Flax. The best flax is produced in temperate regions such as Europe. In certain countries, the plant is grown primarily for linseed, the fibre being a relatively expensive by-product. Reliable information concerning the world's flax industry is difficult to obtain because of this dual-purpose objective. The output of flax appears to have declined by some 70 per cent up to 1945 and has since shown only a moderate recovery. Considerable reduction in output has occurred in Russia, Poland, Belgium and Holland, whereas it has expanded in Egypt, Australia, New Zealand and Canada. Cotton, jute and rayon are proving to be serious competitors of flax, partly because of the high price of linen goods.

Hemp. The chief hemp-producing countries before the War were the Philippine Islands (manila bast fibre, used for marine cordage), the Netherlands East Indies and Tanganyika (sisal bast fibre, used for binder twine), Eastern Europe and Russia (true, leaf hemp, used for twine and cord). World output of bast (or 'hard') hemps fell considerably through the effects of the War in the Far East, although the output in Tanganyika was maintained, and of leaf (or 'soft') hemp in Europe and Russia through curtailment of the area on which the crop was grown.

Jute. Most of the world's jute is grown in Pakistan, but the greatly increased home demand for sacking has brought about a marked reduction in exports. The jute mills and the main port (Calcutta) are situated in the Dominion of India, and future development of the jute industry will depend on the conditions of inter-trade between the two new Indian Dominions. The largest importer of jute is the United Kingdom, although present stocks are low.

Coir. The only important world-producers of coir (coconut fibre) are India and Ceylon, where the industry is carried out as a part-time occupation of villagers, who also utilize a large proportion of the material. The mobilization of native labour for war purposes in these two countries has led to reduced coir production during the past eight years.

Rayon. The output of rayon yarn has been maintained in recent times, despite the collapse of Japan, by the large increase in production in the United States, which has more than doubled since 1941. By 1946, the United Kingdom had become the second largest producer and the second largest exporter. Rayon depends for its raw materials on the supply of wood pulp or cotton linters. The filaments are reeled to produce 'filament yarn' or spun on to spindles to produce 'staple fibre'. The former competes with natural fibres; the latter s an intermediate product which is becoming increasingly important as an admixture to the natural fibres.

OBITUARIES

Prof. F. A. A. Lacroix

On March 16 there passed out of the scientific life of Paris a great figure and one whose scientific writings have been read by mineralogists and geologists the world over for the past sixty years. François Antoine Alfred Lacroix, 'secrétaire perpetuel' of the Paris Academy of Sciences for thirty-four years and professor of mineralogy at the National Museum of Natural History during 1893–1936, was born at Maçon on February 4, 1863, and died in Paris on March 16. He studied at the *lycée* of his native town, at the Sorbonne, and at the Collège de France. He commenced to study pharmacy but soon was attracted to geology and mineralogy, and in 1887 was appointed 'préparateur' at the Collège de France and a collaborator on the French Geological Survey. Before he was thirty he succeeded Des Cloizeaux as professor of mineralogy at the Natural History Museum. He added many fine specimens of minerals and a superb collection of rocks to the Museum collections. In this he was assisted by many of his pupils, mining engineers and government officials in France's overseas possessions who, catching the enthusiasm of the master for his science, seem to have been ever ready to gather materials for his scientific work and for the national collections.

On his appointment to the Museum, Lacroix commenced at once a great work on the mineralogy of France and her Colonies: its fourth volume was completed in 1913. In these volumes he described the associations and paragenesis of the minerals as well as their crystallography and optical properties. A separate work in three volumes on the mineralogy of Madagascar was published in 1922 and 1923. This included a wealth of detailed petrology and many new analyses of rocks as well as descriptions of the minerals. In this book he developed his classification of igneous rocks, a modified form of the American quantitative classification. In later years he devoted more time to petrology than to descriptive mineralogy, and published a great many papers describing the rocks of many regions, and introducing, sometimes in very brief papers, ideas of considerable importance. Meteorites and tektites—the mysterious glass bodies supposedly of meteoritic origin—were also subjects of his research and were described in important memoirs. To geologists Lacroix will be best known for his early work on the granite of the Pyrenees and its contact phenomena (1898–1900), and for the well-illustrated memoirs recording his observations on active volcanoes in several parts of the world, including especially Mt. Pelée, Vesuvius and Réunion.

In addition to all his mineralogical work, Lacroix devoted an immense amount of time to the affairs of the Academy of Sciences, working at the development of its library and the classification and enrichment of its archives, gathering together letters and other documents of great interest. He published biographies of many mineralogists. His two-volume history of the life of Déodat Dolomieu appeared in 1921, and in 1928 a historical note on the distinguished occupants of the 'chair' of the section of mineralogy of the Academy from Nicolas Desmarest (1795) to Lucien Cayeux (1928).

In all his work Lacroix had a sympathetic and devoted companion in his wife, Catherine Fouqué, daughter of the geologist, Ferdinand A. Fouqué, with whom Lacroix worked in his early years. Madame Lacroix accompanied her husband on many of his travels, visiting with him many active volcanoes. Their married life was extremely happy, and their home had a charm which touched all who were admitted to their friendship and their hospitality. Madame Lacroix died in 1944 and Lacroix never completely got over it; but still he remained enthusiastic and immensely active, and went daily to the museum and the Academy. To the end of his life he was surrounded by devoted friends and colleagues. Many geological societies had done him honour during his life-time and many tributes have already been paid to his memory. The president of the Paris Academy of Sciences, in announcing Lacroix's death to the members, described him as a man who had

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devoted his whole life to science and "qui restera dans la mémoire comme un des représentants les plus admirables de ce que peut donner, dans notre race, l'association d'un génie scientifique de premier ordre, avec un de ces caractères incorruptibles qui sont l'honneur de l'humanité". W. CAMPBELL SMITH

Dr. E. P. Harrison

DR. E. P. HARRISON, for many years professor of physics at Presidency College, Calcutta, and head of the Observatory, and later chief scientist to the Mine Design Department in H.M.S. *Vernon*, died suddenly at Chigwell Row, Essex, on May 6.

