

man who had fallen among thieves. There he lay by the roadside, stripped, robbed, beaten, wounded, bleeding, unable to cry for help, and left half dead. By chance a wealthy and a holy man came down that way and when he saw the sufferer he passed by on the other side; and likewise another who came and looked upon him and passed by on the other side. Lastly, a man with an ass came where he was, and when he saw him he had compassion on him and went to him and bound up his wounds, pouring in oil and wine (the antiseptics and healing drugs of the period), and set him on his own beast and took him to an inn (the nursing home of the day) and took care of him. I verily believe that this good man must have been a doctor. I know of no finer example of that sympathy of which I speak and which you should not fail to cultivate.

An Address ON

SOME PROBLEMS OF TROPICAL MEDICINE.

*Delivered at the London School of Tropical Medicine on
Oct. 3rd, 1900,*

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GENTLEMEN,—When in compliance with the request of Dr. Patrick Manson I consented to deliver to-day the opening address to the students of this School of Tropical Medicine, I felt that I was committing myself to a task really beyond my powers. This feeling was deepened on glancing over the formidable syllabus of lectures and demonstrations to be given by the teaching staff. The ground to be covered is so vast, the subjects to be dealt with are so very important, the extensive and diversified knowledge required both in teacher and student is so deep and so wide, as to make one's own ignorance painfully apparent to oneself. I therefore find comfort in the fact that I am here to-night because I am an administrator, not because I am a doctor of medicine.

I understand that the objects of this school are to convey to its students a special acquaintance with the diseases that are of most frequent occurrence in tropical regions and to train them for the investigation of such maladies on systematic and scientific lines. There is excellent reason for believing that Her Majesty's Secretary of State for the Colonies took very seriously to heart the deplorable mortality among public officers and others in our more unhealthy tropical possessions. The calling into being of this school is but one of the many means devised or fostered by the Right Honourable Joseph Chamberlain for curtailing the death-roll of our fellow-citizens in those insalubrious over-sea territories of the empire. This school is but one link in the chain, and the chain is already a long one and it promises to be continuous.

THE TRAINING OF COLONIAL MEDICAL OFFICERS.

The leading idea of the school, therefore, is the appropriate training of colonial medical officers. It is, however, to be hoped that others may take advantage of it and that it may add another ring to the ever-widening stem of the already gigantic tree of medical knowledge. It is certain that there are a great many people in this country at the present moment suffering from what are usually called "tropical diseases," and that these sufferers are not, and cannot be, attended by medical men who have had tropical experience. Very many of these patients must come under treatment by the ordinary medical practitioner. Cases could be adduced in which some of the most distinguished men in the medical profession in this country have been completely at sea as to the exact nature of certain tropical diseases and their sequelæ. The teaching supplied by such a school as this should be a useful addition to medical men practising in this country, especially if cases of tropical diseases in sufficient numbers can be made available to them for clinical study. The list of students who have passed through the courses since Oct. 1st, 1899, does not show, however, that

the school is patronised by the British medical practitioner. Taking into account the already immense and still growing traffic and the rapid and steadily accelerated communication between this country and the tropics, and bearing also in mind the intolerance of any form of quarantine in the United Kingdom, the probabilities are that the special study of tropical diseases will constantly be more and more forced upon medical men in practice in this country, either by the systematic study of such maladies at the ordinary schools of medicine or at specific institutions such as this. If this branch of medicine is neglected, then the sufferer from the tropics will be a certain loser, but not always the only one.

At the present moment, however, many of us are very specially interested in this school in relation to the medical services of our more unhealthy tropical colonies. It is probably the case that not a few of those who have so far passed through this institution were already familiar with many tropical diseases, knew them by experience, and understood how to treat them. To students of that category the clinical studies of these maladies here is not nearly so important as is the training to be had to fit them to investigate tropical diseases on the spot, on the most advanced systems known to medical science and with a full knowledge of what has already been done in these matters in this country and elsewhere. Any average medical officer who has sufficient training in making investigations of this kind will soon master the practical details of all tropical diseases in his district, provided that he is given time, the necessary instruments, and proper accommodation. The best and most proper place for making such researches is undoubtedly the tropics themselves. It must be patent to every person who thinks at all on the subject that the training of medical officers to carry out investigations of this kind is of the utmost importance to each colony, to the empire, and to humanity at large. We all know, or ought to know, what has been done in this field by such men as my late highly esteemed friend Dr. Bancroft of Brisbane; by the distinguished Dr. Patrick Manson, the inspiring genius of this school; by the father of Strachan's disease, the present chief medical officer of Lagos; and by many others who have practised medicine in the tropics. These men had no specialised opportunities given them; they had not the advantage of any systematic training such as is offered now at this school. We are therefore justified in expecting a great deal from the younger men who now come forward here to learn at once the most suitable and the most advanced methods of conducting original investigations in the great and rich tropical field.

STATE ENCOURAGEMENT OF MEDICAL RESEARCH.

But I can tell you that this training and preparation will not yield all that we are justified in expecting from it without the coöperation of the Secretary of State for the Colonies and of colonial administrators. The trained medical officer must have time and opportunity granted to him. That the Colonial Secretary will in every possible way encourage and suitably recognise the researches of medical officers may safely be taken as granted. It is, however, at times a very difficult matter for an administrator so to arrange service affairs as to be able to grant to medical officers the time so necessary to carry on scientific investigations of this kind without their being submitted to grave or destructive interruptions. Colonial administrators and others in high authority have not always in the past lent to the head of the medical department the support required by him. They have not always given to their chief medical officer the confidence that Alexander the Great extended to his. I was myself very fortunate in the first new country in which I served in having as chiefs such enlightened men as Lord Stanmore and Sir William des Voeux. Whatever was really required for the new medical service in Fiji was granted. As one result of that there is no doubt that at the present moment the chief medical officer of that colony, Mr. Glanvill Corney, is thoroughly familiar with the practical aspect of every disease met with in that country. Many other colonies have been less fortunate, but if that is so now Mr. Chamberlain, who not only thoroughly understands the value of medical work but also takes the deepest interest in it and has done more than any other person ever did before to popularise scientific medicine, is just the man to see that medical matters are put right wherever they are wrong. They are, in my humble

