

in embryology at the University of Chicago: in 1897 he was assistant professor. While at Chicago, Wheeler went on study leave to Europe (1893-94), working under Boveri at Würzburg, and at Liège; he also occupied the Smithsonian table at the Naples Zoological Station. In 1899 he became professor of zoology at the University of Texas; in 1903 he was made curator of invertebrate zoology in the American Museum of Natural History, New York, and from 1908 until 1935 he was professor of entomology at Harvard University. In addition to the last-named post, he was dean of the Bussey Institution of that University from 1915 until 1929.

Much of Wheeler's early researches were in the domain of general zoology—especially morphology and embryology. Mention may be made of his work on the development of the urino-genital system of the lamprey (*Zool. Jahrb.*, 13, *Anat.*; 1899): his contribution on the peculiar Annelid *Myzostoma* (*Naples Mitt.*, 12; 1896) and his large treatises on insect embryology (*J. Morph.*, 3; 1889: 8; 1893) besides several articles written in German and contributed to the *Zoologischer Anzeiger*. Wheeler's work on insect embryology, it may be added, is still important to-day. This kind of occupation, however, failed to satisfy him: "My association with Peckham, Whitman and Patten," he wrote, "had converted me into a hard-boiled morphologist." Henceforth he devoted himself to the insect world and developed his predominant interest in ant life. On this subject alone he must have published more than a hundred and fifty papers, covering most aspects of their economy. On the systematic side he has left a great output of high-class work, but it was the living creatures which attracted him most and especially the peculiar relations of ants to other insects and to the plant world. In addition to his great text-book on ants (1910), in the Columbia Biological Series, the treatise of more than 1,000 pages on the ants of the Belgian Congo (1921-1922) is a monument to his industry and to the other workers who collaborated with him. Wheeler's lectures given at the Lowell Institute, Boston, in 1922 formed the basis of his book "Social Life among the Insects" (1923). This work was greatly amplified in the elaborately documented "Social Insects, their Origin and Evolution" (Paris, 1926; London and New York, 1928). In 1928 there were also published his books "Emergent Evolution and the Development of Societies" and "Foibles of Insects and Men". In 1931 there appeared the book "Demons of the Dust: A study in Behaviour"—an attractively written study of parallelism in evolution as revealed by two widely divergent insect types. His last book was "Colony Founding among Ants", published in 1933, but I believe that he left material for at least one other book at the time of his death. He was active to the very end, and some of his latest papers only came to hand a few weeks ago.

All who knew Wheeler—and his friends are scattered in many lands—will feel a sense of personal loss, for he inspired genuine affection and regard. Many will recall his keen sense of humour as revealed in his published addresses and other writings, or in

telling a good story. During his teaching career, at the Bussey Institution, each year brought its quota of students who came to work under him. Many who have now made distinguished careers owe their start to Wheeler's counsel and guidance. His interest was mainly in the research man rather than the undergraduate. Having discussed a programme of work with a student, the latter was usually left to his own devices, for Wheeler rarely visited his students in the laboratory. All who brought their difficulties to him, however, found him both helpful and sympathetic. Wheeler possessed the faculty of inspiring confidence in his men and succeeded in stimulating their best efforts.

Wheeler was a man of simple tastes and with the mind of a scholar. Besides a knowledge of the classics, he was thoroughly familiar with several European languages. His favourite reading for a number of years past covered many aspects of philosophy, psychology and sociology, written in several tongues. With this background, ripened by extensive travel and first-hand observation in the tropics and other lands, he brought to bear a penetrating insight into his interpretation of the evolution and behaviour of social insects. As expositions of such phenomena his writings are unsurpassed.

Wheeler belonged to most of the chief scientific societies of America. He held the degrees of Sc.D. of Harvard and Chicago Universities and of LL.D. of the University of California. He was an honorary member of the Entomological Societies of France and Belgium and was one of the twelve honorary fellows of the Royal Entomological Society of London. His first visit to Europe was in 1893 and he last visited England in 1935, when he attended the British Association meeting of that year. He married Miss Dora Bay Emerson of Rockford, Illinois, in 1898, who survives him together with a son and a daughter.

A. D. IMMS.

Prof. L. Mangin

LOUIS MANGIN, former director of the Museum national d'Histoire naturelle in Paris, died at Orly on January 27 last. Born at Paris on September 8, 1852, Mangin was of Lorraine origin. He first studied botany under Le Monnier at Nancy and then with van Tieghem at Paris. He became professor of natural sciences at the Lycée of Nancy when twenty-one years of age, and at Louis-le-Grand when twenty-nine. His first researches showed the influence of his teachers and were concerned with plant anatomy and physiology; his thesis for his doctorate was on the adventitious roots of Monocotyledons. In collaboration with Gaston Bonnier he undertook research on respiration, transpiration and carbon assimilation, with results which are of interest in the historical developments of these subjects. This was followed by investigations on the physiology of Basidiomycetes, pioneer work which has not been much added to in the fifty years which have since elapsed.

