THE HISTORY OF YELLOW FEVER IN WEST AFRICA.

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INTRODUCTION.

Now that West Africa is beginning in earnest to open up to mining and industrial enterprises of all kinds, I wish to lay before the medical profession, through the medium of the BRITISH MEDICAL JOURNAL, a review of the history of yellow fever in West Africa, which shows that yellow fever is far more prevalent than is usually supposed. In fact, my observations prove, in my opinion, that yellow fever is endemic to-day amongst the natives of the coast towns, precisely as it was amongst the Creoles, the yellow-skins of Havana, Rio, Santos, Para, Vera Cruz, etc. If the mining managers and merchants will forearm themselves by adopting the rational precautions of segregation and *Stegomyia* destruction on the West Coast, they need not fear the awful set-backs to commercial progress which the towns above named experienced from yellow fever.

For convenience of reference I have summarized the history of yellow fever under the following heads:

1. General.
2. Yellow fever in Sierra Leone.
3. Yellow fever in Southern Nigeria.
4. Yellow fever in the Gambia.
5. Yellow fever in Senegal.
6. Yellow fever in Ascension and Bonavista.
7. Yellow fever on the Gold Coast.
8. Yellow fever on the Ivory Coast.
9. Yellow fever in Togoland.
10. Yellow fever in Dahomey.

I.

HISTORY OF YELLOW FEVER IN AFRICA.

. . . The conclusion arrived at concerning the question whether yellow fever was first endemic in the West Indies or in Central and Southern America, was that yellow fever was endemic amongst the early inhabitants of both places. When the even more fragmentary history of yellow fever in West Africa is examined, we will, I think, come to a similar conclusion as regards the West African continent, namely, that yellow fever was in all probability a disease endemial to the native races of the coast. West Africa did not attract military or missionary, or even commercial expeditions at so early a date as did the more attractive New World. It is not until the eighteenth century that information begins to filter home of the deadly African fevers of the coast: of "Bulam Fever" (1793); of the fever of "Fernando Po"; of the "fever of the Bight of Benin," etc. Amongst the earliest records are those relating to the presence of yellow fever in St. Louis in 1778.

The fact that yellow fever has persisted in unbroken line from the eighteenth century to the present day appears to me to be the strongest evidence in favour of the essentially endemial character of the disease. Also many of the earlier military writers on yellow fever adopted this view.

In the case of the sister disease, malaria, we do not discuss whether it was imported into West Africa or whether it was endemic. We regard it as a disease essentially endemic to those peoples living amongst *Anophelines;* similarly, having regard to the very widespread distribution of the *Stegomyia* in Africa, we may reasonably assume that yellow fever has existed so long that it may reasonably be regarded as endemic. As in the case of malaria so in yellow fever, the infection may of course have been introduced, but introduced at such an early period that the question whether imported or endemic is beside the mark. We know that there still are countries, as the East Indies, in which the *Stegomyia* abounds, but in which the disease has so far not been signalled.

We also know that in the eighteenth century ships could have readily at any time introduced the disease into West Africa, for in those days the ships were exceedingly few which did not regularly carry infected *Stegomyia* and patients suffering from the fever. The tables were turned when Grenada accused Bulam in West Africa for having introduced the "*nova pestis*," as they termed it, into the West Indies.

The story is instructive, because it shows that at that period great confusion had already arisen as to whether yellow fever was contagious or not; this same confusion has persisted to the present period in West Africa. Dr. Chisholm maintained that up to 1793 yellow fever was a miasm fever, and therefore not contagious, but that in that year the ship *Hankey* introduced a "new plague," as he called it, into Grenada for the first time, from whence it spread to the other islands, and from them to America and Europe.