opinion, wrong where original work cannot be done. My own personal experience has been that the most unhealthy colonies are, or were, those in which medical research was most neglected; that, however, is apparently being remedied everywhere. In Lagos, for example, no fewer than 10 full equipments for medical officers of the scientific type have been provided by the Secretary of State for the Colonies. An excellent laboratory has been built and an analytical chemist has been appointed. This has been done there without any reference to any school of tropical medicine, and would have been carried out precisely the same had there been no such institution and no medical commission in existence. We look, however, to this school now, as a means of better enabling our medical officers to take advantage of the opportunities that will henceforth be given to them in Lagos, and no doubt similarly in other colonies, for you may depend upon it that colonial administrators will know their duty sufficiently well to follow with zeal the course that has been taken by Mr. Chamberlain. Moreover, there is at the present time in this and other countries a volume and force of public opinion behind sanitary and medical work that has, perhaps, been dormant from the days of Moses and Machaon till now. It was only the other day that the celebrated Grassi lectured on malaria before the Queen of one of the Great Powers of Europe. Such an event is redolent of the times.

It is not my intention to occupy your time in speaking of the details of your training for the investigation of disease, beyond emphasising their very great importance. I would rather in a familiar way give those of you who have not yet practised in the tropics some idea of the extremely interesting and very important work that awaits you there.

OLD DISEASES AND NEW RACES.

You will still, for example, have many opportunities, especially in new countries, of acquiring valuable information respecting the original or natural location of disease, the landmarks of which are fast disappearing before modern civilisation. You will see how old diseases are being communicated to new people and you will be able to watch the strange results that are thus produced. You will doubtless be in a position to add much to the existing knowledge of tropical diseases already more or less studied, and you will in all probability be able to establish the existence of maladies at present unknown and unrecognised; you will thus reduce the sum of human suffering. Can any man desire greater glory than this? As different forms of disease were localised originally, and still remain more or less so, it follows that the experience of tropical medical officers differs largely according to country. Their opportunities are therefore diversified in an unusual degree. Perhaps I may personally have had exceptionally good opportunities of assisting—as a French writer observed some time ago—at the dissemination of disease among new races.

TYPHOID FEVER.

The late Sir Thomas Watson was very anxious to know whether typhoid fever was known in Polynesia. From inquiries made there in 1875 it appeared certain that this disease did not occur in the islands. In 1875, however, a case was observed in a gentleman recently arrived from Australia. It assumed the virulent form that is accompanied by petechial spots, and the patient died. Soon after this a case occurred in a European in the mountains of Viti Levu. The disease, it appeared, had been contracted in the locality where the first case was treated. Sporadic cases were met with at intervals, but they were, formerly at least, few in number. Perhaps their scarcity was largely due to the fact that houses were supplied by rain-water collected from the roof and stored in metal tanks. There was, however, a form of continued fever in Fiji that very accurately simulated typhoid fever up to the ninth day, when it suddenly culminated and the patient got well in a very few days. Typhoid fever was also unknown in British New Guinea. In that country the continued fever that in Fiji so closely resembled typhoid fever was not met with. Typhoid fever is also absent in West Africa. It would appear to be a by-product of civilisation, which is perhaps also true of cancer, diphtheritis, and some other diseases. Fiji, by the mere fact of becoming occupied by a considerable number of Europeans, was a centre for the distribution of other diseases to her neighbours; but she sometimes received their maladies in return, as will be seen from what follows. The disease of yaws has been from time

immemorial endemic in Polynesia. If a Fijian child escapes yaws terrible results are expected to the future health of a being so abnormally constituted. Yaws represented our measles, scarlet fever, chicken-pox, diphtheritis, and whooping-cough in one.

YAWS.

The probability is that no medical officer will be long in the tropics before he is brought into contact with yaws. This disease, like most others in the torrid zone, is of course parasitic. I first met with it in the Seychelles Islands, in African slave-children liberated there by our cruisers and indentured as plantation labourers. It is curious that this disease is much more mild in the African and the Papuan races than it is in the Polynesian race. It may be that it is newer to the latter. In the African it is sometimes so ill-marked that only a medical practitioner of some experience can recognise it at first sight. It is not very contagious to Europeans, but when caught it is loathsome and troublesome. I have never looked on yaws as a disease that could be cured under from three to six months.

I was once invited by my superiors to take up the extermination of this disease in New Guinea, but being then the only medical man in a colony larger than Great Britain, and having absolutely no means of dealing with an endemic contagious malady, I was obliged to say, in somewhat different words, that I might as well try to arrest an earthquake. In Polynesia, if not in New Guinea, there is not only the endemic nature of the disease to contend against but also the very strong native prejudice of "the conscientious objector" in its favour—a prejudice difficult to deal with, though the disease is not made an object of worship there as is the case with small-pox in West Africa.

Though yaws was indigenous to Fiji, *tinea imbricata* was not known in that colony till introduced by plantation labourers. Many Line Islanders were brought to Fiji as plantation hands, and among them *tinea imbricata* is endemic, whilst yaws was unknown to them. The Fijian gave yaws to the Line Islander, and the latter gave his loathsome *tinea* to the Fijian. The Solomon Island recruit also brought *tinea imbricata* to Fiji with him, and he in turn left the colony, in a great many cases, with venereal disease in some form or other.

VENEREAL DISEASE.

Venereal disease was not known to the Pacific Islanders, or to the Papuans, till it was taken to them by Europeans. Certain social habits of these peoples facilitated the rapid spread of these maladies, and they flourished with the usual luxuriance of a crop on new soil. It was very extraordinary how the Pacific Islander was affected by soft chancre. Very frequently the sore developed into a great spongy mass that bled profusely if touched. In not a few cases the ulceration caused death by penetrating the abdominal wall. These specific sores were also remarkably contagious. On the other hand, syphilis, being more slow in its processes, did not immediately effect the ravages that might have been expected. Gonorrhoea was all but incurable in native women. At first many of them were brought to Fiji as plantation hands. It was extremely rare that one returned home with a child. The trader had some small share in spreading these diseases, but it was insignificant compared to what was done by the labour traffic. Yet in the face of all this some good Churchmen, and at least one bishop, who visited the recruiting islands expressed themselves as favourable to the labour traffic. These good men did not see behind the calico—"Come storpiato è Maometto."

