



Sir PATRICK MANSON
1844-1922

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Tropical Medicine and Hygiene.

[193

SIR PATRICK MANSON, G.C.M.G., M.B.,
F.R.S.

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IN the Parish of Oldmeldrum, Aberdeenshire, Patrick Manson was born on the 3rd October 1844, the second son of a family of nine. His father, John Manson, was laird of Fingask and the Manager of the local branch of the British Linen Bank, and his mother, formerly a Miss Blaikie of Aberdeen, is said to have been a remarkable woman, possessing good looks, resourcefulness and some artistic talent. As he grew up and went to school, none discerned in Patrick any signs of unusual ability. Indeed, he was even regarded as dull and his peculiar interest in insects and worms was not encouraged.

At the early age of fifteen his parents apprenticed him to a firm of ironmasters in Aberdeen with whom his mother's family was connected, and here the boy worked until a breakdown in health obliged him to lie on his back with a curvature of the spine for all but two hours of the day. Those two hours were spent at the Marischal College of Aberdeen studying Natural History, and thus it was that, frustrated by illness in his attempt to earn a livelihood in business, he turned his mind to medicine.

Manson had finished his course and passed his finals before he was twenty. By the regulations he had to wait till he was twenty-one before he could

graduate M.B. of Aberdeen University. In 1866 he was appointed Medical Officer for Formosa to the Chinese Imperial Maritime Customs, and so began his connection with the tropics and tropical diseases, a connection pregnant with significance for future generations all over the world. For five years he worked at Takao, a port on the south-west of the island of Formosa, inspecting the ships that called there and treating the crews, and in the town itself he had his private practice, and attended a native missionary hospital where he came in contact with many tropical diseases unknown in England. He describes how he diagnosed as heart disease and prescribed accordingly for the complaint of a Chinese clerk whom he found "propped up in a chair, short of breath, dropsical from head to foot," and how, full of hope for his patient's recovery, he called next day and, to his surprise and chagrin, found him dead. He left the house a sadder and a wiser man. On looking back, when he had gained more experience of tropical diseases, he recognised he had been treating a case of beri-beri, a disease which up till then had been but a name to him.

After five years in Formosa, he moved to Amoy, a large town in one of the islands in the Bay of Hiu Tau where, as Medical Officer to the Imperial Maritime Customs, he had charge of a hospital for seamen and also of another missionary hospital for the Chinese. In spite of much prejudice against European doctors, he succeeded in establishing a medical school in connection with the hospital, where he could train the young Chinaman in the art of medicine. But it was uphill work and he was greatly hampered by the Chinaman's objection to operation

and to *post-mortem* examinations, and by his readiness to believe any tale, however bad, of the Westerner. On his arrival at Amoy the story was abroad among the native population, no doubt encouraged by the native doctors, that a poisonous pill, *Shan-si-fan*, was being distributed by Europeans to the detriment of the Chinaman. Such rumours were difficult to contend with. Eventually, however, when his work became better known, signs of confidence appeared, and it was even said that an antidote to *Shan-si-fan* could be obtained at the hospital.

Filarial disease, one of the most distressing complaints, with its various manifestations such as elephantoid tumours and chyluria, was very prevalent in Amoy as in other tropical places, and it was a subject about which very little was then known. Surgical operation for the removal of the tumours was in many cases abundantly necessary, but at first the natives could not be induced to submit to it. By a stroke of good fortune, Manson was enabled to give a practical demonstration of the value of surgery. A youth of nineteen, who had been weighed down for five years with an elephantoid tumour, had become such a burden to his family and so repulsive in appearance that they went the length of suggesting to him that he should somehow end his useless life. At last the physical and mental torment became so unbearable that the lad twice attempted suicide by swallowing arsenic. But he took so much that he was violently sick before the poison had time to take effect. It then occurred to him that he might just as well be killed by the foreign surgeon at Amoy of whom it was said that he removed tumours with a knife. He therefore submitted himself to Manson for operation,

saying, when he was warned of a possibly fatal outcome, "I have tried to kill myself twice but failed; if you succeed in curing me so much the better, but don't let the consideration of my death deter you in anything you care to do. I am not afraid of death." The operation was a complete success and the rumour of it spread abroad like lightning, as rumours do in Oriental lands, and the reputation of the hospital was greatly enhanced thereby. "In the course of the next three years," says Manson's biographer, Colonel Alcock, "more than a ton of superfluous elephantoid tumour was removed from the population of Amoy," and during the first three years of Manson's charge the number of patients treated rose from 1980 in 1871 to 4476 in 1874. Manson calculated that the mortality from smallpox alone in Amoy was as high as 33 per cent., and he did a great deal to encourage the practice of vaccination and to allay native prejudice against it.

