

published many fundamental papers on such systems as the conversion of chymotrypsinogen to chymotrypsin and ovalbumin to plakalbumin. An example of his inexhaustible ingenuity in the development of experimental techniques was the 'deuterium exchange' technique, which permitted the estimation of the relative rates at which individual hydrogen atoms within the primary, secondary and tertiary structures of a protein molecule could reach equilibration with deuterium atoms in the water in which the samples were dissolved.

Linderstrøm-Lang's scientific talents, combined with his characteristics of warmth and perception, brought him early and frequent recognition by many organizations, both scientific and civic. In addition to receiving numerous honorary degrees from universities throughout the world, he was a member of the Royal Swedish Academy of Sciences, the Academy of Sciences of the U.S.S.R., the Royal Society of London, the Finnish Scientific Society and the National Academy of Sciences of the United States, to mention only a few. He was, at various periods during his life, president of the Danish Academy of Technical Sciences, the Akademiet for de tekniske Videnskaber, and in 1958 of the International Union of Biochemistry.

The list of honours and accomplishments scattered through his career are too numerous to list in detail. Perhaps even more important than these tangibles, however, was the impact of his warm personality on everyone who knew him. Kaj Linderstrøm-Lang had talents in many areas of human endeavour and, had he not chosen science as his major interest, could clearly have contributed prolifically in a variety of pursuits including music, art and literature. Those who knew him will not forget his unique combination of wisdom, humour and intellectual integrity. With his death the world lost not only a great scientist but also a great man. C. B. ANFINSEN, JUN.

Dr. M. Copisarow

MAURICE COPISAROW, who died on April 15, in his seventieth year, was a scientist of quite outstanding ability. His university education was acquired between 1909 and 1913 in the School of Chemistry at Owens College, where I knew him as a fellow student. He stayed on for postgraduate study as Dalton Research Scholar during 1914-16, working with Chaim Weizmann on "Phthalides of the Benzene, Naphthalene and Carbazole Series" (published in 1915). Afterwards, as Honorary Research Fellow (1916-19), he launched out into independent inquiries concerned mainly with reactions promoted by aluminium chloride.

During the First World War, Copisarow worked for the Ministry of Munitions and was responsible for a change in the method of washing TNT which greatly reduced the risk in handling this explosive. At the end of the War he experimented on the conversion of various explosives and also phosgene into products for which industrial uses could be found, and in these operations his eyesight suffered severe injury. Most unhappily, the damage was progressive and in a relatively short time, while still at the outset of his career, he became blind. However, by 1925 he had to his credit nineteen publications of high quality, and in that year he was awarded the D.Sc. of the University of Manchester.

In his work as a chemist he could never have confined himself to narrow specialization. His mind

ranged over whole fields of scientific activity, and his keenness of perception allied to his uncommonly active imagination gave rise to a versatility which is well exemplified by his generalized theory of allotropy (*J. Chem. Soc.*, 1921) and by his work on the phenomenon of periodic precipitation, reported between 1927 and 1932 in various scientific journals. These publications illustrate admirably his ability to recognize certain apparently unrelated chemical processes and structures as forms of expression of a unifying principle and to enunciate it.

After he had lost his sight, Dr. Copisarow's scientific activities became restricted principally to the preparation of review articles and essays dealing with matters calling for theoretical consideration. His blindness seemed indeed to intensify his insight, and he extended his thinking to such subjects as the functioning of certain oxidation enzymes, the effects of radiation on enzymes and the biochemistry of virus infection. He studied these matters with the ultimate object of selecting and co-ordinating knowledge which might throw light on problems associated with the malignant growth of cells. Observations on biochemical work in the field of cancer research were published over a period of years in several journals, including a comprehensive review on the "History of Human Cancer", which appeared in the *Edinburgh Medical Journal* in 1952. Copisarow's writings on these matters were prompted by his great desire to contribute all he could to the furtherance of progress in the war on disease.

Further evidence of his feeling for the well-being of his fellow-countrymen is afforded by the interest he had in the application of appropriate scientific knowledge to agricultural pursuits, and during the Second World War he was active in advising on methods for grassland improvement and for the reclamation of bracken-covered areas. In all, he published eighty-three scientific papers, and in recognition of special services to his country he was placed on H.M. Civil List.

Dr. Copisarow was a man dedicated to the work he had chosen, and though, in later years, he had to endure much ill-health and many worries, he remained courageous in adversity, sustained to no small degree by religious faith and by the devotion of his wife and family. T. K. WALKER

Dr. D. S. Gracie

VOLUNTEERING in the Royal Scots at seventeen, David Smart Gracie was badly wounded on July 1, 1916, at the Somme, and spent the rest of the First World War as a prisoner in Ruhleben, an experience which marked him for life.

In the late 'twenties, after graduating at Edinburgh with a medal, and lecturing on agricultural chemistry, he went to the Colonial Service and carried out a notable "Preliminary Survey of the Soils of Kenya" before the Colonial Agricultural Service had been reconstituted.

Moving to the Egyptian Ministry of Agriculture in 1930, Gracie spent two decades investigating the fascinating problems presented by a soil which has sixty centuries of cultivation history, capped by its change to irrigation all the year round during the past hundred years. As the last survivor within that Ministry in 1949 of what had once been a strong team of some twenty British scientific ex-patriate workers, he finished with a chattering Brunsviga by collating

and analysing his results from sixteen continuous years of field experiments on the cotton crop. One side-issue during the Second World War from his work on other crops was to economize tonnage of merchant shipping by showing that imported artificial fertilizers produced much more food for the Egyptian than grain imported as such, which the British army had to bring in for its own use.

