of the health of Europeans.

Negroes were attached to the regiments in Jamaica, three to each company, as pioneers, and servants, and were found extremely useful, in so far as they saved the soldiers from certain duties of fatigue, and from being employed as servants by the officers ; for those duties which are easy for a soldier to do, as a servant to an officer in this country, would prove destruction to him in the West Indies. But to receive the full benefit that might be derived from the employment of negroes, it is not enough to use them for pioneers and servants, they should be employed as soldiers. In adopting a measure of this kind, there are some important considerations that present themselves. The first and most material is, how negroes may be employed as soldiers with safety ; a second, and almost of equal consequence is, in what manner they should be formed into soldiers, so as to derive the greatest possible advantages from them.

In a country like this, where happily no slavery exists, it is not possible to form an

idea of that state of society, in which the greater part are the slaves and property of the few. We are equally unacquainted with the authority which the master necessarily possesses, and the parental care which he generally exerts; and we can still less form any adequate notion of his fears, and apprehensions, from conspiracies and insurrections. To such as have not had experience of this state of society, by having been in some part of the world in which it exists, too much caution in judging, or too much diffidence in their own opinions, cannot be recommended; more particularly if their opinions are to form the basis of new regulations, reforms, and alterations. In such situations it is most desirable to aid human judgement by the experience, and precedents of former times. The ancient republics of Greece often armed their slaves in cases of great emergency, but they always made them free before they put arms in their hands. The policy, and even necessity of so doing must be obvious. Whenever therefore a negro becomes a soldier, he should be made free. He will then have no temptation to combine with those that are slaves. He should be instructed in the principles of Christianity, as the most  
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compendious and most efficacious mode of giving moral education. He should receive the same pay, provisions, and allowances of every kind, as any other soldier. After serving a certain number of years, and from age becoming unfit to do the duty of a soldier, provision should be made for him, either by allotting him a small portion of land, or otherwise. With these regulations, there can be no doubt that, negroes would serve as soldiers with safety and fidelity.

To derive the greatest benefit from their services, by rendering them the means of preserving from disease the European soldiers, it may be a question, whether it would be better to form them into regiments, or to raise them by separate companies, and to attach two, or more companies, to each regiment, upon their arrival in the West Indies? The regiments about to leave that part of the world, might turn over their black companies to their successors. Whichever of these modes be adopted, there can be no doubt that the black and European troops should be so intermixed, that wherever there were three or four companies of the latter, there should also be one black company; for if this be not done, and the black

troops are kept together in regiments, they cannot save the European troops from such parts of regimental duty as may be injurious to their health. Besides this advantage from intermixing the black and white soldiers, there would also be greater security against the negroes attempting any innovations.

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Note D, page 61.

IT is natural to ask, have the precautions suggested, or the means recommended, to guard against disease, been effectual during the present war in the West Indies? To make a full reply to this question, I have not the requisite information; but it is certain that the mortality of no former war in that quarter of the world, has gone beyond that of the present. Having no object in view but the investigation of the truth; and judging no truth of greater importance than what relates to the health of our troops in the West Indies, my researches have been directed chiefly to the detection of any error, or mistake, I might have

have committed in treating on this subject, in my former edition. I cannot find, as far as I can learn, that the troops have died of different diseases in the present war, from those, which in all former wars have swept away the armies of Europeans, in the West Indies; nor have any new means been employed to avert the mortality. When due attention can be paid to the time at which troops are sent to the West Indies; to the situations in which they are placed there; and to the season of the year in which they are employed in actual service, there is no reason to doubt, that there will be a very great improvement in their health, and a proportional diminution in their mortality.

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Note E, page 87.

