reduction in loss of food in producing countries, but also to improvement in the quality of goods shipped overseas.

It is surprising to find a chapter on general entomology which is elementary to the specialist and of limited value to the layman, but useful descriptions are given of many species which can attack stored products and breed in premises where these are stored and processed.

The sections on the prevention and control of infestation summarize those aspects of hygiene and chemical measures which are necessary to minimize insect attack. They also direct attention to physical means whereby damage can be avoided, including recent advances in preventing infestation of grain by storage at low temperatures. In reference to grain storage in airtight conditions, however, useful observations such as those of S. W. Bailey are omitted.

The book does not always go into great detail but has the advantage of an extensive bibliography on which the reader can draw for further information. Although there is, perhaps, a tendency to dwell on early work, occasionally at the expense of later developments, this publication is undoubtedly a valuable and interesting contribution to the literature in this field of study. It should find a receptive audience, not only among students of entomology, but also among specialists responsible for the inspection and treatment of produce and members of the warehousing and manufacturing trades. G. C. WILLIAMS

Proceedings of the 1965 Heat Transfer and Fluid Mechanics Institute

Held at the University of California, Los Angeles, California, June 21, 22, 23, 1965. Edited by Andrew F. Charwat. Pp. ix+372. (Stanford, California: Stanford University Press; London: Oxford University Press, 1965.) \$10; 80s. net.

THIS book starts off with a brief abstract of the three invited lectures, each with an adequate bibliography. These are followed by eighteen contributed papers, well illustrated but without discussion. Almost all the papers are concerned with the rather extreme conditions of heat and mass flow connected with space research and come from space research laboratories or universities working on grants from such laboratories. There are some cases, however, in which useful results are available from this work for ground engineering, particularly in the fields of viscous pipe flow, of suspensions flow through porous matrices, problems of all oscillation in boiling fluids and advanced studies in radiation from non-grey gases. The papers in these fields will be useful reference papers, the others mainly of interest in connexion with plasma parts, hypersonic facilities and very low gas pressures.

M. W. THRING

Inelastic Scattering of Neutrons

(Proceedings of the Symposium on Inelastic Scattering of Neutrons held at Bombay, December 15-19, 1964.) Vol. 1. Pp. 460. 199.50 schillings; 57s.; \$9.50. Vol. 2. Pp. 574. 241.50 schillings; 69s.; \$11.50. (Vienna: International Atomic Energy Agency; London: H.M.S.O., 1965.)

THESE volumes cover the proceedings of the third International Atomic Energy Agency conference in this series, the previous two being held in Vienna (1960) and Chalk River (1962). The conferences, which are concerned with the dynamical properties of solids and liquids as measured by neutron scattering, are very well organized and are therefore attended by representatives of most of the laboratories working in this field. Full texts of all the contributions are circulated to delegates before the conference and this encourages lively discussions which are also fully reported in these proceedings.

The contributions are presented under five headings, Volume 1 containing papers on "Dynamics of Solids and Magnetic Systems" and Volume 2 "Dynamics of Liquids,

Molecular Dynamics and Experimental Techniques". The first paper in each section is an invited review paper. With the exception of the paper on experimental techniques, which confines itself to work performed at the laboratory of the author, these review papers are most interesting and informative and adequately survey their respective branches of the subject. The quality of the other papers is variable. Most of the papers set quite a high standard, but here and there it is possible to detect a paper written to justify the attendance of the author at the conference. This does not, however, detract too much from the value of these volumes, which should be required reading not only for those interested in neutron scattering but also for those interested in the dynamics of the liquid and solid state. The books themselves are well produced, and in this and in the speed of production the International Atomic Energy Agency has set an example which might well be followed by other organizations. B. C. HAYWOOD

Introduction to Polymer Crystallization

By Allan Sharples. Pp. iv+138+18 plates. (London: Edward Arnold (Publishers), Ltd., 1966.) 32s. net, boards; 16s. net, paper.