In 1875 he returned to England with the intention of improving his knowledge of tropical pathology, and to learn all that was to be known of elephantiasis and chyluria. The fact that he could find no school in London where he could achieve this greatly impressed him, and was responsible for sowing in his mind the seed which in later years gave us the first School of Tropical Medicine. But in 1875 Manson was little known, and he had no introductions to the leading scientific men of the day. Failing to find any other source of instruction, he went to the British Museum. Here he read of Timothy Lewis's discovery of a microscopic worm (*Filaria sanguinis hominis*) found, first in a specimen of chylous urine and then in the blood of a victim of

chyluria in Calcutta in 1870 and in 1872. This was what he had himself been searching for, and, on his return to Amoy, he worked unceasingly in the hours that could be spared from his official duties to find this parasite, to trace its life-history, to watch the stages of its development and to discover how man became reinfected with it.

The worms discovered by Lewis were embryos. These had been seen as early as 1863, though Lewis was unaware of it, by a French surgeon, Demarquay, in Havana, but not in the blood. Calculating that in the blood of patients infected by worms, there were sometimes as many as two million embryos, Manson endeavoured to discover what became of these, and how they made their escape from the blood, for it was evident that, even allowing for the ordinary means of exit from the human body by which some would escape, such a host could not all come to maturity without eventually killing themselves off by over-population along with their human victim. Suspecting the mosquito rather than any of the other blood-sucking insects of being concerned in this business, he fed some mosquitoes on the blood of a sufferer from filariasis. Then, examining the mosquito under the microscope, he saw a wonderful sight. In its stomach were the embryos of the parasite which it had sucked up, and here in this new abode he was able to record their growth from day to day. His delight in watching this process is well described in his own words: "I shall not easily forget the first mosquito I dissected. I tore off its abdomen and succeeded in expressing the blood the stomach contained. Placing this under the microscope, I was gratified to find that, so far from killing the *filaria*, the

digestive juices of the mosquito seemed to have stimulated it to fresh activity. And now I saw a curious thing. The little sac or bag enclosing the *filaria*, which hitherto had muzzled it and prevented it from penetrating the wall of the blood-vessels in the human body, was broken through and discarded." He discovered, also, the very remarkable fact that the embryos of the adult *filaria* disappear from the cutaneous blood of an infected man at certain times of the day, to reappear at sunset, and that during the period of their absence they are to be found attached to the capillaries of the lungs, or hooked on to the walls of the large arteries, although it was not till 1897 at the *post-mortem* of a *filaria* patient in London, that he found out where they retired to, when absent from the blood. Writing to Dr T. Spencer Cobbold, the noted helminthologist, in 1879, Manson gives a graphic description of the embryos' flight: "The young escape into the circulation at regular intervals of twenty-four hours, the discharge commencing soon after sunset and continuing till nearly midnight, from which time till the following noon their numbers gradually decrease. By two or four o'clock till six they are nearly completely absent. This is a striking and most suggestive fact, and in connection with it one might be tempted to speculate on the causes of the periodicity of malarial fevers. It is marvellous how Nature has adapted the habits of the *filaria* to those of the mosquito. The embryos are in the blood just at the time the mosquito selects for feeding."

