

The next four years were busy ones for the young superintendent. He went to Germany to study the comparable organizations there and designed the new laboratories and other equipment. He gathered a small but enthusiastic staff around him, including as his chief assistant and deputy Dr. R. C. Farmer, a fellow student at Wurzburg who, with Dr. Godfrey Rotter (later director of explosives research in the establishment) and Dr. Harold Moore (later director, British Non-Ferrous Metals Research Association), among the seniors, survives him.

This period saw not only the discovery of tetryl and of the means of causing lyddite to detonate effectively in shell (it had conspicuously failed to do this in the Boer War), but also the introduction of T.N.T. into the Service and research into flashless and smokeless propellants and into steels for guns, shells and armour.

Silberrad reported to the Explosives Committee of the War Office, the chairman of which was Lord Rayleigh. In 1906, this Committee was disbanded, and in the same year Silberrad resigned, to become for the rest of his career a consulting research chemist and director of the Silberrad Research Laboratories. Had he remained in Government service, where he was such a distinguished pioneer of modern 'conventional' armaments research, there is no doubt that high office and honours could have been his.

His connexion with the armaments field was not, however, completely severed by his resignation, for in 1908 he was instrumental in providing the Admiralty with a special alloy capable of resisting the erosion suffered by the propellers of high-speed turbine-driven warships. Because of this erosion, the future of such vessels and liners had appeared somewhat problematical. Also, in conjunction with the firm of Hotchkiss, he worked on erosion-resisting steel for guns. Then, in the First World War he was honorary consulting chemist to the Ministry of Munitions. An outstanding achievement of this period was the successful process for manufacturing large charges of lyddite in iron instead of earthenware vessels. This enabled an improved synthesis, requiring a higher temperature than was practicable with the original method, to be used. He also turned his attention once more to flashless propellants and developed one for use in large howitzers.

Silberrad was a brilliant experimenter, and among other achievements of his fertile brain were a new chlorinating agent; a method of manufacturing isoprene; a new means of blasting petroleum wells; and the production of dyestuffs from T.N.T. residues.

I have very pleasant memories of a visit paid to Dryads' Hall and its adjoining laboratory in 1953, when I was collecting material for an article in connexion with the golden jubilee of Silberrad's old establishment, which by then had become the Armament Research Establishment of the Ministry of Supply. I was most hospitably and kindly received by Dr. and Mrs. Silberrad and given access to many old photographs and exhibits, over the assembly of which much trouble had been taken. This first, and unfortunately the last, personal contact with Dr. Silberrad left an impression of a man of intense mental vigour, drive and alertness, in spite of his seventy-five years and the fact that at the time he had not fully recovered from an attack of thrombosis.

Mrs. Silberrad survives her husband, with the only son of the marriage.

J. S. GREW

Dr. Eric Ellenbogen

DR. ELLENBOGEN was born in Vienna in 1921 and emigrated to the United States in 1940. He received his B.S. degree in chemistry from Indiana University in 1943. During 1943-46 he served with the United States Army in India and Burma. After his discharge, he studied at the Brooklyn Polytechnic Institute, working on inorganic plastics. In 1946 he entered Harvard University, received his M.A. in 1947 and his Ph.D. in 1949 under the guidance of Dr. J. L. Oncley. His dissertation dealt with the determination of the physical-chemical properties of insulin. From 1947 until 1949 he was a teaching assistant in the University Laboratory of Physical Chemistry Related to Medicine and Public Health, Harvard University. He was awarded a U.S. Public Health Service Postdoctorate Research Fellowship in 1949, which he held until 1951 in the Department of Biochemistry, Columbia University College of Physicians and Surgeons, under the sponsorship of the late Dr. E. Brand, studying the properties of tri- and tetrapeptides of specific steric configurations. In 1951 he was appointed research associate in the Department of Biochemistry and Nutrition, Graduate School of Public Health, University of Pittsburgh, and was promoted to assistant professor in 1952 and associate professor in 1957.

In 1959 he took leave from his post at the University of Pittsburgh to travel to the Weizmann Institute at Rehovot, Israel, to study with Prof. E. Katchalski, doing research on physical properties of certain polypeptides as models for certain proteins of biological significance. On the way back from the Weizmann Institute to the United States, Dr. Ellenbogen died of a coronary occlusion in Marseilles on May 29, 1960. He is survived by his wife Lois and two children.

He belonged to several American and British learned societies. His contributions to biochemistry include the study of the physical-chemical behaviour of insulin in dilute solution, the physical chemistry of specific polypeptides, the isolation of a non-insulin hypoglycaemic factor from pancreas, and the physical-chemical characterization of cardiac myosin.

ROBERT E. OLSON

Prof. Eduard Reichenow

EDUARD REICHENOW, the eminent German protozoologist, died on March 23 in his seventy-seventh year. He was born in Berlin and was the product of a race versed in the natural sciences: his father, Anton, was a well-known ornithologist; his grandfather, Cabanis, a zoologist of note. He himself married Lilly Mudrow, of international fame in the field of malaria and who collaborated with him in his later work on avian malaria; her death three years ago cast a cloud over his life from which he was scarcely able to emerge.

Reichenow was educated at Schiller-Realgymnasium in Charlottenburg; later he entered the Universities of Heidelberg, Berlin and Munich, where he graduated in natural science.