MEASLES.

Fiji was also the centre for the distribution of measles in 1874, a disease introduced there by one of Her Majesty's ships of war. The epidemic that followed destroyed between a third and a fourth of the whole population, affording a striking example of the exuberance of a new disease among a new people. In this respect, however, measles was not more surprising in Fiji than was the usually insignificant disease of itch in British New Guinea. This latter malady, which was introduced in some old clothes, sped like a tidal wave along the coast, and in a few weeks thousands of people were covered from head to foot by the most exaggerated form of the disease. It probably spread much faster from the fact that one shirt might be worn by several people in one day. When matters were beginning to assume a somewhat serious aspect, the disease, having spent itself,

began to abate, and soon declined to the level it will probably always keep in a community where clothes are common property and itch attacks the human face.

DYSENTERY.

There are few scourges that require the same thorough and exhaustive study which dysentery calls for. This disease, in its epidemic and contagious forms, was unknown in British New Guinea half a score of years ago. In recent years it has caused many deaths there. It began in Fiji with the advent of a European population and led to considerable mortality among them, even before annexation. But during the prevalence of measles, and frequently afterwards, it assumed an epidemic form. From the first introduction of the disease there it was regarded as contagious. When settlement became better established and the houses of Europeans were provided with rain-water stored in metal tanks dysentery among them became much rarer, but on large plantations and in native villages it took on at times a very malignant form. Instances occurred in which even 50 and 75 per cent. of the Polynesian labourers on an estate died from this disease, which was new to them. Excessively high mortality from the same cause occurred also on some of the Queensland plantations among the Polynesians employed there. I was once received at a certain plantation by an interesting-looking boy of about 14 years of age, who was evidently not of the usual class of recruits. On being asked who he was, he said he was So-and-So from New Britain. To the question, "How many are there of you?" he replied, "Plenty all die, only me." I found that there had been 115 of them and that he was the sole survivor. This was the work of dysentery. The treatment in each epidemic was at first like groping in the dark. In a very deadly outbreak that occurred amongst some three score of recruits landed out of a vessel in which they had been battened down for 30 hours during a hurricane, an examination of the contents of the intestines of those who had been dead but an hour or two showed that these consisted of a mass of what were then called vibrios. In consequence of this observation a mixture of corrosive sublimate was given to the two score survivors, all in hospital. The remedy acted like a charm and not another case ended fatally. But this remedy failed utterly in two or three succeeding outbreaks elsewhere in the colony. During one season salicylic acid acted with extraordinary success. Then it in turn ceased to be of any use.

From many observations of this kind it appeared that dysentery is made up of entirely different diseases or of one disease that presents widely diverse stages. It offers a splendid field to the humanitarian and to the enthusiastic scientist who we trust may be sent out from this school. Were I to judge from my own personal experience I should say that dysentery causes more deaths than any other disease in tropical countries. No other malady is so universally distributed and of such constant occurrence.

Laveran says, "Le paludisme est certainement la plus répandue des maladies endémiques," and Dr. Patrick Manson says of malaria, "It is the great disease of the tropics." My experience is different. I have served in two countries where there was no malaria; never in one where people did not die from dysentery. Last year of 39 cases of dysentery treated in Lagos Hospital 10 died, say one in four; of 128 cases of malarial fever, four died, one in 32. Dysentery is the chief agent in the rapid depopulation of the Pacific. It swells the death-rate in West Africa, but not so much amongst Europeans as amongst natives. But there one does not see the wholesale depopulation from this disease that is sometimes so clearly observed on a Pacific island from the return home of a single labourer suffering from contagious dysentery. There can hardly be any doubt as to the contagious nature of some epidemics of dysentery. We regarded the common house fly as an active agent in its spread in plantation hospitals and took precautions accordingly. The communicability of this disease has always to be taken into account in the tropics, more particularly in places like West Africa, where the sewage of a number of houses often flows into the great clay pit from which the houses have been built and out of which the same houses draw their water.

The man who will work out an effective and practical means of dealing with contagious dysentery will be the greatest benefactor of the races that live in the tropics. He may claim to be the saviour of the Pacific Islander, the most loveable man of men now living. It is a study that I most earnestly commend to your attention and on which I trust

you will all turn the searchlight of science. Dysentery is a destructive giant, compared to which strong drink is a mere phantom.

MALARIA.

To the tropical European, though perhaps not to the tropical native, the most important study is probably that of malarial fever, the investigation of which has already furnished us with some of the finest examples of human intelligence, perseverance, and observation, and unveiled to us some of the most wonderful of the workings of nature. To myself this chain of marvels, full of poetry and religion, nowhere better seen than in the splendid illustrations of Major Ross, I.M.S., and Dr. Fielding-Ould, always recall the words of the second greatest Teuton of the century:—

"Wie alles sich zum Ganzen webt,
Eins in dem andern wirkt und lebt!
Wie Himmels Kraefte auf und nieder steigen,
Und sich die goldenen Eimer reichen!
Mit Segen duftenden Schwingen,
Vom Himmel durch die Erde dringen,
Harmonisch all das All durchklingen!"

The prediction that malarial fever would be found to be due to a parasite having its cycle in man and the mosquito, is fit to be compared with Goodrick's theory of the cycle of Algol, with Leverrier's and Adams's assigned position of Neptune, and with Murchison's prediction of gold in Australia. To my own mind it recalls the early teaching of the germ theory of antiseptics by the immortal Lister. It may not improbably lead to an equally great revolution in medicine. The position assigned by foreign writers to our British scientists in this, the greatest of recent discoveries, is, and must remain, most honourable to them and to our nation. The name of Dr. Manson, one of the brilliant lights of this institution, will always be connected with the fertile hypothesis that has led to the astounding revelations of that prince of observers, the great Ross, of Grassi, Celli, Bignami, Bastianelli, Koch, and others.

