

1922 and until his retirement in 1943 was in charge of the grants to postgraduate students for training in research, to individual research workers and the grants to the co-operative research associations. He thus assumed responsibility, without any industrial background, for the research association movement in Britain at the most critical and difficult period of its history.

The novelty of this scheme for Government assistance to research in industry was wearing off, and the post-war boom years were coming to an end. Industry was generally indifferent to science and often suspicious of the co-operative aspect of the associations. Money was tight both in industry and Government, and the associations were compelled to function with very limited resources. Most of them were doing useful work, as evidenced by the book Hetherington wrote with Sir Frank Heath on their early history; but the results achieved were seldom of a kind to make a ready appeal to industrialists imbued with a profound faith in traditional methods. It was largely due to Hetherington's skill as an administrator and to his personality that the movement survived these lean years to play a notable part in the Second World War. His work demanded much tact and patience—virtues which did not come to him naturally. It was a great satisfaction to him to see the associations expand after the War to occupy the important position in British industry they hold to-day.

Hetherington's early training fitted him admirably to deal with the scientific grants to individuals; but even here he had his difficulties, as during the 30's more than one influential, but unenlightened, Civil Servant made no secret of his opinion that many of the grants, especially those for training research students, were little more than unemployment doles.

Hetherington's official work was lightened by two hobbies. The first was his keen interest, as collector and expert, in Chinese porcelain. In this field his important book, written with R. L. Hobson, on "Early Ceramic Wares of China" brought him an international reputation. He also took a leading part in the formation of the Oriental Ceramic Society. His second interest was in turning on the lathe. Here recognition of his skill led to his becoming a Master of the Turners' Company, the honorary freedom of which was bestowed on him in 1932. He took special interest in the turning properties of many little-known Empire timbers.

Finally, Hetherington had quite a talent for versification, and frequently amused his colleagues with mildly satirical verses on matters of topical interest to the Department of Scientific and Industrial Research.

O. F. BROWN

#### Dr. W. D. Douglas

THE death on August 5 of Dr. W. D. Douglas removes another of the now thinning ranks of first-generation aircraft scientists. He was born in Ireland on August 2, 1887, and educated as an electrical engineer at Trinity College, Dublin. For some years he served as a hospital X-ray operator, and then joined the staff of the Royal Aircraft Establishment and specialized in the properties of materials, especially timber and adhesives, which were the common materials of aircraft structures. He became a leading authority on their properties.

In the 1930's, he was in charge of the mechanical testing of aircraft structures and components and materials. Under his guidance the science of testing large structures grew from small beginnings to something like its present degree of sophistication. His advice on the design and strengthening of structures was eagerly sought by aircraft designers.

Douglas's knowledge of the mode and cause of failure of materials was invaluable to the Air Ministry's Accident Investigation Department, and it became usual for the pieces of crashed aircraft to be sent to him. After painstaking re-assembly and examination of scratches, dents and fractures, he was often able to decide the sequence of catastrophe and the cause of failure. The techniques he developed form the basis of present-day aircraft accident investigation. Re-organization during the Second World War put Douglas in charge of the Materials Department at the Royal Aircraft Establishment, the three divisions of which covered chemistry, metallurgy and non-metallic materials.

On retiring from the Civil Service in 1946, Douglas joined the furniture firm of Harris Lebus as its first head of research. In this unique position he spent nine fruitful years, asking questions, seeking answers and giving sound advice. He represented the firm on technical committees, and when the Furniture Development Council was started in 1949, Douglas joined its research committee and was most helpful in formulating programmes and in guiding the Council's research officers. He played a major part in the development of the performance tests for furniture, which are now incorporated in British Standard Specifications. Furniture satisfying the standards is marketed under the 'Kite' mark.

Douglas retired from Harris Lebus in 1955, but continued to serve most effectively on the Furniture Development Council.

In personal characteristics he was a modest man, and the most helpful and sincere of friends to those in need; but he could also be a worthy adversary. A devoted husband and father, he leaves a widow and son.

C. GURNEY

#### Dr. Peter L. Goldacre

DR. PETER L. GOLDACRE, a senior research officer in the Division of Plant Industry of the Commonwealth Scientific and Industrial Research Organization, Canberra, Australia, died after a brief illness on April 16, at the age of thirty-four. Paradoxically, at the time of his death from cancer, he was engaged in incisive and rewarding investigations into the nature of the chemical factors controlling cell division in plants.

Goldacre was educated at Sydney Boys' High School and the University of Sydney. He joined the Division of Plant Industry of the Commonwealth Scientific and Industrial Research Organization, in 1947, as one of the first two plant biochemists to be appointed to this agency. His early work, reflecting his biochemical training, was largely enzymological. He was the first to characterize the 'indoleacetic acid oxidase' complex as being composed in part of a peroxidase. Later, at the California Institute of Technology, where he obtained his Ph.D. degree in 1952, he was instrumental in discovering the activating effect of substituted monophenols on this enzyme complex. During these investigations, he also discovered that 2,4-dichlorophenol is a specific inhibitor

for the enzyme catalase, and thus permits the demonstration of the related enzyme peroxidase in such tissues as the liver, where its presence is normally masked by the preponderance of catalase.

