Observations on the characters of endemic fever in the island of Dominica : preceded by an account of the physical peculiarities of the island, so far as they influence the formation and intensity of disease / by John Imray.

OBSERVATIONS

ON THE

CHARACTERS OF ENDEMIC FEVER

IN

THE ISLAND OF DOMINICA;

PRECEDED BY

AN ACCOUNT

OF THE

PHYSICAL PECULIARITIES OF THE ISLAND,

SO FAR AS THEY INFLUENCE THE FORMATION AND INTENSITY OF DISEASE.

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OBSERVATIONS, &c.

As the nature of endemic diseases depends so much upon the physical characters of the country in which they originate, it may not be considered inappropriate to give a slight topographical sketch of this island before proceeding to the consideration of some of its endemic fevers.

The island of Dominica, in lat. 15° 18′ N., and long. 61° 28′ W., lies between the two French colonies of Martinique and Guadaloupe, and is about 29 miles in length, and 16 in breadth. Viewed from the sea, the island has a singularly bold and magnificent appearance. A dark, irregular mass of lofty mountains rises abruptly from the ocean, as if suddenly upheaved from the deep by some mighty convulsion of nature. The rugged grandeur of the island is softened on a nearer approach by the mantle of green that everywhere covers its surface, from the sea margin to the tops of the highest mountains. In sailing along the coast, the smiling valleys, deep ravines with overhanging cliffs, and lofty wooded mountains, form a succession of views of exceeding beauty and magnificence.

The coasts of the island, for most part bold and rocky, are here and there indented by deep bays. On the windward side, high ranges of cliffs, broken at intervals by ravines and valleys, rise precipitously from the water's edge.

The European visitor is struck with the luxuriance of vegetation that everywhere meets his eye. Not only are the precipices fringed with trees and shrubs, but along the face of the cliffs are seen growing many different kinds of plants; and even trees are observed shooting as it were from the bare rock, and sending out their roots in all directions in search of rents and crevices, into which they dive for the purpose of finding nourishment. Whereever, indeed, the smallest portion of soil can collect, there some form of vegetable life is met with.

The highest range of mountains runs in the centre of the island in the direction of north to south. From this, smaller ranges of mountains pass down to the coast on each side, being intersected by valleys and deep ravines, narrow and winding at first, but opening out towards the coast.

The formation of the island is volcanic. The cliffs near the sea are chiefly composed of vast masses of conglomerate. In many places along the coast, beds of coral are found lying on the conglomerate rock, at a height of more than 200 feet above the sea level. There are many volcanic openings in different parts of the island. Around all of those that I have visited are found large accumulations of sulphur. This substance is met with in greatest quantity at the southern extremity of the island, in a deep and confined valley, where there are several volcanic fissures. Near most of these openings, springs of hot water issue from crevices, and in the Roseau valley they boil up in the bed of the river.

From the mountainous nature of the country, abundance of rain falls; and in the bottom of almost every valley there is a clear, running stream, fed by many tributaries.

The whole face of the island, except where cleared by cultivation, is covered with forest. In some of the valleys the forest trees attain an enormous size and height; their stately, massive trunks, rising from the ground like huge columns, excite the wonder and admiration of the beholder.

The soil differs in quality in different districts, but is everywhere fertile in the low-lying grounds, and a short way up the sides of the mountains. Still higher up, a red or yellow clay is generally found, covered by a thin stratum of vegetable mould. A substratum of clay is however very common throughout the whole island.

Of the surface of the country generally, but a small portion is in cultivation,—not more than a thirtieth part. The sugar plantations are chiefly situated in the valleys near the coast, where the soil is very productive. The mountains bordering on the sea round the whole island were at one time covered with fine plantations of coffee, which then formed the staple export of the colony. About eighteen years ago, there appeared on the trees a blight, which has completely ruined these properties,*—not much

* The same fate is fast overtaking the sugar plantations, but from a very different cause. The policy pursued by the British Government to these colonies since the abolition of slavery has ruined the planters. In defiance of the express guarantee of government, the British colonist with his free labour is compelled unaided to compete with the slaveholder, while he has been deprived of every means that would have given him a chance of success;—and this is called free trade. Can there be any *free* trade when the *slave*, with the lash behind his back, is working against the free negro? Cæteris paribus, the slave will produce cheaper sugar than the free labourer, because the labour is compulsory, and will consequently be greater in amount. It is idle to assert that a free negro will do as much work as a slave. The latter, indeed, is overworked and destroyed. One result of government measures is, that slavery and the slave trade was never in so flourishing a state as at the present moment. The next results will be, the entire cessation of sugar cultivation by free labour, and that sooner than is supposed,—the loss of these splendid colonies to the British crown,—the perpetuation of slavery,—and the monopoly of the sugar market thrown into the hands of the slaveholder. The

more coffee being now produced than suffices for the consumption of the inhabitants.

On the windward side of the island the trade breeze is generally regular and steady. The atmospheric current is interrupted by the high central range of mountains, and in consequence there are frequent calms on the leeward coasts, with occasional gusts of wind rushing down the ravines and valleys with much force.

Though the temperature at some seasons is high during the day, and the atmosphere close and sultry, the nights are invariably cool,—the neighbouring high mountains sending down their refreshing breezes as the sun sets.

The annexed table (page 6) gives the average temperature in Roseau for each month over a period of five years. The mean annual temperature is shown by this table to be 79·40. The average maximum is 83·93, and the minimum 74·88. The mean temperature near the coast is about the same as the other islands, but the minimum range is considerably under most of them.

The subjoined table is interesting, as showing the great difference in temperature at a short distance from the coast, not more in a straight line than a mile and a half, and at a height of only 1400 feet.

Temperature at Gommier, 1400 feet above the level of the Sea. Self-registering Thermometer in the shade.*

1847.	Maximum Mean.	Minimum Mean.	Mean Temperature.	Range from	Range to
January, ...	75·25	67·83	71·54	79	66
February, ...	74·89	66·35	70·62	77	62
March, ...	75·64	67·48	71·56	77	66
April, ...	76·	67·45	71·72	78	66
May, ...	77·83	70·58	74·20	80	68
June, ...	78·16	70·96	74·56	80	68
July, ...	79·29	71·54	75·41	81	69
August, ...	79·	71·18	75·09	81	70
September, ...	79·90	71·50	75·70	82	69
October, ...	78·84	70·96	74·90	82	70
November, ...	78·	69·83	73·91	82	66
December, ...	75·48	67·48	71·48	78	62
General Mean, ...	77·35	69·42	73·39	79·75	66·83

It will be seen from this table that the mean temperature at 1400 feet above the sea level is lowered six degrees. Within the tropics, this difference in the range of the thermometer exerts a most material influence in point of salubrity.

British people will then be *obliged* to buy *dear slave* sugar, while they will be consoled by the reflection of having destroyed their own colonies, and brought ruin and misery on hundreds of thousands.

* The residence of my friend, the Honourable Theodore Gordon, to whom I am indebted for this table, extracted from his register of the weather.

	JANUARY.					FEBRUARY.					MARCH.				
	Maximum mean.	Minimum mean.	Mean temperature	Range. from	Range. to	Maximum mean.	Minimum mean.	Mean temperature	Range. from	Range. to	Maximum mean.	Minimum mean.	Mean temperature	Range. from	Range. to
1843.	81.45	73·	77·22	83·	70·5	81·	72·82	76·90	82·	70·5	81·66	73·	77·33	84·	75·
1844.	81·25	72·58	76·96	82·5	76·	82·42	73·13	77·77	84·	77·	82·67	74·12	78·39	85·	77·
1845.	81·	72·56	76·78	84·	74·5	81·	72·26	76·63	83·	76·	83·56	73·7	78·31	86·	76·
1846.	82·2	72·16	77·9	84·	75·5	80·38	72·2	76·20	85·	74·	83·78	73·88	78·83	86·	78·
1847.	80.	73·11	76·55	82·	75·	80·	71·35	95·97	82·	74·	81·5	72·8	76·56	83·	75·
Mean	81·18	72·68	77·8	83·1	74·3	80·96	72·35	76·65	83·	74·3	82·63	73·37	77·88	84·	76·

	APRIL.					MAY.					JUNE.				
1843.	84·43	74.7	79·25	86·5	77·	86·	77·43	76·71	89·	81·	85·96	76·73	81·34	87·	78·
1844.	82·61	74·73	78·67	84.	77·	83·14	75·56	79·35	85·	77·	...	...	...	...	...
1845.	83·27	74·66	78·96	86·	77.	86·21	77·11	81·66	89·	80·5	86·26	77·	81·63	88·	79·
1846.	85·	75·3	80.1	87·	78·	86·8	76·78	81·43	88·5	79·	87·2	75·56	81·29	90·	81·
1847.	82·1	93·23	77·62	84·5	75·	85·4	76·5	80·9	87·5	80·	85·5	75·93	80·48	87·	79·
Mean	88.48	74·52	78·92	85·42	76·	85·51	76·67	80·01	86·82	79·5	86·23	76·30	81·18	88·	79·

