

## ALPHONSE LAVERAN, M.D.

1845-1922

ALPHONSE LAVERAN, the distinguished discoverer of the malaria parasite, was brought up in an atmosphere which profoundly influenced his future career. Under his father's guidance, he learnt at an early age those methods of accurate observation that characterise the work of the scientist and was trained in the rigorous discipline that the cause of truth demands, and could not but be affected by the quiet spirit of enthusiasm which pervaded his home-life.

His father, Dr Louis Laveran, born in 1812, was a native of Dunkirk, where his father before him had followed the profession of medicine. He had a distinguished career in the Army Medical Service, being appointed at the age of twenty-nine to a professorship in the military hospital of Metz and, after serving in Algeria and carrying out researches on malaria, returned to Paris to fill the Chair of *Maladies et Epidémies des Armées* at the Val-de-Grace, a school of which he afterwards became director. Louis Laveran was known as a man of great uprightness and strong character, broad-minded and good-hearted and faithful in his friendships. His strong sense of duty and of justice, combined with his brilliant professional qualities, earned him the respect and devotion of his pupils. While at Metz, he married Mademoiselle de la Tour, who was descended on her mother's side



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from the Lallemand family of Metz, a name famous in history for the part played by the Generals Lallemand at the Battle of Waterloo, and for the exile which was their fate on the return of the Bourbons to power.

Alphonse Laveran was, therefore, a son and grandson of distinguished physicians on his father's side, and a great-nephew of celebrated soldiers on his mother's side, and inherited the characteristics of both families, retaining all his life a love for the army along with his unconquerable devotion to science. Born at Paris on the 18th of June 1845, he accompanied his parents to Algeria when he was five years old, and spent his early childhood running free among the orange groves of Blidah, with his father alone to teach him. He retained in after years delightful memories of this country.

On the return of his family to Paris in 1856, he attended the schools of Sainte-Barbe and Louis-le-Grand and, finally, choosing his father's profession, entered the *École du Service de Santé Militaire* at Strasbourg in 1863, taking the four years' course under the excellent teachers who were then on the staff of the Medical Faculty, a course which at that time was considered in some respects superior to that of Paris. In 1866 he served as resident medical officer in the civil hospital at Strasbourg, before attending a course at the Val-de-Grace in Paris, and, on leaving this school, was appointed *Aide-Major* at the military hospital of St Martin's. During the Franco-German War in 1870, he saw active service in the besieged town of Metz, and witnessed in these days before antiseptic surgery was employed, or typhoid fever inoculation known, all the horrors and

suffering which overtook the besieged French Army, when septicæmia, erysipelas and gangrene made havoc of the wounded, and typhoid and dysentery raged, amid scarcity of food, medicines and hospital equipment. Alphonse Laveran was present, too, on the fatal day in October 1870, when the garrison surrendered and the town of Metz, "so French," "so patriotic," as Madame Phisalix, his biographer, describes it, was handed over to the Germans, and the tocsin sounded the doom of an anguished, silent people.

In his capacity of doctor, Laveran obtained a passport from the enemy and returned to France through Belgium, serving in the military hospital at Lille till the end of the war.

In 1873 he was attached to the 10th Hussars at Pontivy, and in the following year passed the examination for a fellowship at the Val-de-Grace with distinction, and was appointed *Professor agrégé des Maladies et Epidémies des Armées* at this school, holding the Chair which his father had held before him. Many of the students of the Service de Santé Militaire who attended his lectures here, carried away with them lively recollections of his vigorous teaching, and his demonstrations of practical work with the microscope. He demanded of his pupils the same inflexible discipline which he applied to his own work, and many a young man owed to Laveran's unrelaxing training in the search for truth, the success which attended his after-career. To Laveran, says his biographer, from the time that he entered the Army Medical Service, his life and his work, both professional and scientific, were one and indivisible, for his life was one long devotion to work, lasting fifty-five years,

a devotion which death alone dispelled. All other activities were subordinated to his work, were reduced to the indispensable minimum, and submitted, like the work itself, to an inexorable discipline which the passage of years did not lessen.