As a class, crystalline polymers are capable of a far greater variety of practical applications even than the amorphous polymers (rubbers and organic glasses). This versatility is a direct result of the wide range of physical properties which can be obtained by varying the state of crystallization or local ordering of the long-chain molecules of which the polymer is composed. This state is a function not only of the chemical constitution of the polymer, but also of the mechanical and thermal treatments to which it is subjected. It is therefore important to learn as much as possible about the processes of crystallization which occur and the way in which they can be controlled.

Introduction to Polymer Crystallization gives an excellent account of the various methods which have been developed to study the morphology of crystalline polymers and the kinetics of the processes of nucleation and crystal growth. The available techniques include optical and electron microscopy, small angle and wide angle X-ray diffraction, light scattering and dilatometry. The evidence derived by these methods is presented clearly and discussed in a critical but eminently readable manner, and the directions in which further development appears most desirable are indicated.

The book is a genuine introduction in the sense that it covers the subject in a broad and balanced manner, but is not overloaded with detailed discussion. Its value is greatly enhanced by striking photographs of single crystals, spherulites, microfibrils, lamellae and other growth structures. It will be useful not only to undergraduates, for whom it is primarily intended, but also to more mature workers, who will find it informative and stimulating.

L. R. G. TRELOAR

OBITUARIES

Professor E. E. Turner

PROFESSOR E. E. TURNER, emeritus professor of chemistry in the University of London, died at his home in Tonbridge on September 8. He was born in London in 1893 and attended the Coopers' Company School before entering East London College (now Queen Mary College); here he came under Professor J. T. Hewitt, whom he remembered with gratitude and affection throughout his life. By the age of twenty-one he was a fellow of the Chemical Society and published his first paper, in collaboration with his student contemporary, G. M. Bennett.

For a year he was lecturer at Goldsmiths' College, and then (1916-1919) research assistant to Sir William Pope in Cambridge, working on problems of chemical warfare. From there he went to the University of Sydney, where his research lay in the field of arsenic stereochemistry. He came home to a post in Woolwich Arsenal, and in 1923 returned to his old College as a senior lecturer and carried out the experimental work which established the linear axis of the biphenyl molecule.

In 1928 he became head of the Organic Chemistry Department at Bedford College for Women, as a reader in the University of London. He began a fruitful research partnership with Dr. Mary Lesslie, and the encouragement which he had received in his youth was in turn lavished on his many research students. Nearly half his long list of publications contain the names of women as collaborators. He was a racy, stimulating lecturer, with a fund of chemical anecdotes, a phenomenal memory, and a gift of practical insight.

In 1939 he was elected a fellow of the Royal Society; in 1944 the title of professor was conferred upon him, and in 1946 he became head of the Department of Chemistry. At this time he began to write his *Organic Chemistry*.

His research covered a wide field—biphenyls, chemotherapeutic agents, petroleum hydrocarbons, labile optical activity, the stereochemistry of heterocyclic systems and bridged biphenyl systems, to name the most outstanding. He was a pioneer in the development of molecular models.

He served for forty-two years on the Board of Studies in Chemistry in the University of London, was a fellow of Queen Mary College, a Freeman of the City of London and a Liveryman of the Coopers' Company. In 1921 he married Miss Beryl Osborne Wyndham who, with their daughter, survives him. His enthusiasm, his lightning wit and his encyclopaedic fund of chemical knowledge will be sadly missed.

M. M. HARRIS

Dr. R. H. Boyer

DR. ROBERT HAMILTON BOYER, whose work in general relativity theory brought him an international reputation, was one of those shot to death on the University of Texas campus on August 1. His death, at the age of 33, interrupted a career still approaching its height.

Robert Boyer was born on December 11, 1932, in Johnstown, Pennsylvania. He studied mathematics and physics at the Carnegie Institute of Technology, and went in 1953 as a Rhodes Scholar to Oxford, where he worked on quantum field theory under Dr. Handel Davies, receiving the D.Phil. in 1957 for his contributions to the theory of the photoelectric effect. He then returned to Pittsburgh as research mathematician at Westinghouse Research Laboratories, where he solved a variety of problems, mainly in diffusion theory. Here also he began a study of the discrete analogue of Bessel's equation, which has recently attracted renewed interest.

