

OBITUARIES

Prof. A. H. Reginald Buller, F.R.S.

ARTHUR HENRY REGINALD BULLER was born in Birmingham on August 19, 1874. His biological training included work at Mason College, Birmingham, at Leipzig, Munich, and (in 1900) at the Marine Biological Station, Naples. He then returned to Birmingham as lecturer in botany until, in 1904, he was appointed first professor of botany in the University of Manitoba.

The young and booming city of Winnipeg delighted Prof. Buller, and the cold, bracing winters suited him. He entered with enthusiasm and energy upon his teaching, which at first included geology as well as botany. He prepared all his lectures and laboratory courses with great care, and transmitted something of his scientific spirit to his students. He did much, with the few other faculty members, to promote the growth of the young University.

At night during the long winters, and in any free time by day, he devoted himself to researches on the fungi. With painstaking, persistent care, and with much ingenuity in the use of simple apparatus, he sought out the details of such activities as the production, liberation, and dispersal of spores in *Coprinus* and other fungi. Few could lose themselves so completely in their work as he; but, since he never married and always lived at a hotel, the missing of a meal or a night's sleep disturbed no one.

One of the attractions of the position at Manitoba was the long summer holiday which allowed him to spend three or four months each year at Birmingham, where he worked in the laboratories or library, or studied Nature in the woods and fields, commonly with his friend W. B. Grove. In later years he spent much of each holiday at Kew.

Although Buller had published several papers in scientific journals, by 1909 he had enough material for a book to be entitled "Researches on Fungi". He submitted his manuscript to a society, but was told it could not be published unless it were reduced by about half. That, he considered, would be mutilation. He therefore published the book at his own expense—and later five more volumes even larger. Many mycologists and others have found this *magnum opus* not only of great scientific value, but also eminently readable. Other books included "Essays on Wheat" and a "Practical Botany" for students.

On returning to Winnipeg each year about the end of September, he started his classes and then took advantage of the usually glorious Canadian autumns for a few mycological forays. Alone or with students, and later with members of the mycological colony which gathered at Winnipeg, he went for one or a few days into the primeval woods at Kenora or Minaki. He was a most stimulating leader of such excursions, for he knew not only the names but also the habits of the larger fungi and was always ready to spend an hour or two, even in heavy rain, to discover any new detail.

Prof. Buller gradually built up a strong department of botany and, though there was no graduate school for several years, he helped train a number of mycologists and other men of science now prominent in Canada. He took great interest in the Dominion Laboratory of Plant Pathology, which began at Winnipeg in 1923. He was always ready to help any co-worker.

Many honours came to him, including the presidency of the British Mycological Society, of the Botanical Society of America, and of the Royal Society of Canada. He was awarded the LL.D. by the Universities of Manitoba and of Saskatchewan, and a D.Sc. by Pennsylvania. He was elected a fellow of the Royal Society in 1929, and awarded a Royal Medal in 1937. His popularity as a lecturer increased through the years, and he was frequently chosen to give important lectures or lecture courses in Canada and the United States.

Buller's interests were broad. He knew by sight most of the flowering plants of England and of Manitoba, and many of the birds. He read much, and had memorized long passages from Milton and Shakespeare. He amused himself by writing verse (some of his limericks have international fame), by playing the piano, by conversation—preferably regarding fungi, but with interest on any subject. He listed his recreations as "billiards and crossing the Atlantic" and, though he found little time for the former, he made about sixty-five trans-Atlantic journeys (surely a record for a botanist). He had assumed, when he became professor emeritus at Manitoba in 1936, that his Atlantic crossings would end on an even number. However, the outbreak of war caught him at a congress in New York, so he returned to his researches at Winnipeg, varied with a number of lecture trips. In Winnipeg—which, after all, had been his main home for forty years—he developed a tumour on the brain which entailed weeks of hopeless struggle, and caused him worry because all his planned researches were not completed. He died on July 3, 1944, and is survived by a sister in London.

G. R. BISBY.

Prof. A. E. Conrady

ALEXANDER EUGEN CONRADY was born at Burschied, Düsseldorf, on January 27, 1866. His death in London on June 16, 1944, removes one who has taken a very prominent part in the development of optical sciences in Great Britain, of which he became a naturalized subject in 1903.

His father, Edmund Conrady, ultimately left the profession of schoolmaster to manage a firm which had its business centre in Bradford, England, but A. E. Conrady's first visit to England took place while he was still an undergraduate at the University of Bonn, and later he also had occasion to travel to various parts of the world in the capacity of engineering adviser. He seems early to have developed a great interest in the design and production of lens systems, and in the early 1890's he set up in business at Keighley as "Optician and Mechanician". Somewhat later he received great assistance and encouragement from Mr. George William Brown of Leeds, with whom he entered into partnership under the name of Eugen Conrady and Co., with premises in Park Street, Camden Town. During this period he designed and began to produce the microscope objectives known as the "Holoscopic" Series, which were considered at that time to be unsurpassed in definition. He had also designed and produced a convertible anastigmatic photographic lens of aperture $f/6.3$, followed by others.