Laveran was a prolific writer, and his work appeared in more than 600 publications, of which a few are concerned with every branch of medicine; but the majority treat of the protozoa, the single cell organisms, in their relation to diseases. Before his time a few protozoal parasites had been found, but their pathological significance had not been shown.

In 1875 he published a treatise, suggested by his father's work in epidemiology, entitled *Traité des Maladies et Epidémies des Armées*, and in 1878, the professorship at the Val-de-Grace being terminated, he was attached to the military hospital at Bône in Algeria, where he had ample opportunity of studying malaria. For many years French physicians had done much distinguished work in this country on malaria, and had recognised as characteristic of the disease the pigmentation of the organs caused by small black granules, appearing like specks in the cells of the blood of fever patients; but these had been attributed to the deterioration in the blood itself brought about by a poisonous gas, the "marsh-miasma," as it was called, to which cause it was supposed the fever was due. On arrival at Bône, Laveran soon verified all the work his predecessors had done before him and, by placing fresh unstained drops of blood from living patients under the microscope, discovered that the granules were usually to be found, not free in the blood itself, but wrapped

in small clear cysts within the red or the white corpuscles, or in crescent-shaped bodies; and he at once suspected that these cysts, containing the black pigment, were living organisms of a parasitic nature, rather than a degeneration of the blood as had formerly been supposed. His researches, however, at this point were interrupted for, on being promoted to the rank of Surgeon-Major, he was transferred to Biskra, a place so free of fever that there was little opportunity of studying it. His attention was there directed to the disease known as Biskra Boil, a complaint in which he maintained his interest later on, and in 1879 he published, with Dr Tessier, a work in two volumes, entitled *Les Nouveaux éléments de Pathologie et de Clinique médicales*, which had passed through four editions by 1894. It was not till he was stationed at the Military Hospital at Constantine, where malaria was rife, that he was able to continue his search for the parasite. There, on the 6th of November 1880, a memorable day in the annals of tropical medicine, while examining the blood of a soldier suffering from malaria, he saw the parasite whose existence he had previously suspected, a small pigmented body, with its slender threads (the flagella) thrust out, actively lashing about among its neighbouring cells. From that moment he had no longer any doubt of the parasitical nature of these bodies, nor did he hesitate to place them among the *Hematozoa*. Subsequent researches showed that these parasites were only found in the blood of malaria patients, and never in the blood of persons suffering from any other disease. When in Italy in 1882, Laveran found the same parasite at work in the fever stricken district of the Campagna.

This discovery was communicated to the *Académie de Médecine* on the 23rd and 28th of November 1880, and to the *Académie des Sciences* on the 24th of October 1881, and again in October 1882. The full account of these researches was first published in his *Traité des Fièvres Palustres* in 1884. He had observed the parasite in 432 cases of malaria and named it *Oscillaria malariae*, though it afterwards became known as *Plasmodium malariae*. The announcement of this news was greeted with scepticism, for it was not the first time that micro-organisms found in the blood had been claimed to be the cause of malaria. Furthermore, the technique for studying the parasites was still in an elementary stage, making it difficult for others to verify Laveran's work and, owing to the fact that in Algeria, quartan, tertian and malignant fevers, each with their separate parasite, abounded and confused the investigator in his attempt to follow one of them through all its different stages, Laveran had not been able to trace the life-history of the *Plasmodium*. This was afterwards done by Golgi in Italy, where only quartan fever existed. But it was many years before the existence of the malaria parasite was generally recognised, and it was not till twenty-eight years after the discovery had been made, that a memorial tablet was placed in the hospital at Constantine to commemorate the event.

In 1885 Laveran married Mademoiselle Pidancet of Montoy-Flanville near Metz, his wedding being celebrated in the village church at Noisseville, famous for the battle which was fought there during the siege of Metz. The marriage was a very happy one, for his wife appreciated his enthusiasm for his work,

and understood well how necessary are peace of mind and freedom from the ordinary cares of every day to the original investigator.

