

removed. A spray of formalin, 1 in 1000, increasing up to 1 in 100, was ordered. In March, 1899, a few growths were removed. Since then there had been no recurrence of the growths. The vocal cords were thickened and irregular, but the voice was fairly good.

Dr. N. C. HARING read a paper on Multiple Papillomata of the Larynx.

### TROPICAL DISEASES.

THURSDAY, AUGUST 1ST.

The VICE-PRESIDENT (Mr. JAMES CANTLIE, London) was in the chair.

#### *Malaria and its Prevention.*

The following papers on malaria were read.

His Excellency Sir WILLIAM MACGREGOR, K.C.M.G., M.D. Aberd., Governor of the colony of Lagos, read notes on Anti-Malarial Measures now being taken in Lagos. He remarked first on the importance of the subject of malaria in relation to Lagos and the advantage which would follow the control of malarial fever. In Lagos steps had been, and were being, taken as follows. As a preliminary every effort was being made to spread knowledge of recent malarial doctrine among Europeans and natives by pamphlets, lectures, and teaching in schools, and thus considerable interest in the subject had already been evoked. In active operations the greatest attention was being given (1) to prevention by administration of quinine; (2) to the use of gauze netting; and (3) to attacking the mosquito in its breeding-ground. As regards quinine most Government officers took it regularly. Some could not take quinine because of intolerance, and he himself thought that the taking of quinine should be compulsory among Government servants and that they should be tested as to toleration before being engaged. Judging from results it would seem tolerably certain that by the regular use of quinine as a prophylactic officers could be kept practically free from malarial fever. The great difficulty was to extend this preventive treatment beyond the service, more particularly to natives, but it was found practically impossible, on the ground of expense and the unwillingness of many natives to take it, to give quinine to the whole population. As regards mosquito netting reasons were given why such good results as had been obtained in Italy could not be expected in Lagos. Limited operations were, however, being carried out in this direction in Lagos. With regard to the attack on mosquitoes, swamps were being gradually filled up, kerosine was being used on anopheles pools, water-tanks of houses were being made mosquito-proof, undergrowth was being thinned out and the lower branches of the large trees removed, and general sanitary measures were being carried out in the town and along the railway. Sir W. MacGregor stated that from the more free use made of water in their neighbourhood the quarters of Europeans were more infested with mosquitoes than those of natives. For six months in the year, during the dry season, there was practically no propagation of the mosquito in the interior, and it might be practicable to exterminate mosquitoes in the hinterland were it possible to prevent their production near, and arrival from, the coast. The strong recommendations that Europeans should live away from natives, which he said might be called the academic recommendation, he was unable, from his point of view as an administrator, for reasons fully given in the paper, to accept. Sir William MacGregor concluded by remarking that though the measures taken in Lagos were no doubt far less than the measures required, still if they were persevered in for two or three years their effect would undoubtedly be felt and encouragement would be given to steps on a greater scale. It must not be forgotten that malaria was not the only disease that caused large mortality in Lagos and that large expenditure had to be incurred with reference to other diseases, notably dysentery.

Dr. J. M. YOUNG (Hong-Kong) contributed a paper on Malaria in Hong-Kong and its Prevention. Two distinct varieties of anopheles were abundant in Hong-Kong—*anopheles costalis* and *anopheles sinensis*—and nearly a dozen distinct species of *Culex*. Dr. Young selected the following situations on the island for a study of the disease and its prevention: the Military Sanatorium, Lyemooon barracks, the men's married quarters, Kennedy-road, Pokfulam, Mount Richmond, and the Tai-po police-station. At each of these places it was shown that where no anopheles existed no malaria was found, that where the disease existed the parasite was found in the blood of

children, and breeding-pools for anopheles were found in the neighbourhood. The seasonal increase of cases of malarial fever during the time of ploughing and harvesting the rice-crops was due to the disturbance at these times of mosquitoes usually resting among the grass or growing paddy (rice) and feeding on the Chinese coming within their reach. Dr. Young pointed out the practical impossibility of dealing with mosquito larvæ by any germicides, and regarded the latter merely as useful auxiliaries in extermination of the pests. He regarded permanent good in this direction as possible only by clearing all long grass and undergrowth and destroying all breeding-places by draining, &c. A "cleared area" he considered of the first importance, as no mosquito would fly far from vegetation; and he fixed 150 yards as sufficient clearance around houses, as beyond that distance it was doubtful if mosquitoes would fly.