The whole subject of malarial fever is of more importance to the Italians and to ourselves than to any other nation. The Italians have, they say, 11,000,000 of their people exposed to it, which, according to Celli, furnishes them with 2,000,000 cases a year, with an average mortality of 15,000. It is true that it is almost unknown in Great Britain itself, but Laveran states: "Morehead estimait qu'aux Indes les fièvres palustres comptaient pour 40 sur 100 dans la mortalité générale." This is probably not proved. Dr. Manson at the Royal Colonial Institute showed what a serious matter malaria is on the West Coast of Africa. This is enough to demonstrate of what vast national importance it is to the British Empire.

There seems to be some tendency at the present time to seek the origin of malarial fever in coloured tropical children. Surely it must be acknowledged to be an old domesticated disease in the United Kingdom and on the continent of Europe, for which aboriginal children could not at any time have been held responsible. You all remember how in the beginning of this century the anopheles completely routed one of the most powerful British armies ever sent to the continent of Europe. Then, again, our history supplies few more pathetically ridiculous pictures than the kingly founder of the Royal Society dodging his medical advisers to take his Peruvian bark on the sly. Of course, Dr. Schwalbe would say at once that the king contracted his fever abroad. As the two chief attacks occurred 19 and 20 years after His Majesty "came to his own," the probabilities are strong that he owed them to the genuine domestic English anopheles.

In these modern investigations into malaria the Italians have nobly done their share; so have the Germans, through the illustrious Koch. We owe, further, a very great debt to Laveran. I have often been asked by non-medical friends, who has done this great work? whether it is all British? It appears to me to be more or less like this: Manson was the surveyor, Laveran made the road, Ross built the bridges and laid the rails, and Grassi, Bastianelli, Bignami, and Celli provided the rolling-stock. Grassi says: "Preciso perciò che la scoperta che gli anofeli inoculano la malaria umana è uscita dal mio cervello, seguendo una via da me ideata. Naturalmente anche la mia scoperta, come moltissime altre, non sta isolata, ed io non ho mai esitato a dichiarare che sono parvenuto ad essa giovandomi della ipotesi dei mosquitos svolta tra gli altri da Laveran, Manson, &c." Angelo Celli writes: "Sotto i consigli del Manson, cioè del celebre parasitologo che aveva già descritta la vita della filaria nel corpo delle zanzare, il

Ross, maggiore medico inglese nelle Indie, fece pungere da zanzare uccelli (e) ricostrusse le fasi del ciclo di vita nella zanzara." He speaks again of "questo che possiamo chiamare ciclo del Ross." M. Emile Bertaux thus expresses himself: "Les deux observations initiales sur lesquelles repose la nouvelle théorie de la malaria n'ont pas été faites en Italie. C'est au docteur Laveran que revient l'honneur incontesté d'avoir observé, dès 1880, le parasite dont la présence dans le sang humain est la cause directe et unique de l'infection palustre. Mais c'est le médecin anglais Ross, qui, le premier, détermina rigoureusement l'agent de transmission d'une maladie analogue à la malaria humaine." Koch tells that: "Ueber das eigentliche Wesen der Malaria haben wir erst in der neuesten Zeit Erklärung erhalten durch Laveran." As long ago as 1892 Laveran used these prophetic words: "J'ai émis l'hypothèse que les moustiques jouaient un rôle dans la propagation du paludisme comme dans celle de la filariose." You know how powerfully Manson championed that doctrine, based as it was on his own original and independent work. A great deal still remains to be done in connexion with this subject, perhaps much more in tracing analogies in other diseases than in connexion with malaria itself. There are now many workers in the field, and doubtless their ranks will be strengthened from this school.

THE DESTRUCTION OF THE MOSQUITO.

To my mind the parasitic cycle in malarial fever is proved by demonstration. Although this is so, the experiments now being carried out by some of our countrymen here and in Italy are by no means superfluous. Those who care to read Dr. Christy's book will find at pages 27, 29, and 69 that similar experiments have already been made by the Italians, by whom they have been fully described. But it is highly desirable that they should be performed in a more sensational form and in British blood, to impress and convince the British public. These experiments are the more to be commended that they can be carried out without any greater risk to the subjects of them than is incurred by any European who lives for a few days on the West Coast of Africa, perhaps beyond reach of medical man, nurse, or any other European. The chief use of these experiments is to demonstrate the truth of the theory advanced. There is, of course, no comparison between the position of men sent into a malarial region provided with every appropriate appliance, and with the sole duty of protecting themselves from mosquitoes, and the case of those who mount guard, who nurse the sick, who tend machinery, at night; or with the case of the man belated in the "bush" or stranded on a mud flat.

Even in its present state of development the new doctrine of malarial fever is such that no conscientious administrator could take the responsibility of ignoring it. On the West African coast it must now be reckoned with at every step. Hospital management must be fundamentally affected by it. Wards will have to be painted of a colour that will facilitate the discovery of mosquitoes: and probably some of them will have to be furnished for fever patients with doors and windows of gauze wire netting. Every bed, without distinction, will have to be provided with a fine muslin mosquito net. All water-tanks must be supplied with wire net coverings to prevent the ingress of mosquitoes. Wells and reservoirs and flower-pots will have to be similarly protected. In hospital discipline it will be considered to be a serious offence to allow a fever patient to be bitten by a mosquito. All mosquito breeding-places near a hospital or other dwelling will have to be made unfit for these insects, as far as this is practicable. Much attention will have to be given to the teaching of the new doctrine. All hospital nurses must obtain a mastery of the subject; and so, of course, must sanitary inspectors, otherwise they will be unfit for their posts. But the general public also must have the leading lines of malaria genesis put before them in a way they can understand. It should form a subject of tuition in all the public schools of a place like Lagos, and prizes should be given to the best scholars in the malaria class. The nervous individual who does not know one genus of mosquito from another will, in future, lead an unenviable life in the tropics. Ladies who understand the mosquito theory will not dine in low evening dresses; nor will gentlemen sup with their ankles under the table and covered only by thin black silk socks.