THE fever shewed no tendency to a spontaneous crisis, and its attacks were so irregular, that no judgement could be formed, either of the times of accession, or remission. There was no regular type to be observed, that could  
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be applied to practical purposes; for though the fits might often be reconciled to the type of a double tertian, or a semitertian, yet it was done by considering the fits as anticipating, or postponing several hours, as suited best the preconceived notion; and by a little latitude in the use of this principle, it were easy to assign any type at pleasure to a remittent fever. Of such inquiries, though there appear nothing satisfactory in them, it may still be said, that they are productive of no harm; and that may really be the case, provided no preconceived notion of an expected crisis, ever occasion the loss, or neglect of the present moment; and provided the belief of a regular type do not prove a cause of any relaxation in attending to the sick. The remittent fever of warm climates must be watched from hour to hour. The words of *Celsus*, speaking of fevers of a similar nature\*, are extremely apposite. “ Ex his autem intelligi potest, ab  
 “ uno medico multos non posse curari:  
 “ eumque, si artifex est, idoneum esse, qui non  
 “ multum ab ægro recedit. Sed qui questui  
 “ furviunt, quoniam is major ex populo est,  
 “ libenter amplectuntur ea præcepta, quæ

\* Lib. III. Cap. 3.

“ sedu-

“ sedulitatem non exigunt; ut in hac ipsa re.  
 “ Facile est enim dies vel accessiones nume-  
 “ rare his quoque, qui ægrum raro vident:  
 “ ille affideat necesse est, qui, quod solum  
 “ opus est, visurus est, quando nimis imbecil-  
 “ lus futurus sit, nisi cibum acceperit\*.”

The principal object in the cure of fevers, in the time of *Celsus*, was the proper administration of food; and if that required such assiduity, less surely is not necessary at this time, when we are in possession of powerful remedies in the cure of fevers, in using which diligence, judgement, and unremitting attention are requisite.

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Note F, p. 134.

ON the subject of bile, considered as the cause of fever, it would be easy to shew how ill founded, and how inadequate to the explanation of the *phænomena*, all the opinions advanced on this subject are, were it deserving of minute investigation. If we advert to the

\* Lib. III. Cap. 4.

antiquity of our prejudices on this head, the deep root they have taken, and their general diffusion among the people at large, I am not sure that they do not merit a full and particular refutation, more especially in order to guard those that are young in the profession from errors that may be fatal. But without going at length into the subject, I shall content myself with subjoining a few reflections.

A warm climate, it is alledged, increases the secretion of bile, and renders it more acrid. There does not appear to be the smallest foundation for this assertion. Ships sail within the tropics for months together, exposed to the heat of a vertical sun, while the crew enjoys perfect health, and there is no appearance of the secretion of the bile being either increased, or deranged thereby. The inhabitants of dry sandy islands, commonly called keys, in the West Indies, are very healthy, notwithstanding the heat is intense in such places. In healthy situations, not productive of remittent fever, though ever so hot, there is no appearance of acrimony, or redundancy of bile. The discharge of bile in the vomiting of remittent fever is evidently the effect, and not

the cause of the fever. The stomach and bowels suffering severely in remittent fever, communicate a degree of irritation to the liver; and the same thing happens in the operation of strong emetics, and in sea sickness, and thence a copious discharge of bile.

It is further alledged, that the bile being naturally putrescent, is rendered more putrid by a warm climate. But what are the proofs? Have not experiments, made many years ago, shewn, that there are none of the fluids of the human body that have less tendency to putrefaction than the bile? It might have been supposed, that a discovery so diametrically opposite to the received opinions concerning putrid bile, would have raised suspicions against the whole doctrine: no, the bile is not now putrid, but warm climates produce putrefaction, and the bile being admitted to be antiseptic, such climates require a more copious secretion of that fluid. That a warm climate produces putrefaction in a living body is a vulgar error, derived by a false analogy from the effects of heat on dead animal matter. That a warm climate can have no such effect must be evident to every one, who reflects that the heat of the human body is the same in all climates,  
and

and in all parts of the world. But allowing the bile, because antiseptic, to be more copious in a warm climate, why should it be the cause of disease? Do antiseptics produce remittent fever, or fever of any kind? There is neither consistency nor probability in the doctrine; as a specimen of physiological reasoning it is disreputable to men, who have had a philosophical education; and as applicable to practice it is deleterious in an high degree. An unexperienced young man administers an emetic in the retchings, and strainings, that accompany remittent fever; and though the patient expire under the operation, it only calls forth the following reflection, that the quantity of putrid bile was so great, that there was not strength to bring it up! Such mischievous effects, of supposing the bile to be the cause of remittent fever, are consistent with my own knowledge.