	JULY.					AUGUST.					SEPTEMBER.				
1843.	85·19	76·79	80·99	87·	79·	86·26	76·35	81·30	88·	78·	83·35	75·73	79·54	88·	79·
1844.	...	..	...	...	...	85·67	76·87	81·27	87·	78·5	86 16	76·71	81·43	88·	78·
1845.	86·17	76·77	81·47	88·	78·5	85·84	78·87	82·35	88·	81·	85·94	76·84	81·39	88·	79·
1846.	87·	77·67	82·33	90·5	81·	86·7	76·7	81·7	89·	78·	85·4	76·7	80·55	87·5	79·
1847.	83·3	76·3	79·8	89·	79·	85·	76·14	80·57	88·	79·5	84·85	76·21	80·53	86·5	78·
Mean.	85·41	76·88	81·14	88·6	79·3	85·89	76·98	81·43	88·	78·82	85·14	74·43	80·66	87·42	78·

	OCTOBER.					NOVEMBER.					DECEMBER.				
1843.	85·	76·2	80·6	86·5	78·	83·71	74·68	79·19	85·5	76·5	82·2	73·27	77·64	85·	75·
1844.	86·	76·25	81·12	87·	78·	84·61	75·46	80·3	87·	78·5	83·	44·	78·	85·5	76·
1845.	86·09	76·4	81·28	88·	78·5	83·91	75·43	79·67	86·5	77·5	81·46	73·11	77 28	85·	76·5
1846.	85·67	75·88	80·77	87·	79·	84·46	75·36	79·91	86·5	77·5	81·95	74·1	77·98	84·5	76·
1847.	84·	75·11	79·55	85·5	77·	81·95	74·21	78·8	84·5	76·24	80·	72·61	76·30	83·	75·
Mean.	85·33	75·96	80·66	86·62	78·1	83·72	75·02	79·57	85·64	76·84	81·72	73·43	77·44	84·42	75·7

The mountains of this island are the highest in the whole range of the lesser Antilles, the highest peak of Morne Diablotin reaching the height of 5314 feet. I am not aware that its summit has ever yet been scaled, though the attempt has been made. One of the highest mountains at a short distance from town, and another in the centre of the island, have been ascended.

To gain the summit of any of the higher mountains is a task by no means easily accomplished; for they rise so abruptly as only to be accessible by following the course of some steep ridge. I have twice ascended the Couliabon mountain (not far from Roseau), which is 4500 feet high. Gradually as the ascent is made, the character of the vegetation alters, and the noble forest-trees shrink into small shrubs. Still, wherever the eye rests, all is green, unless it be where dark-grey masses of rock project from the mountain sides, or a bright-red surface is left by some avalanche of earth that has been recently separated by the heavy rains, and has fallen into the ravine below. When the traveller has at length reached the highest peak, he is rewarded for the toilsome ascent by a prospect of surpassing loveliness and grandeur. The sublimity of alpine scenery is combined with the verdure and luxuriant vegetation of the tropics. On one side the spectator looks down on the country below as on a map; on the other, mountains stretch away beyond mountains, some shooting up their isolated peaks to the skies, others sloping in undulating ridges to the seashore. The mountain sides, brilliantly lighted up by the rays of the sun, furnish a strong contrast with the dark masses of shadow thrown on the deep ravines beyond. The snowy-looking clouds, as they float along, continually vary the light and shade; while every tint of green is beautifully blended, from the deep sombre shade of the primitive forest to the light lively hue of the cultivated cane-field. The air that is breathed is pure, and uncontaminated by the causes of disease that abound along the sea margin, or lurk in the recesses of the ravines and valleys.

The division of the year is into the wet and dry seasons, though rain falls at all times of the year. The only difference is, that a much greater quantity falls in the rainy, or hurricane season, as it is more commonly called (beginning in the latter part of July, and ending in October), than at any other period of the year. By the register kept in the garrison Morne Bruce, it appears that, from April 1846 to April 1847, 68 inches of rain fell, and during the succeeding year 72 inches.

Vegetation is hurried on with extraordinary rapidity by the heat and light and continued supply of moisture; but decay is equally rapid. In these countries, indeed, the destructive process that is in operation everywhere, goes on with an energy and activity unknown in temperate climates. The heavy rains, followed

by intense heat and high winds, act upon the cliffs, and continually detach stones and large fragments of rock. Where the roads lead under these cliffs, it is dangerous to pass during or after heavy rain. Land slips are constantly happening in all parts of the island. The mountain slopes are washed by the floods of rain in the hurricane season, and the clear sparkling streamlet becomes all at once a turbid impetuous torrent, dashing down to the bottom of the ravine to join the river below, which rolls on to the sea loaded with immense quantities of earth, vegetable and animal matter, and the trunks of trees; and sometimes large stones are carried along its bed by the force of the torrent. The ocean is tinged for miles out by the red earthy matter, and the debris is often washed up by the waves, and strewed along the coasts. Nature, indeed, in these islands, assumes her most terrible as well as most beautiful forms; for what visitations can be more appalling than the earthquake and the hurricane? The one shaking down cities in a few moments, and burying their miserable inhabitants in the ruins; the other sweeping with its destructive blast across the face of the land, and leaving only desolation and ruin behind.

The island still awaits the investigations of the geologist; and to those who take pleasure in botanical pursuits there is a rich and varied field, which has never yet been fully explored.* The woods of the country are very valuable, and of many different kinds. The wild animals and birds are few in number; but there is ample room for the researches of the entomologist, the insect tribes being very numerous.

The whole surface of the island being so irregular, there is comparatively very little marshy land. The only morass of any extent is near the fortress of Prince Rupert, and in consequence the district in the neighbourhood is very unhealthy.

The population, by the census taken in 1844, amounts to 22,964. The majority of the people reside on or near the sugar estates, or in detached huts and villages along the coasts; though many are located on the abandoned coffee-estates in the mountains, or on the crown lands. As may be supposed from the nature of the country, the climate varies much both in point of temperature and salubrity. One or two limited portions of the island, but chiefly around the marsh of Prince Rupert, are unhealthy, and have given the island a general character for insalubrity that it by no means deserves. Did sufficient data exist to furnish a fair statement of the vital statistics of all our West Indian colonies, I doubt not that Dominica would take a rank far

* I have sent several collections of dried plants to Sir William Hooker, gathered chiefly in one part of the island. Among these, many rare and some new plants have been discovered by that distinguished botanist.

above that which it now holds. It is certainly healthier than Tobago, St Lucia, and many parts of Jamaica, and equal, if not superior, to Trinidad and Demerara in this respect. The general healthiness of a country can scarcely be judged of by the prevalence of sickness in one or two limited localities. The climate of England might thus be called unhealthy, because fever abounds in the fens of Lincolnshire. The statistics of the garrison during the last ten years will, I have no doubt, show that the mortality has been comparatively small from the common endemic diseases of the island. The troops have suffered occasionally from yellow fever; but this type of fever prevails at times in Dominica in common with all the West Indian colonies. The mounting of guards, and other duties performed by the black troops, the substitution of rations of fresh meat for salt beef and pork, and the greater attention paid to the purity of the water drank by the men, have, it may be presumed, done much to diminish the mortality among the white soldiers from dysentery, which, in truth, is the most fatal disease of the country.

As in all these islands there is a less amount of sickness in general on the windward than the leeward coasts, the mountain districts throughout the whole island are remarkable for salubrity. No other British West India colony possesses the same advantage in this respect; for an hour's ride will take the debilitated invalid from the hot, sultry atmosphere of the coast to the cool, invigorating air of the mountains. The elevation above the sea level, and the difference in temperature of six or eight degrees, gives altogether a different climate. Health returns with almost every breath that is inhaled. The change of climate and temperature is felt much more keenly than when the system is strong and vigorous; and the alteration for the better even within a short period is often very striking.

The highest position occupied by the troops in Jamaica is Maroon Town, and it appears from the army statistical report that this post is remarkable for its healthiness. It is 2000 feet above the level of the sea; the medium annual temperature (from the statistical report) is $74\frac{1}{2}°$, the maximum $80\frac{1}{2}°$, the minimum $68\frac{1}{2}°$. On examining the table of the range of the thermometer at Gommier, it will be seen that, at the height of 1400 feet in this island, there is a lower temperature than at 2000 in Jamaica,—the mean annual temperature at Gommier being only 73°.39. It will also be observed that the climate is more agreeable; the range at Maroon Town, from the highest to the lowest point, being 12°, while at Gommier it is only 7°.93. In this uncommonly healthy part of the country, and about the same height, is situated Morne de Moulins, formerly a military station. Now, if Maroon Town, with a higher temperature than Morne

de Moulins, is beyond the reach of yellow fever, it may fairly be concluded that the latter is above the range of that destructive malady, unless the difference of a few hundred feet be of consequence, irrespective of temperature. In a former paper in this Journal, the eligibility of Morne de Moulins as a convalescent station for the troops was adverted to. The distance is not more than one mile in a straight line from the garrison at Morne Bruce, and certainly not more than a march of two hours. Were arrangements made to station the white soldiers on these heights, immediately on the appearance of yellow fever in the garrison, I have very little doubt that the progress of the disease would be at once arrested. The mortality would at all events be greatly lessened, and this island would soon be considered as healthy for the troops as any of the whole range, instead of being looked upon as among the most inimical of all to the European constitution.