By the time he returned to Australia, Goldacre had become keenly aware that many important questions in biology were not ready for investigation by classical biochemical techniques. He made the important and difficult decision to shift his research emphasis to the mechanism underlying differentiation of plant cells. His experiments on the auxin-induced initiation of lateral roots in cultured excised flax roots convinced him of the existence of a cell division inducer (kinin) elaborated by the inhibited, pre-existing lateral root primordia. His search for rich sources of kinin-like materials in tissues undergoing cell division led to the discovery of 'Kineapple' (*Nature*, 184, 555; 1959), a yet uncharacterized, highly active inducer of cell division from young apple fruitlets. In collaboration with several colleagues in Canberra, he was attempting the isolation of this material from

three-quarters of a ton of apple fruitlets at the time of his death.

Peter Goldacre's outstanding characteristics were his honesty and easy-going informality, together with his impatience with pretension and sham. He loved camping and the outdoor life; he had a powerful physique and excelled at swimming and other sports. Six months before his fatal illness, he had attended the Fourth International Congress on Plant Growth Regulation at Yonkers, N.Y., and appeared in vigorous good health. The sudden knowledge of his impending death did not materially alter his essentially humorous and compassionate outlook on life.

He leaves his wife and three young children, the youngest born only a few months before his death. To those privileged few who knew him well, he will be remembered as one of Nature's noblemen. The tragedy of his early death lies in the fact that he had so much to give to many who had not yet come to know him.

ARTHUR W. GALSTON

## NEWS and VIEWS

### Education in Industry

THE British Association for Commercial and Industrial Education has issued reports on two of its recent conferences. The first, "Education for Survival", contains the papers presented at the proceedings of the East Midland Group and is noteworthy for a stimulating account of technological education in Britain by Dr. B. V. Bowden, principal of the Manchester College of Science and Technology. The list of members attending indicates that speakers on subjects like the training of non-apprentices and the attitude of trade unions to apprenticeships were preaching mainly to the converted. The Association would perform a valuable service to industry if it could persuade recalcitrant managing directors of the need for training apprentices and others. The second conference dealt with "The Implications of the Crowther Report", and the speakers, who included the Minister of Education, underlined its main findings and recommendations. The value of what might have been a useful report is diminished by its appearance some five months after the Conference. Information about both reports may be obtained from the Director, British Association for Commercial and Industrial Education, 26a Buckingham Palace Road, London, S.W.1.

### British Rubber Producers' Research Association

THE current report of the British Rubber Producers' Research Association gives an account of the progress made during 1959, both in the fundamental study of the structure and properties of natural rubber and in the application of scientific knowledge acquired in recent years to the problems of the industry (Twenty-second Annual Report. Pp. 53. 1960). On the fundamental side, work on the biosynthesis of rubber in the tree has been made possible by the installation of a tropical greenhouse at Welwyn Garden City. The attack on this elusive problem includes the study of the structure of the latex vessels by the electron microscope, and the chemical examination of cell constituents. The chemical processes of vulcanization, that is, of the

formation of a network of long-chain molecules, and the converse processes of ageing or network breakdown continue to be the subject of intensive study; progress in this field, though necessarily slow, is continuous. Of particular interest is the elucidation of the mechanism of surface cracking by ozone and the role of anti-ozonants. It is well known that this type of degradation is dependent on the state of stressing of the rubber, and it has now been shown that the effect of the anti-ozonant is to raise the critical stress for crack growth, while leaving the rate of growth above this critical stress unchanged. The somewhat related problem of fatigue failure has been shown to be associated with the growth of flaws having dimensions of the order of 0.01 mm. The report gives examples of the application of the knowledge obtained from these fundamental investigations to the production of rubbers and rubber compounds having more desirable physical and chemical properties. This work is designed to ensure that natural rubber is not left behind in the competition with the synthetic materials now available. The report is available from the Association, 19 Fenchurch Street, London, E.C.3.

### Comparative Efficiency of Indexing Systems

A REPORT by Mr. C. W. Cleverdon on the first stage of an investigation into the comparative efficiency of indexing systems, an investigation supported by a grant to the Association of Special Libraries and Information Bureaux by the National Science Foundation, has now been issued by the College of Aeronautics, Cranfield, on behalf of Aslib (Pp. v+166. Cranfield: The College of Aeronautics, 1960). The grant of £10,000 was made in July 1957 for a study of the comparative efficiency of the Universal Decimal Classification, the alphabetical subject catalogue, a faceted classification system, and the Uniterm system of co-ordinate indexing, which in this first stage involved the indexing of 18,000 research reports and periodicals in the general field of aeronautical engineering, about half of which dealt with high-speed aerodynamics. The present