the disorganisation resulting therefrom may favour the development of atheromatous change. Of the association of gout and rheumatism with a tendency to early atheroma there can be no doubt.

With regard to the mode of formation of dissecting aneurisms, certainly such an aorta as this favours Dr. Peacock's view (which, indeed, I suppose would be the general view) rather than Rokitsansky's. Dr. Peacock believes that the first event is the giving way of the inner coat, and the consequent insinuation of a portion of blood, which splits up the middle coat and thus produces the dissection. Rokitsansky thinks that the first step wrong, at any rate in some instances, is a morbid condition of the external coat, which causes its separation from the other coats, and that they, being thus unsupported, give way. The disease here was certainly in the inner coat and inner portion of the middle coat, which were so eaten out with atheroma as to account for any amount of giving way in any part of the vessel. An inner coat so broken up as this could hardly be conceived capable of preventing the leakage of blood at some points into the wall of the artery. Moreover, the two principal ruptures were situated exactly at the part where the brunt of the stream would fall, and where the force from within and the penetrating power of the blood would be most felt.

REMARKS ON AN EPIDEMIC OF INTERMITTENT FEVER IN MAURITIUS DURING 1866-67-68.*

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My excuse for venturing to read to the British Medical Association a paper on a disease so well known and understood as intermittent fever, is that, as late Medical Superintendent of the Poor-law Commission of Mauritius, I had certain opportunities favourable for observation afforded me. My objects are to endeavour to lay before you some of the facts connected with the appearance of intermittent fever in a new field—a colony to which it had been previously a stranger—and to trace its progress around and over the island; not for the purpose of submitting my deductions and opinions, but rather that the members of the Association may have data for forming their own: and to mention, very briefly, a mode of treatment which a consideration of the causes of malaria suggested to me; the result of which treatment, as far as it was carried out, was, I think, one more fact confirmative of the theory that this disease owes its origin to the spores or seeds of a vegetable growth of low order. And for these objects it will perhaps be permitted me to give a short account of Mauritius, its climate and meteorology, and of its inhabitants and their condition.

The island is situated within the tropics, is of volcanic origin, and, up to the appearance of a so-called Bombay fever, to which I shall presently allude, bore the character of being extremely salubrious—so much so, that at one time it had been a resort for those of our Indian invalids who lacked time or means to reach their native land. It has a surface of seven hundred square miles, and of this from one-half to two-thirds is cultivated, principally in the production of the sugar-cane; the remaining third being crown reserves, mountain, and forest.

The mountains are in some parts bare, but the majority are covered with trees to their summits; and it is a noteworthy fact, that it was to a dense leafy screen of this kind that the inhabitants of Savanne owed their immunity from this fever for some fifteen or more months after its first outbreak in an adjoining district.

The rivers exhibit a diminished, and, it is feared, a diminishing quantity of water, owing partly (possibly) to geological changes, partly to a decreased rainfall—this decrease again being by many considered to be the consequence of the destruction of forests and trees bordering on water-courses.

The whole island is surrounded by a coral reef, having several inlets. The water between the coast and the reef is, in places, shallow; and organic matter brought by the rivers to the sea is neither fairly nor quickly carried away. This reef is distant from an eighth of a mile to three or four miles. There are large marshes existing even in the higher portions of the country.

The seasons are hot or hurricane, and cool or winter: the former lasts from December to April, and the latter absorbs the remainder of the year. The mean temperature of the hurricane season is from 84 to 86 degrees; of the cool, about 77; the mean of the whole year, 81 degrees. In the hills, at times, you may enjoy 50 degrees and a fire; in the plains, you may groan under a temperature of 90 to 95 degrees. The barometer is highest in July, lowest in January.

The prevailing winds are south-east and east-south-east; but during

the hurricane season the hot wind of Madagascar, which has passed over the arid plains of Africa, seldom fails to visit the island for a few days, and its effects are depressing, blighting, and even destructive, to animal and vegetable life.

The rainfall has been gradually decreasing: 1866 was exceptionally dry, thirty-four inches only having fallen during the year. On the 12th and 13th February, 1865, not less than ten inches fell.