The main features of remittent fever in all countries where it prevails are nearly the same, and having been so well delineated by many writers, any lengthened description is unnecessary. The object of this paper is to dwell chiefly on some of the most severe and unusual forms, under which the disease presents itself in this island. It will therefore only be necessary, as a general outline, shortly to state, that after certain premonitory symptoms succeed a rigor or chills, or alternate chills and flushes of heat. Then follow general increased heat of the surface, quick pulse, restlessness, headach, flushed face, pains in the loins and lower extremities. The tongue is coated. The thirst is intense. The bowels are constipated, and the urine scanty. The hot stage, after a period of longer or shorter duration, begins to abate; a gentle moisture appears either partially or over the whole surface. The pulse moderates, and the general uneasiness and pains are to a certain extent relieved. This abatement of the febrile action will sometimes take place with a dry surface, or the perspiration may be profuse. In a few hours we have a return of all the febrile symptoms, probably much aggravated;—with delirium and other phenomena, indicating cerebral excitement. If the case terminate favourably, the paroxysms become milder and of shorter duration, until they finally disappear. If the malady run on to a fatal termination, the period of remission is scarcely observable, or the febrile action is continued. The surface is sometimes suffused with a yellowish tinge. The delirium is increased in intensity, or effusion within the encephalon is indicated by constant drowsiness passing into profound coma. The train of symptoms preceding death will depend upon the organs chiefly affected, or the extent of the disorder of the circulating fluids.

The above are the leading symptoms of common remittent fever. Its type varies with country, locality, season, epidemic, constitution, or peculiarity in the system of the individual attacked.

Though the endemic fevers of this island, when early attended to and judiciously managed, are generally amenable to treatment, and the mortality small, it should ever be borne in mind, that no case, however mild in appearance, should be considered altogether free from danger. When the patient is seemingly doing well, dangerous symptoms may suddenly set in, requiring prompt and active treatment. Lives are not unfrequently lost from the neglect of the patient or his friends at the onset. The malady may have been allowed to make such progress before medical aid is called, that probably little remains to be done.

A patient, for example, suffers from a mild attack of fever, with possibly scarcely any premonitory symptoms, or such as he has not particularly regarded. The fever leaves him, and he is so much better as to quit his bed and go out to look after his business, thinking his slight indisposition of no consequence. The fever returns, the paroxysm being somewhat more severe; still a complete remission follows, and he again leaves his bed, taking no remedies whatever for his illness. A third exacerbation sets in, with violent fever and great disturbance of the cerebral functions, or sudden and rapid sinking of the vital powers make their appearance, that soon end fatally, unless active measures are at once resorted to. This peculiarity of the sudden sinking of the vital powers, being a not unfrequent and most dangerous complication, should never be lost sight of in the treatment of our fevers. Cases presenting these alarming and dangerous symptoms may be met with at any time; but in some seasons they form the most prominent feature of the prevailing epidemic.

During the autumnal months of 1836, remittent fever prevailed very generally in the colony, among all classes, the epidemic constitution being of the marked asthenic character above alluded to. The season presented nothing unusual in regard to the quantity of rain that fell and the range of the thermometer. It was observed that thunder storms were far less frequent than generally is the case in the hurricane months; indeed, it could scarcely be said that the island was visited by a thunder storm of ordinary violence during the whole season.

There was usually great prostration at the commencement of the attack, succeeded by rapid sinking of the vital powers. Severe cerebral symptoms was an invariable accompaniment of the fever. Irritability of stomach, a very common and often intractable symptom in our endemic fevers, was not of very frequent

occurrence, nor difficult to subdue when present. The attack began with rigors or chills, alternated with flushes of heat, pains in the loins, great restlessness and anxiety, in general thirst. The tongue was sometimes clean at first, but soon became covered with a thick dark coating. Great functional disorder of the biliary apparatus was always noticed, as evidenced by copious discharges of morbid biliary secretions, often giving rise to severe griping pains as they passed along the intestinal canal. In most instances, remissions were observed of more or less distinctness, varying in duration from three or four hours to twelve. The details of one or two cases of the fever follow.

Visited Mrs ———, middle-aged; stout. She was taken ill with fever on the 6th September, at a healthy situation in the mountains, whither she had removed from town for change of air, in consequence of feeling rather unwell. She took a few grains of calomel, and on the following day (7th) the fever left her. On the morning of the 8th there was an accession of fever, with aggravation of all the symptoms, and an express was thereupon sent off for medical assistance. I found her in a state of great debility; pulse above 120, very weak; extremities rather cold and clammy; surface generally warm; violent headach; heat of head much increased. Little thirst; no vomiting; tongue slightly coated; moist. Bowels open; the patient complains of soreness over the abdomen, which she attributes to the ride from town. Is anxious and uneasy; says she is aware of her dangerous state.

Small doses of calomel, combined with quinine, were ordered at short intervals; nourishment, with a little wine, frequently. A blister to the nape of the neck. The feet and legs to be rubbed with a liniment of turpentine and hartshorn. When pain is felt let them be immersed in hot water. Cold affusion to the head while the feet are in the bath. Cold to the head constantly till the extreme heat is reduced.

Towards morning (9th) she rallied considerably; the pulse fell to 106, and became firmer. The head much relieved, though there was still pain. Skin warm; blister had risen well. The quinine and wine were discontinued, and calomel, combined with genuine James' powder, ordered every two hours. The bowels were, at the same time, acted on by occasional doses of sulphate and carbonate of magnesia. For the next two days there was little variation in the symptoms, with the exception of an increase of the abdominal pain, which was relieved by the application of a large blister. The coating on the tongue also became thicker and darker. The pulse varied in quickness and strength, but never sank below 100. The pain of head was at times severe, and never altogether removed. On the recurrence of the violent headach, the irritating liniment and foot-bath were resorted to, and

always with good effect. Cold applications to the head were continued. Quinine, when the symptoms would permit, and calomel with James' powder, were given at intervals. The bowels were kept open by occasional purgative draughts and enemata. The alvine evacuations were dark-coloured and offensive.

On the night of the 11th, alarming symptoms of sinking made their appearance. The surface became cold; the pulse extremely weak and quick; the tongue black, but moist; the breath very fetid, with anxiety and restlessness. The calomel was discontinued, and she was ordered two grains of quinine and two grains of camphor every second hour, with nourishment and wine frequently. Turpentine liniment to be applied to the lower extremities, and blisters to the thighs.

During three or four hours she continued to sink. The surface was cold, and the pulse almost imperceptible at the wrist. The treatment was assiduously continued. Wine and brandy were administered in quantities as large as the stomach would bear.

By noon of the 12th she had rallied considerably. The skin was warmer, and the pulse more firm and slow. From the commencement of the sinking symptoms, on the night of the 11th, there was an entire cessation of the pain in head. As the pulse rose, the stimulants were gradually discontinued; the bowels were evacuated by senna draughts.

On the 13th she was much improved in every way, and from that time her recovery went on very favourably. When her strength began to return, the calomel took effect on the system.

September 9th. Called to see Fanny, a young, stout negro girl. The account given is, that she was taken ill with fever yesterday, and has continued getting worse to the present time. There is great prostration of strength; she has scarcely the power of raising herself from bed. Pulse about 120, weak and irregular; skin hot; excessive pain and heat of head. She appears rather confused, but answers questions rationally. Nervous tremors of the upper and lower extremities. Tongue has a white coating, and moist.

A large blister to the nape of the neck. Three grains of calomel were ordered to be taken every third hour till the bowels are opened, assisted by senna draughts. Cold applications to the head and cold affusion occasionally; foot-bath.

Next morning (10th) she appeared rather better. The head was somewhat relieved; the pulse more regular, and less nervous agitation. Towards evening the violent headach returned; the pulse became so weak and quick as not to admit of being numbered; the strength greatly reduced; indeed she appeared in almost a hopeless state. Blisters were ordered to the thighs; tur-

pentine liniment to the feet and legs, with foot-baths. Camphor and quinine every hour and a half; nourishment with wine frequently; cold to the head.

In the morning, I found that a favourable change had taken place. Although she was still very weak, the pulse was firmer and not so rapid; the head less painful, and not so much anxiety and restlessness.

For the next three or four days she remained in rather a doubtful way, a remission generally taking place in the morning, and an accession of fever at night. She was treated with large doses of quinine during the remission. When the sinking symptoms set in, camphor and quinine, sometimes combined with calomel, were given, and wine in arrow-root. The cold douche and irritating liniment were repeated till the violent head symptoms were mitigated. The paroxysms became gradually milder and less frequent, and she was soon convalescent.

The above cases will be sufficient to show the dangerous nature of the epidemic constitution of that year. Many such instances were met with, and several proved fatal. The same symptoms are, however, to be guarded against at all times; they may occur when there is no unusual epidemic influence existing, as in the following case.

August 26th 1840. Summoned very hurriedly to visit Ledeate, sugar planter, tall, thin, middle-aged. His wife and family are standing round his bed weeping. He says he knows he is dying. The body is covered with a cold sweat, and the extremities are very cold. The pulse is feeble and fluttering, and at times can barely be felt. Countenance pale and shrunk; voice hollow. The tongue has a thick white matting over all its surface; great thirst; bowels open; evacuations bilious; strength much reduced. The account given is, that he has had attacks of fever for the last three or four days. During the remissions, he has been able to leave his bed and walk about, and even mount his horse to visit his labourers in the field. Last night the attack was more severe than usual. His skin was burning hot; the thirst intense. He drank a large quantity of water; perspiration came on, and continued most profuse, with scarcely any abatement of the thirst. Feeling his strength failing him rapidly, and that he had, as he thought, but a short time to live, he sent an express for medical assistance. Some purgative medicine has been given. His family were requested to leave the room, and the strictest quietness enjoined. A glass of sangaree* to be given immediately. This was rejected. A little arrow-root in the meantime being prepared, was given with brandy, and retained. Camphor, quinine, and calomel, of each two grains, every third hour; arrow-root with

* Madeira, sugar, water, and nutmeg in certain proportions.

brandy at short intervals; a little brandy and water or sangaree occasionally. The perspiration to be constantly rubbed off with warm flannels or rough towels. A large blister over the epigastrium. Not to indulge in large draughts of any kind of fluid. The thirst is still intense.