For a decade, from 1884 till 1894, Laveran held the Chair of Military Hygiene at the Val-de-Grace in Paris, and in these years laid the foundations of a sound teaching in this science, emphasising the benefits to be derived from practical instruction as well as theoretical, and founding a Museum of Hygiene. His *Traité d'Hygiène Militaire*, published in 1896, was greatly appreciated in the Army.

The *Académie des Sciences* awarded him the Breant Prize in 1889 in recognition of the discovery of the *Plasmodium*, and two years later the publication of his second work on malaria, *Du Paludisme et de son Hématozaire*, was received with more enthusiasm by the medical world than had been accorded to the announcement of this great discovery eleven years before. Honours were now bestowed upon him by many learned societies. He was elected a member of the *Société de Biologie*, and in 1893 a member of the *Académie de Médecine*, Correspondent, and later Fellow, of the *Académie des Sciences* in 1895, and a Commander of the *Légion d'Honneur*.

On the termination of the professorship at the Val-de-Grace in 1894, Laveran hoped to be appointed to some position where he would be able to carry on his research work. The authorities, however, ignoring his great talents, made no provision for this, and for the next two years he was occupied as Director of the military hospital at Lille and afterwards at Nantes, doing work for which he had little liking, and deprived of a laboratory and all facilities for research. It was expected in 1895, when the Govern-

ment sent an expedition to Madagascar, that his services would be employed to protect the troops in a country where malaria was the greatest enemy they would encounter; but he was not sent with the forces, and the many graves erected to those soldiers who died of fever in the island, testify to the price the Army paid for this omission. In 1896, finding that all opportunities for research were still denied him, he resigned from the Army at the age of fifty, refusing to reconsider his decision despite all the efforts of his colleagues in the military corps to get him to change his mind. Thus the corps, to whose service his work had been so generously devoted, lost one of its most brilliant men.

He was enthusiastically welcomed at the Pasteur Institute by Pasteur's distinguished disciples, Duclaux and Roux, and here for the next twenty-five years he laboured, sparing himself not at all as the years accumulated behind him, punctual at his laboratory by eight o'clock every morning, allowing nothing to interfere with the vital interest of his life, his work. In collaboration with M. Mesnil, he returned to his researches on the protozoa, publishing many interesting accounts of several new parasites discovered, and carried out many investigations of the *trypanosomes* (the parasite of sleeping sickness) of men and animals, being responsible for the programme of the French Commission on Sleeping Sickness to the Congo. He took part in the conference on this disease in London in June 1907 after the return of the English Commission from Africa, where Bruce had identified the parasite which causes sleeping sickness, the *Trypanosoma Brucei*. Laveran's work on these parasites was published in an important volume,



entitled *Trypanosomes et Trypanosomiasis* in 1904, in collaboration with M. Mesnil, a second edition being brought out in 1912.

But amid all the work on new parasites Laveran had not lost sight of the work still to be done on malaria. Although he had identified the parasite which causes the disease, there was still nothing known of its history outside the human blood. A vain search for it had been made in water, in the air and in the soil. As early as 1883, Dr King in America, who had not heard of Laveran's discovery, had given numerous reasons for supposing that mosquitoes inoculate men with malaria brought from the marshes, and Manson's famous mosquito-malaria hypothesis, based on his own discovery of the part played by this insect in the transmission of the parasite which causes chyluria, was published in 1894. Meanwhile, Ross in India was hard on the track of the parasite *Plasmodium malariae*, as it developed within the body of its host, the mosquito of the species *anopheles*, and his great discovery of how this insect not only takes the microbe out of the blood of the fever stricken patient, but after developing it within its own body, also puts it back again into the blood of man through its bite, was announced by Manson in Edinburgh in 1898. Laveran was among the first to support Ross, and by his researches on the different kinds of mosquitoes sent to the Pasteur Institute from all malarious countries, showed that in all places where malaria was, there also was the mosquito *anopheles*, while in those parts of the country free from fever this breed was not to be found.