The population at the end of 1866 amounted to 360,000. Less than one-fifth, or about 65,000, were Africans, who had been slaves, and their descendants; three-fifths, or 220,000, were Indians, with a few Chinese; and rather more than a fifth, or 80,000, were Europeans and creoles. Of these last I do not think more than 3000 or 4000 were Europeans; the rest being creoles, a few white, and the great majority of all shades of colour between white and black; of all kinds of parentage, crosses of English, French, Spanish, Dutch, etc., with Bengalis, Madrassees, Africans, and Malgaches, *cum multis aliis*; and recrosses innumerable and incomprehensible of the descendants of these with each other. I may safely say that the manners of these coloured creoles are polite, their customs beastly; but I cannot enter into particulars. Suffice it that many of them lead dirty, vicious lives, and, being improvident and wanting in energy, are content to continue their existence in the midst of filth, huddling together in one small room or mud-hovel, with every door and window close fastened. A creole hates nothing more than clean water and fresh air. The diet is simple. Indians and Malabars eat rice, a very little salt-fish, and manioc or cassava; creoles add to this more salt-fish or pork, and brèdes (the leaves of the *Solanum nigrum*), and other vegetables. Very little nitrogenised food is consumed by either of these classes; they both indulge freely in condiments, and when they can in country rum, which, until a recent increase in the duty, was very cheap. It may be added that want and themselves are always near neighbours; a slight rise in the price of the staple food, rice, invariably causing great distress and its consequences, as was well shown in 1865, during which year there was a famine in India, whence is principally drawn the supply of rice for Mauritius, and its dearthness caused great misery; added to this was the fact that the dependent and pauper population was larger than ever, because, owing to failures in sugar-crops during this and former years, many proprietors had been obliged to turn adrift whole gangs of labourers, whom they were no longer able to employ; and the always large loafing community of this colony had received too many recruits from families who had been in better circumstances.

A few remarks are required about a former epidemic of fever, and these will, I regret to say, involve some statistics; but I have made them as few and short as possible, and have selected them from three representative institutions, as being those in which the greatest care and skill would be likely to be exhibited, and whose returns and observations would be considered as reliable and trustworthy. They are the civil hospital of Port Louis, admitting all classes and sections, being both a *pension médicale* and a public hospital, under the charge of several English medical gentlemen; the prisons' hospitals, admitting all sections of the community, representing every district, and under the charge of government medical officers; and the vagrant dépôt at Grande Rivière, which receives only the most miserable and destitute, and which is under the care of the superintendent of the government lunatic asylum. These statistics, and some of the observations contained in this paper on the previous condition of the island, I owe to the blue-book, and to the reports of the Fever Commission of 1868.

Some of the older practitioners speak of the occasional and limited appearances of remittent and bilious remittent fevers among Indians as early as 1839-43-44, and opinions were divided as to whether the disease was or was not contagious, malarious, endemic. In 1862, there was recognised by some of our English brethren a disease called by them bilious remittent fever, but, I think, considered by a majority of our French *confrères*, and by some English practitioners also, to be a bilious-typhoid or pseudo-continued fever, with splenic and hepatic complications. From this time to 1867, when intermittent seemed to supersede remittent, this Bombay fever, as it was popularly called, became epidemic in one district after another. I have not time to give even a brief outline of this disease; it was exceedingly fatal, the mortality in proportion to the attacks being very great; and it was almost confined to the Indian population. In 1867, the percentage of deaths to attacks in the three institutions I have just named was twenty-six; in 1868, it was only ten per cent. You may observe that the ratio was very much diminished in the second year: this was not the case with the intermittent epidemic.

We have now arrived at, and even passed, the period at which intermittent declared itself; and I beg a few moments to place before you, as well as I can, the condition of the country and of its people at this time.