In the eighteenth century the slave ship was no doubt one of the most powerful factors in the distribution not only of yellow fever, but of all other racial and endemic diseases and of the insect carriers peculiar to them. Not only did the slave ship carry human beings in whose blood might have been the virus of yellow fever, malaria, sleeping sickness, relapsing fever, filariasis, plague, etc.; it equally well served as the means of transport of the various species of mosquito, fly, or flea. Some of these might have been taken on board infected; others, we know, could have developed on board ship, for in all probability every cask of water taken on board at a tropical station was already infected with the ova or larvae of the *Stegomyia*. The "slaver" was a floating native village, in which the worst features of the native village were reproduced, white and blacks living jammed together in hot stifling quarters, providing the ideal conditions for the multiplication of the *Stegomyia* and the spread of yellow fever. The slave ship justly earned its reputation of being the great cause of the dissemination of diseases, and now in the light of modern discoveries we more strongly than ever realize the truth of this statement.

The consideration of the following records of outbreaks of yellow fever in West Africa shows how often history repeats itself. If the early settlements in the West Indies and in Central America were hampered by yellow fever, so precisely on the West Coast of Africa the foundation of missionary settlements or the arrival of new regiments were heralded as a matter of course by outbreaks of what in every probability was the same disease.

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II.

HISTORY OF YELLOW FEVER IN SIERRA LEONE.

The foundation and settlement of Freetown appears from the commencement to have been impeded by outbreaks of yellow fever. References are constantly made by writers on yellow fever to an epidemic which occurred in 1815. According to Johnson, in that epidemic 26 out of 50 died, the symptoms being jaundice, pain in the loins, stupidity in the head, black discharge or black vomit, followed soon by death. He states further that the Nova Scotia settlers called it "break bone fever." The fever was at the time attributed to a vessel which arrived in January, 1815. There can be little doubt that the disease was genuine yellow fever.

This epidemic is also referred to by Staff Surgeons Barry and Fergusson.

French writers have taken it for granted that Sierra Leone was the home of yellow fever on the West Coast, on the very natural ground that it was more thickly peopled, and had wider relations with the outside world.

Pym also contended that Sierra Leone was the home of yellow fever in West Africa.

Griesinger believed that it had early become endemic.

From Freetown the disease is supposed to have spread to the other parts of the coast.

1817. Johnston refers to this year as an epidemic year, and states that three missionaries died after five days' illness.

In 1821 a missionary died from yellow fever accompanied by black vomit.

From 1822 to 1824 a considerable number of cases occurred. Staff Surgeon Barry, who described the outbreak, states that it broke out in December, 1822, and that the first case was that of a sailor; previously, however, the crews of several ships in the harbour had been attacked with what he describes as the endemial remittent fever of the locality. It was also a matter of much speculation whether the disease was imported or endemic. Some held that it was an imported contagious disease; others that it was local in origin, and that the endemial remittent fever of the place was another form of the disease; others, again, held that the endemial remittent and yellow fever had a common parent. One thing is clear, however, from the description of the symptoms and *post-mortem* appearance, that the disease was yellow fever.

The white population, and especially the sailors, suffered from the disease; out of a party of 12 schoolmasters, with their wives, 10 died.

It was noticed, however, that the blacks remained healthy, with the exception of the Croomen. During the outbreak H.M.S. *Bann* arrived, and her crew were attacked. She then sailed for Ascension, and some affirm introduced the disease for the first time into that island in 1823. (See Ascension Island.)

The mortality is given as follows (Walker)

December, 1822	... ...	7 deaths.
January, 1823	... ...	2 deaths.
February, 1823	... ...	9 deaths.
March, 1823	... ...	11 deaths.
April, 1823	... ...	12 deaths.
May, 1823	... ...	24 deaths.
June, 1823	... ...	12 deaths.
	Total	77 deaths.

According to Burnett, a disease differing from the usual remittent and possessing the character of yellow fever occurred in 1823. It was not contagious, and was not imported by H.M.S. *Caroline*.

In 1825 an epidemic is described with a total mortality of 263.

There was also a considerable outbreak in 1826, for, out of a garrison of 535 soldiers, 115 died from June 14th to August 24th.

Major Crofts gives a table showing the mortality from remittent fever in July, 1826; 53 men and 3 officers are stated to have died. In all probability the disease was yellow fever.

In 1827 a typical case of black vomit was recorded (Fergusson).

In 1829 an epidemic broke out, and in the garrison of 130 whites 12 cases were reported; 11 deaths occurred.

