predecessors had failed, in breeding his oysters, laying their spat and protecting their shells. Meantime, the market for pearl shell had gone, Vienna, its chief user, being almost a city of the dead, and he himself driven to hawking his shells where he could. Donganab was abandoned and Crossland came back to England.

During the next twenty years, Crossland used Cambridge as his home base, writing many papers on his collections, those on the chaetopods in a class by themselves. There came next that curious expedition on the sailing yacht *St. George*, which anyone could join, each "going as he pleased". He wrote admirable accounts of the calm and muddy seas off Panama and of the fresh volcanic slopes of the Galapagos. In the older bays of the Marquesas corals tried to build in a singularly barren region. He left the ship at Tahiti, where he settled on its coasts for a year, to study its highly developed reefs and a luxuriant fauna, the most easterly outlier of Malaya. The surrounds of Tahiti, Moorea and later Rarotonga were compared to those of other regions, with striking results. Basaltic stones were found lying in the reef surfaces or bedded in the rock below. The reefs are going back rather than extending seawards, and in extreme cases appear as submerged banks. The lagoons were formed by the hollowing out of an originally continuous reef. These important conclusions were followed by a close study of the corals, on which he was still engaged up to the time of his death.

Crossland, however, was called from retirement once again to go to the Red Sea, being commissioned by the Egyptian Government to found a biological station at Ghardaqa off the mouth of the Gulf of Suez. Like everything else, he did this well, the facilities for keeping living organisms being excellent. He explored the deep waters of the Gulf of Akaba and of the Red Sea off the same. To-day his station is a flourishing institution and Dr. Gohar, its director, generously extends its hospitality to Western workers.

In many respects Crossland was a most attractive person. He enthused everyone with whom he came into contact, this extending to his native labour wherever he was. His published researches number about forty and are characterized by their original, often unorthodox, outlook. They demand the study of all who are concerned with biological and faunistic research in the tropics. His deafness was a tragedy, for it prevented that personal contact with his fellows so valuable to research workers. J. S. GARDINER.

Dr. Alexander Russell, F.R.S.

DR. ALEXANDER RUSSELL, advisory principal and governor of Faraday House College, died at his home at Mill Hill on January 14.

Dr. Russell was born at Ayr in 1861 and graduated at the University of Glasgow with first-class honours in mathematics and natural science. In 1882 he went to Caius College, Cambridge, and became a wrangler in 1886. He was for a time mathematical lecturer at Caius, and afterwards mathematical master at Cheltenham College and then at the Oxford Military College.

In 1890 Dr. Russell joined the staff of Faraday House, so that he was associated with it practically from the beginning. He became principal in 1909 and remained in this position until 1939, when he became advisory principal, leaving the more active work to a younger man. It was during these thirty years that he built up the college and its reputation,

so that the name of Faraday House is always linked with his and can never be dissociated as long as it exists. No successor can take his place.

Many honours came to Dr. Russell during that time. He was awarded the D.Sc. by his old University of Glasgow in 1908 and in 1924 the LL.D. He was elected president of the Institution of Electrical Engineers in 1925 and had been president of the Physical Society and vice-president of the Institute of Physics, and nominated an electrical inspector by the Electricity Commissioners. He was elected to the Royal Society in 1924 and finally in 1940 he was awarded the Faraday Medal of the Institution of Electrical Engineers. There have been only eighteen recipients of this medal since its foundation, and among them are such famous names as Sir Oliver Lodge, Lord Rutherford, and Sir William Bragg.

Dr. Russell had been a pupil of Lord Kelvin, who had been a friend of Faraday, so that an authentic link was preserved, through him, with the pioneer of practical electricity.

Dr. Russell was fortunate in being known in the electrical world in the early days of the practical application of alternating currents and was able to apply his mathematical knowledge to the problems that they raised. His two books, "Alternating Currents" and "Theory of Cables", became standards, and the method he invented for computing the mean horizontal candle-power of a lamp is still called the "Russell angles". He was a most industrious writer and produced a life of Lord Kelvin as well as many papers communicated to the Royal Society, the Physical Society and the Institution of Electrical Engineers. For many years he was a frequent contributor to NATURE.

One of Dr. Russell's great interests was lightning and atmospheric electricity, but during his latter years he became absorbed in the theory of numbers.

In the early days of television, Dr. Russell took a party of engineers to Baird's early studio in St. Martin's Lane. It was suggested that an attempt should be made to transmit a human face, and Dr. Russell was selected for the experiment. It has, therefore, been claimed that he was the first man to be televised, but complete confirmation of this fact is lacking.

Many hundreds of old students of Faraday House College, now scattered all over the world and in the Services, will remember Dr. Russell by his kindness and helpfulness to all who came to him. This is the truest and most lasting memorial to the memory of a great man. W. R. C. COODE-ADAMS.

Prof. R. G. Collingwood, F.B.A.

PROF. ROBIN GEORGE COLLINGWOOD, archaeologist, historian, and philosopher, originally acquired his artistic and scholarly tastes from his father, W. G. Collingwood, the friend and biographer of Ruskin, and his Jewish mother. He early became an omnivorous reader and an adept linguist, and thus laid the foundations of the almost universal learning which was the surprise and delight of his friends in conversation. In boyhood, too, he learnt how to use his hands in playing the piano and violin, in draughtsmanship, and in sailing a boat (always a favourite recreation), and he thus acquired the manual dexterity which was later a prominent characteristic, evidenced, for example, in toys he made for his children and in his beautiful handwriting.