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Note G, page 137.

WHEN the remittent fever is of the worst kind, the yellowness of the skin occurs most frequently;

frequently ; but the yellow fever is neither a different disease, nor do all the sick, even in fatal cases, turn yellow ; yet at such times it has been customary to call the prevailing fever by the name of the *yellow fever*. I have stated, that I found no difference between them, except the addition of a jaundice ; and the fever, which has of late made such havock among our sailors and soldiers in the West Indies, appears not to be in any thing different from the remittent fever, which has at all times proved the destruction of European armaments, in those parts of the world. The remittent fever, when of a bad kind, at all times, and in all countries, is often accompanied by jaundice. This is agreeable to the earliest accounts we have of West India diseases. The addition of jaundice to the fever, is certainly much more frequent in some seasons than in others, and has upon all occasions chiefly affected those, who have lately arrived in the country ; it is not therefore surprising, that we have heard most of that fatal disease, during military operations in that quarter of the world.

## Note H, page 143.

IT is of the greatest importance to be able to determine with truth how far a disease is, or is not, contagious. In military physick the great improvements to be made are not so much in the cure, as in the prevention of diseases, which depends altogether upon a knowledge of their causes. If a disease arise from contagion there are sure remedies against it, which are so well ascertained, that while the plague, the most contagious and most fatal of all diseases, commits its greatest ravages in large cities, individuals remain in the midst of them in perfect security, trusting to a careful seclusion under proper regulations. Again, if disease arise from the air contaminated by the foul ground of a camp, or the exhalations of a marsh, it can only be avoided by a change of situation, or by taking care not to come within the sphere of activity of such noxious causes.

Let it be supposed for a moment possible, that a mistake should be made in the two cases just stated ; and that the plague is not allowed to be contagious, nor the camp or remittent fever

fever be considered as proceeding from their proper causes, but believed to depend upon contagion. It is evident that complete destruction to all must be the consequence of such an error; and in medical history, there is reason to fear, more examples than one of this might be produced. Considering the magnitude of the subject, sufficient pains have not been taken to ascertain, when diseases are, or are not, contagious; when they arise from a cause generally diffused, or when multiplied by personal contagion. There are some plain rules that may help to guide our decision in such cases, which I shall mention shortly, without going much at length into the subject.

By a contagious disease is to be understood, a malady arising from a poison generated in the body of the sick, which produces in others a similar disease. This poison in some diseases, as the small pox, is sufficiently apparent; in others, as the plague, or hooping cough, it almost eludes our senses. It is peculiarly characteristic of such diseases, that persons of all ranks, and descriptions, are equally affected by them. Wherever they prevail, the old inhabitants of a country suffer as much as

those that have arrived lately. But this is never the case in the yellow fever, remittent fever, or even intermittent fever, for such as are seasoned to the country or climate suffer infinitely less than new-comers. Again, contagious diseases having gone through their course rarely attack the same persons a second time; on the contrary, diseases proceeding from a cause generally diffused, and operating upon all, do almost constantly recur in the same persons, not once or twice, but many times, as long as they continue exposed to the original cause; thus, in camps, and marshy situations, the sick are constantly relapsing in remittents, and intermittents, till they change their situation; and there has been occasion to observe already, that the mortality among soldiers in the West Indies is, in a great measure, owing to these repeated attacks. But what may be considered as an *experimentum crucis*, to prove the non-existence of contagion is, when the sick leave their usual residence, and go to other places which are healthy without spreading the disease. This constantly happens in the remittent fevers of the West Indies; for the good effects of changing the air of the towns for that of the mountains

tains is so well known, that it is very generally practised; but certainly without the slightest suspicion of any mischief arising from any contagion carried by the sick. If we try by this rule the fever epidemic in Philadelphia, in 1793, we shall not pronounce it to be contagious: but our accounts of that disease are yet imperfect; and therefore it is best to suspend our judgement. There is one more observation, which I shall add; when disease arises from a cause generally diffused, separation from the sick does not avail. Thus, ships of war have gone into a harbour in the West Indies, and have had no intercourse with those on shore, or with the crews of other ships, and yet in a few days the men have been seized with the prevailing fever in great numbers.

