lowered the spark potential and reduced sputtering to a quite unexpected degree. Shortly afterwards, N.V. Philips recommended a helium–neon mixture containing up to 5 per cent of argon for the reduction of sputtering, and in 1926, T. E. Foulke at Schenectady, with far more theoretical knowledge at his disposal and after prolonged investigations, confirmed the value of a mixture of this nature.

Meanwhile, efforts were being made to find materials with a low cathode fall which would enable glow lamps to start and run on 110 V. d.c. Skaupy solved this problem in 1917 by coating metallic electrodes with barium azide and afterwards heating them, but simplification and improvement of the process took nearly five years. N.V. Philips in 1921 made tubes with cathodes of magnesium and beryllium alloys which would start below 110 V. and obtained improved results by introducing potassium nitrate. These results aroused great interest in the United States, where Foulke had been studying the effect of gas composition, as mentioned above. He soon succeeded in producing a tube with magnesium electrodes which would start with 70 V., and three years later he had developed two new coating processes now known as the 'oxide' and the 'azide'. The first started with barium carbonate, which was heated in the tube to 1,000° C. or more and activated by a discharge with a steep-fronted wave-form. The second was similar to Skaupy's but a little cæsium was added to the barium and the subsequent processes were strictly controlled. The result was a lamp starting with 45 V. a.c.

During this work, an outstanding design of lamp was evolved. The lamps, named *T*-lamps, were made from tubing $\frac{1}{4}$-in. or less in diameter, with two parallel wires as electrodes, the overall length being less than 1 in. These miniature lamps, bright enough to be seen as indicators and readily incorporated in instruments, caused an increased demand, but it was not until about 12 years ago in the United States and a few years later in Britain that a remarkable development took place, caused by the introduction of glow lamps into domestic appliances such as electric irons and refrigerators, and later into switches. The demand was far greater than had been foreseen and much ingenuity had to be exercised in developing machinery to carry out what was still a highly complicated process requiring the greatest precision. It is estimated that the world output of neon glow lamps is now about 80 million a year, and is increasing rapidly. Quite 80 per cent of these are of the *T* type. These can be sold for less than a shilling, are remarkably robust and reliable, and will run for their rated life of 25,000 hr. at a cost of twopence.

Within the past few years a demand has arisen for 'high brightness' lamps which can be seen readily in full daylight. This could not be met by minor modifications of existing processes and required a great deal of additional research, one item being a study of lanthanum and its alloys. Satisfactory lamps are now in production in several countries, but research is by no means at an end.

These notes are extracted from a longer account of the development which I have compiled, and it may be mentioned that a very valuable publication has just appeared dealing with the scientific basis of the glow discharge, with 156 references, written by M. P. Lemaigre-Voreaux as a D. ès Sc. thesis presented to the University of Lyons.

OBITUARIES

The Right Hon. the Lord McGowan, K.B.E.

Lord McGowan of Ardeer, who died on July 13, was honorary president of Imperial Chemical Industries, Ltd., of which he was chairman from 1930 until the end of 1950 and for the creation of which, with Sir Alfred Mond, afterwards Lord Melchett, he was mainly responsible.

Henry Duncan McGowan was born in Glasgow on June 3, 1874, and educated at Allan Glen's School, entering the Glasgow offices of the Nobel's Explosives Co. in 1889 as a junior clerk or office boy. He became assistant successively to the home and to the overseas sales manager, and then, in 1902, deputy assistant sales manager, and in 1909 assistant manager. In December 1915 he was appointed to the board and became primarily responsible for co-ordinating the Company's activities in relation to the requirements of the Ministry of Munitions. In 1918 he was appointed managing director, and in recognition of his services during the War he was created K.B.E. At the conclusion of the War he was responsible for the merger of all the important explosives and ammunition companies in Britain into Explosives Trades, Ltd., of which he became chairman and managing director. Earlier, in 1910, he had used the Hamilton Powder Co. as a nucleus for the amalgamation with three other explosives companies and the Dominion Cartridge Company of Quebec to form Canadian Explosives, Ltd., and in the winter of 1923–24 he also negotiated the formation of African Explosives and Industries, Ltd., in South Africa.

The creation in 1926 of Imperial Chemical Industries, Ltd., by the joint efforts of McGowan and Sir Alfred Mond, out of Nobel Industries, Ltd., Brunner Mond and Co., Ltd., the United Alkali Co., Ltd., and the British Dyestuffs, Ltd., was thus the crowning of his persistent efforts towards amalgamation and rationalization of the chemical industry of Britain, and McGowan became president and Mond chairman of the new Company. Mond (afterwards Lord Melchett), however, died in 1930, and McGowan succeeded him as chairman, and the growth and shaping of the enterprise were very largely his work. By 1938, however, he realized that it had become too large to be managed efficiently from the centre and that the advantages of large-scale production were in danger of being offset by rigidity, and McGowan initiated some degree of decentralization.

By temperament McGowan was something of an autocrat, but he was a good mixer and, working hard and thoroughly himself, he expected the same of others. What mattered was the way the job was done, and with marked ability to grasp the essentials of a problem, he was also swift to see and seize an opportunity. Melchett had been elected president of the Society of Chemical Industry in 1930 in view of the Society's jubilee meeting in London in the following year. On Melchett's death McGowan took his place, and his presidential address to the Society

on "Science and Industry" in July 1931, and his Messel Memorial Lecture to the same Society at Cardiff three years later on "The Uneven Front of Research" display very fairly his outlook on science and technology.