Mangin then turned his attention to the structure of cell membranes, and by his methods of micro-chemical analyses and differential staining laid the

foundation of modern histological research; that on the membranes of Mucorineæ and Peronosporaceæ is still the basis of text-book descriptions.

From the physiology of fungi and the structure of membranes it seemed logical to pass to the study of fungal infections, and this Mangin did with such effect that he is rightly regarded as one of the founders of French phytopathology. His best-known investigations are those on the diseases of wheat, chestnut, vine (with Viala) and fruit trees; he also studied rots of timber.

In 1904, Mangin was appointed professor of the classification and natural families of Cryptogams at the Museum national d'Histoire naturelle in succession to Dehérain, who had held the chair since 1880, but as professor of vegetable physiology. Here his enthusiasm and administrative ability resulted in his being surrounded by a group of active workers—but in conditions which were surprisingly bad. He continued his investigations and became interested in phytoplankton. One aspect of his work which has not received the recognition due to it, was the attempt to add precision to the description of moulds. In 1920, he was elected by his colleagues to succeed

Edmund Perrier as director of the Museum. His administrative duties, particularly heavy on account of the effects of the War, left him little opportunity for research, but he devoted what time he could spare to the study of phytoplankton. By the time he retired in 1931 he had extended the activities and raised the prestige of the Museum; but perhaps his greatest service was the building of the magnificent new Botanical Gallery at a cost of twenty million francs, of which the Rockefeller Institution gave five millions.

Louis Mangin showed his character in his work; when one met him he appeared somewhat reserved but alert and practical, though ever ready to extend to younger men courtesy of a kind suggestive of an older generation.

J. R.

WE regret to announce the following deaths:

L. B. L. Belinfante, secretary of the Geological Society of London in 1916–30, and editor of the *Quarterly Journal* in 1890–1930, on April 10.

Dr. A. P. Wills, professor of mathematical physics in Columbia University since 1910, on April 17, aged sixty-four years.

News and Views

Royal Society: New Fellows

At the meeting of the Royal Society held on May 6, the following fellows were elected: Dr. J. D. Bernal, lecturer in crystallography, University of Cambridge; Prof. A. C. Chibnall, assistant professor of biochemistry, Imperial College of Science and Technology; Prof. G. R. Clemo, professor of chemistry, Armstrong College, University of Durham; Dr. A. N. Drury, lecturer in pathology, University of Cambridge; Prof. H. Munro Fox, professor of zoology, University of Birmingham; Prof. W. E. Garner, professor of physical chemistry, University of Bristol; Dr. S. Goldstein, lecturer in mathematics, University of Cambridge; Dr. Percival Hartley, director of biological standards, National Institute for Medical Research; Prof. H. L. Hawkins, professor of geology, University of Reading; The Rev. J. E. Holloway, lecturer in botany, University of Otago; Dr. W. Hume-Rothery, Warren research fellow of the Royal Society; Dr. T. G. Mason, Cotton Research Station, Trinidad; J. Reid Moir, archæologist; Dr. M. L. E. Oliphant, assistant director of research, Cavendish Laboratory, Cambridge; Dr. C. F. A. Pantin, lecturer in zoology, University of Cambridge; Dr. D. R. Pye, deputy director of scientific research, Air Ministry; Dr. E. C. Stoner, reader in physics, University of Leeds.

Coronation Honours

THE following names of scientific workers and others associated with scientific work appear in the list of Coronation honours conferred by H.M. the King: *Barons*: The Right Hon. Christopher

Addison, first Minister of Health, 1919–21, and Minister of Agriculture and Fisheries, 1930–31; Sir John Cadman, chairman, Anglo-Iranian Oil Company and Iraq Petroleum Company. *G.C.M.G.*: Sir Frederick Leith Ross, chief economic adviser to His Majesty's Government. *K.C.B.*: E. J. Forsdyke, director and principal librarian, British Museum; Prof. E. Mellanby, secretary of the Medical Research Council. *K.C.M.G.*: Sir David Chadwick, secretary of the Imperial Economic Committee and of the Executive Council of the Imperial Agricultural Bureaux; Prof. A. P. W. Thomas, emeritus professor of botany, zoology and geology, Auckland University College, New Zealand. *Baronet*: Sir David Milne-Watson, president of the National Gas Council and Governor of the Gas Light and Coke Company. *Knights*: Prof. R. W. Chapman, professor of engineering, University of Adelaide, South Australia; Brigadier H. J. Couchman, surveyor-general of India; Dr. Allen Mawer, provost of University College, London, and director of the Survey of English Place Names; Colonel A. Olver, expert adviser in animal husbandry to the Imperial Council of Agricultural Research; Dr. R. H. Pickard, director of the British Cotton Industry Research Association; Dr. D'Arcy W. Thompson, professor of natural history, University of St. Andrews. *C.H.*: Prof. C. T. R. Wilson, for services to experimental physics.

C.B.: Major-General H. M. Perry, honorary surgeon to the King, director and professor of pathology, Royal Army Medical College; Dr. D. R. Pye, director of scientific research, Air Ministry; B. Rackham, keeper, Department of Ceramics,