If these observations be applied to the remittent or yellow fever, there will be no ground for believing either to proceed from contagion.

But allowing that we are free from all apprehensions of contagion, it is no less requisite to ascertain the real cause; for the air of a marsh, or of a foul camp, may destroy an army almost as soon as the true plague. The

remedies in such cases are obvious, and consist in getting at a proper distance from the noxious exhalations, or removing the causes of them. A very small space frequently includes the limits of healthy and unhealthy ground. An adjoining height a few hundred feet high is often perfectly healthy. Having regard to the course of the winds within the tropics, so that the noxious vapours shall be carried from, and not towards an army, will often prevent or remove disease.

The nature of military service may render a change of position, however unhealthy, highly hazardous, or altogether impracticable. Under such circumstances the attention should be turned to the removal of the causes of disease. A small marsh, which might easily be drained, excites frequently great sickness. The disorders arising from the foul ground of a camp, by moving a few hundred yards, will disappear. I conceive it to be practicable, to remain upon the same ground for a long time without injury to the health, if care were taken, from the beginning of the encampment, to bury at a good depth all excrementitious matter, and to have proper receptacles under ground for the water used in cooking or washing,

washing, and also all remains of victuals, as bones, &c. It would further be necessary to provide places to receive the urine, to prevent it from being spread upon the ground; for that alone, when a camp is crowded, and an army remains long on the same spot, would contaminate the ground; as any one may easily satisfy himself, that will compute the quantity that is daily discharged by a given number. The urine, as well as the water used in cooking and washing, are all impregnated with animal and vegetable matter, and therefore more readily give rise to noxious exhalations from any ground upon which they are thrown.

All towns, but for similar precautions, would be subject to the same fever with camps. The drains, common sewers, pavement, scavengers, &c. all contribute to prevent remittent fever; though we know from medical writers, that they have not always prevented it. We learn from Sydenham, and still more distinctly from Morton, that the remittent fever was prevalent frequently in London in their time. The bills of mortality shew also, that formerly the dysentery, which almost constantly appears in the same places and seasons as the remittent fever, was

annually fatal to great numbers. Of late years it has almost intirely disappeared, except in some seasons when the heat has been unusually great. The exemption, which London now enjoys, from dysentery and remittent fever, is chiefly to be ascribed to the attention that is paid to draining, watering, cleaning, and paving all parts of the town. But I believe the remittent fever will still at times be found to commit great havock in some towns, from neglecting the above precautions; and of this nature I suspect the fever to have been, which proved so fatal in Philadelphia in 1793.

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Note I, page 151.

THE poison producing remittent fever is no doubt of very different degrees of strength, at different times.

Diseases arising from personal contagion admit of little variation, in whatever way the poison be applied: those slightly exposed to it, if they do catch the disease, have it as bad as those who have been exposed in the greatest degree, as in the plague, or small pox. The case

case is quite different with the poison of the remittent fever. Its virulence is at all times proportioned to the approximation to its source. This is clearly seen in the health of ships stationed off a marshy coast. Those that are nearest suffer most, both from the frequency and violence of the fever; those that are further off suffer less, till at last at the distance of a few miles, they are perfectly healthy. The poison is weakened by diffusion in air; and in proportion as it is more diffused, it produces a slighter disease. Its virulence may however be influenced by other causes; thus, it would appear to rise from the ground, in some places, and in some seasons, much more virulent than others, without our being able to assign any good reason for it. The various degrees of virulence in the poison produce equal variation in the violence of the remittent fever, which is sometimes a most fatal disease, and at other times a very slight one. To this circumstance are to be imputed the various, and often contradictory reports, made of the success with which the fever has been treated, even when the same remedies have been employed. It is often slight, and will yield quickly to a dose of physick. When

more violent, it is still readily conquered by a judicious use of the Peruvian bark, and proper evacuations; but it rises under certain circumstances to a degree of violence, that can hardly be said to yield to any remedies yet known. In such cases mercury has been recommended, and given freely; and the reports of its success are extremely favourable; but, alas! the concomitant returns of the numbers of the sick and of the dead, in the same writers, do by no means confirm the high character they give to this remedy\*. I do not presume to say that it has no virtue in the disease, but it is certainly no specific, nor is its efficacy so clearly established, as to supersede the use of other remedies.