The steps mentioned above, and many others like them, are all very obvious and seem very simple in theory. I regret that I cannot completely share the rosy optimism of our

leaders and teachers in this matter. I do not overlook the fact that malaria has been practically extinguished in this country which is not congenial to it for reasons of meteorology. Malaria in the tropics is much more difficult to deal with than typhoid fever, rabies, or small-pox here, and those are not yet vanquished. It is to be feared that in a country like Lagos when all that can be done shall have been accomplished there the results may be somewhat disappointing. Lagos is on a lagoon that crosses the territory from east to west, at some places four or five miles broad. It is all fresh water except near the town of Lagos where it is brackish. We know from the Italians, and by our own experience on the great western coast of British New Guinea, where there is no fresh water, that the anopheles can breed in brackish water. The lagoon water is full of aquatic plants; it has very little current; it rises and falls probably five or six feet; it cannot be drained; it cannot be enclosed within banks; it cannot be kept at the same level. One thing could be done: Lagos Island could be surrounded by a sea wall that would render the current there generally too fast for the anopheles according to the measurements of Celli. It is believed in Italy that the velocity of water to ensure against the breeding of the anopheles must not be under about 1900 yards an hour. Then Lagos Island contains very likely 200 acres of swamp, with all sorts and sizes of water puddles. These could be filled up. If, however, the statement of Grassi is well founded that "gli anopheles si sviluppano la dove sono paludelli anche microscopici," mosquito-hunting at Lagos will never lead to the extermination of the anopheles there. It may be said that the remedy for all this is to abandon Lagos town and go further inland. Alas, we cannot transport the lagoon, and it is necessary for our commerce. A considerable number of people must remain at Lagos, even if the seat of Government is shifted to some other place. My own opinion is that were the harbour opened, the island surrounded by a sea-wall, and the swamps filled in, Lagos would then be fairly well protected from fever, but not otherwise. In the absence of these costly undertakings we must trust more to the paradox of preserving the anopheles from infection than to anything else. We must give quinine to all and sundry gratuitously and we must see especially that it is given to children. Our fever patients and our convalescent stations must be carefully guarded and kept, when possible, where there are no mosquitoes. Our medical staff is numerically weak: we must train native youths in Lagos itself to the extent of making them able to deal with such things as small-pox, malaria, and dysentery. This has been done elsewhere and therefore should be carried out at Lagos.

If the sanitation of the Lagos railway now under construction is not thoroughly taken in hand on sound principles two results will follow: the railway will increase malaria and increased malaria will augment the cost of working, perhaps make the railway a financial failure. We have many swamps in our large towns and huge clay-holes in all towns and villages to deal with; add to this that our population is half naked. These are among our difficulties. Add to those the immense fecundity of the mosquito. Ficalbi says that one mother mosquito may in the fifth generation be the progenitor of 50 milliards. Howard shows that one rain-barrel may contain 19,110 larvæ and that they may produce at least 12 generations in one summer. This at 70 eggs a mosquito would produce in a summer a number of mosquitoes expressed by 25 figures. In our favour we shall have the support and encouragement of the Colonial Office, a chief medical officer who is himself a successful worker at the malarial theory, and we shall have a number of medical officers trained here. It is also in our favour that we have no rice-fields; that our soil is sandy and dries very quickly, resting on a shingly sub-soil. It will be interesting to watch the result of all this.

A very important point to determine at Lagos is the distance an anopheles will fly to a feeding-ground. Will it cross the lagoon? To Mr. Fagan I am indebted for the recent work on mosquitoes by Howard, an American. From it we gather that mosquitoes may travel 15 miles on a light wind. Celli admits that mosquitoes will extend probably three miles in a horizontal direction. I have had painful verification of that on the New Guinea coast and on Lagos lagoon. Celli seems to cite the case of Sezze to show that the limit of oblique propagation of the mosquito is attained at an altitude of 1000 feet. Koch finds them at 3000 feet in fever communities in Java. We were punctured by

mosquitoes in our camp on Mount Scratchley at 10,000 feet. They were very troublesome at from 5000 to 6000 feet. Mere altitude, therefore, cannot be taken as a safe guide to safety from fever. Before we can shift establishments to the Olokemeji hill, 1000 feet high and fourscore miles from Lagos, we must station residents for a year on the hill in order to ascertain how far it would be fever-free.

My own personal experience of the anopheles has been somewhat interesting. I never saw one in Fiji, where malarial fever is, or was in my day, unknown. Mr. M. I. Finucane tells me that it is still absent there. But amongst the recent consignments of mosquitoes from Fiji Mr. Theobald has found the remains of one anopheles. If it is established that there are anopheles mosquitoes there, the matter becomes one of much scientific interest. Fiji would therefore be in the position of Mauritius and Bourbon before the terrific outburst of fever there in 1867; that is to say, there would be given a country hitherto free from malaria but furnished with Indian coolies with fever blood, from which at any time the propagation of malarial fever may be set agoing in Fiji. So far Mr. Theobald has not had any anopheles from Mauritius. No doubt they will turn up soon. I first saw the anopheles on the afternoon of the first day we visited the west coast of British New Guinea, about nine years ago. I saw something on the forehead of Mr. Cameron, one of my officers, that looked like a small brown peg, and was surprised to find it was a mosquito standing as it were on the end of its proboscis, projecting nearly at a right angle to Mr. Cameron's forehead. It soon filled with blood and began to void it till a drop of blood fell from it to the ground, on which Mr. Cameron thought that he had had enough of it. We all had sufficient experience of it before night, for it is not the case that the anopheles bites only at night or that its puncture is always painless. On the contrary, we found it often as sharp as a prick from a needle. Of course all mosquitoes love dark ways, and will prefer to bite at dusk; but the anopheles will not hesitate to feed, at all events on a dull day or among trees, when it gets the chance. Specimens were then sent to Mr. Savile Kent, who pronounced them a new mosquito.

It seemed strange that we were repeatedly camped for weeks at a time in the mud and swamps of the western or anopheles country and yet left without any cases of fever. The reason is that for some 150 miles of coast there were no human inhabitants. We had been at work a couple of years in the central and eastern districts and had suffered much from fever there before we visited the west, yet the anopheles was new to me when I saw it there. Koch has, however, shown that the fever parasite is very common in Kaiser Wilhelmsland, from which it may be inferred that I overlooked the anopheles in Eastern New Guinea. Those who suffered most from fever in British New Guinea were the crew of the steam yacht *Merrie England*, who were far more frequently ill than those people who travelled daily in swamp and forest, no doubt because anopheles had become domesticated in the men's quarters on board.

