

## OBITUARY.

Lieut.-Col. R. Knowles, C.I.E., I.M.S.

WE regret to have to announce the death of Lieut.-Col. R. Knowles, C.I.E., I.M.S., which occurred in the early hours of the morning of August 3rd at the Carmichael Hospital for Tropical Diseases, Calcutta.

Robert Knowles was born on October 30th, 1883, in India where his father was a missionary. His early education was at Mill Hill School. He went up to Cambridge (Downing) in 1901; here he took his arts degree and commenced his medical studies. From there he went to St. Mary's Hospital, London, and in 1907 took his qualifying diploma, the M.R.C.S., L.R.C.P. It was at St. Mary's Hospital where he worked under Sir Almroth Wright that Knowles first acquired a taste for medical research which was to be the dominating influence of his whole life. He took the I.M.S. entrance examination in 1908 and passed into the service at the top of his batch. After four years of military service he achieved his first ambition, and was put into the then-newly-formed Bacteriological Department which afterwards became the Medical Research Department.

He was posted as Assistant Director at the Pasteur Institute, Kasauli. Here he came in contact with a number of people who had a considerable influence on his life and work—Harvey, McKendrick and above all Acton. His first work was carried out with Acton as his collaborator and together these two workers published some important papers on the action of snake venom, on halteridium in pigeons and on other subjects; the first volume of the *Indian Journal of Medical Research* contains eight papers by them. Knowles always maintained his interest in snakes and snake venom, although he had little chance of doing further work on the subject, and the work on halteridium gave him an introduction to protozoology, a subject of which he later became a master.

His work at Kasauli was interrupted by the War, and he was sent to Mesopotamia with the 11th Mahratta Light Infantry. He was wounded very badly in the leg in the battle of Ctesiphon and was mentioned in dispatches, and after a long stay in hospital in India and later in London he was posted as Bacteriologist to Cumballa War Hospital in Bombay. As his leg wound

had incapacitated him for active field service he was later transferred back to civil employment and was sent to Shillong to open the Pasteur Institute there. This was Knowles' first independent responsible post and he made a very great success out of it. The anti-rabic treatment was only a small part of the functions of the Institute. It was practically the only laboratory in the province and it had to be organised to deal with an enormous amount of routine laboratory work. And this was not all; at that time kala-azar was beginning to increase alarmingly in Assam and Knowles established a kala-azar ward and carried out an investigation on the treatment and on many other aspects of the disease. He worked out a scheme of dosage with sodium antimony tartrate—a drug that Sir Leonard Rogers had just introduced; this scheme was followed for many years in Assam until the new pentavalent compounds came into general use.

It was during this time at Shillong that Knowles met Sir Leonard Rogers; it had been at the latter's suggestion that he started the work on kala-azar. When Sir Leonard left India in 1920 he selected Knowles as his successor at the Medical College. He also left him the far more arduous task of starting the School of Tropical Medicine. Knowles decided to devote the whole of his energies to the latter task; he was appointed Secretary of the School and with the aid of Colonel Baptist (then Captain) organised the staffing and equipment of this large and important institution. The next year when the School opened he was appointed Professor of Protozoology, and he held this appointment until his death nearly sixteen years later.

He was determined that his classes in protozoology should be a success and he devoted an enormous amount of time and trouble not only in preparing his lecture notes but in collecting material from all over the world for demonstration specimens and for issuing to the practical classes. In 1923 he published his lecture notes in the form of a book which the students of the earlier years at the School found invaluable.

This would have been full-time occupation for most men but Knowles with his unbounded energy found time to carry out

many important research investigations. He maintained his interest in kala-azar and actively co-operated in the research that was being carried out on the transmission of this disease. The paper that he wrote with L. E. Napier and R. O. A. Smith on the development of leishmania in the sandfly, *Phlebotomus argentipes*, opened a new phase in the investigation of this subject. It would be out of the question here to attempt to enumerate the various investigations which he carried out in the realm of medical protozoology; his published papers covered a wide field, reporting investigations on trypanosomes, leishmania, spirochætes, amœbæ, intestinal flagellates, and human and simian plasmodia. During his last years he carried out some very important investigations on monkey plasmodium, a strain of which, first discovered at the Calcutta School by some of his associates and distinguished from other simian plasmodia by Sinton, was named after him, *Plasmodium knowlesi*. He and his valued assistant Biraj Mohun Das Gupta were the first to transmit this plasmodium to man. This strain has recently been used in the treatment of neurosyphilis in Europe.

Perhaps, Knowles will be best known for his excellent book on medical protozoology. For many years there was no satisfactory book on this subject for the student and it was always Knowles' ambition to provide one. In the first few years at the School he felt that there were too many gaps in our knowledge to make a book on the subject worth while; he thought that it would be out of date before it was printed. However, at the beginning of 1927 he felt that the time had come to put his notes together and to fill in the gaps, and by the end of the year he had completed the manuscript for his book which he modestly called an *Introduction to Medical Protozoology*. When he had written more than half the book, Wenyon's classical work on this subject came out and Knowles wavered in his intention, but he considered that Wenyon's book did not quite meet the needs of the Indian student and he decided to finish his own book. The new matter which

Wenyon's book presented made it necessary for him to expand and even re-write some of the sections that were already finished. The writing of this book was a gigantic task which he completed in an incredibly short time.

Other important books that he wrote were *On the Dysenteries of India* with Acton and on malaria with Mr. S. White.

On a number of occasions he officiated as Director of the Calcutta School of Tropical Medicine.

He was Assistant Editor of the *Indian Medical Gazette* from 1922 to 1928 and Editor from 1928 to 1932; he devoted a very great deal of his time to editorial work and he did much to raise and to maintain the standard of this journal. He was a most facile and lucid writer, and his output was enormous.

During the last few years of his life ill health curtailed his activities; however even then he was not content just to do his routine duties and in 1934 he undertook the task of writing a comprehensive review of the work of the School of Tropical Medicine during the previous twelve years.

He was President of the Medical Section of the Science Congress in 1930 and his presidential address on the evolution of medical protozoology was an excellent example of Knowles' best work; it has frequently been quoted in this and other countries. He was always a great supporter of the Asiatic Society and he was for a long time Medical Secretary, and later for a number of years a Vice-President of the Society.

He was a Foundation Fellow and was also on the Council of the National Institute of Sciences of India.

He was given a C.I.E. in 1935, an honour which many of his friends considered he should have earned many years earlier.

The medical profession and medical research in particular have suffered a great loss through his untimely death.

L. E. NAPIER.