be slip lines, because the establishment of thermally etched striations takes considerably longer than six seconds.

Preliminary quantitative observations on the plastic properties of solid argon have included measurements of the ultimate stress as a function of temperature. The programme of future research includes a further study of the slip process, efforts to obtain single crystals, measurements of the creep-rate at liquid oxygen temperatures and below, a quantitative study of grain-boundary movements during grain growth and measurements of the elastic constants of solid argon.

C. DOMB

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OBITUARIES

Sir Alexander Fleming, F.R.S.

SIR ALEXANDER FLEMING, the discoverer of penicillin, died suddenly on March 11 at his home in London with a heart attack at the age of seventy-three.

Alexander Fleming, the son of a farmer, was born near Darvel in Ayrshire, Scotland, on August 6, 1881. He received his early education at the village school and at Kilmarnock Academy. His father died when he was seven years old, and at thirteen years of age Alexander and his brother Robert were sent to live in London with a doctor brother who practised as an oculist in Marylebone Road. He continued his education for two or three years by attending the Polytechnic Institute in Regent Street, and then for four years worked in a shipping office. However, his doctor brother encouraged him to take up medicine, and with the help of a small legacy he became a student at St. Mary's Hospital Medical School, where he won the senior entrance scholarship in natural science. He showed that he had found his true bent by winning practically every class prize and scholarship during his student career. He qualified in 1906 and took his M.B., B.S. of the University of London in 1908 with honours and the gold medal.

In 1906 Fleming had begun to assist Almroth Wright in the Inoculation Department at St. Mary's Hospital, and he continued to work in the same Department for the rest of his life with the exception of an interlude during the First World War.

In 1928 he was appointed professor of bacteriology in the University of London, and he retired with the title of emeritus in 1948, but continued as the principal of the Wright-Fleming Institute of Microbiology until the end of last year. He was busily occupied with lecture tours and laboratory work to the end.

Fleming never ceased to pay tribute to the inspiring leadership of that great bacteriologist, Sir Almroth Wright, with whom he worked for nearly forty years. There is little doubt that in the early years he, like other assistants—and they were a distinguished team—was to a considerable extent the apprentice of Almroth Wright, whose dominant personality and fertile brain directed the general research programme of the Inoculation Department for many years. But even in the early days, Fleming showed

his ingenuity and originality in devising simple apparatus and techniques for tackling laboratory problems. The First World War directed his attention to wound infection and its control; he was one of the first to show that most wounds become infected after admission to hospital. As Wright's disciple, he took an active part in the controversy on the physiological versus chemical treatment of wounds, and again his inventiveness in devising apparatus and experiments to test the validity of a hypothesis or statement was very well demonstrated. This work led on to one of his classical experiments, in which he showed that carbolic acid when added to blood in certain concentrations killed the leucocytes but not the pathogenic germs, so that the antiseptic actually helped rather than hindered bacterial multiplication.

In 1922 came the discovery of lysozyme. Following an observation that his own nasal secretion after a common cold had an inhibitory action on some of the bacteria present in the nose, he showed that this lytic substance was present in many tissues and secretions of the body and was also widely distributed in Nature. But, because it was not particularly active against pathogenic organisms *in vitro*, the medical world did not give it the attention it deserved. His work with lysozyme prepared the way for the epoch-making discovery of penicillin.

Fleming had been studying variation in the staphylococcus, which meant that he was frequently examining colonies of that organism as they appeared on ordinary nutrient agar. As a result of this exposure, a mould appeared on the culture medium some days later and Fleming noticed the unusual phenomenon of the disappearance of staphylococcal colonies around the mould. His first paper describing his work with the active principle of this mould, which he named penicillin, shows that he appreciated the great potentialities of this substance as a new kind of antiseptic.

Fleming was a reticent and rather taciturn man, with great independence of mind and strength of character. He was a born naturalist, keenly observant of everything around him, and always ready to devise and test new methods for studying germs in the laboratory or seeds and plants in the garden. He accepted the many honours that were showered upon him with slightly amused modesty. The simple kind of tribute touched him most, such as a collection of signatures or a letter from a child or from some poor person who had benefited from penicillin. Freed from administrative duties, he had been looking forward to working again with his beloved phagocytes and lysozyme, for the natural defences of the body were his abiding interest; now, instead, we mourn the loss of a great scientist.

ROBERT CRICKSHANK

Prof. A. L. Dixon, F.R.S.

ARTHUR LEE DIXON died at Folkestone on February 20 at the age of eighty-seven. He was the son of the Rev. G. T. Dixon, Wesleyan minister of Northallerton, and was educated at Kingswood School, Bath. He was a scholar of Worcester College, Oxford, and his long and distinguished career is summarized in the appointments he held: in 1891 prize Fellow of Merton, in 1898 tutorial Fellow of that college, in 1922 Waynflete professor of pure mathematics and professorial Fellow of Magdalen

College, Oxford. He was elected to the Royal Society in 1912 and was president of the London Mathematical Society in 1924-25.

