

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