Boyer decided to return to academic life, and after a year at McGill University was appointed to a lectureship in applied mathematics at the University of Liverpool in 1961. While at McGill he had turned his attention to general relativity, which occupied him for the rest of his life. He first developed techniques for studying gravitational fields in terms of a preferred congruence of time-like curves. Later he applied these techniques, which resemble Møller's "frames" and Cattaneo's "method of projections", to the relativistic theory of rigid motion. He clarified the relations between various conditions on the motion of a relativistic rigid body, and gave sufficient conditions for the extension of the classical theorem of Herglotz and Noether to general relativity.

Boyer's major contributions were to the theory of rotating gravitating systems. In a series of papers, he investigated the general properties of rotating fluid masses, and contributed largely to the physical under-

standing of an exact solution of Einstein's field equations, discovered in 1963 by R. P. Kerr, which appeared to represent the exterior gravitational field of a rotating body. On a visit to Texas in 1964-65, as research associate at the Center for Relativity Theory, Boyer collaborated with R. W. Lindquist on a detailed analysis of the Kerr metric, which is outstanding among global studies of particular gravitational fields.

At the time of his death, he was returning to Liverpool from Mexico City, where he had been for some weeks collaborating with G. Plebanski at the National Institute of Technology.

Boyer's able teaching and lecturing were complemented by the writing of a number of valuable expository articles, which, with his discriminating research papers, will leave a clear mark on his subject. His colleagues and students will remember him not only for his work but also for his gentle and unassuming manner. He was a ready listener and an honest and patient critic, always willing to take pains to see another point of view.

He married in 1957 Lindsay Robinson, of Liverpool, who, with two young children, survives him.

F. A. E. PIRANI

J. K. Zbrozek

THE sudden death on September 25 of Jerzy Kazimierz Zbrozek, at the early age of 53 years, came as a great shock to his many friends. He collapsed and died on arrival at Kennedy Airport, New York, at the start of a visit for discussions with specialists in the United States and Canada on atmospheric turbulence in relation to aircraft.

Zbrozek was born in Poland, and studied mechanical and aircraft engineering at the University of Warsaw. He came to Great Britain following the invasion of Poland at the start of the Second World War, and became a fighter pilot in the Royal Air Force. At the end of the War he joined the Royal Aircraft Establishment, Farnborough, as a member of the staff of the Aerodynamics Flight Division, with which he later moved to Bedford. He was concerned with a wide range of aeronautical research, and early on devoted much of his efforts to helicopters. He then took up the study of gust loads on aircraft, and this proved to be the line of work which he developed, to become a leading authority on atmospheric turbulence and its effects on aircraft. He was promoted senior principal scientific officer on an individual merit basis in 1956. Zbrozek always prided himself on a thoroughly practical approach, but the fundamental importance of the research he fostered was well exemplified in the *Proceedings of the Symposium on Atmospheric Turbulence* which he organized at Farnborough in 1961, and in his paper on "Gust Research", for which he was awarded the Busk Prize of the Royal Aeronautical Society in 1965.

While actively pursuing his specialist line of research, Zbrozek continued to maintain a close interest in all aspects of aircraft flight, covering as well as stability and control, aeroelasticity and loading actions, the study of pilots' activities and of environmental influences. In addition to being a member of the Gust Research, Loading Action and Oscillation Committees of the Aeronautical Research Council, he was active on Committees of the Electrical Research Association and of the Motor Industry Research Association.

Zbrozek was a colourful and warm-hearted personality, universally known as "George", who was capable when he chose of being bluntly forthright and provocative in discussion, without ever fear of giving offence. The interest and enthusiasm he brought to his work were a great stimulus to all who worked with him, and particularly to junior staff, to whom he showed the greatest understanding and consideration.

He is survived by his widow and a son and daughter.

F. O'HARA