

prevent spread of radioactivity in the event of any rupture of the primary system. The lower half of this vessel is of concrete surrounded by water tanks, while the upper half is of lead slabs surrounded by polyethylene. Should the ship sink in deep water, two of the manholes will open automatically to equalize pressure and then close to prevent undue leakage of radiation products. Provision is also made in the case of shallow-water sinking to allow purging of the containing vessel or filling it with concrete. The total weight of the containing vessel is about 2,000 tons.

Waste liquids likely to be radioactive are fed to storage tanks and will not be discharged at sea except under the conditions set forth by the Maritime Administration and the Atomic Energy Commission. Radioactive gases are diluted and discharged up the

radio mast after being filtered. Purging of the air of the containing vessel, of which the argon is slightly radioactive, is carried out periodically at sea. Cooling of such components as primary circulating pumps is effected by fresh water cooled by sea water in an intermediate circuit. The sea water does not become radioactive.

Apart from the care taken in the design and construction of the ship, extensive training in nuclear reactor theory and its marine application is being undertaken by the candidates for the posts in the *Savannah*. The longest course taken by engineering-officer candidates occupies fifteen months. A shorter course has also been arranged and is intended for candidates already possessing a science degree and includes seven observers from Britain, Denmark, Holland and Japan.

F. D. ROBINSON

OBITUARY

Sir Alfred Egerton, F.R.S.

ALFRED CHARLES GLYN EGERTON died suddenly on September 7 following a heart attack. He was on holiday at the time at his house at Mouans Sartoux in the south of France, with his wife and son Francis. He was seventy-two, but was in full vigour; his sudden death comes as a great blow to all those in combustion science, in which Sir Alfred has been the acknowledged leader for many years. He had also made many important contributions in engineering, and in scientific administration and education.

He was educated at Eton, where he took the science prize and founded the College Scientific Society, and at University College, London, where he gained first-class honours in chemistry and was later president of the College Chemical and Physical Society. He studied at Nancy and in Berlin with Prof. W. Nernst, and in Sir William Ramsay's private laboratory as his last research student. During 1909-13, he was instructor at the Royal Military College and, during the First World War, carried out research on explosives and had his first contact with chemical engineering.

After the War Egerton went to the Clarendon Laboratory at Oxford and carried out researches on the vapour pressures of metals at high temperatures and, in advance of his time, worked on the separation of zinc isotopes. He was appointed reader in thermodynamics in 1923. During a British Association meeting in Canada, Sir Harry Ricardo and Sir Henry Tizard, with whom his friendship was life-long, aroused his interest in combustion and in the role of the newly discovered 'anti-knocks'. He applied his knowledge of physical chemistry to this problem of knock in internal combustion engines and put forward the view that break-down of unstable organic peroxides was responsible for 'pre-sensitizing' the premature detonation. His interest in combustion continued throughout his life, and he and his research group published a steady stream of valuable papers on the role of peroxides in combustion, on peroxide analysis, on slow combustion processes, on gaseous detonation, on limits of inflammability, on burning velocities, and on techniques for these studies, such as the use of absorption spectra and the development of the flat-flame burner.

Egerton also carried out or stimulated work in many fields of applied science. He made measurements of the properties of that important working substance steam, and stressed the value of methane or natural gas as potentially the most efficient fuel for the internal combustion engine, and worked on the combustion, liquefaction and bulk handling of methane. This led to an interest in liquefaction problems, and he was active in founding the Low Temperature Group of the Physical Society, of which he was first chairman in 1946.

He was elected to the Royal Society in 1926, and in 1936 was appointed professor of chemical technology in the Imperial College of Science and Technology (University of London), a position which he held until his retirement in 1952. During his tenure of the chair, he started the undergraduate course in chemical engineering and pioneered the development of this subject in Great Britain. The Department, under his guidance, became a leading centre in both combustion research and chemical engineering.

Egerton was secretary (physical sciences) of the Royal Society during 1938-48, during the important War period, and he was also a member of the Scientific Advisory Committee of the War Cabinet during 1940-45. In 1942, he spent some time in Washington in charge of the British Commonwealth Scientific Office, where he did important work improving Anglo-American co-operation. His membership of numerous committees gave him a tremendous breadth of knowledge of affairs and of people. At various times he was chairman of the following committees: the Heating and Ventilating Committee; the Fuels and Propulsion Committee, Admiralty Scientific Research Department; the Scientific Advisory Council, Ministry of Fuel and Power; the committees reporting to the Government of India on the Indian Institute of Science, and on the sixteen Government of India laboratories; the Scientific Advisory Committee of the British Council; the Combustion and Fuels Committee of the Aeronautical Research Council; and the Royal Society Scientific Information Conference. He had been director of the Salters' Institute of Industrial Chemistry and a manager of the Royal Institution. He was president of the British Section of the Combustion

Institute, editor of *Combustion and Flame*, and formerly of *Fuel*. He was active in work on the dissemination of scientific information (*Science Abstracts* Committee), on the use of scientific man-power (Barlow Committee) and on the use of the world's fuel and energy resources. His educational interests are shown by his active membership of the governing bodies of Winchester College and of Charterhouse. Last year, he was responsible for the successful organization of the seventh International Combustion Symposium in Oxford. His recent intense activity had been on the Government Committee of Inquiry into the Fishing Industry, and in research into the characteristics of smouldering for the Tobacco Manufacturers' Standing Committee. His work was recognized by a knighthood in 1943 and a number of honorary degrees and medals, including the Rumford Medal of the Royal Society in 1946.