Boyle, in commenting upon the 1829 outbreak in Freetown, and refuting the idea that the fever was imported into Freetown by H.M.S. *Eden*, states that occasional cases of yellow fever are to be met with every year in Freetown. Violent controversy also arose as to whether the disease was contagious or not. In consequence, a memorandum to the effect that yellow fever was not contagious was drawn up in Freetown on May 27th, 1829, and signed by J. Boyle (Colonial Surgeon), M. Sweeny, M.D., Deputy Inspector, and W. Fergusson, Surgeon R.A.M.C.

In 1835 a case of black vomit is recorded.

The origin of the outbreak was ascribed to importation from Fernando Po, and by others to the town of Zangara, 400 miles distant; it was seriously proposed to build a high wall to keep out the pestilential breeze which, it was alleged, came from this town.

The next large epidemic occurred in the years 1836–38. In December, 1836, a malignant fever broke out amongst the crew of the barque *Mary* whilst in Freetown; 15 of the crew were attacked and 5 died. Cases then appeared on shore, one of those who died being a mulatto lady who had come from the United States; another was young man who had only been one month in the colony. Five of the crew of another ship, *The Lady Douglas*, who had gone ashore and who had lodged in the house previously occupied by the crew of the *Mary*, were infected, and 4 died in January, 1837.

Deaths occurred in March and April, and the fever was at its height in May and June; the last case was recorded in July, when, as the writer states, the yellow fever was succeeded by the common remittent fever of Freetown and confidence was once more restored; but, adds the writer, to every one's astonishment, the fever broke out afresh before the end of the year. The first to succumb were the crews of three ships which had arrived during the autumn, and Staff Surgeon Fergusson attended 20 cases amongst the white residents between November, 1837, and February, 1838; 2 ended fatally.

In 1839, 6 officers of the garrison, 7 officers of the Royal Navy, and many soldiers and sailors died of yellow fever.

Table Showing the Number of Cases Treated by Fergusson from February, 1837, to March, 1838.

Occupation.	Cases.	Deaths.
Navy	43	25
Army	11	5
European resident merchants and seamen	272	107
Total	326	137

During the prevalence of the epidemic H.M.S. *Curlew* arrived and stayed one week in Freetown Harbour, and sailed for the Gambia; during her voyage the crew are stated to have suffered from an outbreak of the disease. Freetown was in consequence blamed for having introduced yellow fever into that colony for the first time.

As in the previous epidemic, so also in this one, the relationship of the endemial remittent fever to yellow fever was much discussed. Fergusson put forward the opinion that yellow fever or malignant remittent fever was only the malignant form of the common "endemial remittent" fever, and he thought that if cases of the simple endemial remittent type were transported by ship to other localities they might give rise to the malignant form. Fergusson firmly believed that "yellow fever was a product of the colony itself," but that both the Gambia and Ascension were infected from Sierra Leone.

In 1837 Burton described an outbreak of yellow fever in the island of St. Mary, situated off the north-west coast of Sierra Leone.

From 1837 to 1839 inclusive the quarterly medical reports of the garrison and town show unquestionably fatal cases of yellow fever entered under the heading of "malignant remittent fever."

In the period 1840 to 1845 there is a yearly record of the "endemial remittent fever," sometimes with severe and fatal symptoms. Ships' crews were often severely affected.

In 1845 a case of malignant remittent or yellow fever appeared; the fever broke out amongst the crews of the squadron at anchor on the Roquelle River. The symptoms recorded are unmistakable, and are confirmed by the *post-mortem* accounts (Fergusson). In this year also there appears some evidence that Bonavista was infected from Freetown by H.M.S. *Eclair*. It is also stated that in this year cases occurred frequently and with the most severe symptoms amongst the newly arrived sailors, and least so amongst the native soldiers. At this period, also, the expressions "bilious remittent fever of the country" and "inflammatory fever" occur—other names, no doubt, for the same disease.

In 1847 an epidemic is chronicled by Staff Surgeon Lawson. The resident white civilian population is put down at 100, and of these 12 died from yellow fever. There were also cases amongst the sailors in the port and on H.M.S. *Syren*, on which ship there were 17 cases, 3 of which developed black vomit ten days after embarkation.