Now we require to know how and why mental excitement, any considerable change of temperature upwards or downwards, whether caused by the sun, cold draughts, rain, or other agency, should bring on an access of fever long after possible infection and in spite of long-continued and large doses of quinine. In my own person an access of fever seems to be sometimes caused by exposure to bright sunlight, without reference to temperature. In British New Guinea we never doubted that the horse and the dog suffered from malaria, but this part of the problem seems to be solved by the experiments of Koch, which show that even the fever parasites of man and of the anthropoid apes are different and not transferable from one to the other.

TEXAS FEVER.

Although the specific nature of the human parasite seems thus to be proved it still leaves open for investigation on the West Coast of Africa a cognate question of great social and economic importance, to which I venture to invite your special attention—namely, that of the disease which makes it so difficult to keep a horse alive in the forest country near the coast. I do not scruple to suggest that you should investigate this equine malady or maladies, for two reasons. In the first place, it is of very great importance; and in the second place, if medical men do not examine it it is not probable that any other competent person will do so. I for one shall be surprised if it is not found that the disease is a parasitic one, though poison has been often suspected.

Could I find the money I should be prepared to advise the Secretary of State for the Colonies to offer a handsome prize to whomsoever should discover the means of rendering horses immune to this fatal disease. My fellow administrators are enterprising men and something may yet be done in this direction by combination.

Koch¹ is convinced that a practical inoculation against Texas fever can be arrived at. This and his observations on the Surra-krankheit,² coupled with the observations of Smith and Kilborne, are sufficient to justify any such expenditure as that proposed, showing as they do that certain breeds of animals are already immune to the tsetse malady and to Texas fever.

ELEPHANTIASIS.

It has been announced lately that the mosquito has been found to be concerned with that strange disease, elephantiasis. This is a malady that I have seen in man on perhaps every part of the body, from the crown of the head to the sole of the foot; but I have never witnessed it in any other animal. In practice and in origin there does not, according to my experience, seem to be any connexion between elephantiasis and malarial fever. In Fiji, where there was no malarial fever, elephantiasis was very common, in certain small islands phenomenally so. The largest scrotal tumour removed there weighed 122 lb. There were several over 80 lb. in weight. In British New Guinea, where malarial fever was very common, elephantiasis was rare. The same is true of Lagos. It would therefore seem that these diseases are in those places more or less in inverse relation to each other. I have not heard of any case in Lagos or in British New Guinea where a European contracted elephantiasis. Two European officers at least became affected by it on the island of Rotumah. Though, therefore, it is a matter of minor importance compared to dysentery or malarial fever, you will still find elephantiasis to be a very interesting subject for investigation.

PHTHISIS.

It does not appear that phthisis was a disease known to the Papuan. The natives of New Guinea are, however, very subject to a form of pleuro-pneumonia common in epidemic form at the beginning of the cold season, apparently contagious and most likely parasitic, to which many succumb. Phthisis was not originally a Fijian disease. Its primal distribution you will find to be a question to the solution of which you can still contribute something.

DIPHTHERIA.

Neither in Fiji nor in British New Guinea was there any such disease as croup or diphtheria; they had not reached the latter colony when I left it in 1898. The first case of diphtheria that occurred in Fiji was about 20 years ago in a little girl seven or eight years of age. This little patient brought the disease from Sydney, and both the child and her mother died from it. A few weeks later a case appeared among the prisoners in gaol in the same town. Sporadic cases occurred later, and probably the disease has now become domesticated in that country, but it is, I believe, still rarely met with there. It does not appear to occur in the Lagos territory in West Africa, and Koch notices its absence in German East Africa.

CANCER.

In some of these new countries there are interesting points to note with regard to cancer. I do not remember to have ever operated on a Polynesian or a Melanesian for cancer, though I had to do so several times on Europeans in Fiji. For nine and a half years I never saw a case of cancer in British New Guinea, but at the end of that time there occurred an example of encephaloid cancer of the tibia in the person of a Papuan who had for seven or eight years lived practically a European life, eating tinned Australian meat daily. It seemed hardly possible that he could have become infected from any previous case. Lupus exedens is very common in New Guinea, but it is always clearly distinct from cancer. The latter disease is, of course, very prevalent in Australia. It may be remarked in this connexion that the Polynesian and the Papuan are practically vegetable feeders. Dr. O. Johnson of Lagos, now in this city, tells me that in Lagos during a practice of 14 years' duration he has five times seen cancer in native patients and that in each

¹ Aerzliche Beobachtungen in den Tropen.

² Reise-Berichte, 1898.

case the sufferer had lived as Europeans live. In West Africa there are, however, very marked cases of destructive lupus.

TETANUS.

An equally remarkable experience was met with as regards tetanus. In the disturbances that took place in Fiji in 1876 and 1877, when the mountain chiefs refused to recognise the authority of the Queen and Lord Stanmore had to reduce them to obedience by force of arms and without any army, we treated about 150 wounded men suffering from all kinds of injury. Although the nursing and dressing must have been very imperfect, and operations were performed under difficulty, there was not a single case of tetanus. On the other hand, an officer who had received very serious injuries from the explosion of a charge of dynamite in the interior of British New Guinea died from true traumatic tetanus. He was camped at the upper end of the alluvial country on a piece of ground cleared by us close to the foot of the hills, some 60 miles from the sea. Four or five days later, after a journey down the river, during which we camped each night on its alluvial bank, he was got on board the steamer and a few days thereafter showed the unmistakable symptoms of tetanus. He was taken straight to the Cooktown Hospital and died there from this disease. No case of tetanus in man or animal had ever been heard of before in British New Guinea. It is not clear that the case of Commodore Goodenough, who was reported to have died from tetanus from an arrow wound received at Vanikoro, is parallel to this one. It is quite possible that the detachable bone point used by Papuans and some Micronesians on the tips of their arrows may in his case have been left in the wound and have caused septic poisoning. These bone points, prepared by scraping down a piece of human bone, would contain septic matter, yet I have not known these to produce tetanus in New Guinea. It may here be mentioned that erysipelas was unknown in those countries.

