strongly than its predecessor on the necessity for fostering agricultural research; this was fully accepted by Lord Curzon; the agricultural departments were strengthened, and Mr. Phipps's gift made possible the Central Experiment Station.

It was established at Pusa in Bihar, an interesting district at that time as much indigo was grown there and the planters were feeling the competition of the synthetic product. They had their own research organization, but it was too small, too late, and wrongly organized; the crop had to be abandoned. Pusa was better organized from the start: its staff included J. W. Leather as chemist, A. Howard and his gifted wife Gabrielle, née Matthei, both able botanists, she exceptionally good; E. J. Butler was mycologist, and M. Lefroy entomologist. All did valuable work. Leather's was perhaps the least known; it was on the water requirements of plants and on soil moisture and received less attention than it deserved. The Howards had available to them the very useful collection of wheats at the Cawnpore Experiment Station started by W. H. Moreland and extended by J. Haymon and later by Bryce C. Burt; one or both of the Howards had the artist's eye for picking out suitable parents, and before long Pusa 4 and Pusa 12 were widely and successfully grown in the United Provinces and the North West Frontier Province. The aim at the time was to produce in a bad season enough wheat to satisfy home requirements; this meant a surplus in a good season which could be exported to Britain. The plant breeders therefore had in mind the requirements of British millers. Rust-resistant linseeds and wilt-resistant pigeon peas were also bred. Breeding of sugar cane varieties was systematized at Coimbatore by C. A. Barber, and the work was continued by T. S. Venkataraman; the Station was joined with the Imperial Institute in 1931 and remained so until recently.

Pusa had several disadvantages: it was very isolated, which is always bad for the staff of a research institute, and it was not exempt from earthquakes. One came in 1934 and damaged the main building beyond repair. It was wisely decided to transfer the Institute to a site near New Delhi. A thousand acres of land was acquired and some very fine laboratories were set up: the new Institute was opened in November 1936 by the Viceroy, Lord Linlithgow. The ceremony was unforgettable; I was among the guests, and kept in touch with the Institute in after-years; on my last visit four years ago it was a great pleasure to see how well the high hopes expressed on that opening day had been fulfilled.

The present director, Dr. B. P. Pal, has done valuable work in breeding wheats resistant to rust and loose smut. India's wheat belt is in the north, but as rust is worst in the hills Dr. Pal has bred varieties suitable for use there. All three rusts occur—black, yellow and brown; varieties showing good field resistance to each have been produced, but none is yet resistant to all three. Varieties of potatoes resistant to late blight have been produced. The entomological staff is making some interesting investigations on the biological control of insect pests. Good work on soil colloids was done by the previous director, J. N. Mukherjee; the well-known Soils Department is in charge of S. P. Raychauduri. In the Agronomy Department under T. J. Mirchandani a good dairy herd has been built up, giving an average milk yield of 600 gallons per lactation which is far in excess of the usual quantity in India. Co-operative fertilizer trials in different parts of India are also made.

The Institute's agricultural extension work in the Delhi villages promises to yield valuable results; India's great problem hitherto has been to get the peasants to adopt the improvements devised at the experiment stations. It has not been entirely a matter of ignorance: there have been serious practical difficulties which this extension work will reveal and ultimately, it is hoped, overcome.

A valuable feature of the work from the outset has been the training of postgraduate students to fill the numerous posts created by the Planning Commission and other development organizations. A hostel has been built to accommodate a hundred of them.

The contributions of Indian scientific workers to the advancement of their respective subjects are not so well known outside India as they should be, and it is very desirable that steps should be taken to summarize them in easily accessible monographs. A beginning was made in 1949, when Dr. P. E. Lander, formerly principal of the Punjab Agricultural College, produced "The Feeding of Farm Animals in India"; this was followed by "Dairying in India", by J. N. Warner, of the Allahabad Agricultural Institute, and by "Animal Nutrition Research in India", by Dr. K. C. Sen, director of the Indian Dairy Research Institute at Bangalore.

The Institute has a great record of valuable service rendered to agricultural science in general and to India in particular: a record of which its members can be justifiably proud. It has an able and enthusiastic staff, and all their colleagues and friends elsewhere will wish them a happy and prosperous future.

OBITUARIES

Sir Godfrey Thomson

By the death of Sir Godfrey Thomson at Edinburgh on February 9, education and educational psychology have suffered the loss of an outstandingly vivid personality.

Born in Cumberland in 1881 and educated from early years at Newcastle, Godfrey Hilton Thomson to the end of his life was recognizably of that part of England that lies between Tyne and Tweed. At Armstrong College (now King's College), Newcastle upon Tyne, he graduated B.Sc. with distinction in mathematics and physics, a postgraduate fellowship allowing him to study at Strassburg under Ferdinand Braun and gain a doctorate in physical science. There his natural talent for geometry also found inspiration from K. T. Reye; but for certain turns of circumstance he might well have become a geometer. As it was, the Queen's Scholarship upon which he had entered Armstrong College exerted a long-range effect, since one of its provisions had been that the holder should teach for a number of years. Thus Thomson became an assistant lecturer in education in his old College, an experience which, together with earlier experience as a pupil teacher, gradually transferred his interests towards the psychology of education. This transition is marked by some papers dealing with psychophysical methods. A long vacation spent in the laboratory of C. S. Myers at Cambridge and some statistical contact with Karl Pearson played a further part in fixing the lines of his career. In later life he claimed to be a Pear-

sonian; perhaps Aristotelian might have been the more exact description.