In 1850 a case of fatal yellow fever was reported; it was said to have been introduced by a sailing ship from Rio.

In 1859 an epidemic occurred in which 100 whites died of the disease.

In 1865 and 1866 cases were also observed.

After this period there is a lull in which no doubt the disease persists amongst the permanent residents, but in a mild and undiagnosed form, but does not make itself obviously manifest, owing to altered conditions in the navy, mercantile marine, and in commercial enterprise.

In 1872 it broke out again and 6 deaths were recorded. The colonial surgeon, writing in 1883, states: "We have had no cases of yellow fever since 1872." It is presumed to have been present in 1878.

In 1884 a severe epidemic prevailed in Freetown; the cases appear to have been diagnosed either as yellow fever, severe or pernicious remittent fever, African fever, and a dispute arose as to the nature of the fever. In the annual military returns one soldier is returned as having died of yellow fever, and the statement is made under date June 25th, 1884, that yellow fever and a severe type of remittent fever prevailed in the town during this year. There is no doubt that great confusion existed at the time between remittent fever and yellow fever.

The term "bilious remittent fever" has been employed in a great number of cases as another name for genuine yellow fever; some have, however, regarded it as a distinct disease. From the history of yellow fever on the West Coast it certainly appears probable that a very large proportion of the bilious remittent fevers were cases of yellow fever. When the fever assumed a more severe type and became epidemic it was called yellow fever; as long as the cases remained mild they were put down as remittent fever.

The question therefore arises, Do the remittent fevers represent the mild forms of yellow fever? In this connexion it is interesting to note that there is some evidence from the MS. notes of the period that the "endemial remittent fever of Freetown" conferred a certain degree of immunity against yellow fever, which would show that the remittent fever might be a mild form of yellow fever. Moreover, the fact that the natives escaped the severer form would also tend to show that they had had a milder form of the disease, probably the "endemial remittent." Lawson states that some medical men of the period considered that the natives did suffer from a mild form, which was capable of inducing the malignant form in the whites. Lawson himself considered that both diseases had a common cause.

A Dr. Davies, practising in Freetown, reported a case of yellow fever on July 15th, 1884. Upon receipt of this report, the acting principal medical officer sent a letter to Dr. Davies, asking him upon what grounds he had diagnosed a case of yellow fever, and if "he considered the case of yellow fever which he had had in his practice to be contagious or not." In a subsequent letter to the Governor, the principal medical officer stated that, in his opinion, Dr. Davies had made a grievous mistake in his diagnosis of yellow fever. This correspondence is of great interest, as showing the attitude of mind at the time as regards the nature and diagnosis of yellow fever. Yellow fever in the same year appears to have broken out at Rufisque, in another part of the colony.

In 1884 the evidence shows that there was a considerable reluctance to notify the outbreak as yellow fever, and cases which terminated fatally and with the classical symptoms of black vomit were entered as "pernicious remittent fever," "African fever," "typhoid," and "enteric fever." The year 1884 showed a mortality of 50 amongst the whites; probably the majority of these were yellow fever.

In a report sent in July 30th, 1884, to the then Secretary of State—the Earl of Derby—by Sir Arthur Havelock, the Governor of Sierra Leone, it is stated that a fever, described as "typho-malarial fever," was prevalent during the months of May and June; recently arrived Europeans suffered most severely. The malignant symptoms of the disease became more marked every day. On June 27th the disease was described as a "pernicious remittent fever on the borderland of yellow fever." At the same time a private practitioner had already concluded that the disease was yellow fever, and the military medical officer had actually reported a case of yellow fever. On June 28th a European died of black vomit. On July 2nd two Europeans died of yellow fever, diagnosed as such by the colonial surgeon; on July 6th another fatal case occurred. After this date a few more cases occurred, but of a less virulent type.

The final opinion—given on July 17th by the colonial surgeon and the other practitioners in Freetown—was that the disease was a "mild type of yellow fever of a non-contagious nature." The Governor in his report states that a noticeable feature was that, as the disease assumed a more virulent type, it became more and more restricted to Europeans. The natives seemed to have complete immunity from its attacks, there not being a single authenticated case amongst the negro population.