\* Of twenty-seven recruits for the Royal Artillery, who arrived in Grenada in July 1793, twenty-six were seized with the fever, and of these twenty-one died before the middle of August ensuing, that is, in six weeks. Dr. Chisholm had satisfied himself of the great virtues of mercury at least four months before, yet this is a mortality never exceeded in any fever.—Vid. Dr. Chisholm's Essay, page 97.

## Note K, page 153.

IT would be curious and interesting in the history of the remittent fever, to ascertain the interval that may take place between exposure to the cause, and the appearance of the disease.

Though I had reason to suspect that this period might be much greater than three weeks, I had not any facts or observations that were decisive on the subject. But in 1793 the West Suffolk regiment of militia, upon being called out of their own county, were sent in the month of February to Hilsea barracks. The low, marshy, and unhealthy situation of these barracks has been fatally known to the army since their first erection. The regiment remained there about five months. They went in all in perfect health, as might be expected in a corps raised from the peasantry of one of the healthiest counties in England, with scarcely a man among them exceeding twenty-four years of age. They became very sickly, and twenty-two died of fevers before they left the barracks, which  
they

they did in the end of June. When they arrived in camp in the first week of July at Waterdown, in the neighbourhood of Tunbridge Wells, they brought many sick with them, and those who were well, instead of the florid healthy look natural to our peasantry, looked fallow, and as if they were come from a warm climate. From the fatigues of their march, and the duties of the camp, their sick list soon amounted to one hundred out of five hundred; and of these there were thirty ill of fevers in the hospital. The fevers had all the characteristic marks of a bad remittent; great irritability of stomach, and violent retchings; irregular exacerbations and remissions; and terminations frequently unexpectedly fatal to those unacquainted with the disease. During the four months of the campaign there died of fevers in this regiment twelve, a greater number than what died of all other diseases put together, in the eleven other battalions, that were encamped on the same ground. The regiment remained weakly all the campaign, for the convalescents recovered their strength very slowly; and in the month of October some were taken ill of the fever, who had never had it before; that is,  
nearly

nearly four months after they had ceased to be exposed to the cause of the disease at Hilsea barracks. This interval was longer than any I had had an opportunity of observing previously, but what happened to the 18th regiment of foot, in the years 1783 and 1784, proves that the cause of fever may remain even longer in the body, and produce it's peculiar effects at the end of six or seven months.

The facts I am about to state I received from Mr. Venour, surgeon to the regiment at the time, and at present upon the medical staff of Great Britain: I give them in his own words.

“ The 18th regiment of foot arrived from the island of Guernsey, where it had been stationed a considerable time, with nearly two hundred men, at Hilsea barracks, about the 22d of June 1783. They had been quartered in the town of St. Pierre during the last six months, and many of them had been encamped the preceding campaign in the Vale parish, a very swampy part of the island, and remarkably subject to agues; however on leaving the island there were only two men ill of agues in the regiment. They remained at Hilsea barracks until the 9th of October, during which time there  
were

were many fevers amongst them of the low remittent type, with frequent diarrhoeas and some dysenteries. At the time of embarking for Gibraltar, on the 9th of October, there were sixteen men in agues. Whilst at Hills barracks, the regiment received men or recruits to make their number in all about four hundred, at the time of embarkation. I had been taught to believe, that the agues I took to sea would vanish very shortly, and if not before, certainly soon after, their arrival at Gibraltar. However not one ague disappeared whilst on board, nor on the passage, which was about twenty-three days. We arrived at Gibraltar in the beginning of November, when the weather was fine and mild, and spring vegetation advancing very fast. From a belief that the climate would cure the agues, very little was done in the way of medicine for the first month; but as they continued without abatement, the usual remedies were employed, the chief of which was Peruvian bark, and some of them were removed, whilst others continued obstinate. During the first three months, several slight fevers terminated in intermittents, which gave way to the bark, &c. but the men remained weakly, and in like manner as those