Returned in the evening, and found him somewhat improved. The pulse increased a little in strength, but still feeble and rapid. Extremities continue cold, with cold perspiration. Has vomited occasionally, but retained a good deal of the stimulus, &c.

Continue the same treatment.

27th. Considerably better; has been able to take his nourishment and stimulus well since last visit, and the medicine has been regularly given. The pulse is fuller and less frequent; perspiration not so profuse. The surface begins to recover its natural warmth. The patient is in much better spirits.

Same treatment.

Evening. Improving. Surface natural; pulse gathers strength. He now believes that he will recover. Discontinue the stimulants gradually. Nourishment in small quantities, and often. A dose of castor oil to be given in the morning.

28th. Going on well. Stimulants no longer necessary. Purgatives were administered occasionally until the tongue began to clean, and in a few days he was convalescent.

This is not an uncommon instance of the dangerous form that an attack of fever, apparently mild, may suddenly assume. The patient considered his symptoms of so trivial a nature as to refrain from sending for medical aid till well nigh too late. Life, in such cases, may hinge upon the delay of a few hours. When called under such circumstances, it is better to administer immediately whatever stimulus may be at hand, regulating the quantity by the effect produced, or the state of the stomach. If irritability of this organ exist, then the danger is greatly increased; for the patient may sink before it can be sufficiently calmed to retain the nourishment and stimulus required to rally the failing powers of life.

It is not always that the result is so favourable as in the above case, as the next instance will show.

August 15th 1845. Visited —— Scott, European, aged about 25, manager of C. estate; some years in the island. He has been suffering from fever since the 12th. Has not sent for medical assistance till now, 4 P. M. He says the fever was very hot at first, then perspiration came on. He has been perspiring since yesterday.

Clammy perspiration over the whole surface, which is cool; head painful, and hotter than other parts of the body, but moist with perspiration. Great thirst, irritable stomach, tongue coated,

moist, pulse weak and quick. He is able to sit up. He has taken one dose of calomel, followed by a draught of senna and salts. A pill of calomel and opium ordered, and quinine mixture at short intervals. Nourishment frequently. A few hours after, word was sent to say that he was weaker, and very low. Stimulants, &c. were ordered at short intervals, but he continued to sink, and died the same night.

Had the patient been seen a day sooner his life might have been saved. But he was evidently deceived by the treacherous mildness of the attack.

When this sudden failing of the powers of vitality occurs, unassociated with any severe local affection, the case is much less dangerous, provided timely and active measures are adopted. If there be untractable gastric irritability, with intense thirst, the chance of recovery is much diminished; but the most dangerous complication is the presence of severe cerebral symptoms. When there is intense heat of head, delirium or coma, with cold perspirations, icy cold extremities, and faltering feeble pulse, recovery takes place but rarely. The following is a case of this character.

March 17*th* 1835. Visited J. M'I., European, aged about 25, three years in the island, of strong constitution. Since the 13th he has had two paroxysms of fever, but in the intervals felt so well as to be able to go out of doors. He took some calomel and castor oil, also an emetic. On the night of the 16th the fever returned, with intense headach and violent throbbing over the eyes; towards morning he became delirious, with profuse cold sweats.

Present symptoms.—He is lying in a state of stupor, from which he can be roused for a short time by speaking loudly to him. Answers incoherently and with difficulty. Pulse quick and feeble, extremities covered with cold clammy perspirations, heat of head increased, tongue has a yellow coating, bowels open.

Apply a blister to the nape of the neck. Four grains of calomel to be given every third hour. Cold applications to the head. Warmth to the feet. If not roused by the blister, apply another over the epigastric region. Nourishment occasionally; and if he continue to sink, give stimulants.

18*th*. During the night he became quite insensible, and could not be roused. The pulse at times could scarcely be felt. Both blisters were applied. The extremities were kept warm by artificial means. Involuntary discharge of urine and fæces. Very little of the medicine has been taken.

He is at present comatose. When spoken to in a loud voice, he opens his eyes, and endeavours to articulate a few words, and sinks back into a state of stupor. Pulse weak and quick, tongue

foul but moist. Heat of the extremities supported by constant application of warmth.

To continue the calomel, with two minims of croton oil, till the bowels are freely acted on. Turpentine liniment and hot-bath to the feet, to be repeated every four hours. Cold to the head. Saline draughts occasionally.

19*th*. Sensibility restored; answers questions rationally. Pulse slower and firmer. Heat of surface natural. Tongue cleaner and moist. His friend who has been attending him says that, before using the counter-irritation to the feet and legs, he was perfectly insensible, the eyes fixed, sometimes wild and staring. When his feet began to get red, he complained of their burning him; and on putting them in hot water he became very violent. The pulse then began to rise, and was stronger. The calomel and croton oil acted on the bowels, and after each evacuation he was more sensible. The evacuations are very bilious. His mouth appears slightly affected by the calomel. Continue the calomel till the system is brought under its influence. Saline draughts occasionally. Continue the warmth to the feet, and cold applications to the head.

20*th*. Much improved. Salivation has taken place.

22*d*. Convalescent.

The counter-irritation to the lower extremities had a marked good effect in this case; but in general, with such symptoms, all remedies fail. The calomel was continued till the patient was salivated, such being the practice of the medical men of the country at the time.

November 1*st*, 1839. Visited —— Gibson, European, aged about 20; overseer G. estate; three years in the colony. Has had several attacks of intermittent fever. Three days ago he was seized with chilliness after a cold-bath. Since then he has had constant fever, with chills; great headach, and pains over all the body. He has vomited everything. Though feeling ill, he went to the labourers in the field yesterday and the day before.

At present there is a remission; but the symptoms denote great danger. He has perspired freely, and the extremities are cold and clammy. Pulse weak, and easily compressed; not very quick. Breathing rather hurried; great pain of head; intense thirst, but everything taken is almost immediately rejected. Pain in the region of the stomach; tongue foul; bowels not open for two days. He is very anxious.

Eight grains of calomel and half a grain of opium, in the form of pill, to be taken every fourth hour. Two hours after each pill a small dose of senna and salts to be given till the bowels are freely evacuated. A large blister over the epigastric region, warmth to the extremities, nourishment if the stomach will bear it.

2d. He vomited part of the medicine given during the night, and the nourishment. The bowels have been freely opened. Says he had a little fever in the night, but it went off with perspiration.

The symptoms are by no means improved. The extremities have the same cold clammy feel; the surface generally cold and moist; pulse weak, tremulous, and intermitting. Breathing hurried; headach without external heat; thirst intense; stomach irritable; strength evidently failing. Three grains of quinine, with half a grain of opium, to be given every two hours. Nourishment with wine every half hour. The patient still vomits, but has retained part of the food administered. Has only taken one pill from the neglect of his attendant. No amendment. Minute purplish specks, with here and there small vesicles of purulent matter, appear on the abdomen and arms.

Continue the pills, adding one grain of calomel to each. Stimulus to be frequently given.

Evening. Much worse. The medicine has not been administered, from the culpable neglect of the manager of the estate. The patient has taken some nourishment without wine, as he said he did not like it. Arrow-root in small quantities, and often. Let the pills be given as previously ordered.

3d. Retained a good deal of the arrow-root and the medicine, but is worse. He is very anxious, and asks if I think he might get up a little in the forenoon. Pulse weak, quick, and irregular; cold extremities; breathing laboured and accelerated; extreme thirst; strength giving way.

During the forenoon there was less vomiting. About two P. M. a flush of heat came over him, and immediately after he was seized with a convulsive fit. On its subsidence he was left in a comatose state. He sank rapidly, and died in the evening.

Had this poor young man applied for assistance in time, the result might have been different. When visited, the debility was so great, and the disease so far advanced, as to forbid the use of depletory measures in any form, with the exception of purgatives. The danger was not so much indicated by the mere vital depression—which might have been overcome by the exhibition of stimuli—as by the continuance of the intense thirst, irritability of stomach, and pain of head, when the more active febrile excitement had subsided. The chances of recovery were lessened by the careless and unfeeling conduct of the manager of the property.

October 18th, 1847.—J. D., 21 years of age, native, stout habit of body, generally healthy, was brought up this afternoon from Prince Rupert's, where he had been residing for some time, ill with fever, which attacked him on the 14th.

The present symptoms are the following:—Weak, quick, com-

pressible pulse. The arms from the elbows downwards cold, and covered with profuse cold perspirations. The lower extremities are cold and clammy. The general surface above the natural temperature, and dry. Face flushed. Great increase of heat about the head, with free perspiration anteriorly, requiring to be constantly wiped away; posteriorly, no perspiration. Says he has had no headach, but had pains in his limbs. Tongue moist and coated. He has vomited everything for the last two days. Great thirst. Bowels at first open, but not moved for twenty-four hours. Restless and hurried in his manner.