In 1912, he married the Hon. Ruth Cripps, only daughter of the first Baron Parmoor, sister of his close friend at University College, the late Sir Stafford Cripps.

As a man, we remember his quiet unassuming manner, his unfailing smile of greeting, his tireless work on his many scientific interests, and his delight in his second career as a painter. Somehow, despite his many activities, he always had time to spare for everyone. He had the genius for bringing out the best in those with whom he worked and took a fatherly interest in the numerous research students he sponsored, so many of them now in high positions in science and industry. This keen personal interest in his students, colleagues, and indeed in all he did, was fully shared by Lady Egerton. His life and work are an example to all those whom he has influenced.

A. G. GAYDON

NEWS and VIEWS

Biochemistry at Birmingham : Dr. S. V. Perry

THE development of a Department of Biochemistry in the University of Birmingham, arising as it does in part from the former Department of Industrial Fermentation, needs for guidance a man of scientific ability and vigorous powers of leadership. The appointment of Dr. S. V. Perry to be professor of biochemistry has recently been announced. Dr. Perry graduated with first-class honours in biochemistry in the University of Liverpool in 1939 and was elected to the Isaac Roberts research scholarship upon graduation. After the Second World War he was elected a Rouse Ball research student of Trinity College, Cambridge, and began his researches on muscle biochemistry in the Department of Biochemistry. He was elected a research fellow of Trinity College, Cambridge, in 1947 and a Commonwealth Fund Travelling Fellow in 1948, spending the year 1948-49 in the Department of Physiology of the Medical School of the University of Rochester, New York, investigating the biochemical properties of skeletal muscle. In 1950 he was appointed a lecturer in biochemistry in the University of Cambridge. His researches have been largely concerned with biochemical function in relation to intracellular morphology with particular reference to the muscle cell. A study of the intracellular components of striated muscle has been pursued in an investigation of the biochemistry of the cell in general, and of the contractile process in particular. These studies are throwing important light on the nature of the association between muscle proteins and the role of their interaction in muscular contraction. Dr. Perry has taken part, by invitation, in a number of international congresses concerned with the biochemistry of muscle, and has published many articles on this subject in the *Biochemical Journal* and other scientific periodicals.

Analytical Chemistry at Birmingham :

Prof. Ronald Belcher

THE award of the title of professor of analytical chemistry is a tribute to the work Dr. Belcher has done at Birmingham in building up the School of Analytical Chemistry, which is unique in Great Britain. The honour comes at an appropriate time, since he is at present the president of the Analytical

Chemistry Section of the International Union of Chemistry and a vice-president of the Union. Prof. Belcher received his early education in Sheffield and gained his first qualifications through the Royal Institute of Chemistry. After carrying out extensive researches since 1928 on coal at the University of Sheffield, he became a lecturer in chemistry in the University of Aberdeen in 1946, moving to Birmingham in 1948. Since that time a constant flow of papers has come from his group and no less than twenty-eight higher degrees have been awarded to graduates in analytical chemistry under his supervision. With pupils and colleagues he has published more than 150 papers and ten well-known books, all in the field of analytical chemistry, and to these and his many editorial and committee activities he owes his world-wide reputation. He gained the Ph.D. and D.Sc. of the University of Birmingham. With the vast extensions of the Chemistry Department at Birmingham nearing completion, Prof. Belcher and his colleagues will have greatly increased facilities for research and the training of analysts at all levels.

Mathematical Physics at Birmingham :

Prof. G. E. Brown

THE title of professor of mathematical physics has been conferred on Dr. G. E. Brown, at present reader in the Department of Mathematical Physics. Dr. Brown, who is a citizen of the United States, studied in South Dakota State College, at the Universities of Iowa and Wisconsin, and after war service became a graduate student at Yale in 1947 and obtained his Ph.D. there in 1950. He was awarded the D.Sc. of the University of Birmingham in 1957. He went to Birmingham with a post-doctoral award in 1950, was appointed a research fellow in September 1950 and has been on the teaching staff since 1954, except for a period of study leave from January to September 1958, which was spent in the Institute for Theoretical Physics in Copenhagen. He has published numerous papers on different aspects of quantum theory, particularly on relativistic electron theory, including relativistic corrections in atomic problems. More recently he has done important work in nuclear theory, including a series of papers with various collaborators on the relation between the nuclear many-body problem and the 'optical model'.