Born in London in 1877, he was the eldest son of Robert William Harrison. His school career was much interrupted by illness, but he entered University College, London, where he won the Clothworkers' Exhibition, and an 1851 Exhibition Research Scholarship in physics. From London he went to the University of Zurich, where he took a Ph.D. in science. In 1904 he went up to King's College, Cambridge, as an 'advanced student', and worked at the Cavendish Laboratory for two years. He lectured at King's College, London, and the Royal College of Science, Dublin, and was then appointed professor of physics at the Mahommedan College of Aligarh in India. Afterwards he was appointed to the Indian Educational Service, and became professor of physics at the Presidency College, Calcutta, and later, in addition, meteorologist to the Government of Bengal.

In 1923, he became chief scientist to the Mine Design Department, H.M.S. *Vernon*, a post which he held until his retirement under the age limit in 1937. His work during this period naturally received no publicity; but under his direction the application of scientific research to the problems of naval mining, begun in the First World War, under the inspiration of, among others, W. L. Bragg, F. E. Smith and G. W. Walker, was continued and extended, and the results he achieved bore good fruit when another war came. He was happiest when working in a laboratory, and never allowed the responsibilities of administration to keep him from active research.

Among Dr. Harrison's personal contributions to naval problems were pioneering work in the application of magneto-striction to the generation of high-frequency sound in water, and the investigation of various properties of the high-permeability alloys of the 'permalloy' group. Perhaps the most interesting of these are the very large changes of impedance which occur in a wire carrying audio-frequency A.C. when small longitudinal magnetic fields are applied to it. An account of fundamental work on this effect was published by Dr. Harrison and members of his staff in 1936, and a practical application was a novel form of magnetometer which was used before the War, in anticipation of the use by the enemy of magnetic mines and torpedoes, to explore the possibilities of controlling the magnetic fields of warships by current-carrying cables. This was probably the earliest practical essay in 'degaussing'. During the War the magnetometer was developed on behalf of the Admiralty by the Electrical Research Association, and became a standard measuring instrument on degaussing ranges.

On leaving the Admiralty, Dr. Harrison joined the staff of Messrs. Hughes and Sons, of Barkingside, and arranged to continue the work he had begun earlier on magneto-striction in H.M.S. *Vernon*. The original oscillators made by him were developed by the firm, and a large number of experiments were made with listening devices off Gourock pier, which led to increased sensitivity.

The outbreak of war attracted his attention to the detection of mines, either floating or submerged, by supersonics, and very valuable data were collected. Later he did much work, both in the laboratory and in trials at sea, on non-contact firing devices for torpedoes.

Dr. Harrison was a physicist in the classical tradition, and had a very keen brain which he applied with great zest to new technical arts of war and peace. He had a large circle of friends, and will be greatly missed for his constant kindness and help to young scientific workers.

NEWS and VIEWS

The King's Birthday Honours List

THE following names of men of science and others associated with scientific work are included in the King's Birthday honours list:

Baron: Sir Alfred Webb-Johnson, president of the Royal College of Surgeons.

K.B.E.: Sir Hector Hetherington, principal and vice-chancellor of the University of Glasgow; Acting Air Commdre. Frank Whittle.

Knights Bachelor: A. Leigh B. Ashton, director of the Victoria and Albert Museum; Dr. A. H. Gardiner, the well-known Egyptologist; Dr. C. R. Harington, director of the National Institute for Medical Research; Prof. C. N. Hinshelwood, Dr. Lee's professor of chemistry, University of Oxford; J. D. G. Medley, vice-chancellor of the University of Melbourne.

C.B.: H. M. Garner, principal director, scientific research (air), Ministry of Supply; N. H. Kinnear, director of the British Museum (Natural History); O. Thornycroft, director of aeronautical and engineering research, Admiralty.

C.M.G.: W. N. Allan, recently director of irrigation, Sudan Government; Dr. P. Stocks, chief statistician (med.), General Register Office; Dr. H. H. Storey, secretary of the Colonial Agricultural Research Committee.

C.B.E.: Prof. W. E. Agar, lately professor of zoology, University of Melbourne; H. H. B. Allan, director of the Division of Botany, Plant Research Bureau, New Zealand; Prof. J. H. Biggart, professor of pathology and dean of the Faculty of Medicine, Queen's University, Belfast; Dr. H. W. Cremer, president of the Institution of Chemical Engineers; Mrs. Maud E. Cunnington, for services to archæology; Prof. A. Findlay, emeritus professor of chemistry, University of Aberdeen, for services to chemistry; B. E. Frayling, Colonial Mines Service, lately chief inspector of mines, Nigeria; Lieut.-Colonel W. French, superintendent of the Technological Department, City and Guilds of London Institute; Dr. A. A. Griffiths, research engineer, Rolls-Royce, Ltd.; W. F. Higgins, superintendent of the Physics Division, National Physical Laboratory; Prof. W. R. Jones,

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