Captain C. F. FEARNside, I.M.S., read a paper on the Inoculation of Malaria by Anopheles. He said that the central prison of Rajahmundry, Madras Presidency, was one of the most malarious jails in India, and from the years 1880 to 1897 no less than 60 per cent. of admissions for malarial fever in all the larger jails of that Presidency were accounted for by this prison. In 1899 Dr. Manson suggested that he (Captain Fearnside) should make investigations to see how far the anopheles mosquito was the bearer of the malarial organism. In November last he dissected 40 free anopheles which had at some time or other been feeding on the blood of the prisoners, and he found malarial sporozoites in one—i.e., 1 in 40. The sporozoites were very numerous in the veneno-salivary gland from the tenth to the twelfth day after infection. From the fifteenth day after haustellation the numbers decreased, so that there were few sporozoites in the gland on the nineteenth day. The infected mosquito could only infect a limited number of persons, and further, to give a successful inoculation a considerable number of sporozoites must be infected, because if a small number only found their way into the blood the phagocytes destroyed them. Of 17 anopheles fed on blood containing summer-autumn parasites and crescents nine were found to contain Ross's cysts. The failures he had explained and the conclusion was that 70 per cent. approximately became infected. Of seven fed on blood containing spring tertian parasites all became infected. Eight persons were inoculated and of these seven contracted fever. The blood on which the anopheles fed originally was examined and the parasite recorded: the blood of the person inoculated was examined from time to time and also recorded. The incubation period was from 12 to 25 days for both types of fever. The prevention of the spread of malaria by means of wire-protected houses and mosquito-curtains was out of the question in India. To put the native population, men, women, and children, who sometimes had only sufficient money to keep body and soul together, under mosquito-nets and in mosquito-proof houses was impossible. The next suggestion one heard of was the destruction of anopheles. If this was to be done properly the rice-fields, which were the main source of food throughout a great part of India, would have to be abolished. Was the population to starve in the meantime? Famine had been quite bad enough in recent years without the abolition of these fields. The last remedies were the freer use of quinine and the segregation of infected individuals. The former seemed to be the more practical, but the segregation of infected natives would be as difficult a task as the wholesale slaughter of the anopheles.

Dr. GEORGE A. WILLIAMSON (Larnaca, Cyprus) read some Notes on Cyprus Fever. He commenced by calling attention to the unsatisfactory plan of giving the names of localities to diseases which, although doubtless found elsewhere, occurred in those localities, and went on to state that there was no particular form of fever which belonged to Cyprus alone, and which could therefore with any truth be called "Cyprus fever." Leaving out of the question all eruptive fevers, some of which occasionally occurred in epidemic form, the most common cause of fever was malaria. Undulant fever, which was now known to occur in many places, had been described as "Cyprus fever," but, of course, had no right to the special name; and it only occurred occasionally in Cyprus. The most frequent forms of fever were malarial (as proved by the microscope) and a febricula. The principal forms of malarial fever met with were tertian and quartan and their double varieties; pernicious malarial fever was now (in consequence of improvements—viz., draining and planting) far

less frequently met with than in former days. He gave tables showing the proportion of cases of malarial fever of different kinds to each other and of these cases to the whole number of diseases coming under notice in a given time, which indicated that Cyprus was far from being the fever-stricken place it was sometimes supposed to be.

Dr. GEORGE C. LOW (Barbados) gave the results of his investigations in Malaria and Filaria in Barbados. He found neither anopheles nor malaria in Barbados; but found the culex mosquito and filarial diseases in plenty. He believed that filarial ailments and filariasis could be readily exterminated in Barbados by destroying the breeding-places of the culicidæ. The water-supply of the island was excellent, water being laid on in pipes to the houses, and the culex mosquitoes found their breeding-grounds in the rain-water tanks and pools around the dwellings. Were these tanks covered or done away with and the pools drained the filarial scourge would speedily, in his opinion, be mitigated or altogether wiped out.

Professor R. W. BOYCE (Liverpool) upheld a point contended for in Sir W. MacGregor's paper—namely, that measures adopted in West Africa to eradicate malaria must be adopted for natives as well as for Europeans. He believed that segregation would not be productive of so much good as the extirpation of mosquitoes bearing malarial infection.

Dr. EDWARD HENDERSON (London), although he regarded the method of exterminating mosquitoes as almost hopeless throughout the length and breadth of China, still believed that the example set by Europeans of the several methods of preventing malarial fever would produce a good effect amongst the Chinese and might stimulate many of them to follow the example.