This momentous discovery of the mosquito as the intermediate host of the parasite, *Filaria sanguinis hominis*, in 1877, opened a new chapter in the annals

of science and pointed the way which led eventually to Ross's famous discovery twenty years later of the manner in which man is infected with malaria. These experiments were reported by Manson in the China Customs Medical Report for 1877 and by Cobbold to the Linnean Society in 1878, and again in 1883 by Manson to the Linnean Society. In these papers he describes in detail how the young of the adult *filaria* are withdrawn from the human blood, and go through a process of development in the body of the mosquito before they can infect another human being. "When the mosquito penetrates a blood vessel," he says, "the passing embryos, lashing about as is their habit, entangle themselves on the proboscis and get sucked up." The idea that blood-sucking insects might have some connection with disease, especially fevers was, of course, not new in Manson's time. It was a common notion among natives in many tropical countries, but what part they played and how was quite unknown, although Leuckhart in 1858 had shown that the guinea-worm develops in the water-flea. Manson's discovery established the fact of the part mosquitoes play as intermediate hosts, a necessary stage in the development of the parasite, and disclosed, in Colonel Alcock's words, "a new and far-reaching principle of the necessary intermediation of the blood-sucking insect as a causal factor in the sphere of disease." But at the time, the discovery did not attract anything like the attention it deserved, nor was its full significance realised till long after. He was working alone in a far-off part of the world, isolated from schools of research, and in the intervals of leisure that a busy practice allowed. "Men, like myself, in

general practice," he said in his letter to Dr Cobbold, "are but poor and very slow investigators, crippled as we are with the necessity of making our daily bread." Manson hoped to discover where the adult *filariæ* lodged in the human body, and although he did not accomplish this until after they had been seen by Bancroft in 1876, and by Lewis a little later, nevertheless, he predicted before these discoveries were made where the adults would be found—in the lymphatic system.

In December 1883, Manson left Amoy to take up private practice in Hongkong. There he started a Medical College, which was the origin of the present University and Medical School of Hongkong. In his inaugural address to this College he said: "I can conceive no grander position or opportunity for any man to have, than that we offer to each of our students. At his back the whole of European Science, before him 300,000,000 to whom to give it." And, as illustrating the difficulties and prejudices with which the Chinese student would have to contend, he said, referring to the traditions of Chinese medicine, "For example, as every foreigner soon gathers from his native friends or his servants, every article of food, of drink, and every medicine is classified according as it is considered a heating or a cooling thing. In keeping with this, every disease is classified a hot disease or a cold disease. It is evident that a hot disease requires a cooling diet and medicine, and a cold disease a heating diet and medicine. The delightful simplicity of this has laid a very firm hold on the popular mind. It is a style of logic that catches the uneducated. It has a pseudo-scientific air about it that is taking. It enables the layman, he thinks, to

argue with his doctor on an equal footing. It is a sort of medical logic that has often filled the pocket of the European quack, and it is equally productive in China. It is one of those touches of Nature we meet everywhere, and proves the kinship of the whole world."

In 1889 Manson left China and settled in London, at 21 Queen Anne Street, and in May 1892 he was appointed Physician to the Seamen's Hospital Society and had charge of a ward at the Albert Dock Hospital. Here the constant influx of natives from the tropics kept him in touch with tropical diseases, and here, later, he was chiefly instrumental in founding the first School of Tropical Medicine in London.

The subject of malaria was now occupying a great deal of his thought, and about this time he published his famous mosquito-malaria hypothesis, which formed the basis of the researches for the malaria parasite after it leaves the human blood and before transmission to another human being. This parasite (*Plasmodium*) had been discovered by Laveran in 1880; the method by which man became reinfected by it was still quite obscure. With the results of his researches on filaria in mind, Manson suggested that the malaria parasite should be sought for in the body of the mosquito, which had been fed on malaria-infected blood; that its development would be traced in the tissues of this insect; that, when the time was ripe, it would be transmitted in some manner to another human being. He surmised that man might become infected by drinking the water in which the infected mosquito had died, but in this he was mistaken. Working in London, Manson himself had not sufficient material at his command to carry out these researches. He said,

however, "The hypothesis I have ventured to formulate seems so well grounded that I for one, did circumstances permit, would approach the experimental demonstration with confidence." And we may be sure he longed to be under a tropical sun where he could accomplish this. But the young men were not wanting to answer his call. Among them Surgeon-Major Ronald Ross went to Queen Anne Street. So inspired was he by the mosquito-malaria theory, that he undertook to verify it by experiment. From this date onwards, Manson kept in constant touch with Ross's work in India, and helped him continually by encouragement and advice. At home he did all he could to interest scientists, notably Lord Lister and those in authority, in Ross's researches. The malaria parasite was traced by Ross in the stomach of the mosquito (of the genus *Anopheles*) which had been fed on the blood of a malaria patient, and in 1897 he traced its growth within the body of the mosquito till it reached the salivary glands of this insect. Then the mystery of the retransmission of infection to man was solved, for it was plain that this was accomplished by a bite from the *Anopheles*. At the meeting of the British Medical Association in Edinburgh in July 1898, Manson launched upon the world the news of Ross's great discovery, which was destined to revolutionise the life of the white man in the tropics.