In 1898 Conrady began his long association with Messrs. W. Watson and Sons, Ltd., as chief designer and scientific adviser. The "Holoscopic" systems were and still are produced by this firm, for which

he designed many other notable systems, including a range of apochromatic objectives. During the War of 1914-18 it was early found that all the periscopes used in British submarines had been obtained from a foreign firm and that no British maker had experience of their design and manufacture; but Conrady produced very successful designs for this essential instrument and superintended the subsequent production, thus helping materially to avoid a very grave peril.

The Department of Technical Optics was founded at the Imperial College of Science and Technology in 1917 to meet the urgent need of training more optical designers for British firms, and Conrady was appointed to the chair of optical design on the strong recommendation of the late Prof. F. J. Cheshire. Conrady's first class was a summer vacation course, attended by a large number of enthusiastic students including a Senior Wrangler. Freed from the immediate pressure of an industrial post, Conrady's unrivalled practical experience flowered into original and strikingly simple treatments of optical theory.

Conrady had already had contributions to the theory of optical design published in papers in the *Monthly Notices of the Royal Astronomical Society* during 1904-5, and had thus indicated already that the main feature of his work would be the application of physical optical principles in this field. He was greatly influenced by the work of the late Lord Rayleigh, and coined the now familiar term 'Rayleigh limit' to denote the $\lambda/4$ maximum allowable optical path difference characteristic of a good design. He worked out the relations between geometrical and physical expressions of aberration, and showed how to control the residual aberrations. A series of papers which appeared in the *Monthly Notices* during 1918-20 reflect something of the fertility of his ideas, which were, however, treated much more fully in the typed lecture notes issued to students. His well-known book, "Applied Optics and Optical Design" (Oxford University Press, 1929), was the result of many trials and experiments in presentation. His work has placed the whole subject of optical design on a far stronger basis than was previously obtainable.

Beyond the material contained in the first book, he had given, in his lectures to advanced students, more extensive material on the systematic design of microscope objectives and a new treatment of aberration theory based on considerations of optical path. It was hoped that after his retirement from the Imperial College in 1931, he would have leisure to complete this material for a second volume, but ill-health unfortunately frustrated him. The hope has been widely expressed that since some members of his family are distinguished in the fields of physics and optical design, they will be able to edit and publish the very full notes which he left.

Conrady was never happier than when lecturing to his students, emphasizing special points with a shake of the upraised forefinger. He had a keen sense of fun and humour, and he enjoyed and told many a good story. Fond of the open air, his favourite holiday frequently took the form of an extended trip with his family up the Thames in a rowing boat. He was, however, extremely shy and sensitive, shrinking instinctively from controversy.

His activity of mind made him seem somewhat inattentive to parallel work carried out by others. Faced by a question, he found it easier to obtain the answer from his own research than by reference to

published literature, and indeed his writings are remarkable for their scarcity of references to investigations published by other writers. He might have been happier if his temperament had allowed him more readily to tolerate controversy and criticism, but on his retirement he withdrew completely into privacy, partly owing to indifferent health. He had lectured before the Royal Institution, and had received the Traill-Taylor Medal of the Royal Photographic Society; and it is pleasant to record that shortly before his death he was made an emeritus professor of the Imperial College of Science and Technology. But if honours were comparatively few, his most notable honour is the gratitude of many students to whom he opened paths which would otherwise have been impassable. His passing will be much to the regret of students and former colleagues.

In 1901 he married Annie, the fourth daughter of William and Mary Bunney of Harefield, who died in 1941. He is survived by three daughters.

L. C. MARTIN.

Dr. Milan Hodža

DR. MILAN HODŽA, the Czechoslovak scholar and former statesman, died in Florida on June 27 at the age of sixty-six. The son of a Protestant pastor, Hodža was born at Sučany, in north Slovakia, in 1878 and graduated at Budapest. Circumstances led him to champion the cause of his Slovak kinsmen, whom he represented in the Hungarian parliament during 1905-14. He was imprisoned during the War of 1914-18, but when the Czechoslovak Republic was founded his advancement was rapid. Indeed, he was almost continuously in the Cabinet either as Minister of Agriculture or Education and lastly as Premier during 1935-38.

Hodža was responsible for many progressive educational measures and for various social advances such as the radical land reform in Czechoslovakia. In education, his policy was to neglect no section of the community, and to utilize the nation's resources to the financial limit. This involved the erection, equipping and staffing of thousands of new elementary and secondary schools, and the establishment of two new universities, besides various scientific institutes and research stations. In agriculture he realized the importance of the need for greater application of scientific knowledge for improved crop cultivation and stock-breeding, and he also did much to promote international co-operation among agriculturists.

His premiership coincided with critical years for his country, and when its independence was lost he went first to France, then to England and finally to the United States, where his last years were spent in writing his "Federation in Central Europe", in which he outlined a scheme for a federal co-operation among the Danubian States.

G. DRUCE.

WE regret to announce the following deaths:

Sir Ralph Fowler, O.B.E., F.R.S., Plummer professor of applied mathematics in the University of Cambridge, on July 30, aged fifty-five.

Mr. F. J. Mortimer, C.B.E., a former president of the Royal Photographic Society and editor of several photographic journals, recently by enemy action, aged sixty-eight.