TINEA IMBRICATA.

The steady stealthy progress made by new invading disease was well seen in British New Guinea in the case of tinea imbricata. It was a domesticated disease in the west, on the Fly River for example, where it is known by the same name that is applied to tobacco. It was also domesticated in the east end, where it is called by a word that in a certain district means "to curl" or "fold up." The central district was still free from it as recently as 10 or 12 years ago, but it is slowly and surely gaining on that region, and during the last three or four years cases have been appearing even at Port Moresby. In a few years it will be endemic over the entire coast, a great eastern wave from the Line and Solomon Islands meeting a wave equally great and irresistible coming from the west. There, as in Fiji, the best treatment was found to be fumigation with sulphur, but it is not possible to apply the remedy universally in New Guinea so as to extinguish the disease.

OTHER TROPICAL DISEASES.

I can only mention by name several other tropical diseases which I have met with that are of special interest and that require investigation. There can be no doubt that ankylostomiasis is indigenous in the Pacific. In 1876 it was found in Fijian mountaineers and in recruits from the Solomon Islands. Perhaps some of you may be able some day to explain its wide distribution and its exact significance. Cerebro-spinal meningitis was not a native disease but it appeared amongst Indian coolies in Fiji. How it came there was a mystery. Beri-beri was not, I believe, a Fijian malady, but it has been introduced by plantation labourers from Japan. In New Guinea it is indigenous but not common.

In New Guinea there is a curious multiple tumour often met with as large as a walnut. It occurs most frequently about the elbows or the parts of the body that touch the ground when one is asleep on it. This has not been investigated. It is probably parasitic. In the Pacific there is a strange post-mortem appearance that is extremely common and that I trust some of you may throw light on. In the hilum of the kidney there is very often half a teaspoonful of brown or purulent fluid. It is found in the greater number of bodies even if dead only an hour or two. Its cause or origin, so far as I know, has not been made out.

RABIES AND "DINGOES."

As an example of the kind of medical legislation as to which you will have to give advice I may first cite from my own experience with rabies. As you all know, there is a

species of dog, the so-called "dingo," native to Australia and New Guinea. Where that animal came from is not clear. My distinguished friend Professor Giglioli of Florence gives good reasons for regarding the Australian aborigines as degenerated Aryans. If they are so they probably brought their dogs with them, and this at a time when rabies did not exist in Aryan communities. We shall not consider here whether the barking of dogs is a modern accomplishment or whether the dingo gradually forgot the art. The dingo and the dog cross readily and the first cross between them barks. Doubtless, therefore, the dingo would be readily susceptible to rabies. There is a wild dingo on the top of the Owen Stanley range in British New Guinea, and a complete specimen was secured and deposited by me in the Queensland Museum, but the result of its examination is not yet known to me. The domestic dingo is very common in New Guinea as a pet, as a hunter, and as a table delicacy. All the dingoes of a village meet several times a day to howl and they never separate without a fight. They are provided with long, thin, sharp teeth, which they use in season and out of season, but by preference when out of sight. It closely resembles, or is identical with, the Australian dingo. I have never seen a native dingo in the Pacific Islands. The point that most concerns us here is that the Australian and New Guinea dingoes were free from rabies. The Australian colonies have protected themselves from rabies by instituting a term of quarantine on imported dogs. It was seen that rabies introduced into a country like New Guinea with swarms of ill-tempered biting dingoes, among a bare-footed, bare-legged population, and with a wild dingo in the mountains and numberless pigs everywhere, would be a very serious matter not only for that country but also for the whole of Australasia. The matter, therefore, was dealt with on the broadest platform. A representation was made to the great colonies that had charged themselves with part of the burden of maintaining British New Guinea, urging that the Secretary of State for the Colonies should try to induce France, Germany, and Holland to introduce laws similar to those of British New Guinea to prevent the introduction of rabies into their possessions in those seas. The then Prime Minister of Queensland, Sir Samuel Griffith, saw at once the importance of the measure and warmly supported it; it was, I believe, also approved by the Government of New South Wales. The then head of the Government of Victoria thought the proposal more or less ridiculous and was of opinion that France and Germany would give no attention to such a trifle. Lord Knutsford and Lord Salisbury, however, obtained at once the cordial coöperation of the three foreign Governments. There is, therefore, good reason for hoping that now the whole of Australasia is, with reasonable care, secured for all time against the terrible disease of hydrophobia.

THE "JIGGER."

The question of the introduction of the "jigger" is one that has recently occupied the attention of the Indian Government. To such matters even as the control and distribution of this flea you require to devote time and study. Guided by our experience in Lagos we could only report to the Colonial Secretary that the "jigger" does not cause any noticeable inconvenience on official expeditions, and that it appears in private life to claim very little attention. But a medical officer advising his Government in India would require to know a great deal about the insect before he could venture to recommend any legislative steps regarding it or could suggest that no action whatever should be taken.

LEPROSY.

It is probably now generally conceded that the disease of leprosy is communicable and that the isolation of lepers should be carried out in the interests of the community. No aboriginal people whom I have known have ever entertained the slightest doubt as to the contagious nature of the disease. The natives of West Africa isolate the lepers. In the South Seas they kept them apart and often buried them alive when they reached an advanced stage of the disease. More than 20 years ago I read in a German author that leprosy was extinguished in Scotland "durch die Entmannung der Männer." I have not been able to find the authority for that statement, the author of which has been dead for many years. Leprosy was at one time apparently not uncommon in Scotland. In the "L'Histoire Universelle" of M. Rambaud it is stated that Scotland's most celebrated king died from this dread disease. The whole subject of leprosy now requires to be studied exhaustively in the light of the new pathology. No doubt

some of you are aware that the native Fijian treatment was to bake the sufferer from leprosy near a slow fire. It was confidently affirmed that cases were cured in that way. It will be very interesting to see whether a fuller knowledge of the disease will offer any explanation of such a cure.

QUARANTINE.