In 1949 Gracie started afresh in the dusty precincts of Amman with scanty resources, locating cultivable areas in the Jordan valley and the desert for the United Nations Arab Relief. In 1955 he transferred to Iran with better resources, where he created a large efficient laboratory organization for the United Nations Technical Assistance Board at Teheran. In 1958 he broke down from heat exhaustion, and retired to his Edinburgh home too late, dying there on May 31 of this year, leaving his wife Vera and one son.

With all his work done overseas, in countries not notorious for gratitude, merely increasing the resources of those countries by many acres of cultivation or many more tons of annual crop, he is likely to be one of those for whom there is but little remembrance—a depressing reflexion on those fine political projects for under-developed countries.

Gracie has been described as “a fierce seeker for truth, who could never suffer a rogue gladly”, though he might tolerate a fool. He held on to his standards of precision, and made sure that his native assistants did the same.

Out of thirty years joint experience, a mutual friend writes of “the qualities of integrity, judgment, and application in good and indifferent health which he brought to his work. He had none of the narrowness with which specialists are sometimes charged; he was widely read in a diversity of subjects and worth listening to on any of them. Unbending in his uprightness with an inner light which lit for him so clearly the path he held in all affairs, yet he was not stiff; human, kindly, generous, and considerate, his friendship was one of the wholly good things a man could be blessed with”. W. LAWRENCE BALLS

Dr. W. W. Francis

DR. WILLIAM WILLOUGHBY FRANCIS, librarian of the Osler Library at McGill University, Montreal, since 1929, died on August 10, aged eighty-one. A relative of Sir William Osler (his mother was Osler's first cousin, and Osler always spoke of him as a nephew), he was born at Montreal on April 2, 1878, and was educated at Trinity College School, Port Hope, and at Johns Hopkins University, Baltimore, where he graduated A.B. in 1898 and M.D. in 1902. After further study in Montreal, Baltimore, Vienna and London, he returned to Montreal in 1906. In 1912 he was appointed assistant editor of the *Canadian Medical Association Journal* and secretary-treasurer of the Canadian Medical Association, and in 1915 he went overseas with No. 3 Canadian General Hospital (McGill) as registrar. On demobilization in 1919, he lived in Oxford (where Osler was regius professor of medicine) before he became editor of the *International Journal of Public Health* at Geneva.

Dr. Francis's *magnum opus* was started in 1922, when he joined R. H. Hill, Archibald Malloch and Leonard Mackall in compiling the catalogue of Osler's magnificent library at Oxford. Working for 14–16 hr. a day for seven years, he succeeded nobly in inter-

preting Osler's dream of an ideal biobibliography of epoch-making books and in staging it as a pageant. The catalogue under the title “*Bibliotheca Osleriana*” was published by the Oxford University Press in 1929, and the Osler Library at McGill was officially opened on May 29 of that year. Dr. Francis was president of the Medical Library Association during 1935–37, and honorary consultant to what was then called the Armed Forces Medical Library at Washington.

Bearing a striking resemblance to Osler in the shape of his head, his olive complexion, his dark, humorous eyes, the lightness of his step, and several of his mannerisms, ‘Bill’ or ‘Billy’ Francis was a charming man. Someone said of him that he was born under a dancing star and sang his way through life. His learning was vast and bizarre, but never pedantic, his memory was rich and retentive, his humour was spicy and puckish. His seemingly infinite leisure was at the disposal of the young and old who went to him for inspiration and for help. A classical scholar, a painstaking bibliographer (“his meticulousness exceeds anything you ever met with”—Osler), and an unsurpassed writer of whimsical letters, Dr. Francis married in 1921 Hilda Colley, who survives him, with his daughter, Dr. Marian Kelen. W. R. BETT

Prof. A. Preece

THE William Cochrane chair of metallurgy in the University of Durham at King's College, Newcastle upon Tyne, became vacant last November with the untimely death of Prof. Archibald Preece at the age of fifty-three.

Preece was educated in South Wales and graduated from University College, Swansea, in 1926. He first joined the Pressed Steel Company of Great Britain as metallurgist, and later became a research officer to the South Wales Siemens Steel Research Association, but he returned to academic work in 1933 when he became a lecturer in metallurgy in the University of Leeds. There he pursued researches on the effect of high temperatures upon steel. The importance of his work was recognized by the award of the Sir Robert Hadfield Medal by the Iron and Steel Institute and by his promotion to a readership in the University of Leeds in 1946.

In 1948 he was appointed to succeed C. E. Pearson as professor of metallurgy in King's College, Newcastle upon Tyne. He took charge of a small but active department of teachers and research workers who carried out important work on the scaling of metals, temper brittleness and the solidification of steel castings, which were Preece's particular interests, though he encouraged others to work on a wide variety of different metallurgical topics. Just before his death he had the satisfaction of moving his Department into more commodious quarters and installing new equipment.

Prof. Preece was a deeply religious man who could be stern or kindly as the occasion demanded. He set himself extremely high standards both in his work and in his dealings with students and colleagues. Probably the most outstanding quality by which he will be remembered was his unwavering integrity and his strict adherence to the truth as he saw it. He was deeply devoted to his work and to his Department, and his sudden death was a great loss to all who came in contact with him.

A. F. BURSTALL