Twelve grains of calomel and a grain and a half of opium to be formed in three pills. One every third hour, followed by senna draught (in small quantity). To sit in hot water, in which the arms are to be immersed.

10 P. M. Two pills and the draughts have been taken and retained. Wanders at times; but when spoken to, answers sensibly. The great heat about the head continues, while the general strength is giving way. Pulse weak and quick. Partial perspiration and cold extremities continue. The perspiration almost runs from the forehead without diminishing the heat. Extremely restless.

Cupped on the nape of the neck to the extent of eight ounces of blood; blister to be afterwards applied. Cold affusion over the head. Sinapisms to be applied to the arms. Warmth to the feet. Three grains of calomel every two hours, followed by small doses of infusion of senna with sulphate of magnesia, till the bowels are acted on.

19*th*. The patient has been very restless, talking incoherently all night, though when asked a question he answers rationally. Surface generally warm and dry. The great heat about the head is unabated. Pulse and strength failing. Urinary secretion scanty. A table-spoonful of saline mixture ordered every two hours. The cold applications to the head and warmth to the extremities to be continued. If he continue to sink, add wine to the arrow-root. The purgative medicine operated freely.

Noon. The patient is still sinking. The intense heat about the head is only kept in check by the constant application of cold water. He can scarcely keep his attention fixed for a few minutes. He is extremely restless. The sinking symptoms increased, notwithstanding every means used to rouse the system and relieve the head, and he expired calmly in the evening.

In this case, as in most others of the same type, the balance of the circulation was upset, and the brain surcharged with blood. The head symptoms were rendered more formidable and obstinate in consequence of hereditary predisposition to cerebral congestion; several of the same family having died under somewhat similar circumstances.

The three last cases afford examples of the most dangerous form that the endemic fevers of the colony present. We have a concurrence of symptoms which, in regard to the indications of treatment, are exceedingly embarrassing. The great congestion, or increased action in the brain and its membranes, would require depletion for their relief. At the same time the cold extremities, feeble, sinking pulse, and general failure of nervous energy, urgently demand an opposite treatment, or the patient quickly dies. We are thus compelled to deplete with one hand and stimulate with the other; to relieve the excited or congested brain by depletion, while we support the failing powers of life by administering stimuli. Instances are however met with, where the loss of even a few ounces of blood would be hazardous. The continued application of cold and counter-irritation are then our principal remedies for the removal of the local affection. These symptoms are often induced by the patient neglecting to use the proper means at the commencement. The system is frequently loaded with disordered biliary secretions, which, if not thrown off by active purgatives at the onset of the attack, appear to act as a depressing and deadly poison, affecting more especially the brain and nervous system. The probability of recovery taking place is thus greatly lessened; for in the last stage the system will not so readily support the reducing effects of active purgation, though at first such effects would rather have been beneficial than otherwise. Neither will the exhibition of stimulants, when necessary, produce the same favourable results as when preceded by purgatives.

From July 1837 to the beginning of 1838, the colony was very sickly. The epidemic constitution differed in some respects from that of 1836. The natives of the country were the chief sufferers from the prevailing fever. Although comparatively mild in character, the number of persons attacked far exceeded that of the preceding year. The fever partook more of the intermittent than bilious remittent type; but when the epidemic first appeared, there were some cases presenting the dangerous asthenic character already described. I copy from my notes of that year.

"The precursory symptoms were such as usually precede fever. Pains in the back, and sometimes over the whole body, aching in the bones, slight headach, &c. A chill or rigor of greater or less intensity was experienced, lasting from a few minutes to a quarter of an hour; but in many instances the fever commenced without any sensation of cold. In those cases there was no feeling of chilliness on the return of the paroxysm. The duration of the hot stage was very variable, remaining sometimes only for four or five hours, and at other times more than twenty-four hours. In the majority of cases the febrile excitement was relieved by pro-

fuse perspiration, which left the patient in a state of great feebleness. It was not uncommon, however, for the paroxysm to subside gradually with no perspiration whatever, or indeed without any critical discharge. Intense headach, with great external heat, were the most prominent local symptoms. The pain was often confined to one spot,—generally the forehead,—and in some instances was so severe as to induce delirium. The severe headach, and disturbance of the sensorial functions, with scarcely any exception, vanished when the paroxysm subsided or perspiration broke out. Derangement of the biliary organs was much less frequently met with than usual; nor at the commencement was there generally much disturbance of the digestive functions, the tongue being clean, or having only a slight whitish covering, the bowels regular, and comparatively little irritability of stomach being present. When the fever was neglected, the tongue became loaded, there was great thirst and aversion to food, the alvine evacuations ill-conditioned and offensive.

"The period of intermission or remission was extremely inconstant and irregular, both in regard to duration and the time at which it took place. Sometimes there was a remission of only a few hours; in other instances there was a complete intermission of twelve hours' duration,—the patient during that time feeling quite well, with the exception of being much reduced in strength. The period of invasion was, however, uncertain. The case sometimes changed into a regular tertian or quartan ague. The fever varied much in regard to the period of its continuance. If the symptoms were mild, and the necessary treatment had recourse to early, it was often subdued in a few days or a week. But if the case was severe, and remedial measures neglected, the disease fixed itself in the system, exacerbations coming on day after day for many weeks, till the patient was reduced to a state of great debility and emaciation.

"It sometimes happened that, when the fever had been absent for several weeks, and the patient had recovered health and strength, a recurrence of the attack would take place, generally with mitigated symptoms, or a change in its form, but so obstinate as to resist for months the usual treatment.

"With regard to the treatment, depletory measures to any extent could seldom be borne; nor, indeed, was the abstraction of blood often required, or followed by permanently good effects. When blood-letting was practised during the stage of excitement, the head affection was certainly relieved, but returned with equal violence when the next paroxysm of fever came on, the patient's strength being lessened by the previous depletion. The intestinal canal was cleared out by gentle purgatives. During the hot stage, saline diaphoretic and diuretic medicines were administered,

and while the remission or intermission lasted, quinine was administered in quantities as large as the system would support, or the nature of the case admit. The head symptoms were combated by the constant application of cold and blisters to the nape of the neck. Great benefit was derived from the assiduous application of cold water to the head; by this means, the cerebral symptoms were kept in check, with no loss of strength to the patient,—a point of much importance, considering the general prostration that almost always accompanied the attack. The relief afforded by the cold affusion over the head was so immediate, that the patient generally requested the jug of water to be brought when the pain returned.

" The sulphate of quinine was given in doses of from two to five grains every second or third hour, when the febrile excitement had so far subsided as to allow of its exhibition. If the case was treated early, and the quinine given in sufficiently large doses, it acted as a specific, the fever being either at once arrested in its course, or each succeeding paroxysm rendered milder. It was never considered safe to discontinue the quinine till the patient had been convalescent for several days; it was then left off gradually by diminishing the doses daily. If, from any cause, the quinine was administered in small quantities, it appeared to make very little impression upon the disease."

One or two cases are subjoined.

September 25th. Visited G. H., aged 12. Health usually delicate; has had fever for two or three days. She is at present delirious; heat of head greatly increased; skin hot and dry; countenance flushed; pulse 140; thirst.

Cold affusion to the head after removing the hair; cold applications constantly; foot-bath. Two grains of calomel and three grains of genuine James' powder were ordered to be given every second hour, with a table-spoonful of saline mixture till the bowels are acted on and perspiration appear.

Evening. Has perspired freely; delirium gone; has no recollection of what happened during the day; skin cool and moist; pulse moderated; very little headach; bowels open. To commence with quinine in an hour or two.

26th. Has taken several doses of quinine. No fever. Continue quinine.

Evening. Had a little fever during the day, but with no disturbance of the sensorial functions. Give the quinine as before.

28th. Had no return of fever. Convalescent. Continue the quinine for several days.

September 27th. Visited Mrs P., elderly widow lady, who had seldom been sick, but who was attacked with fever five days ago, and has had a daily paroxysm since. The exacerbation comes on

in the morning with chilliness, which remains about half an hour, when the hot stage commences with severe headach; the fever leaves her at night, but without perspiration.

Present symptoms. Excruciating headach, confined principally to the forehead, with darting pains now and then. Heat of head not much increased. Intolerance of sound; light not disagreeable; pulse 112, weak; extremities cool; much thirst; tongue slightly coated; bowels open, having taken several senna draughts.

Hot foot-bath; cold affusion to the head; blister to the nape of the neck. A table-spoonful of saline draught every two hours.

Evening. Pain of head gone. The blister was not applied, as she felt so much better. Pulse 90. Perspired freely, which she has not done since the commencement of her illness. Quinine ordered every third hour.

28*th.* No return of fever. Continue quinine; senna draught.

Evening. The fever returned, and the headach was so severe, that the blister was applied, which now begins to give pain. Headach at present slight; nearly free from fever. Give quinine during the night.

29*th.* Has been suffering during the night from severe spasmodic pain of the stomach, to which she is at times subject. No fever. One ounce of castor oil with thirty minims of laudanum to be taken immediately. Hot fomentations over the epigastric region, and foot-bath.

Evening. Is now free from pain, but a good deal exhausted. A little wine may be given in arrow-root.

There was no return of fever, and the case did well under the common treatment.