For some years there had been a diminishing rain-fall; trees and

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even whole forests had been cut down and removed; large quantities of soil had been disturbed in the making of railways and gas-works; no hurricane had occurred for some years; an extraordinary fall of rain and tremendous flood in February 1865 had carried down a mass of organic matter which remained decaying under water; 1866 was remarkable by an exceptional heat and drought, by an absence of the usually prevailing cool south-easterly wind, and by the frequency of the hot, unhealthy Malgash wind—the consequences of which circumstances were, the drying up of rivers, pools, and marshes, and the free exposure to the air of this fermenting mass of animal and vegetable matter. Again, we had an ill-bred population, constitutionally feeble, and rendered still more feeble and less able to resist attacks by the remains of a remittent fever, and by the increase of paupers and decrease of food, amounting too frequently, I fear, to famine; and an impoverished upper class, unable to assist, and constantly adding to the number of, the poor. It was just at this time that a large barrachois at the mouth of Petite Rivière, on Union Estate in Black River district, was cleaned out, and the mud, said to have been of an overpowering fetor, was heaped on the banks of the river to dry, and subsequently carted to the land for manure. A very short time after this—that is to say, in January 1866—intermittent fever began modestly on this very estate with one attack; in February there were 26, and in March 211 cases, and so it went on, increasing and diminishing according to the seasons, until we find that in this and an adjoining farm there occurred during the twelve months 724 cases and 72 deaths.

I shall endeavour to trace the progress of the fever from this point—the point at which, I believe, the intermittent epidemic commenced in January 1866, and from which it spread over the whole island, or very nearly so. This Petite Rivière, then, is about ten or twelve miles south-west of Port Louis, and this distance the disease traversed in three months, fever attacking the capital in April. It had hardly extended beyond it when it was arrested by the advent of the cold season. In December of the same year, being the commencement of summer, it continued its progress along the west coast, northwards and eastwards, until it reached the most northern point of the island in Feb. 1867; thence it descended southwards along the eastern shore, attaining in June, Rivière Sèche, at a spot on the eastern coast, nearly corresponding to that at which it commenced on the western, the direct distance across being twenty-four miles only. Thus it had occupied a space of some eighteen months in embracing the north and north-eastern coasts (about sixty miles of circumference); but all this time, too, it travelled inland, extending laterally, and killed in the northern districts many thousands. It did not mount the hills and carry all before it; probably it never during this period attained a height exceeding 550 feet, but it crept up ravines and river-beds, and enforced itself by marshes and in jungles, ceasing its ravages only on the reappearance of the cold weather. Returning to its starting point, Petite Rivière, let us now follow it in its course southwards, a very short one. Step by step it advanced slowly or rapidly, until it occupied a strip of land some twenty miles in length and from one to four in breadth, containing over forty square miles of ground—resting, however, here as everywhere, during the winter, to rouse up at the very commencement of summer, and attack with an increasing virulence the inhabitants of the newly invaded territories. But in the midst of its career, during the very heat of summer, it was arrested, and beyond this south-west corner of the island it never passed or penetrated. Here, running from north-east to south-west, from north-west to south-east, and almost directly from east to west, are chains of mountains, among the highest in the colony; and they formed a double, almost a triple, barrier of from 1000 to 2500 feet in height. At the foot of these the intermittent fever stayed, occasionally throwing out an attack which might reach a few hundred feet up. Round the flanks it could not pass; one was guarded by dense forests on rising ground, the other seawards, by a huge, nearly square, mass of basaltic rock, called La Morne de Brabant, having a height of, I should think, not less than 1000 feet, with a base of two or three square miles. This grand rock stands out boldly from the coast nearly directly west, and no seeds of malaria could pass it to again reach the island, unless the wind veered first from south-east to east, then to north; again from north to west, and finally to the south—a very improbable occurrence.

Finding the enemy completely checked in the south, we rejoin him where we left him in June 1867, at Rivière Sèche—that point on the east coast which corresponded to his initiation on the west. Recovering from the torpor of the cold season, December again warmed him into activity. With rapid strides he continued his southerly course, passed the south-east corner of the island, involving Flacq, Grand Port, and Savanne, in succession, attacking here, as he did in the north, places far inland as well as on the coast, and was finally arrested only when he had reached the southern aspect of that Morne de Brabant, whose northern face had checked his career more than a year before. Thus it

took three hot seasons, or about two and a half years, to surround Mauritius. All flat and marshy districts inland were reached, and suffered severely; and only those who lived in the mountains or on the high table-land in the centre of the island escaped, or, if attacked, recovered quickly; while those living in the lowlands who did not yield to the repeated attacks of fever, too frequently perished of dysentery and paludal cachexia.