To Sir Arthur Havelock's covering dispatch is appended the report of the Special Medical Committee, consisting of the acting colonial surgeon, the senior military medical officer, and Dr. Cole, a private practitioner.

From the report it appears that the epidemic was most fatal in Westmorland, Rawdon, and Home Streets (the European quarter). The disease, they state,

> resembled yellow fever, or that type of pernicious remittent fever of a malignant destructive type having as its characteristics yellowness of the skin and conjunctivae, dark-coloured and very offensive alvine evacuations, dark-coloured urine containing blood casts and very obvious albumen, a quick pulse and a persisting high temperature ranging from 102° to 105°. Vomiting, often persistent and very difficult to control, dark in colour and containing a large quantity of bile, in some cases with distinctly black vomit.

Duration, five to seven days, and, in malignant cases, four to five days.

The report describes the types of fever prevalent on the coast as intermittent fever or ague, remittent fever, enteric or typho-malarial fever, and pernicious malignant or yellow fever. They state that the years 1807, 1809, 1812, 1815, and 1819 were marked by great sickness, the nature of which they do not state. They allude to the 1823 yellow fever epidemic, and state that in 1825 out of 902 persons attacked 263 died. Another epidemic occurred in 1829, when out of 150 Europeans attacked 11 died.

In 1837 an outbreak also occurred in April, preceded by very suspicious cases in January. The epidemic, they state, died down, passing insensibly into the common endemic remittent fever. In 1838 yellow fever appeared in February and ended in March.

In 1839 6 officers died of yellow fever, and an appalling number of the troops, 7 officers of the Royal Navy, and 13 seamen died.

In 1845 yellow fever broke out amongst the crew of H.M. squadron at anchor in the Roquelle River.

In 1847 yellow fever was epidemic in Freetown during June, July, and August.

In 1859 also an epidemic broke out, when 100 Europeans died of yellow fever. Cases also occurred in 1865 and 1866.

In 1872 there was an epidemic, and 6 deaths occurred in December of yellow fever. The total mortality from this disease may have been 250.

Dr. Lamprey, describing the cases of yellow fever in the 1884 epidemic in the BRITISH MEDICAL JOURNAL, 1885, states that the outbreak of yellow fever in Sierra Leone was sporadic in origin, the undoubted product of Freetown, and that all attempts to trace its origin to a non-sporadic source had failed.

He notes the difficulty of distinguishing between the bilious remittent fever and yellow fever. He states that in 1853 yellow fever was present, and that an epidemic occurred in 1825. He states that also in the years 1829, 1837, 1838, 1839, 1845, 1865, 1866, and 1872 there were very many cases of yellow fever.

In the 1884 epidemic he notes that the total death-rate amongst the native population was 35 per 1,000, and amongst the Europeans 6 per cent. per month. The epidemic commenced in May and lasted until August.

He then describes in detail the symptoms of a large number of cases. There can be no doubt, therefore, that there existed a severe yellow fever epidemic in 1884.

Examination this year (1910) of the scanty medical reports of Freetown shows that in the year 1893, 4 deaths occurred from pernicious malarial fever.

In 1894 the statement is made that there were 16 deaths amongst the Europeans, of which 13 were stated to be due to bilious remittent haemorrhagic fever and 1 from malignant malarial fever. Three of the cases

died within thirty-six hours of their landing from the rivers.

Of course, it is not now possible to be certain whether there were cases of blackwater fever or whether some of them were not genuine yellow fever cases.

In 1899 there were 17 cases of remittent and 6 cases of bilious remittent fever entered in the hospital records.

In 1900 the statement is made in the annual report that there were 2 cases of yellow fever in the six years from 1885 to 1891.

In 1908 a Syrian died with symptoms which the medical officer who was in attendance regarded at the time as a case of gastric ulcer. He now thinks that it might very well have been a case of yellow fever.

In 1909 a fatal case occurred which, in the light of recent experience, the medical officers who were in attendance now conclude was yellow fever.