those who brought agues from England, that had ceased to be regular in their paroxysms, had every now and then fits at irregular periods. About the latter end of January 1784, agues became frequent amongst the men who had not before had any, and many of those who had been ill formerly relapsed. The number of agues continued to increase in an alarming degree, in so much that, by the beginning of May, they amounted in all, men, women, and children, to two hundred and eighty. They assumed all the various types described by authors, and one, the most obstinate of all, came every sixth day. Medicines seemed to have very little effect, that is the bark with the usual aromatic stimulants, sudorifics, &c. for at that time I was not acquainted with the use of the metallic salts in those complaints. From the beginning of May no more men were attacked, and those already ill began to recover rapidly; by the end of June not an ague remained, and most of the men were able to return to their duty. From the above period the regiment became as healthy as the other regiments in garrison.

“ The commanding officer of the regiment had, from his notions of a warm climate, pro-

vided the men with linen waistcoats and breeches, which were cleaned with whiting wetted; this was generally done whilst they were on, and the men wore them till dry. The regiment was likewise nearly without watchcoats. The commanding officer wishing to make every soldier able to cook, ordered a man *per* company to take that duty daily in turns. The provisions being salt beef, pork, and peas, and the lot of cooking falling frequently on raw boys and recruits, the messes were often in a wretched condition and scarcely eatable; added to all these circumstances, more rain fell that winter than had done in all the three winters of the siege, so that the men's cloaths were seldom or ever dry."

The reflections to be made from the above facts are both curious and useful. The 18th regiment of foot, and the West Suffolk regiment of militia, after leaving Hilsea barracks, were both in situations where they could not contract fevers, and the regiments encamped with the latter, and in garrison with the former, had no fevers. There cannot therefore be a doubt, that the poison had remained quiescent in their bodies for four, five, and

six

~~fix~~ months. It may be asked, had it no effects in all that time? Certainly there were instances in which it did not appear to occasion any sensible change in the constitution; but this was not always the case, for the men of the West Suffolk had in general lost their florid healthy look, they had lost flesh, and had not their usual activity or strength, as appeared by their being tired and fatigued by any exertion, even though inconsiderable. In this situation, getting wet in the open air proved a very strong exciting cause of fever, as was observed both in the West Suffolk, and 18th regiment.

Ships returning from a warm climate, particularly if they have been in harbour during the unhealthy season, have many of their men taken ill of the remittent fever, even two or three months after being at sea; and care should be taken not to confound this fever with what is called the jail, hospital, or ship fever.

## Note L, page 169.

THE Calomel was used in intermittent fevers in order to give greater efficacy to the bark, and not to supersede the use of it. It might probably be administered with the same view in bad remittent fevers, with similar good effects. It has been given by itself, and as a specific in that disease; but the accounts before the public do not yet appear satisfactory. The evidence, indeed, of it's good effects are very strong, but not altogether consistent; for the success of the practice of those, who bestow the highest commendations upon it, scarcely warrant such encomiums; and the lists of the deaths and recoveries of the sick, as far as any have been laid before the public, do not give a favourable impression of it's virtues. A remarkable thing is, the great quantity of Calomel that is given, and the inconsiderable operation that it produces; which is probably to be imputed to the torpid state in which the bowels are, owing to the comatous stage of the fever. Though no symptom be more formidable than *coma* in this disease, yet it  
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runs its course, and frequently, even when most alarming, terminates in a remission of the fever; a circumstance which must give rise to some uncertainty, whether a remission is to be imputed to the natural progress of the disease, or to the Calomel.

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Note M, p. 179.

IT is a remarkable thing that in the East Indies, under the same latitude nearly as Jamaica, that is, at Madras and Bombay, the disease known in those countries by the name of the *Liver*, or *Hepatitis*, should be the most prevailing disorder among Europeans, and that the same should not be known in the island of Jamaica. The *Liver*, or *Hepatitis* of the East, is an acute disease, attacking often suddenly, and soon proving fatal, unless proper remedies be used against it. By its natural progress it hastens to suppuration, and if the disease arrive at that stage, there are few to whom it does not prove fatal.