Up to this appearance of intermittent fever at Petite Rivière, in 1866, be it remembered, there had never been an epidemic of ague, nor had the inhabitants of any portion of the island suffered from paludal fever. It had been remarked by successive chief medical officers and by other professional men that, in an island like Mauritius, presenting circumstances so favourable to the development of malarious fever, it was extraordinary that this disease had had no existence. All have not held quite this opinion; but all agree completely as to the rarity of intermittent, and as to its never having prevailed in an epidemic form until 1866. The very few cases that were treated in hospital were generally those of persons who had had the opportunity of contracting ague in other countries. Soldiers fresh from the Kentish and Essex marshes, and Indian emigrants from swampy districts in Bombay and Madras, here experienced relapses. Only 35 cases were registered in the military hospitals during the thirty-five years between 1823 and 1858, or just one *per annum*. In the civil hospital of Port Louis, there were admitted in the four years preceding the epidemic, that is to say, in 1862, 4 cases; in 1863, 24; in 1864, 14; and in 1865, 43 cases, being a total of 85, with 7 deaths; and it is remarkable that of this number 75 were Europeans, of whom 5 died, nine Indians with two deaths, and one creole, who recovered. Note the very extraordinary change in the numbers attacked of the different sections in the same civil hospital during the next eighteen months ending June 1867, when there were attacked 571 Europeans with 33 deaths (5.75 cent.), 240 creoles with 41 deaths (17 per cent.), and 1735 Indians with 272 deaths (15 per cent.).

For the two years 1866-67 the percentages of deaths to attacks were as follows:—European, 5.17; Indian, 14.19; and Creole, 19.20. To show how much more the Creole, the native of the country, suffered from this new disease than he did from the bilious remittent, and than did the white and black population, to both of whom intermittent need not be deemed to have been an absolutely new thing, I hold the two in contrast. In Europeans, in the bilious remittent, the percentage of deaths to attacks was 16.50; in Indians, 45.75; in Creoles, 6.50 per cent.; while in intermittent, of Europeans attacked, 5.17; in Indians, 14.19; and in Creoles, just 20 per cent. died.

Again, taking the three representative institutions, I find that in 1867 there were 10,780 admissions of intermittent, and 732 deaths, being about 7 per cent. The total registered mortality from this disease during the year was 31,920; and the estimated death-ratio of Port Louis was 274 per 1,000 of the population. During the six months ending June 30th, 1868, there were in these same institutions 4,456 admissions, with 415 deaths, being about 9.3 per cent. The registered mortality of the colony for the half year, from the same cause, was 8,343.

To give an idea of the gradual diminution of fever, I take March as the best month for averaging deaths from this cause. In 1867, there were 6,671; 1868, 2,817; 1869, 1,412; and in 1870, 691. The present state of the colony is very good, the death-rate from all causes being only twenty-six and a quarter per thousand.

Let me bring forward a few more figures. In the dispensary and hospital which I first established in Plaine Magnien, and which were under my charge for the five months ending October 22d, 1868, I treated 937 cases of uncomplicated intermittent fever. Of these 144 suffered relapses more or less numerous, and fifteen died. There were under my care fourteen cases of dysentery followed by intermittent, with a death-rate of 14 per cent.; of intermittent followed by dysentery, thirty-three cases and a death-rate of 6 per cent.; of uncomplicated dysentery, forty-six cases and a death-rate of 13 per cent. I ought to add that the registered mortality does not give the whole of the victims of malaria; some died on cane-fields and roadsides, and many more were entered as dying from other causes, which were frequently sequelæ of fever.