He was created a baron in 1937 and received honorary degrees from the Universities of Glasgow (1934), Birmingham, Oxford, Durham and St. Andrews. He married in 1903, Jean Boyle Young, of Paisley, who died in 1952, and he is survived by two sons and two daughters, the title passing to his elder son, Harry Wilson McGowan.

R. BRIGHTMAN

Sir Hugh Warren

HENRY WILLIAM HUGH WARREN was born on June 30, 1891, and died on June 18, 1961. He is survived by Lady Warren and a daughter. An only son was killed serving with the R.A.F. in 1939.

Hugh Warren, in 1929, took over the Research Laboratory at the British Thomson-Houston Co., Ltd., Rugby, which, six years previously, he had helped the late R. C. Clinker to start. In 1938 he was appointed to the board of B.T.H. as director of research. He remained in charge of the Laboratory until 1945, becoming managing director of B.T.H. in that year and managing director of A.E.I., Ltd., in 1948, retiring in 1954. He received honorary degrees from the University of Bristol in 1942 and from Birmingham in 1946, and was knighted in 1951.

It is as leader of what is now the A.E.I. Research Laboratory, Rugby, a job he did for sixteen years, that 'H. W.' will be remembered. He was alert and interested in everything, intensely energetic and always desirous of presenting the work of his Laboratory in as impressive a manner as possible. His own subject was insulations. It was in 1916, on the then vital matter of the insulation of magnetos, that he showed the energy and enthusiasm to engage in, and pursue relentlessly, difficult technological problems that proved to be characteristic of the man. He directed with vigour the pioneer work of his Laboratory on sound reproduction, talking films and discharge lamps. During the War, starting with the *VFO* ('Valve for Oliphant') klystron, he built up a large effort on centimetric radar, including work on magnetrons and other microwave valves, radar sets and the silicon and germanium crystal valves which were the forerunners of the modern semiconductor devices.

He played a part of considerable significance in bringing about cordial and fruitful co-operation between teams of scientists from industry and those from Government and military establishments that frequently met together at Rugby to attempt to solve some of the problems of the times. Such meetings were memorable and, whether 'H. W.' took the chair or not, his presence with its sense of urgency and promise of achievement helped us all to accomplish things that seemed to border on the impossible. He enjoyed overcoming the difficulties of people as well as those of physics and production.

Hugh Warren was a member of many engineering institutions, councils and committees, and was the author of many technical papers and a comprehensive volume published in 1931 entitled *Electrical Insulating Materials*.

He loved writing, and would spend odd minutes as well as long hours on semi-technical essays, some of which were gathered together in a volume called *ON—Some Irresponsible Jottings, Scientific and Otherwise*, published for private circulation in 1944. He had a great sense of humour and was a pleasant companion and a kindly and courteous leader; he will be remembered with admiration and affection.

L. J. DAVIES

NEWS and VIEWS

Technical Managing Director of Reactor Centrum Nederland : J. Pelser

JOHANNES PELSER has been appointed technical managing director of the Reactor Centrum Nederland foundation in succession to J. J. van Rijsinge. Johannes Pelser was born at Dordrecht on March 21, 1925, and matriculated at the Christian Grammar School at Dordrecht; afterwards he studied at the Technical University at Delft, where he obtained his certificate for physical engineering in 1951. Following this he joined the Foundation for Fundamental Research on Matter, but was transferred to the Reactor Centrum Nederland foundation when it came into existence in 1955. While at the Foundation for Fundamental Research on Matter, he was seconded to the (Netherlands–Norwegian) Joint Establishment for Nuclear Energy Research at Kjeller, Norway. Here he worked for four years and took part in the research work with the nuclear reactor *Jeep*. A short time after the setting up of the Reactor Centrum Nederland, Pelser returned to the Netherlands and took an active part in the preparations for the building of a research centre at Petten. In 1957 he was sent to the United States as a representative of the Reactor Centrum Nederland to supervise the fabrication of the high-flux reactor. By the end of 1958 he was appointed head of the Reactor Department at Petten, taking charge of the preparation and experiments with, and the operation and maintenance of, not only the low-flux reactor but also the high-flux reactor.

Aircraft Propulsion at the College of Aeronautics, Cranfield : Prof. A. H. Lefebvre

PROF. A. H. LEFEBVRE has been appointed to the chair of aircraft propulsion at the College of Aeronautics, Cranfield, in succession to Prof. A. G. Smith, who is now head of the Mechanical Engineering Department, University of Nottingham (see *Nature*, 187, 743; 1960). After leaving Long Eaton Grammar School, Prof. Lefebvre served an apprenticeship at Ericssons Telephones, Ltd., where he was employed afterwards for several years on engineering production and inspection. He studied electrical engineering at Loughborough College and mechanical engineering at the University of Nottingham. He is a graduate of the University of London and a postgraduate student of the Imperial College of Science and Technology. Since 1952, Prof. Lefebvre has been with the Aero-Engine Division of Rolls-Royce, Ltd., where his main responsibilities have been in combustion research and in the design and performance analysis of gas turbine