In 1910 some 10 cases of yellow fever have been reported, of which 8 proved fatal, but there may have been more cases and more deaths. The one fact which is certain is that the disease was yellow fever, and that the Syrians were the first attacked and amongst whom the greatest mortality occurred. The outbreak occurred in May, and continued into September.

From the preceding history of epidemic and endemic disease in Freetown, the reader is, in my opinion, forced to but one conclusion—that in the case of Freetown, as in the case of the towns in Central America, South America, and the West Indies, yellow fever in a mild or virulent form has been a disease common among those living in the *Stegomyia*-infected town of Freetown since its foundation to the present day.

In the preceding account yellow fever is diagnosed and carefully described by well-known military and naval surgeons fully conversant with the disease in other parts of the world, and the descriptions which they have left in manuscript prove that their diagnosis was correct.

Again, there is the history of the almost annual occurrence of outbreaks of black vomit—a disease which all observers mention—attacking new-comers in preference to the indigenous inhabitants. Indeed, authorities were agreed that the permanent black population did not get the severe yellow fever of the white man. Some authorities began to discuss the relationship between the common mild, endemial, remittent fever, or acclimatizing fever of Freetown, with yellow fever, and many concluded that the mild form could pass into the severe yellow fever. Others concluded that both had a common parent; others, again, that the remittent fever of the native could give rise to the yellow fever in the white man.

Another authority of the time concluded that the endemial remittent fever conferred a certain degree of immunity against yellow fever. All these are points which have, over and over again, been discussed in countries where yellow fever is endemic. They are all based on accurate observation, for no doubt the mild endemial remittent fever of the inhabitants of Freetown was in very many instances mild yellow fever, and it naturally conferred a certain degree of immunity, or perhaps complete immunity, to a subsequent attack of yellow fever. The endemial remittent fever of the native was the source from which the *Stegomyia* obtained its infection. The outbreak which has taken place this year (1910), and in which the Syrians were early infected, is, in my opinion, the final proof of the essentially endemic character of the disease in Freetown. The Syrians have in recent years increased in numbers in Freetown. They are engaged in a small trade, and live with and amongst the natives in the more crowded parts of Freetown. Their yards and those of their neighbours were infested with *Stegomyia*. It was but natural, therefore, that yellow fever should first manifest itself amongst them, as they were obviously most exposed to the infection. On the other hand, the merchants and officials living in better and less congested quarters suffered to a far less degree, whilst those completely segregated were not affected at all.*

Taking into account the very numerous outbreaks and sporadic cases of yellow fever which have been described in Sierra Leone during the nineteenth century up to date, and bearing in mind that after no epidemic or sporadic case was any town fumigated to destroy the infected *Stegomyia*, we may be certain that, following the laws of yellow fever, cases of the disease occurred in intervening years. When these facts are borne in mind, and the same reasoning applied to the other colonies in West Africa, we are in possession of facts which, in my opinion, place it beyond a doubt that yellow fever is endemic on the West Coast of Africa.

Bérenger-Féraud, one of the great historians of recent times on yellow fever, especially in Africa, contends that Sierra Leone is the endemic source of yellow fever in West Africa, and compares it to Mexico and Cuba; he further remarks upon the great efforts which the English authorities took to deny the existence of yellow fever.

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III.

YELLOW FEVER IN SOUTHERN NIGERIA.

It would be strange, in view of the reasons which I have put forward for regarding yellow fever as endemic in West Africa, if a colony like Southern Nigeria, where the prevailing town mosquito is the *Stegomyia calopus*, and close around which the existence of yellow fever has been officially chronicled during the past fifteen years, should be exempt from endemic yellow fever. I am of opinion, however, that yellow fever is endemic, and that in all probability, as in other colonies, the disease has long been overlooked and mistaken for other diseases. Unfortunately the medical records which have been kept in the hospitals in the past have been of a very scanty nature, and there are no careful manuscript records of the diseases prevalent amongst the troops and sailors similar to those which have been preserved in Freetown.