Our systematic writers have described, and most of us are familiar with, the symptoms of ague; the fever of which I am speaking exhibited pretty much these appearances. Premonitory symptoms were oftener absent than present, the attack being frequently sudden; occasionally only was there a complaint of general malaise; then came insomnia, formication, pain more or less severe in the regions of the stomach, duodenum, liver, and spleen, accompanied by nausea, giddiness, and vomiting; rigors often frightfully severe, and which no amount of blankets, hot-water, and stimulants seemed to alleviate. These were followed by reaction and the sweating stage, the two generally occupying a period of time in pretty regular proportion to the severity of the attack. In a few cases, if the patient were at once removed to a non-malarious

district, it happened that, after one or two mild seizures, complete recovery ensued. Much more frequently there was no intermission of perfect health; the pulse, skin, and tongue might be in their normal state, or nearly so, but the capability of the individual to resist the attack was much lowered; generally, too, during this partial recovery, there continued the sense of prostration, the loss of appetite and of energy, and a dull pain in the neighbourhood of the liver and spleen: remaining, as the majority had to remain, subject to malarious influences, yet properly treated and sufficiently fed, the attacks became more distant, quotidian becoming tertian, quartan, erratic, or ceasing altogether. It is perhaps hardly necessary to say that the stages were not always well marked. We had malaria without fever. Sometimes, but rarely, typhoid symptoms occurred; there was no longer an intermission, scarcely a remission; it became a continued fever with accessions at regular or irregular periods; in these we had the typhoid symptoms only before death. On examination *post mortem*, it was found that Peyer's patches were never involved. The relative frequency of quotidian, tertian, quartan, and erratic was, according to the Civil Hospital returns, as follows:—Quotidian, 82.90; tertian, 13.08; quartan, 0.45; and erratic, 3.57; and my experience would yield somewhat similar results. The sequelæ were hæmorrhages, anasarca, ascites, hæmaturia, constipation, diarrhœa, and, by far the most fatal, dysentery.

The *post mortem* appearances were very various; these depended, to some extent, upon whether the patient had yielded to one sudden, sharp attack, or whether he died only after having made a stout resistance. I am greatly indebted to my friend Dr. Dickson of Grande Rivière for information on this subject, and I regret that I am not able to furnish the more exact data that his necropsical journal would afford. There were generally present cerebral congestion and effusion; after many attacks, softening of the brain, which, too, was often stained of a yellow colour. The heart was flaccid; the ventricles contained yellow fibrinous clots, which sometimes extended to a considerable distance into the aorta and pulmonary artery; the liver was enlarged, congested, softened, and friable—more rarely hard and shrivelled; the spleen much enlarged, and after numerous seizures, of a dark slaty colour, and softened; the mucous membrane of the stomach and intestinal canal was very much congested; the kidneys normal, or flabby, white, and bloodless; more rarely shrivelled and dry; more frequently softened.

The treatment was that usually adopted:—emetics, purgatives, and antiperiodics during the intermission; stimulants, diaphoretics, and counterirritants during the paroxysm. It was, I think, pretty generally established that a large dose of quinine, administered about an hour before the expected attack, modified, shortened, or postponed it. I may here mention some large doses of that alkaloid. Usually from three to five grains were prescribed; after a time, 10, 20, 30, 40 grains, the last being the largest dose I ever employed, or took. I have known a hundred grains given in two doses, with an interval of twelve hours between them; and Dr. André speaks of its being not uncommon to administer 160 grains in the twenty-four hours. Arsenic, iron, beeberine, strychnine, sulphur, hyposulphite of soda, Warburg's tincture, and other remedies were tried, (especially at a time when quinine sold for £19 an ounce,) and found of little or no use. Carbolic acid administered by mouth was valueless, but, hypodermically injected, gave favourable results. It was to this mode of treatment I alluded in the early portion of my paper. I used a solution containing two minims of the crystallised acid to a drachm of water, and, when I could do so, injected from twenty to forty minims a short time before the attack was expected, and at the same hour on two or three consecutive days. I regret that I was only able to treat in this manner thirty-six cases in hospital and dispensary. Of these twenty-two were cured, but eight relapsed after an interval of from six to thirty days; in seven cases failure was more or less complete, and the remaining seven not having reported themselves at the Dispensary, the result in these cases was not positively known.