It is probable that his final orientation was determined at the time, and by the occasion, of the well-known controversy, now almost forty years old and somewhat outdated, between him and C. Spearman, concerning the latter's theory of the general and the specific factors that enter into mental ability and are presumed to explain certain properties of the correlation tables derived from test scores. Thomson's own theory, antithetical to Spearman's, was a many-factor sampling theory; but he always preserved a mind open to various later explanations. His mature views are to be found in his book, "The Factorial Analysis of Human Ability", published in 1939.

In 1920 Thomson was appointed to the chair of education at Newcastle, a post which he held for five years, one session being spent in America, where he was always *persona gratissima*. It was during these years that he devised the Northumberland Tests, designed to select children for the advantages of free secondary education. His motive here, as always, was the securing of justice for all classes of the community.

In 1925 he was appointed professor of education in the University of Edinburgh and director of Moray House Training College, an arduous double office which he held until his retirement in 1951. It is remarkable that in spite of the exorbitant demands of administration and of numberless extraneous committees, he still found time to write papers and books. During this period the Northumberland Tests evolved into the Moray House Tests. Characteristically, he refused to accept personal benefit from these, establishing a trust which administered the proceeds towards educational research.

In the two great surveys, in 1932 and 1947, of the intelligence of a complete age-group of all Scottish children, with sociological and other implications, Thomson was chairman of the Mental Survey Committee. Many other chairmanships and secretaryships, of the Committee of Sociology under the Colonial Research Council, of the Twelfth International Congress of Psychology, the British Psychological Society, the Psychology Section of the British Association and so on, make it very apparent that Thomson, a man of pre-eminent public spirit, never spared himself.

A knighthood was conferred upon him in 1949, the culmination of many distinctions. These were worn so lightly that in his presence they were forgotten. Both personally and as an educationist he was known and respected throughout the world; tall, spare-built, alert of glance and quick of speech; forthright, endlessly generous and sympathetic. His work remains and will be remembered; but still more one will remember the man. A. C. AITKEN

Prof. C. O. Bannister

BY the death on February 22 of Charles Olden Bannister, professor emeritus of metallurgy in the University of Liverpool, at the age of seventy-eight, the teaching and practice of metallurgy loses one of its few remaining links with the closing years of the past century, when such far-reaching changes were taking place in regard to what should constitute the curricula of courses for students in that branch of technology. In fact, metallurgy, as a subject, apart from the operations of smelting and recovery, was only just beginning to be recognized as an essential adjunct to successful engineering practice. In this rapidly widening conception of what metallurgy should stand for, Bannister had played a distinguished part.

With a sound basis of practical chemistry before going to the Royal College of Science in 1896, he had there the unique advantage of coming under the direct tutelage of Prof. W. A. Tilden and a brilliant group of lecturers and demonstrators which included William Palmer Wynne, Martin O. Forster and J. S. S. Brame, all of whom achieved distinction in wider fields in later years. Electing to take the associateship of the Royal School of Mines in metallurgy, Bannister then came under the inspiring influence of Roberts-Austen, whose teaching and researches had already pointed the way to the future scope of metallurgy. After heading the list in his year (1899), with the award of the Bessemer Medal, he remained at the School as an instructor in assaying, first under the professorship of Roberts-Austen (until his death in 1902) and then under his successor, Prof. William Gowland. During this period, when he was closely associated with the late W. H. Merrett, he received the postgraduate award of an 'honours' associateship. Then, in 1903, the opportunity came to transfer his activities to the City of London where, a few years previously, the considerable enlargement of a very old city foundation in Aldgate had led to the creation of the Sir John Cass Technical Institute. There, as head of the Metallurgical Department, Bannister built up, during the next sixteen years, what became an outstanding school of metallurgy in the Metropolis.

During his tenure of this post Bannister was also closely associated, as a consultant in Westminster, with the late F. W. Harbord (a School of Mines man of an earlier generation) and with the late E. F. Law (one of his own fellow-students). This association brought him into intimate contact with the varied metallurgical problems with which practising engineers were being confronted in those days, when there were but few to whom they could turn for help and advice. During the First World War (1914–18) Bannister was responsible for a variety of work for the British and Belgian Governments, and he also served as a war-time lecturer at the Royal School of Mines. Then, in 1920, came his appointment as the first occupant of the chair of metallurgy in the University of Liverpool, which he continued to hold with distinction until his retirement in 1941. The Department of Metallurgy was, at that time, unique in being within the Faculty of Engineering. This ensured that its students received tuition both in mechanical and electrical engineering. Moreover, Prof. Bannister arranged that all engineering students should attend courses in metallurgy, particularly of iron and steel. Courses were arranged for naval architects and marine engineers to cover matters such as corrosion and the metallurgy of bearing metals. From time to time he was called as an expert witness in law cases of importance and at times in association with Horatio Ballantyne. During the tenure of his professorship at Liverpool, he had been dean of the Faculty of Engineering from 1924 until 1928 and again from 1935 until 1938.

Bannister undertook to revise, in step with rapid progress, certain metallurgical text-books having an established prestige—Gowland's "Metallurgy of the Non-Ferrous Metals", Sexton's "Metallurgy" and Lunge and Kean's "Technical Methods of Chemical Analysis". He was also the co-author, with H. Garland, of "Ancient Egyptian Metallurgy", and he