Dr. P. MANSON, F.R.S. (London), held that different methods of dealing with malaria were applicable according to environment. In one place the administration of quinine was alone possible; in another the destruction of mosquito breeding-grounds; and in a third the protection afforded by mosquito netting. In some places all these plans of protection might be expedient, but it was unwise to depreciate one at the expense of the other, or to think that the amelioration even of malarial ailments was not to be aimed at, and he objected to any plan of defeating malaria being condemned merely because it was not completely perfect. It seemed impossible to compel negroes to take quinine, and the attempt about to be made by the Germans in this direction was bound to fail. Dr. Young referred in his paper to the culex larvæ consuming anopheles larvæ when placed in the same pool. When food was scarce this no doubt occurred, but when food was plentiful the two varieties of mosquitoes would be found living side by side amicably. Questions which it seemed expedient to go into were, why was malaria absent and why present in some parts of the tropics? why were anopheles met with in one place and culex mosquitoes in another? and yet again, why were they found both abundant in some places? Could these points be ascertained they would be approaching a rational solution of the mosquito difficulty, and be able to apply "natural" means of exterminating mosquitoes in the place of the present empiric plans by netting, quinine, and destruction of larvæ. They had examples of analogous methods of dealing with parasitic diseases afforded in the cases of the vines in France and of the orange trees in America and he believed that in the future means of prevention would be found in this direction.

Lieutenant-Colonel J. L. POYNTER, I.M.S., considered it impossible to teach the natives of India the use of preventive measures against either malaria or cholera.

Mr. CANTLIE said that the "Swatow lamp" in use in China and the Straits as a means of killing mosquitoes within a mosquito-net was a safe and sure method and that he had had the lamp made in London where it could now be obtained.

Dr. F. M. SANDWITH (Cairo) read a note on

*The Entrance of Ankylostoma Embryos into the Human Body by Means of the Skin.*

He affirmed that it had long been known that ankylostomiasis infection could occur by the mouth, but the present paper was to draw attention to Dr. Looss's discovery that the embryos had also the power of entering the skin chiefly by the hair follicles. In 1898 Dr. Looss announced this fact, but as there was no analogy for a parasite behaving in this way his paper met with no reception beyond a little hostile criticism. Like many scientific discoveries this was the result of a pure accident.

While working in the laboratory of the Cairo medical school a drop of a pure culture of embryos fell on his hand; he happened to examine the drop some minutes later and was astonished to find that it contained countless empty embryo sheaths and a few sluggish embryos. The bulk of the embryos had apparently entered the skin. His hand became red and burning and he found himself later suffering from anæmia and debility with evidence of ankylostoma infection in the fæces requiring a prolonged course of treatment. Since then a similar experiment had been made on a human leg one hour before amputation. Sections of the skin showed that the embryos had entered chiefly by the hair follicles. Inside the follicle the embryos pushed their way towards the hair papillæ, during which process, if there were many in the hair follicle, the root sheath of the hair was almost completely destroyed. When the papillæ were reached the embryos left the hair follicle to pierce the surrounding tissue of the true skin.<sup>1</sup> A section under the microscope and some micro-photographs showed many embryos in different stages of entry. It was assumed that the embryo found its way from the skin to the small intestine, but of this there was as yet no proof. Dr. Looss's researches threw an additional light upon ankylostomiasis infection in many countries, and might lead to an analogous discovery with regard to bilharzia and perhaps other parasites.

Lieutenant-Colonel G. M. J. GILES, I.M.S., said that he had seen Dr. Looss's specimens in Cairo, and he quite agreed with his conclusions. He believed that the ova of the ankylostoma gained access to the body by the mouth, being conveyed on the dirty hands of coolies. The earth in Assam tea-gardens teemed with the ova, and as the coolie ate his food with unwashed hands he became infected with the parasite. He was, prepared, however, to agree that embryo worms could gain access by the skin, but he failed to understand how they could reach the intestines in the numbers they did unless they were swallowed.

Dr. MANSON deprecated premature conclusions being arrived at from the discovery of Dr. Looss. He looked upon specimens showing the embryos entering a hair follicle of the skin and thereby gaining access to the subcutaneous tissues more or less in the nature of a curiosity. Were the embryos of ankylostoma placed on the skin he believed they would seek shelter in a hair follicle, but he could not believe that this mode of infection was usual. He suggested further experimental research on the subject.