There has been, however, a strong opinion, expressed by many of the experienced traders, that the disease which has proved rapidly fatal to the white man on several occasions, and which had at the time been attributed to a malignant form of malaria, was in all probability yellow fever. This view is much strengthened by the outbreak of yellow fever which took place in Bonny in 1899, and by the undoubted cases, in my opinion, of yellow fever which occurred in Lagos in 1893-4, and again in 1905.

I will now briefly record the outbreaks and supposed outbreaks of the disease in some of the chief towns of Southern Nigeria, in order that the student may realize why I consider yellow fever endemic in Southern Nigeria at the present time.

YELLOW FEVER IN SOUTHERN NIGERIA.

Warri.

The medical officer reports that a tradition exists that there was a yellow fever outbreak at the European factories about the years 1860-70.

* Sir William Pym, in commenting upon the origin of yellow fever in West Africa, states the great difficulty of bringing positive proof of its existence amongst the natives, because they have it in so mild a form that it does not kill. He mentions how the Croomen escaped yellow fever in the West African squadron when the white crews were suffering and dying from the disease. He concludes that it is reasonable to suppose that the Croomen had already had the disease in their native country.

The opinion of the acting principal medical officer, Dr. Kennen, and of others was that the epidemic of 1910 had a local origin and was not imported. This opinion of the endemic origin of the epidemic of yellow fever was the view most frequently adopted by those who had been called upon to investigate outbreaks in the past. Investigation failed in 1910, as in past years, to prove importation. I concur, as the result of examination of the facts on the spot, with the endemic origin of this outbreak.

Calabar.

An undoubted case occurred in the years 1830–1.

Bonny.

In 1873 several deaths were recorded which might have been due to yellow fever.

In 1883 it is stated that an outbreak of yellow fever occurred, due to importation from Freetown.

In 1890–1 a very serious outbreak is recorded of what was unquestionably yellow fever. The medical officer, Dr. Parker, was certain that it was genuine yellow fever. The description of the symptoms is such as to leave no doubt as to the nature of the disease—the disease was thought by some to be malignant malaria, and was attributed to the pulling down of an old factory; others maintained that it was introduced in the straw and litter on a ship coming from South America. The natives were not affected. There were 11 cases and 9 deaths amongst the population of 15 white men.

Dr. A. J. Brown, who was in Bonny at the time, informs me that he attended two of the cases. The symptoms were headache, pain, great prostration, albuminuria, yellowness, persistent black vomiting.

Dr. Parker, who was the medical officer at the time, stated that he was convinced that the disease was yellow fever. He subsequently contracted the disease and died.

Dr. MacDonald, Bonny, has furnished me with notes of a suspicious case which occurred in 1909, six weeks after arrival in Bonny. The diagnosis at the time was "gastritis and jaundice." No malarial parasites were, however, found in the specimens of blood which were repeatedly examined.

From numerous inquiries which I have made, there can be no doubt that yellow fever occurred in Lagos in a virulent form from 1894 to 1895. Thus, I have it on reliable authority that seventeen members of a mission arrived from England in Lagos on December 13th, 1893. Of these, five had died by the end of January, 1894. In addition, a resident missionary, and the young child of another missionary, had also died. The cases presented the classical symptoms of yellow fever. According to Ott, cases were reported at Lagos in 1896.

At Sapoli in 1898–9, there were a considerable number of suspicious deaths, and in 1907 an outbreak of a severe type of fever was recorded at Widah.

Examination of the medical notes in the hospital at Lagos convinces me that genuine well-marked cases of yellow fever occurred in the years 1902–5. There were also many mild cases.

The symptoms recorded are violent headache and body pains, high temperature, slow pulse, suppression of urine, black vomit, and coma, terminating fatally. In 1905 the symptoms recorded could hardly be those of any other disease but yellow fever, yet the diagnosis made at the time included "fever and gastritis" and "fever and morbus cordis"—a diagnosis which Ott also states was made in Togoland. I am, therefore, strongly of opinion that in Lagos one of the causes of mortality in the past has undoubtedly been yellow fever. When it is recollected how little is known of the fevers amongst the 60,000 native inhabitants of Lagos, and when it is understood that by far the most abundant mosquito is the *Stegomyia*, it is not unreasonable to assume that the natives in all probability suffer from a mild type of yellow fever, and that therefore yellow fever is endemic.