Ross's discovery of the mode of transmission of malaria crowned Laveran's work of 1880 and opened

the way for the prevention of malaria in tropical countries on a scale that had never been dreamt of before. In a paper read before the *Académie de Médecine* in 1901, Laveran made a proposal for the foundation of a Society of Sanitation for Corsica, giving full details of the preventive measures to be employed. This society, under the name of *Ligue corse contre le Paludisme*, was founded in the following year with Laveran as its Honorary President, and his post was no sinecure, for he visited Corsica in 1902, made a study of the habits of the anopheles mosquito wherever it was to be found, assured himself that preventive measures were properly applied, and, when it was alleged that malaria existed in several places where no mosquitoes of this breed were present, he immediately visited the spot indicated, and invariably found the *anopheles* without trouble. He published in 1903 a small volume entitled *Prophylaxie du Paludisme*, giving concise and clear directions for the protective measures to be adopted against malaria. Sir Ronald Ross has pointed out that Laveran's "great discovery of 1880 was not connected in any way with the science of medical bacteriology—which had been recently founded by Pasteur, Lister and Koch—but with the much older science of animal parasitology."

From 1903 onwards, Laveran was engaged in the study of the diseases known as *leishmaniasis*, from the fact that Sir William Leishman first identified their causative agents—Indian and Mediterranean kala-azar and the Delhi and Biskra boils. Many observers had thought that Mediterranean and Indian kala-azar were distinct diseases till Laveran established their identity. His work on this subject, entitled *Traité de leishmaniasis*, was published in 1917.

Many foreign societies had now recognised Laveran's work. He received the Jenner Medal of the Epidemiological Society of London in 1902, was awarded the Moscow Prize at the 15th International Congress at Lisbon in 1906, and won the Nobel Prize for Physiology and Medicine for his researches in protozoology in 1907. He was elected a Foreign Member of the Royal Society in 1916, an Honorary Member of the Medical and Surgical Society of London, of the Royal College of Physicians of Edinburgh, of the Pathological Society of Great Britain and Ireland, and of the Society of Tropical Medicine and Hygiene.

When in 1907, owing to the great expansion of its work, the Pasteur Institute acquired a building for additional laboratories in the rue Falguière, Laveran was allotted the second floor on which he established his famous *Laboratoire des Maladies Tropicales*, to the equipment of which he devoted the proceeds of his Nobel Prize. To this spot in the gay city of Paris came students and research workers from all points of the compass to study under the master, and here Laveran worked with unrelaxing zeal till the end of his life. During the War years when he served on numerous commissions for the hygiene of the troops, and when every member of his staff had gone to the Army, he carried on in his laboratory with the sole aid of his faithful assistant Léon Breton. In June 1915, on the anniversary of his seventieth birthday, he received congratulatory addresses at the Pasteur Institute, and Dr Roux, with the precision and clarity which characterised all his utterances, gave a remarkable account of the lifelong work of Alphonse Laveran.

But Laveran's work was not yet done. From 1919 to 1921 he published the results of researches with Dr M. G. Franchini on the flagellate parasites of insects, giving an account of the technique for obtaining them in pure culture, and of the infections for which they are responsible. It was remarkable with what vigour he sustained his active interest in the work of the laboratory up till the very end. But in 1920, when as President he addressed the *Académie de Médecine* at its centenary meeting, it was noticeable that his strength had begun to wane, although he delivered an interesting discourse with the rigorous conscientiousness that allowed no personal consideration to interfere with his work. When at last his physical forces began to decline, he faced the end with a stoicism and a consideration for others which was the admiration of all his friends. Once he knew that medical science could do no more for him, he resigned himself to his fate and, after an illness of a few months, the only one that had interrupted his long life of labour, he died on the 18th of May 1922.

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