It is unnecessary to continue the relation of cases. The peculiarities of the fever were, its being confined chiefly to the native population of all colours; its very irregular character, being sometimes remittent, at other times some form of intermittent, or changing from one to the other, while severe head symptoms, lasting only during the hot stage, were invariably present. The great increase in the temperature of the head and violence of the pain, in many cases bearing no proportion to the slight febrile excitement, were such as might have led to the supposition that some serious cerebral affection existed, but for the amelioration or entire cessation of those symptoms on the subsidence of the paroxysm. It was oftentimes very remarkable to visit a patient labouring under hot fever, intense headach or delirium, intolerance of light and sound, and, on returning in a few hours, to find every bad symptom gone, the patient suffering only from great prostration of strength. I was not aware of any case of this type of fever ending fatally; it could always be mastered by the early and liberal use of quinine. Six or eight grains between the paroxysms

were sometimes sufficient to affect the system, while in other instances the point of saturation was not attained until probably more than thirty grains had been administered. This most valuable medicine utterly failed in its curative effects, when the yellow fever broke out among the European inhabitants, and committed such havoc a few months subsequent to the disappearance of the fever above described.*

During the hurricane months of 1845, remittent fever, accompanied by inflammatory irritation of the respiratory passages, prevailed to a considerable extent in the colony. The symptoms were those of mild remittent fever, complicated with influenza, or of influenza presenting symptoms of a remittent character.

There were seldom any premonitory symptoms, the patient being generally in good health before the attack, which never came on with distinct rigors, and only sometimes with a slight chill. General febrile heat was experieneed, with severe pain in the upper and lower extremities. The whole surface was often sore and painful to the touch. In many cases, the mucous membrane of the nostrils, frontal sinuses, and air passages generally was affected as in common influenza. There was usually much depression, and the patient was left in a very weak state for several days after the cessation of the febrile symptoms. While the remissions lasted, the patient was, in a great measure, free from pain, which returned with the exacerbation. The treatment consisted in the administration of gentle purgatives, sudorifics, the warm-bath, and quinine. When the latter was given in sufficient quantity during the remission, the febrile paroxysms were arrested. No fatal case occurred with the above symptoms.

The summer months of the succeeding year (1846) were marked by a higher range of the thermometer than usual, and, in consequence of the great heat, much sickness was anticipated when the heavy rains of the autumnal season set in. The hurricane months, notwithstanding, passed over with even less sickness than common. The whole year, indeed, was remarkably healthy.

In the autumn season of 1847, remittent influenza again prevailed widely without any apparent cause. The type was precisely the same as that of 1845. Though the symptoms were very troublesome, and much debility followed the attack, it was not of a dangerous nature.

It may be worthy of notice, that when the remittent catarrhal fever of 1845 began to subside, an epidemic broke out among the horses throughout the whole island. The nostrils discharged a thin clear fluid, which afterwards became opaque. There was slight cough, accompanied by fever. The disease continued from

* See No. 142, Vol. liii. p. 78, Edinburgh 1840, of this Journal, where an account of the epidemic yellow fever is given.

a few days to two or three weeks, but was not fatal in its consequences. It appeared evidently to be of the character of influenza. If such were its nature, it shows that the lower animals are sometimes subject to the same epidemic influences as man.

In making a few general observations on the treatment of remittent fever, it may be premised, that the curative means on which we place the chief reliance, are the judicious use of the lancet, quinine, and calomel.

Within the last quarter of a century, considerable changes and modifications have taken place in the mode of treating West India fevers. The lancet is, I believe, used with a much more sparing hand; neither is it considered absolutely necessary to exhibit calomel in order to produce salivation; while quinine is given in much larger quantities, and with the view of saturating the system.

With natives of the country, or those who have been long resident, the necessity of general blood-letting may be considered as rather the exception than the rule. It is in the treatment of the fevers of Europeans newly arrived that blood-letting is of the greatest service. When there is a full bounding pulse, dry burning skin, intense headach, or other severe local symptoms, sanguineous depletion is clearly indicated. But even here let not the young practitioner for a moment imagine that the attack is to be cut short by the active use of the lancet. We shall suppose, in a case of this nature, that the arm is bound up,—a vein is opened,—the blood gushes forth freely. The headach now subsides; the deep flush on the countenance disappears. The dry burning heat gives place to a gentle moisture over the surface; —drops of perspiration roll from the forehead. The patient feels faint and lies down, expressing himself greatly relieved. The medical attendant retires, and, on returning in an hour or two, he finds all the favourable symptoms vanished. Again the patient is tossing about with dry hot skin, bounding pulse, and racking headach. These symptoms may be moderated in violence, or they may be as intense as at first. The vein may be opened a second time, and the like pleasing but fleeting results follow. Meanwhile, with the loss of the vital fluid, the patient loses that strength which is to carry him through the attack, while the regular course of the fever is not to be shortened by the blood which has been taken away, unless, indeed, it be by inducing complete prostration. It will, however, sometimes be observed, that phlebotomy accelerates the critical discharge from the skin, and the remission takes place; but this will generally happen when the paroxysm has lasted for several hours, and would probably have subsided in the natural course.

It is not always that we meet with these high febrile symptoms

in the fevers of newly-arrived Europeans. The type that prevails at the time may give a different character to the attack. There may be a weak rapid pulse from the onset, with great prostration, contraindicating depletion.

The effect of paludal poison, or whatever the nature of the morbid agency producing periodic fevers may be, on the animal economy, is of a depressing nature. It is true that the action of the heart and circulating system may be much increased, but this is conjoined with great loss of nervous power. Though high febrile action must often be controlled by depletion, and inflammatory action repressed, should it be lighted up in the course of fever, this depressing influence of the fever poison should never be lost sight of, and lowering measures be carried no further than really required. This remark is made as applying more particularly to the fevers of this island; for, in other countries, depletion may be much more necessary, and less likely to be followed by the extreme prostration so often occurring as a consequence in this colony.

The chief objects, then, we have in view, in taking blood from the system, are,—to lower high febrile action, not to cut short the attack, inasmuch as the lancet cannot reach the cause of the febrile commotion,—and to relieve congestion, or, it may be, inflammatory action in one or more organs. When there is much local action, topical depletion will often produce the desired relief without the debilitating effects of general blood-letting. These local affections can scarcely be dealt with as common attacks of inflammation, for they are a consequence or part of the fever; and fever, in truth, is not a local but a general disease. The blood is affected; the whole system is disordered.

In determining on the propriety of blood-letting, we must always keep in view peculiarities in the constitution of the individual, the stage of the fever, and the habits of the patient; for if he has been intemperate, the lancet ought almost to be proscribed, rapid and fatal sinking of the vital powers being sometimes the immediate result of loss of blood.

In the sulphate of quinine we happily possess an agent that may generally be considered as an antidote to the poison that generates periodic fevers. Its power in putting a stop to the paroxysms of remittent as well as intermittent fever, is very great. Its action will depend much upon the mode in which it is administered, as well as upon the period of the disease at which it is commenced. It may be laid down as a principle, that quantity is not so much to be looked to as the effect produced. Six grains may exert the same salutary influence in one person as sixty with another. To destroy the febrile poison, and produce its specific effects, it is necessary that the medicine be exhibited up to the point of tole-

rance in the system, which is indicated by phenomena that are familiar to tropical practitioners. A sense of fulness about the head is experienced, with a rushing noise as of water falling; there is ringing in the ears and deafness; sometimes nervous agitation or a feeling of slight intoxication. One or more of these symptoms are felt by the patient according to the quantity of the medicine administered. The above fact, as to the necessity of exhibiting this valuable febrifuge up to the point of saturation, is of great importance, and has, I believe, been well known to most West India medical men for several years past.

It appears to be almost a necessary condition that the quinine be given till it produce some of the symptoms already noticed, to enable it to contend with and master the febrile poison; short of this, it is much less efficacious, if not indeed powerless.

It is sometimes curious to observe the struggle that apparently takes place between the two antagonistic powers. When quinine has been given during the remission in the necessary quantity, at the time the access is expected, the patient may be seized with an indescribable feeling of restlessness, unaccompanied by actual pain or febrile heat; he tosses about in bed, but can scarcely say what is the matter. In a little time this feeling goes off, and the patient is again well, or there may be a mild paroxysm of fever.

The full action of quinine is not always a positive preservative from a return of the fever; it may and does very often recur, though usually in a much milder degree. Patients will sometimes remark, in rather a disappointed tone, "I have got the fever again, though the quinine is ringing in my ears."

The manner in which I have been in the habit of administering quinine, is carefully to watch the slightest appearance of a remission in the symptoms. If the headach and pains in the back and lower extremities subside; if the surface, previously dry, becomes moist; if the patient was delirious and has become sensible; from two to five grains are then administered every two or three hours; but if the case is urgent, every hour or half hour, until its usual effects on the brain and nervous system are perceived. The form of administering the medicine will depend upon circumstances. It appears, however, to be taken more rapidly into the system when given in solution with sulphuric acid; and I have sometimes thought that a less quantity was required when given in this manner. But the stomach will often reject the acid solution, and it is sometimes disagreeable to the patient. The addition of sulphate of magnesia to this solution, when it is necessary to act on the bowels, will frequently be advantageous; or if judged advisable to give calomel during the remission, both medicines may be very well combined. As soon as the patient complains of deafness, noise in the ears, &c., the medicine is dis-

continued for the time. The quantity that produces this effect will be found to vary much in different individuals, though from fifteen to twenty-five grains is the most usual quantity.