He was associated with the Institute of Tropical Medicine, Hamburg, for most of his academic years, first as a student, for many years as director of its Department of Protozoology, and finally as its president. He travelled extensively in the pursuit of his work, and some of these journeys produced results of great scientific value—the discovery of malaria parasites in gorillas in the Cameroons, the

elucidation of the complicated life-cycle of *Karyolysus* and other haemogregarines in Spain, and the development of piroplasms in animals in East Africa. He investigated Chagas's disease in Venezuela, Mexico and Guatemala, sleeping sickness in Africa, marine biology at Rovigno and in the Baltic. In Germany itself he studied the intestinal protozoa of man, and with his wife he described in detail exoerythrocytic schizogony in *Plasmodium relictum* and other avian species of malaria parasites.

His careful observations on the cycle of piroplasms in the tick led him to conclude that this important group of protozoa belonged more probably to the Sarcodina than to the Sporozoa, among which they had hitherto been placed, and this new view may well act as a guide to their still unknown nature.

Reichenow's work and reputation were consolidated in his successive editions of Doflein's "Protozoology". Doflein's widow asked him to undertake this task and he produced the fifth edition in 1929; the sixth was not completed until 1952. The history of the latter provides a good illustration of his strength of character—the manuscript of the new edition was practically finished during the later years of the

Second World War when a bomb fell on his house and the entire work was destroyed; undeterred, he recommenced the task and completed it a few years later.

Eduard Reichenow was a simple, quiet man, cautious and conservative in his scientific outlook, with an absence of flamboyance which did not detract from his ability to disentangle complicated problems in taxonomy or biology. His sound approach made him an ideal court of appeal, and he readily responded to requests for his opinion from all quarters of the globe. In these respects he resembled the English protozoologist, the late C. M. Wenyon, whose views on many problems coincided with his own.

He received many honours towards the end of his life: he was made an honorary member of the Society of Protozoologists, given an honorary doctorate of the University of Granada, and received special recognition from Munich on the occasion of the jubilee of his graduation.

The death of Reichenow has left a gap in the ranks of protozoologists which it will take long, if ever, to fill. He is survived by his daughter.

P. C. C. GARNHAM

NEWS and VIEWS

Physics at University College, London:

Prof. J. Hamilton

DR. J. HAMILTON has been appointed to the newly created second chair of physics in University College, London, from October 1. Dr. Hamilton studied in the Queen's University, Belfast, and later began research at the Dublin Institute for Advanced Study under Heitler. During the War he was engaged on scientific work for the Royal Navy. After a brief appointment as lecturer in theoretical physics at the University of Manchester he moved to Cambridge in 1950 as lecturer in mathematics and was elected to a fellowship at Christ's College. Dr. Hamilton's interests have always lain on the physical side of mathematical physics, and during his time at Cambridge there has been a considerable strengthening in the amount of physics available to students reading the Mathematical Tripos. He has also succeeded in forming an active group of young workers imbued with his own pragmatic spirit. Under his leadership they have been applying modern dispersion relation techniques to low-energy pion physics with most interesting results. This characteristic emphasis on physical content is also to be found in his recent book, "The Theory of Elementary Particles", which contains valuable chapters on phenomenology as well as those dealing with the development of quantum field theory. The appointment of Dr. Hamilton to University College will strengthen considerably the theoretical side of a department which is already active in experimental high-energy nuclear physics.

Mechanical Engineering at Cardiff:

Prof. S. P. Hutton

DR. S. P. HUTTON, who has been appointed to the new chair of mechanical engineering at the University College of South Wales and Monmouthshire, was educated at Calday Grange Grammar School and the University of Liverpool, where he graduated in 1941.

After a period in industry, he joined the Aerodynamics Department of the Royal Aircraft Establishment in 1942 and was concerned with the design, development and use of high-speed wind tunnels for research on sub-sonic and trans-sonic aircraft. During 1945–46 he was in charge of similar research facilities in Germany. During 1946–49 he was a lecturer in fluid mechanics at the Imperial College of Science and Technology, where he was awarded his Ph.D. for research on water turbines and fans. Since 1949 he has been with the National Engineering Laboratory, East Kilbride, where he supervised the design and commissioning of the hydraulic machinery laboratory, eventually becoming head of the Fluid Mechanics Division in 1954. During 1951–52 he was sent by the Department of Scientific and Industrial Research to the Federal College of Technology, Zurich, where he carried out research under Profs. J. Ackeret and H. Gerber. Since March 1959 he has been deputy director of the National Engineering Laboratory responsible for industrial liaison. His research interests are in engineering fluid mechanics and his publications have been mainly concerned with flow measurement, fans, pumps and water turbines. He is a member of the Hydraulics Group Committee of the Institution of Mechanical Engineers and has been closely associated with the work of national and international standards organizations for water turbines. He has travelled widely and in 1956 was a member of the British Hydroelectric delegation to the U.S.S.R.

Chemical Technology at Edinburgh:

Prof. P. H. Calderbank

DR. P. H. CALDERBANK has been appointed to the chair of chemical technology in the University of Edinburgh in succession to Prof. K. G. Denbigh, who is going to the Imperial College of Science and Technology, London (*Nature*, January 2, 1960,