Manson was appointed Medical Adviser to the Colonial Office in 1897, a position which gave him the opportunity of re-organising and co-ordinating the work of medical officers in the Colonies. He had long had in mind a scheme for instruction in tropical diseases, remembering how, as he pointed out at a

later date in his inaugural address to the Society of Tropical Medicine and Hygiene in 1907, he himself had been twice disappointed when he came home on leave from China, hoping to hear in London the latest news of tropical medicine: "I once more came to London on furlough," he said, "in the year 1882-83 to learn the latest in medicine and surgery, especially in their application to tropical medicine. I heard plenty about the tubercle bacillus, but, although I visited the societies and became acquainted with many medical men of standing, I did not once hear of Laveran's important discovery of the malaria parasite. . . Had there been a Society (of Tropical Medicine) in 1883, doubtless Laveran's discovery would have been a prominent subject for discussion, the technique for its demonstration would have been familiar to the Fellows, and I should have gone back to China in a satisfactory position to pursue the study under favourable conditions. I lost ten years by this."

In an address delivered at St George's Hospital in October 1897, he made a vigorous appeal for Government support for the establishment in London of a School of Tropical Medicine, where all medical students desirous of instruction should be admitted, and where those who returned from the tropics could learn the latest developments in tropical medicine. As a result of the publicity given to this address, Mr Joseph Chamberlain, then Colonial Secretary, took the matter up, and the Seamen's Hospital Society generously acceded to his request to found a School for the study of tropical diseases at the Albert Dock Hospital. In October 1899, the School held its first session.

In 1898 Manson was appointed Lecturer on Tropical Diseases to the Royal Free Hospital for Women, and in this year he published his *Manual of Tropical Diseases*, a book which ran into six editions in the next twenty years and was regarded as the standard work on the subject. He received many honours. In 1900 he was elected a Fellow of the Royal Society, and received the C.M.G. In 1903 a knighthood was conferred upon him, and in 1904 Oxford University gave him the honorary degree of D.Sc. In 1912, on his retirement from the Colonial Office, he was awarded the G.C.M.G. "in recognition of his eminent services in connection with the investigation of the causes and cure of tropical diseases," and in 1921 he received the LL.D. of Cambridge University. Many foreign societies bestowed their honours upon him, and he was President of the Epidemiological Society, and the first President of the Society of Tropical Medicine and Hygiene.

Manson had been a lifelong sufferer from gout and, in consequence of his ill-health, he retired to live in Ireland in 1912 when his arduous duties at the Colonial Office came to an end. The War, however, brought him back to London, and to the last he took a very lively interest in the work of the School of Tropical Medicine, visiting it in its new home in Endsleigh Gardens shortly before his death in April 1922. In these last days he often talked over the project of the incorporation of the School with the London School of Hygiene and, although he did not live to see the erection of the present magnificent building in Gower Street, which the generous gift of the Rockefeller Foundation has made possible, his name will always hold a high place



Main Entrance of the London School of Hygiene and Tropical Medicine.
From a drawing by J. D. M. Harvey.

in connection with its work, for he may truly be called the founder of the original School in London, as he is the "Father of Tropical Medicine." Future generations of students, equipped with all the benefits the School can give, will remember thankfully the work of Patrick Manson, done in complete isolation at the beginning of his career, for the benefit of mankind.

REFERENCES.—*The Life and Work of Sir Patrick Manson* by Philip H. Manson Bahr, D.S.O., M.D., and Lt.-Col. A. Alcock, I.M.S.: Cassell & Co., Ltd., London, 1927. *Proceedings of the Royal Society*, 1922-23, vol. xciv., Sir Patrick Manson by Lt.-Col. Alcock.