It is not sufficient that the system be only once brought under the full influence of the quinine, and the medicine be afterwards discontinued. To insure the patient's safety, its action must be kept up for several days, though probably not to the same extent as when first administered. It is also prudent to continue the medicine in smaller doses for some length of time after the patient is quite recovered. It is difficult to prevail upon some persons to follow out this treatment, even when the object is fully explained to them; the consequence is oftentimes a return of fever when least expected.

The practice of administering quinine in large doses, as fifteen or twenty grains at once, has lately been strongly advocated as necessary to the final and efficient treatment of endemic fever; but if the same salutary effects can be produced by giving it in divided doses at short intervals, would not the permanent deafness and other rather serious accidents that are caused by excessive doses be avoided? I have met with very many instances where patients could not take beyond eight or ten grains without suffering seriously. In the case of an intimate friend, a single grain produces extreme excitement of the brain and nerves. In only one instance in my own practice have I met with rather serious effects from an over-dose of quinine. Miss T———, aged 20, of nervous temperament, in delicate health, subject to an asthmatic affection, was attacked with mild remittent fever, severe fits of coughing occurring during the paroxysms, but leaving her with the fever. She was ordered quinine in small doses at first to ascertain its effects on the system. She took $2\frac{1}{2}$ grains during one remission; when the fever abated it was again resumed in grain-and-a-half doses every two hours. After the second dose, her sister observed that she was drowsy, but gave the same quantity a third time. The effect of this was to throw her into a complete state of coma. On visiting, I found her lying in a perfectly senseless state, with such symptoms indeed as caused considerable uneasiness both to myself and her friends. The usual means were had recourse to for the purpose of rousing her, but six or eight hours elapsed before sensibility began to return. Had fifteen or twenty grains been given in this case at one dose, what would have been the consequence?

If it be an acknowledged principle that quinine exerts its salutary properties in the cure of fever as soon as it effects the nervous centres, it may be asked if the presence of a greater quantity in the system than can effect this end is necessary or desirable? Is it not more likely to be injurious when given in excess? If

mercury is exhibited in any disease with the view of bringing the system mildly under its influence, will not the result be as favourable as if violent salivation had taken place? Did the same dose of quinine always produce like effects, the matter would be much simplified; but finding, as we do, such diversity among different individuals in this respect, it does appear to me that giving the medicine in divided doses is the safer plan, allowing a very short interval between each, when the case is urgent.

Quinine is sometimes exhibited in large doses at the onset of fever during the hot stage; but I am not aware that a sufficient number of facts exist to show that this mode of administering the medicine has any advantages over the usual practice of introducing it into the system as soon as there is the slightest appearance of the period of remission. Before admitting the superiority of this method of exhibiting quinine, it must be tried in different countries over a series of years, in severe and dangerous as well as mild epidemics. If it can then be shown that the mortality has been lessened by this practice, it should be universally adopted. I cannot avoid thinking that, in fevers where there is high febrile action, or where the system is loaded with disordered biliary secretions, it might be preferable first to lower the febrile excitement and act upon the morbid secretions, for then it may be presumed the quinine will be more likely to exert its antifebrifuge properties. In cases of paludal fevers, where at the commencement there are no very dangerous symptoms, or evidence of any organ being seriously involved, quinine may no doubt be given with perfect safety, and it may be advantageous. But, on the other hand, when the attack begins, as not unfrequently happens, with violent head symptoms, or there is great pain and tenderness over the region of the liver, would it be equally prudent at once to pour quinine into the system in large doses without previously endeavouring in some measure to remedy the local mischief that is going on? What is the effect of quinine given in this manner? Does it shorten the paroxysm? or does it simply remain in the system, and come into operation on the occurrence of the remission? If it can be shown that the former is the case,—that, on the ingestion of large doses of quinine, the paroxysm is shortened or at once arrested,—it is clearly the preferable mode of administering the medicine. If the latter, the advantages are not so evident, for it is taken into the circulation so rapidly from the stomach, that its curative effects may be brought to bear as readily the one way as the other. The question, however, is not one merely of opinion; it can only be decided by careful and impartial observation.

The great value of calomel as a therapeutic agent in the treatment of tropical fevers is generally admitted, though the manner

of administering it has undergone considerable modifications, and the same results are not expected from it as formerly. Mercury is by no means so generally looked upon now as a specific for fever, and, in consequence, calomel is seldom given in the immense doses that used to be common in former times. This is, unquestionably, a very great improvement. The object being to salivate as rapidly as possible, calomel was poured into the system in large and frequently-repeated doses until ptyalism was produced. The patient had thus to endure the suffering of a severe salivation, the debilitating effects of which, with the exhaustion arising from the fever, greatly protracted the period of recovery. By exhibiting calomel in this manner, its action was but little under control, and patients were often salivated when the attack of fever was mild, and there was no necessity for so severe a measure.

Very frequently in proportion to the severity of the attack will be the difficulty of bringing the system under the specific influence of mercury. It is true that, if the patient is once fairly salivated, he may generally be considered safe; but then, he would in all probability have recovered without the salivation. In some states of the system, it is almost if not altogether impossible to effect ptyalism, though at other times the same individual may be easily enough affected.

It is of the greatest consequence to act promptly and energetically on the intestinal canal in the treatment of remittent fever; morbid secretions are thereby carried out of the system; the liver and other abdominal organs are relieved; the intensity of the head symptoms is reduced; the remission is more likely to be distinct, and the sulphate of quinine to act with greater power. When there is much gastric irritability, this object cannot always be effected so quickly as would be desirable. At the commencement a full dose of calomel is generally indicated—from five to ten grains; for no other purgative will be followed by equally beneficial effects. The calomel may either be given alone or combined, according to the exigencies of the case. Gastric irritability is a symptom so common and unmanageable in the bilious fevers of this island, that it is often a matter of extreme difficulty to succeed in getting purgative medicine to remain on the stomach, particularly if given in a bulky form. In such cases, it is necessary to allay the irritability of stomach by administering opiates previous to or in combination with purgatives. This is usually best effected by opium and calomel in the form of pill. When the stomach is quieted, calomel may then be given alone, or combined with other purgatives, in doses of two or three grains at intervals, with intermediate purgative draughts, till free alvine discharges follow. The gastric irritability is kept in control by

stimulating embrocations, sinapisms, or blisters over the epigastric region. The draughts are given in quantities not larger than a claret-glassful at a time; for while this tendency to vomiting continues, a large draught of any fluid whatever will almost instantly be rejected, while smaller doses given at intervals will be retained, and act with equal efficacy.

When the bowels have been freely acted on, and the symptoms are ameliorated, the calomel is discontinued, at least for a time. The action of the medicine on the system is also carefully watched. If the patient complain of soreness or stiffness about the throat, —if the slightest swelling or soreness of the gums appear—any taint in the breath, or the least symptom is manifested of its specific operation, the exhibition of the calomel is immediately suspended, for its action will still proceed to a certain extent. Severe salivation can thus be generally avoided, and any benefit that may arise from the specific action of mercury is obtained without much inconvenience to the patient. When calomel has been given in large and frequently-repeated doses, it is impossible to tell how far its effects will go; and if a grain or two be taken after the slightest appearances of its specific operation have shown themselves, severe and protracted salivation may be the result.

It may be observed, that when certain symptoms are present and calomel has been given in considerable quantity, it may lie dormant for a time, and afterwards act with an energy by no means to be wished for. In the low sinking stages of fever, it will be found almost impossible to bring the system under its specific action, even if desired; it is therefore better to suspend its administration. Should the medicine be given during this period of depression, when the pulse recovers strength, the surface its natural warmth, and the nervous energies are restored, the patient may be suddenly and violently salivated. Nay, when the calomel has been discontinued for some days, salivation may still take place on recovery from this state of collapse, as may be seen in some of the cases related.

As there are few instances of remittent fever in which the biliary organs are not more or less implicated, it will be found that calomel, from its action on the liver, is by far the best purgative that can be employed. It is of great value when the tongue is loaded with a yellowish or dark-coloured coating, the stomach irritable, with great thirst, and tenderness over the epigastric or right hypochondriac regions; the skin being of a lurid or yellowish tinge, the heart and circulating system acting feebly, the urine scanty and tingeing the linen yellow, the strength much reduced,—such symptoms indeed as denote great contamination of the circulating fluids. In these cases there is no other medicine that will act so quickly and efficaciously in removing diseased biliary matter, and

rectifying the disordered state of the secretions and excretions. Depressing treatment in any other form but that of purging will in general be injudicious.

The effects resulting from the operation of calomel will often be the reverse of debilitating. As its purgative action goes on,—as the morbid secretions are carried out of the system, it appears as if a load that had been pressing on the springs of life were removed; for the heart and blood-vessels will act with greater freedom; the skin perform its functions more readily; the mind, if previously disturbed, will become clearer, and far from prostration ensuing, strength returns.

These beneficial effects are not, however, to be expected when the treatment has been commenced at a late period in the disease.

The powerful action of calomel on the liver and biliary secretions may sometimes be observed when it is given subsequently to the exhibition of other purgatives; the latter may have only produced watery evacuations, while a full dose of calomel will be followed by the copious discharge of diseased biliary matter. The medicine given in powder will sometimes be retained when everything else is rejected.