The time during which the fever-poison will remain, and the very peculiar manner in which it will exhibit its power, its erratic course, and its periodicity, may be shown in my own case. My last attack in Mauritius—a very mild one—occurred in March 1869. I arrived in London in May, and spent more than six months there and at Reesmouth on North Tyne, quite free from fever. Attending the November meeting of the Northumberland and Durham Medical Society, I experienced my first attack in England in the library of the Infirmary, and, by the time I reached my hotel, it became a pretty sharp one. I had a return every twenty-seven days for five months, remaining perfectly well during each interval. Although it is now more than four months since the last seizure, I need not say that I do not consider myself safe.

The inferences and opinions deduced from the facts herein narrated, with certain advice, were duly forwarded by me to the colonial office for consideration, and, belonging as they do to that department of government, are not for publication.

ANOTHER SOURCE OF LEAD-POISONING.

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I AM desirous of recording a case of lead-poisoning, in which the discovery of the source whence the metal was derived was somewhat difficult, although, as will be seen, it was superficial enough.

A middle-aged man, a coach-builder by trade, came to me complaining of pains which had troubled him for years, and for which he could get no relief. The man was gouty, and the pains he suffered from partook of the gouty character; occasionally during an exacerbation developing into ordinary arthritic gout. His aspect was very much that of chronic Bright's disease; he was anæmic and pasty-looking; but repeated careful examinations of his urine excluded the possibility of that disease being present.

Knowing the influence of lead in predisposing to gout, I looked to the gums, and there found a marked blue line. I now set myself to discover the source of the metal, and made careful inquiries in every direction that suggested itself to me. To begin with, the man assured me that he had nothing to do with painting or with the metal-work of coach-building; he confined himself exclusively to the wood-work. I then investigated the character of the water-supply, and looked into the possibility of his food or drink being the agents whereby the poison was introduced into his body, but with negative results. I was baffled at every turn; yet I felt convinced that his system was impregnated with lead, and the happy results of treatment by iodide of potassium confirmed me in this belief.

Determined not to be frustrated if I could possibly avoid it, I one day asked him to describe to me in detail exactly what his work was, thinking it just possible that he might use leaden rivets or something of that kind in fastening his work together. He then told me, with an expression of surprise, that he had not thought of it before, that he was a coach panel-maker, and that the panels were fitted into carriages by means of *white lead*, no screws or bolts of any kind being used. Here, then, was the source of the metal which, superficial as it may appear, for some time eluded discovery. I have since learned that carpenters, joiners, cabinet-makers, and other workers in wood, not unfrequently use white lead for fastening joints, etc.

I need hardly say that the foundation of the man's sufferings being disclosed, he soon got relief. He told me he had been a sufferer for years, and had frequently been under the treatment of surgeons in general practice, and had consulted one or two well-known physicians, but, beyond relief of the more urgent symptoms of acute gout, he could get no ease. Iodide of potassium and iron, Epsom salts and sulphuric acid, cured him.

57, Wimpole Street, November 1870.

ABNORMAL FORMATION OF THE VAGINA.

SOME months since, I was called to attend a woman in her first confinement. On examination I could not pass my finger more than an inch in any direction into the vagina. It was some time before I could feel on the soft flat muscular substance which met my fingers anything like an os uteri. I at last detected, lying very much forward and against the pubes, a slit feeling something like an os. I could not make out the presentation; and, as the pains were irregular and no urgency about the case, I gave a dose of opium and went to bed. On visiting the case ten hours afterwards, I found that one foot had descended through the opening by the pubis, and the other made a rent for itself through the centre of what I may describe as the false or abnormal floor of this vagina, which seemed of average capacity. I put back this foot and brought it down with the other. I could now, on passing my finger through the rent in the centre, feel the os and uterus, which was well dilated and very moveable. I thought for some time that the opening through which the feet protruded seemed inclined to dilate sufficiently to admit of the child passing, but it was not so; therefore, with the traction which it was necessary to make, and the size of the child, the two rents soon became one. Even after this, there was much difficulty in delivering, the uterus seeming to come down with the child as traction was made. I gave ergot, used external pressure, and made as gentle traction as possible, although much force was required before delivery was completed. There was a good deal of hæmorrhage, evidently from the torn muscle, which made me glad I did not divide it with the knife, its vascularity seemed so great. The woman made a very good recovery. This abnormal muscle again contracted, and keeps up the uterus as before.

C. J. DENNY, Malvern Wells.