I would call your attention for a moment to a medico-legal subject of great importance to many colonies and to which I trust some passing attention may be given in the courses of this school. I allude to quarantine against the introduction of infectious or contagious disease. In all international conferences on quarantine matters British delegates take their stand against the imposition of quarantine. Their system is the isolation of affected or suspected individuals, the disinfection of vessels, and sometimes of cargo. This procedure can be carried out successfully only in a country where there are highly developed police, health, and sanitary services. It requires ample hospital accommodation where patients and prospective patients can be isolated, it needs a staff of trained and intelligent officers to exercise surveillance over people who may have been exposed to possible contagion, and it requires the means of dealing with any of these wherever he may be found. Here in the United Kingdom cleansing and disinfecting can be carried out with scientific accuracy and completeness and at small cost. In this country, then, in the face of the drainage, the ventilation, the accessibility to suspected persons, and the means of dealing with these as well as with infected persons, an outer line of defence may not at any time become necessary. But it is widely different in most colonies. Here the outer line of defence, imposing quarantine on infected or suspected vessels or persons, becomes a necessity. You will find that it will tax your powers to the utmost to advise your Governments how best to combine the public safety with the minimum of disturbance to trade, for that in practice is the problem to solve. At Lagos we have tried to combine the two systems by providing the medical department with the powers necessary to protect us from outside by imposing quarantine on arrivals and to exercise surveillance ashore over persons exposed to a possible infection but who cannot, or need not, be detained in quarantine. Ashore, the medical officers may remove from a community, and isolate, an infected individual; or they may put a house, a village, or a district in quarantine. The small numerical strength of the staff available, the inadequacy of accommodation, the evil sanitary condition of all towns and villages over a great and populous area, make it practically impossible that we should depend entirely, or even chiefly, on our inner line of defence against epidemic disease. You are perhaps aware that in Australia a system of federal quarantine has been in force for several years. The geographical position of the Australian continent is very favourable to this line of action, yet recent events have shown that both the outer and inner ring of defence may be insufficient to keep out disease. The whole subject is one that will call for special and serious study at your hands.

WATER AS A CARRIER OF INFECTION.

Let me impress upon you the extreme desirableness of becoming experts in the examination of water. Nothing is of greater importance in the tropics. Although the new doctrine of malarial fever shows that water is only an indirect agent in the production of that disease it still remains an essential factor in its continuation and spread. It retains all its former importance in respect of other diseases. In West Africa the medical officer should be able to say whether a given well is safe or not on account, for example, of guinea-worm. Water is popularly credited with the origin of the "craw-craw" disease in Europeans. It doubtless has much to do with the spread of dysentery, typhoid fever where that exists, cholera, and several other maladies. Altogether it is one of those subjects to which you cannot give too much attention. Personally I have always contended that the quality of the water used by a community may have as much, or nearly as much, influence on them as has the quality of the food which they eat or of the air which they breathe. A medical officer is constantly liable to be asked by his Government to report fully on the water-supply of some place or of some community.

CONCLUDING REMARKS.

I cannot conclude these somewhat dry and disjointed remarks without offering my hearty congratulations to you

who are to become students at this school. In my opinion your lot is the most enviable of any body of men in this great country. You have already travelled over the ordinary road of medical education and have become acquainted with the more frequented parts of the limitless field in which you are to labour. You have become ordinary members of the greatest, the most beneficent, and therefore the noblest of all professions. It can be said with greater truth to-day than it could 3000 years ago: "Ἱητρος γὰρ ἀνὴρ πολλῶν ἀντάξιος ἀνδρῶν." Here you are now to be taken into some of the by-paths of medical study. There you will be brought face to face with some of the most interesting problems of science, questions which are of vast importance to the life and health of the individual and which will exert a reflex action that will be felt in many of the transactions of public, of national, and even of international life. I trust and hope that you will leave this school well fitted by your knowledge of your profession to do your part in the exercise of your calling, and that you will have securely planted in your mind that high sense of duty that is the life and soul of religion, of patriotism, and of every efficient public service, and that enables the medical man to devote by instinct, and unselfishly, all his mind and all his strength to the prevention and cure of every disease that affects humanity.

Presidential Address

ON

THE ROMANCE OF SURGERY.

Delivered at the Inaugural Meeting of the 128th Session of the Medical Society of London on Oct. 8th, 1900,

BY JOHN H. MORGAN, M.A. OXON.,
F.R.C.S. ENG.,

SURGEON TO CHARING CROSS HOSPITAL AND CONSULTING SURGEON TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND-STREET.

GENTLEMEN,—When it was announced to me that by the kind suffrages of the Fellows of this ancient society I had been elected to the important and honourable position of your president it was not without considerable apprehension that I accepted the position which was offered. For it could not but be felt that to follow in the footsteps of so many distinguished men as have occupied this chair would be a task of no small difficulty. I was, however, reassured by a knowledge of the fact that the loyalty of the Fellows of the Medical Society is so thorough and so well proven, that throughout my year of office I could rest secure of the support and assistance of one and all in my efforts to make this society a focus for earnest work amongst all classes of the profession. I have read with interest and profit the addresses which have been delivered from this chair for the last several years, and so many and so instructive are they that to choose a fresh topic was by no means an easy matter. Following the example of some I might have taken you with me on a holiday excursion. I might have asked you to follow me in journeys over Europe from Lapland to Constantinople or from Warsaw to Cadiz. Or I might have transported you with me to the barrens of Newfoundland or the woods of Nova Scotia, and although I could not have interested you with a disquisition on the flora that we found together I might have treated you to some observations on the fauna of those wild countries, particularly those which lend themselves to pursuit with the rod, the rifle, or the gun and have told you many things which are not to be found in works on medicine or surgery as means of diagnosing the age of a hoof-mark or the direction of your camp. Indeed, it has often occurred to me that there are the materials for a most instructive lecture on the cultivation of the powers of observation which is entailed by many forms of sport and the powers of inductive reasoning thereby engendered. We have only to read Baden Powell's hints on scouting to see how many things we neglect to observe in our daily life, whilst their application has been delightfully pointed out by a member of our own profession in the varied experiences of Sherlock Holmes.

But we have returned from our holidays, refreshed and