When there is great irritability of stomach, and the bowels are at the same time constipated, the addition of one or two drops of croton oil to a pill of calomel and opium will be found extremely useful. The croton oil can be so readily administered, and its action is so powerful and rapid on the intestinal canal, that, in certain cases, we can scarcely substitute any other purgative that will act with equal certainty and benefit: when, for instance, the gastric irritation is extreme, the cerebral symptoms alarming, and the intestinal canal is at the same time torpid. The stomach may have rejected every kind of medicine, or part may have been retained but has failed to act. If the object in such cases be to operate freely and quickly on the primæ viæ, croton oil is invaluable from its certain and energetic action. Calomel alone is not sufficiently powerful.

Castor oil is very commonly used in this country, and is an excellent purgative in fever, if the stomach will retain it, which is not often the case if the symptoms are severe.

Emetics under any circumstances whatever should be ordered with great caution. I have several times had occasion to witness very dangerous consequences from their use,—such as rapid loss of vital power, requiring the exhibition of strong stimuli,—or, what is more frequent, gastric irritation that no means afterwards will allay.

It need scarcely be remarked, that saline diaphoretics and diuretics form excellent adjuvants in the treatment. Cold sponging will sometimes afford much relief when the surface is dry and

hot. Local action requires to be carefully watched, for mischief will oftentimes go on very insidiously. The brain is very frequently affected, and after death will sometimes be found greatly congested or inflamed; or there is serous effusion in the ventricles, at the base of the brain, or between the membranes. Dissection will sometimes reveal inflammation or disorganization of the liver or the lungs, most frequently the former. The stomach will sometimes be inflamed and abraded, while the symptoms during life have scarcely been such as to indicate lesions of so serious a nature. The fever poison may destroy life without causing much or any structural alteration, or at least such as are discoverable by our present modes of investigation. The circulating fluids in such cases are evidently so contaminated or disorganized, that the functions of life cannot be carried on.

The low, asthenic form of fever demands the liberal use of stimuli, but only while the sinking symptoms remain. To lay down any one plan of treatment, as applicable in every particular to the endemic fevers of these islands generally, would be as unphilosophical as practically inefficient; for not only do the fevers of the torrid zone differ from those of temperate climates, but even within the tropics difference in locality, or in the physical aspect of a country, will cause the symptoms of the same type of fever to vary much. The remittent fevers of Antigua and St Christopher's may differ in character from the same disease in Dominica and St Lucia. In the same island the epidemic constitution will often stamp a peculiarity on the endemic fevers, requiring the treatment to be modified accordingly. The fevers of one year, for example, may present such symptoms as indicate the necessity of depletion; at another time the type may be asthenic, and an opposite course is required. The local symp oms may also vary; sometimes the brain and nervous system are chiefly implicated. Again, the biliary apparatus is most prominently affected, or the respiratory organs may be attacked.

The causes of our endemic fevers reside permanently in some localities; but in certain seasons remittent and intermittent fevers become prevalent throughout the island. The influence of locality may nevertheless be still observed, for the more elevated the position, the number attacked will be smaller, and the cases milder and more amenable to treatment. The Prince Rupert's district is justly considered the most unhealthy part of the island; and the cause is evident in the extensive morass and low-lying swampy land in the neighbourhood, from which are eliminated the noxious exhalations that generate fever. In other parts of the island considered unhealthy, we have the same conditions, but in a less degree.

Though the causes from which periodic fevers originate are

permanent in the country, yet do they not always operate with the same energy. Sometimes these morbific agencies remain in almost a quiescent state, and fevers occur comparatively rarely. At other times they manifest unusual activity, and then we have remittent and intermittent fevers in abundance. That season has a powerful influence in giving activity to these morbid poisons, or in predisposing the economy for their operation, is clear; for as the autumnal months come round, so also do our fevers assume a more severe character, and occur more frequently.

The fact is well ascertained, that fevers prevail with greater frequency from July to October than at other seasons; yet it is difficult to say why this should be. It cannot be heat alone; for there may be as high a temperature at other times, or the season may be unusually hot, and yet no sickness prevail. It is not moisture alone; for we may have heavy rains, and yet the country remain healthy. Nor does it always arise from heat and moisture combined; for we have often hot rainy seasons, with very little sickness. Some hidden element must therefore enter into the chain of causation of which we are in no ways cognizant, but which, in certain situations, and at certain seasons of the year, is more active than at others, though not uniformly so.

Throughout the West Indies generally, wherever we have morasses, or low-lying swampy land, there periodic fevers are met with in greatest frequency and severity. It seems, therefore, a fair conclusion to come to, that where there is a morass with a certain degree of temperature, the inhabitants in its neighbourhood are, as a necessary consequence, subject to attacks of paludal fevers; and the fact invariably holds good, so far as this part of the world is concerned. But if we take a wider range of observation, we find that we are again at fault. The army statistical report states that the island of Mauritius, in the Eastern hemisphere, resembles Jamaica in its physical characters. The temperature is the same; it lies nearly in the same latitude, but to the south of the line; morasses and marshy land occur as frequently in the one as the other. And yet periodic fevers are rare in the Mauritius, and the mortality small from this cause; while in Jamaica the reverse is the case, remittent fever being a common and fatal disease. Here we have the same apparent conditions, stagnant water, with decaying animal and vegetable matter at a certain temperature and elevation, not, however, followed by the same effects on the human organization. It is thus evident that swamps may exist within the tropics without the presence of what has been considered their invariable product, malaria, or it is eliminated in a very trifling degree. We must therefore infer that some other element which eludes our observation is necessary for the generation of periodic fever, or to give a morbid activity

to the exhalations that arise from morasses. The term malaria does often appear to be applied in a somewhat indefinite manner as a cause of fever. That swamps within the tropics and elsewhere, under certain unknown states, give forth emanations that act as a deadly poison on the animal economy, is a fact but too well established; and this poison is called malaria. An epidemic fever makes its appearance where there are no swamps, where the country may even be dry and rocky; still the cause is malaria. On ship-board a dangerous febrile epidemic breaks out; again the cause is malaria. What then is the nature of this subtile agency, that is generated under conditions so diverse, in circumstances so various? What is there to prove that the dry rock has given forth precisely the same cause of disease as the deadly swamp? Is not this rather an assumption than a fact already established? Is not the word malaria often used to conceal our ignorance rather than to throw light on this obscure subject? It would surely be more philosophical at once to acknowledge ignorance, than to assume causes without sufficient proof; for by assuming more than facts will authorize, we obstruct the path of inquiry, instead of leaving it open to others who may be more successful in finding the right direction to the truth. Hasty generalization,—taking for granted what still remains to be proved,—can only serve to retard the onward march of medical science. When causes have once been assigned for the generation of disease, it is much more easy to adopt those opinions, than to strike out into the path of independent inquiry. It is much more difficult, if an epidemic break out, to admit ignorance of its cause, than to assert boldly, that it has its origin in the neighbouring pond, or arises from the wet weather, or the dry weather, or the blowy weather, as the case may be. At the same time, every circumstance connected or associated with the outbreak of epidemics, or the general prevalence of fever in particular localities, cannot be too closely or minutely observed; nor can too much caution be exercised in drawing conclusions therefrom.

We might enter into speculations on the probable causes of fever; on the changes that may take place in the elements that surround us, injuriously affecting the human frame, or of chemical alterations in our own organization predisposing to disease; of different kinds of poison floating in the atmosphere and giving origin to diseases of diverse types, or modifying their more abiding causes; of the very probable influence of that powerful and all-pervading agent, electricity. Such speculations can however be of but little service. Truth can only be arrived at by labouring in the legitimate path of observation and experiment; the result of which, in connection with the general progress of science, will

doubtless ultimately remove much of the darkness that hangs over that difficult, yet most important question,—the origin of fever.

JOHN IMRAY, M. D., &c.

Since writing the above paper, I have read with much interest a review in this Journal of Dr Stevens's work on the Blood, &c.* The treatment proposed by Dr Stevens for yellow fever demands the serious attention of the profession in this part of the world. * In the epidemic yellow fever of this island, in 1838, the saline treatment was tried by the medical officers in the garrison as well as the civil practitioners, but it was not followed by the favourable results expected. This may possibly have arisen from the salts not being properly combined. It certainly behoves every West India practitioner to give a fair trial to this treatment, exactly in the manner proposed by Dr Stevens, especially as the ordinary modes of treating yellow fever are so unsuccessful. If malignant yellow fever can thus be so disarmed of its deadly virulence that 49 out of 50 cases will always recover, then has Dr Stevens conferred on the West Indies and other tropical countries a boon of inestimable value, and earned for himself a name that will be associated with that of Jenner and other benefactors of the human race. Be this as it may, to Dr Stevens is unquestionably due the whole merit of first calling the attention of the profession to the diseased state of the blood in the fevers of these countries; and his views with regard to the disordered state of the circulating fluids have been borne out by the observations of others.

The opinions held by Dr Stevens of the origin and contagious nature of yellow fever, do not appear to be so easily maintained. The mass of evidence is entirely on the other side. At all events, I believe these opinions will be supported by a very small minority of West India medical men.

* Edinburgh Medical and Surgical Journal, Vol. lxviii. p. 418. Edin. 1947.

* The saline treatment of fever as proposed by Dr Stevens has been long abandoned - It utterly failed to produce promised results. J. J. 1872

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