In 1945, on his voluntary retirement from the Waynflete professorship (for his was a pre-commission appointment), he was elected by Magdalen College to a supernumerary non-stipendiary fellowship, an appointment but rarely made and a very great tribute to Dixon's personal quality: colleges do not lightly award fellowships, with rooms and dining rights, to retiring professors in their late seventies.

Dixon's research career as a mathematician was long and varied. He wrote on algebra, algebraic geometry, pure geometry and elliptic functions; then, beginning a seven-year series when he was sixty-two years of age, published papers in collaboration with the present writer on Bessel functions and summation formulæ. He was no believer in compelling

every promising young man to embark on research: he was himself an example of how a man must carry out research if his mind is made that way.

Dixon's physical prowess and accuracy of eye were unusual, especially in the way he retained them to a late stage of his career; when he was nearly seventy it was not easy to beat him at squash, and even with seventy behind him he could still normally defeat several of his younger colleagues. But it is not for his hockey, tennis, squash or croquet skill that one admires Dixon most; nor even his musical knowledge and skill, nor yet his facility in foreign tongues: the thing about him that one recalls first and admires most is the slightly old-world courtesy and charm that permeated his every social contact. It was as completely natural to him as his physical strength or his mathematical power: it endeared him to many friends and made him a welcome visitor wherever he went.

W. L. FERRAR

NEWS and VIEWS

Glass Technology at Sheffield:

Prof. Harry Moore

PROF. HARRY MOORE, who is retiring from the chair of glass technology in the University of Sheffield, began his career in the University of London as a lecturer in physics. During this time he studied the effects of homogeneous X-radiation on a variety of materials and also wrote (with H. S. Allen) his "Textbook of Practical Physics", which was followed later by the "Textbook of Intermediate Physics". After the First World War he was appointed assistant director (later director) of research of the British Scientific Instrument Research Association, where he was able to use to the full his capabilities as an administrator and leader of a powerful research team. Prof. Moore had long been interested in glass, and the invitation, which he accepted in 1937, to become director of research for Messrs. Pilkington Bros., Ltd., enabled him to turn his attention to the many problems of modern, large-scale glass manufacture. In 1945 he went to Sheffield in succession to Prof. W. E. S. Turner. He was president of the Society of Glass Technology in that and the previous year. His recent work has been primarily concerned with the colouring and decolorizing of glass in relation to its structure. He has conducted spectrophotometric studies and also investigations into the magnetic and electrical properties of glasses, all of which have provided valuable information on the role of iron in colouring glasses. Internationally known for his work in glass technology, Prof. Moore is particularly distinguished for his capabilities as a lecturer; his ability to explain intricate problems in lucid terms has delighted many audiences.

Prof. R. W. Douglas

PROF. MOORE is being succeeded by Mr. R. W. Douglas, who has pursued his scientific career as a member of the G.E.C. Research Laboratories, which he joined in 1927. After some early work on the measurement of the physical properties of glass, he became concerned with more fundamental problems such as the relation between the physical properties and basic structure of glass and the similarity in

behaviour between glass and the liquid phase in respect of such properties as density, thermal expansion and viscosity. He is now well known as an authority on the physics of glass, and his many publications on the subject have enriched the literature in this field. From about 1946, Mr. Douglas extended his activities to include participation in the field of semiconductor physics. A primary concern with the semiconductor materials themselves and their physical properties led to an interest in the physics of the solid state generally. Among the projects for which he has been responsible have been the development of new semiconducting materials and the elucidation of the properties of semiconductors on the grounds of both theory and experiment. In recent years, Mr. Douglas has contributed to several international meetings concerned with the physics of semiconductors. In spite of this later change in his activities, Mr. Douglas has retained his interest throughout in all matters concerned with glass technology and the physics of glass. He has served on technical committees of the Society of Glass Technology and since 1949 has been honorary secretary of that Society.

British Glass Industry Research Association

A NEW research association, the British Glass Industry Research Association, has been formed and has started work at "Elmfield", Northumberland Road, Sheffield, with Dr. R. G. Newton as director of research, and Dr. D. K. Hill as assistant director. Unlike other newly formed research associations, this one does not have to inaugurate its research, for it will take over from the Department of Glass Technology of the University of Sheffield and will thus continue the tradition of research work begun there during the First World War. During the past few years it has become evident that the demands from industry on the time of the professor at Sheffield have become so great that it is essential to divide the work previously carried out into two portions: a University teaching department, which will also carry out research; and a research association which will carry out all the functions for industry of consultation and remedying troubles, together with research for industry. The new arrangements have