Lieutenant-Colonel ANDREW DUNCAN, I.M.S. (retired), read a paper on

*The Causation of Enteric Fever in India,*

in which he reviewed the various theories appertaining to the etiology of enteric fever. He mentioned the vicarious theory of Martin; the transformation theory of M. Colin, who held that fever primarily paludal could be transformed into enteric; the non-specific theory of Moore; the fæcal-poisoning theory of Fayrer; the climatic theory of Bryden; the opinion of Gordon that there was no such disease as enteric fever in India; and the theory of Home who regarded all diseases in which ulcers were met with in the intestine as enteric. Lieutenant-Colonel Duncan said that the factors concerned in the evolution of enteric fever in India were to be found in the facts: (1) the yearly advent in India of a large body of subjects at an age most liable to the disease; and (2) the country presented an environment to these subjects most favourable to the disease. Soldiers in India imbibed the liquids offered for sale in the native bazaars, and in spite of precautions within their barracks became thus infected and also by the dust conveyed by the winds and by the agency of flies. He upheld the inoculations of Professor Wright against enteric fever as being of great practical value.

Lieutenant-Colonel A. CROMBIE, I.M.S. (retired), stated that enteric fever in India was not commonly met with amongst natives. Ghoorkas were liable to the disease; but in Madras and in Lower Bengal enteric ulcerations were not found. He stated that he tested the blood of six natives of India in London and found that three gave Widal's reaction. All these were under 30 years of age and the three in which the reaction was negative were over 40 years of age. A continued fever lasting 21 days was common in India, in which there was no eruption, diarrhoea, or enlargement of the spleen. 75 per cent. of the cases of continued fever

<sup>1</sup> Centralblatt für Bakteriologie, May 31st and July 5th, 1901.

in South Africa during the Boer war gave Widal's reaction. Concerning the efficacy of Professor Wright's serum for enteric fever, Lieutenant-Colonel Crombie stated that of 300 patients convalescent from enteric fever whom he had seen, 60 per cent. had been inoculated once and 10 per cent. twice. Second attacks of enteric fever also had not infrequently occurred.

Captain W. R. BATTYE, I.M.S., believed that a benign bacillus could, according to environment, become pathogenic in its properties.

Lieutenant-Colonel POYNTER, I.M.S., believed that the immunity of adults in India to typhoid fever was in all probability due to their having had typhoid fever in their youth.

Dr. SANDWITH said that of course Professor Wright's method of preventing typhoid fever was as yet only on its trial. He had seen several cases of enteric fever amongst nurses who had been inoculated. He advocated blood examinations after inoculation to elucidate the effects of the anti-typhoid treatment.

Major F. P. MAYNARD, I.M.S., read a paper on

*Some Ophthalmic Complications of Plague.*

He called attention to the injected condition of the eyes which had been described by writers as characteristic of the plague facies, and discussed 12 cases of plague with ophthalmic complications which came under his notice during a recent severe epidemic of the disease at Patna. The plague symptoms in all the cases were, or had been, severe, but none of the patients died; six recovered with one eye sound; of the remaining 18 eyes vision was lost in five, partly lost in eight, and fairly good in five. The lesions were for the most part the results of iritis and opacity of media apparently from interference with the nutrition of the eye. Tension was diminished in 12 eyes and was normal in the rest. It was remarkable that, considering the frequent cases in which blood extravasations in various places throughout the body were met with in plague post-mortem examinations, in only one case did a fundus show hæmorrhage. Treatment, except in one case, was of no avail because it was started too late.

### THE PATHOLOGICAL MUSEUM.

Relegated to one little room in a corner of the palatial edifice known as the "Winter Garden," the rest of which was devoted to the exhibition of drugs and foods, the Pathological Museum can hardly be said to have received its due share of space, certainly not commensurate with its importance. Perhaps it was a sign of the times.

Among the most interesting exhibits may be mentioned a valuable series of photographs illustrating the various lesions met with in the recent epidemic of arsenical poisoning among beer-drinkers, contributed to the collection by Dr. T. N. Kelynack (Manchester). This included excellent photographs of cases of atrophy of the lower extremities, general wasting, double wrist-drop, and dropped hands and feet; and among the skin affections, erythema with keratosis and pigmentation of the palms and soles, general pigmentation with characteristic distribution over the thigh and abdomen, extensive scaly eruption, melanosis of the arms and abdomen in a patient whose suckling infant, aged nine weeks, also presented symptoms of arsenical poisoning, and a case of ridges on the nails. A series of x-ray photographs was contributed by Mr. J. Hall-Edwards (Birmingham) who was with the Imperial Yeomanry in South Africa, which included representations of bullets in various positions. Here again we find undoubted evidence of the use of soft-nosed or expansive bullets by the Boers. The same exhibitor showed a portable coil and apparatus for taking radiographs in the field.