At Oxford he came under the influence of Haverfield, who deepened the interest in Roman Britain which he had already caught from his father. But philosophy claimed him, and it was a philosophical fellowship to which he was elected at Pembroke College in 1912. Always too absorbed in his studies to have much time for social distractions, he had comparatively few close friends, although his attachment to those he had, like theirs to him, was deep and lasting. No less enduring was the regard of his pupils, for on them he lavished the resources of his vigorous and original mind, placing philosophical problems in their historical context and illuminating them with his extraordinary power of graphic exposition.

During his years at Pembroke he was working equally strenuously at excavating Roman sites, collecting inscriptions, and re-interpreting the history of Roman Britain. His work in these fields was recorded in a long series of publications, culminating in "The Archaeology of Roman Britain" and finally in the first volume of the "Oxford History of England", on which his fame as an historian securely rests. It was as much for his historical as for his philosophical work that he was elected a fellow of the British Academy and given the honorary degree of LL.D. at St. Andrews.

In philosophy his aim was to persuade philosophers that history was as important for their investigations as physical science. In this aim his work is meeting with some success, although his own philosophy has not yet been so widely accepted as his history. His standing as a philosopher will probably rest ultimately on his "Essay on Philosophical Method"; his later books, "The Principles of Art", "An Essay on Metaphysics", and "The New Leviathan", all con-

tain original thinking of the highest order, and they are written with a lucidity and verve uncommon in philosophical works, but they lack the finish of the earlier book, and over parts of them there hangs the shadow of his increasing ill-health.

Insomnia and overwork had begun to undermine his strength even before he became Waynflete professor of metaphysical philosophy at Oxford in 1935; and the hope that his new office, by easing his teaching burden, might enable him to recuperate and to expound his own philosophy *in extenso* was only partially fulfilled. After a serious breakdown in 1938 he fought a steadily losing battle; in 1941, when he could no longer both lecture and write, he chose to resign his chair. But there was no recovery, and he died on January 9 at the comparatively early age of fifty-three, mourned by his friends as a lovable personality, by scholars in general as one whose contributions to learning have substance and permanent worth.

T. M. KNOX.

WE regret to announce the following deaths:

Sir Robert Armstrong-Jones, C.B.E., consulting physician in psychological medicine at St. Bartholomew's Hospital, formerly general secretary and later president of the Medico-Psychological Association, on January 30, aged eighty-five.

Prof. C. C. Farr, F.R.S., emeritus professor of physics in Canterbury College, Christchurch, New Zealand, aged seventy-six.

Dr. F. S. Sinnatt, C.B., M.B.E., F.R.S., director of fuel research, Department of Scientific and Industrial Research, on January 27, aged sixty-two.

NEWS and VIEWS

Geological Society Awards

THE Council of the Geological Society has made the following awards: Wollaston Medal to Prof. A. E. Fersman in recognition of his fundamental contributions in the field of geochemistry and his researches on the economic mineralogy of Russia; Murchison Medal to Prof. A. Brammall for his notable contributions to geochemistry and petrogenesis, especially of the rocks of Dartmoor and Malvern; Lyell Medal to Mr. D. N. Wadia, lately of the Geological Survey of India, for his work on the syntaxis of the Himalaya and his contributions to the geology of India, especially Kashmir; Bigsby Medal to Dr. G. M. Lees, chief geologist of the Anglo-Iranian Oil Company, for his geological studies on Persia, Oman and his important share in the discovery of oil in England; Wollaston Fund to Miss Ethel D. Currie in recognition of her valuable researches in palaeontology; Murchison Fund to Mr. A. G. Davis for his work on the Cretaceous and Tertiary fossils of south-eastern England; one moiety of the Lyell Fund to Mr. F. A. Bannister and another moiety to Dr. M. H. Hey, for their joint X-ray and chemical investigation of minerals.

Highway Engineering at the University of the Witwatersrand

DR. BERNARD H. KNIGHT, research officer in highway engineering in the University of the Witwatersrand, Johannesburg, has been appointed to the newly

created chair of highway engineering in that University, with effect from April 1 next. It is believed that this chair of highway engineering, which is tenable in the Department of Civil Engineering, is the first of its kind to be founded in the British Empire outside Great Britain. Its establishment has been made possible by the joint support of the South African Iron and Steel Corporation and the National Road Board. Dr. Knight, who was formerly lecturer in road engineering at the College of Estate Management, London, was appointed senior research assistant in highway engineering at the University of the Witwatersrand early in 1939. Since then, three post-graduate scholarships in highway engineering have been established in its Department of Civil Engineering. The marked development in highway engineering research which has taken place at this University has been made possible by the provision of the new Civil Engineering Laboratories situated in the Hillman Building, which was officially opened by the Prime Minister of the Union of South Africa, General Smuts, in June, 1941.

Science Students and Industrial Experience

THE War is undoubtedly speeding up many changes in our educational habits. Until quite recently, it was the custom for students of engineering only, either during vacation or otherwise, to spend some part of their time in the practice of engineering on the industrial side. The needs of total war have brought