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I have taken notice of the enlargements of the liver and spleen, which occur in Jamaica, after long continued intermittents, the same that are to be met with in all countries, in which intermittent fevers prevail; but they are totally different from Hepatitis, having no tendency to suppuration, and generally ending in dropsy. I never saw them except as the effects of preceding intermittent or remittent fevers; but the Hepatitis comes without any previous disease. There is pain, and often fulness, in the right hypochondrium, a pain on the top of the right shoulder, and fever. These symptoms have a rapid progress to suppuration in the substance of the liver. Mercury is the remedy chiefly to be depended upon in the cure of the disease.

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Note N, page 180.

In the stage of Dysentery described page 180; and also where there is a complication of fever and dysentery, and both diseases are equally violent, I have of late given with advantage

vantage the Angustura bark \*. After premising the proper purgatives, it was given in the dose of ten or fifteen grains, in two ounces of a decoction of Peruvian bark, and repeated every four hours, taking care not to offend the stomach. This practice does not supersede the use of purgatives, which must still be given according to the degree of griping pain, and the state of the evacuations, which are to be deemed favourable, or the contrary, as they approach more or less to the natural feculent discharge of the bowels.

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Note O, page 180.

SIR JOHN PRINGLE gave rhubarb and calomel as the best purgative in the dysentery; but he considered it merely as a purgative. Calomel, and mercurials in general, have of late been supposed to possess specific virtues in that disease. How far they deserve that name it is no way necessary to discuss, but as the

\* See Mr. Brande's Account of the Angustura Bark.

results of the practice \* of giving mercury in dysentery have frequently passed under my examination, it may be useful to state a few facts, that appear to be clearly made out, leaving to time, and longer experience, the more complete elucidation of the subject.

Nothing certainly affords equal relief, or tends so much to remove the disease, as purgatives, if administered with judgement and assiduity. This observation applies to purgatives of all kinds ; but I am inclined to believe that a preference is due to those purgatives of which calomel forms a part ; at least it has appeared to me, that cases treated in this way were sooner cured, and that a greater proportion got well than in any other manner. It is not necessary that the calomel and purgative should be given together ; one of the best modes of using it, is to give from three to five grains of calomel, with the usual opiate at bed time ; and to give the morning following a solution of purging salts, an infusion of fenna with *Kali Tartarifatum*, or any other purgative ; none perhaps is better than the *Mag-*

\* It was first recommended, I believe, by Dr. Clarke, and has been generally adopted by the surgeons of the ships in the service of the East India Company.

*nesia Vitriolata.* When the symptoms are violent, particularly the griping, the purgative is given every day, and the calomel and opiate every night. Much depends upon the diligence with which the purgatives are administered; the sick should be visited three or four times a day; and whenever the griping recurs with violence, opening medicines are the only sure means of relief. Though any purgative medicine will, generally speaking, do good, I should prefer that course of medicine of which calomel made a part. With regard to the specific effects of mercury, there are facts and observations that favour that opinion. It is observed, that as soon as the mouth gets sore, the griping and other symptoms of the disease do considerably abate. Yet our experience is not quite uniform in this particular; for when the mercurial ointment is used, there are many cases in which salivation is excited, not only without benefit, but with the appearance of precipitating the disease. When mercury has been used most successfully, it has been given in such preparations as produce purgative effects; at least so it appears to me, from reviewing the practice of others in this disease.

Note

Note P, page 224.

I BELIEVE the obstinate ulcers, that occur so frequently in the West Indies, are to be imputed to the bad habit of body produced by the gradual, and insensible operation of the poison, or cause of fever upon the constitution. I am led to this opinion, by what I had occasion to observe in the West Suffolk regiment of militia. While the men remained of a fallow and unhealthy look \*, slight cuts or accidents produced sores exactly like those, that occurred in Jamaica. The granulations were rather luxuriant, though pale, and their surface somewhat glossy; and the sores were more disposed to spread than to heal. It is true I saw none of them that extended to a large size, as they did in Jamaica; yet they had the same appearance, and if the constitutions of the men had continued to suffer, by remaining constantly exposed to the cause of fever, I have no doubt the sores would have been as bad as in the West Indies.

\* See note K.