A series of interesting photographs by Dr. E. A. Dent (Cheltenham) showed various arthritic affections and malformations of the hands. Some beautiful and life-like sketches from the museum of St. George's Hospital, made by Joseph Perry in 1836, illustrated cases of pemphigus and Pott's disease of the vertebræ. Upon the same table, placed there presumably for lack of space, certainly not for any reason of scientific classification, was a very remarkable series of ancient Egyptian bones, exhibiting various forms of fracture. These were stated to have belonged to a people living over 2000 years ago, and reveal the fact that they were subject to much the same form of injury as those who live in the present day.

They were presented by Professor D. MacAlister to the museum of the Cambridge University and were exhibited by Mr. Joseph Griffiths.

So cramped was the space afforded that even the side posts of the doorway had to be pressed into the service and here there were suspended two interesting photographs showing a somewhat unusual form of bromide eruption in an infant who had had one of the numerous patent "soothing" medicines administered to it and a case of accidental vaccination of chapped hands in a nurse whose parents had refused to have her vaccinated previously on account of "conscientious objections."

Among the rarer and more interesting of the mounted specimens, mostly prepared by means of the formalin method, were the following. A ball-thrombus in the auricle (from University College, Sheffield) from a patient who died with signs of mitral disease and many emboli, the thrombus being loose in the auricle as seen in the specimen. Syphilitic myocarditis (from University College, Sheffield) from a man who was discharged from the army on account of epilepsy, who died in a fit; the muscular substance of the heart showed the mottling. It would have been interesting in this specimen to have learned if there were any gross changes in the brain to account for the fits, or whether these were, as some maintain, due entirely to circulatory disturbance. Brown atrophy of the heart (from the Royal Free Hospital) from a case of phthisis. Thrombus in the thoracic aorta (from Westminster Hospital); the transverse part of the aortic arch and a portion of the descending aorta showed the presence of a firm clot in the lumen of the vessel. The clot reached down to the level of the diaphragm. It was taken from a body of a man, 49 years of age, who died from a large mixed-cell sarcoma of the os innominatum. There was no evidence found at the necropsy of a collateral circulation. Microscopically the clot in the aorta was mostly fibrin, but there were a few large cells of sarcomatous appearance in places. Specimen of dilated stomach produced by simple hypertrophy of the pyloric sphincter consequent on traction of a moveable kidney (exhibited by Dr. H. Bramwell, Cheltenham). Lymphangiectasis of the intestine (from the Westminster Hospital Museum). The mucosa of the duodenum and commencement of the jejunum was covered with closely-set villous processes which gave it a shaggy appearance. In the recent condition the mucous membrane was much congested though the villous projections were white. The entire intestinal tract was similarly affected. It was taken from the body of a man, aged 38 years, who had suffered for some months from intermittent attacks of diarrhoea and vomiting. Emaciation ensued and he died from exhaustion. With the exception of the intestinal condition, which affected the whole of the small intestines, the viscera were normal. Specimens of scurvy rickets (from the Westminster Hospital Museum) showing the pelvis and lower extremities of a child who died from the disease. The periosteum of the femur was stripped up from the shaft and underneath it was a blood-clot. The upper epiphysis was separated and there was a fracture at the lower end just above the epiphyseal line; blood-clot intervened between the broken ends. The changes were remarkably symmetrical on the two sides. The bones of the legs were very soft and could easily be cut with a knife. The specimens were from a male child, aged 11 months. The child was quite well until the age of five months, when he began to fail in strength and general health. The child sweated about the head, was constantly sick, and very constipated. Red sand was often found in the urine which was much increased in quantity. Two months before admission the mouth and gums became spongy and livid and there was epistaxis. Five weeks before death the ankles, feet, shoulders, legs, and wrists were swollen and painful, and the eyelids and face were puffy.

In the department of Comparative Pathology Dr. S. T. Pruen (Cheltenham) exhibited an interesting series of specimens (macroscopic and microscopic) of tuberculosis in birds and animals. As an illustration of careful observation and description the microscopic specimens of parakeratosis variegata exhibited by Dr. J. M. H. Macleod (London) may be mentioned. In general terms the descriptive catalogue had been prepared with unusual care and completeness and the various preparations were well arranged. Much credit in this respect is due to Mrs. Grace Stewart-Billings, M.P. (Cheltenham), the secretary of the Pathological Museum, and