Further evidence in favour of this contention is furnished by the admitted frequent presence of yellow fever in Dahomey and Togoland close by (see the paragraphs on these colonies). It must also be recollected that, just as in the case of Sierra Leone, the infected *Stegomyia* were not destroyed by fumigation, but were left to propagate the disease.

(To be continued.)

IN a recent note on Cinematographic Microscopy we mentioned that Messrs. Pathé Frères, of 31 and 33, Charing Cross Road, were always willing to exhibit their films illustrative of micro-organic life to medical men on presentation of their cards. The firm now requests us to state that, owing to the number of medical visitors, it has set aside Friday afternoons for the demonstrations in question.

PUERPERAL ECLAMPSIA:

*A COMPARISON WITH VENOM POISONING AND A SUGGESTION FOR TREATMENT FOLLOWING THEREFROM.**

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IN a recent number of the *Journal of Obstetrics and Gynaecology of the British Empire*[1] I have gone fully into the pathological lesions found in eclampsia and their interpretation. On this occasion I wish, in the first place, to summarize some of the evidence given in that paper, and especially that part of it which seeks to show that the single, although complex, type of toxin which I take to be the cause of the disease is capable of producing a very definite polymorphism of lesion in such an organ as the liver; I should then like to add some confirmatory evidence which has come my way since that paper was published; and, finally, to give certain new therapeutic suggestions which are rendered at least plausible by the results I will lay before you.

It is very necessary that I should make it absolutely plain that I am referring to an acutely toxaemic attack occurring in the puerperal state without any evidence of pre-existing chronic nephritis. Of those convulsive and other toxaemic conditions occurring in pregnancy associated with a chronic inflammatory lesion in the kidney I can say nothing. I have had no opportunity of examining such cases, and their exact relation to eclampsia on the one hand and to uraemia on the other must at present be difficult to determine. The problems presented by uraemia itself are so vast and complicated, as may well be judged from a perusal of the experimental work on record,[2] that a combination of eclampsia and renal disease, with inter-relation of the two, is likely to present still greater difficulties for elucidation.

You will understand, then, that I limit myself to that acute and usually convulsive toxaemia which tends more particularly to affect previously healthy young primiparae, which commences most commonly quite suddenly, but which may develop in a more ingravescent form during some days or weeks (pre-eclamptic stage), which in the event of a favourable issue very rapidly and completely clears up, and which is characterized by purely degenerative, as opposed to inflammatory, lesions in the kidney.

The difference of opinion as to the nature of eclampsia is, as your know, extremely marked—the divergence ranging from the view that the disease is indistinguishable from uraemia to the idea that it is a disease as peculiar to pathology as is the ovum to pregnancy. That the condition is not a simple uraemia the most satisfactory histological evidence goes to prove. I think, too, that a correct interpretation of the lesions will show them to be peculiar neither to eclampsia nor the puerperal state, but to occur in whole or in part in certain other natural and experimental conditions.

As seen in the liver, the lesions of eclampsia consist of three definite and distinct changes. First, and without exception, there is a degenerative change widespread throughout the organ and varying in intensity in different cases. This degeneration is usually rather more marked towards the centre of the lobule, and may in that region proceed to a little irregular necrosis. Secondly, and very commonly, although by no means invariably, there is seen towards the surface of the liver a very peculiar condition of focal necrosis in the periphery of the lobule. This necrosis is strictly limited to the outer zone or to part of it, and does *not* gradually merge into the degeneration seen in the middle and inner zones. And, thirdly, there is frequently seen, particularly towards the surface of the organ, a certain amount of blood extravasation, especially in association with the necrosed areas.

The points of greatest importance are, first, the invariable degenerative change, and, secondly, the absolute lack of relation which this bears to the focal necrosis. In other words, the clinical severity bears no relation to the amount of necrosis seen *post mortem*.

An explanation of these peculiarities is found in the complex nature of the toxin at work. It contains both

* Read at a pathological meeting of the Liverpool Medical Institution on December 1st, 1910.