

earlier to a study of the fundamentals of structural geology.

The reader is guided step by step from the classical account of deformation and flow with which engineering students will be familiar, including finite strains and yield criteria, through a discussion of such complications as plastic flow, firmo-viscosity, brittle fracture and earthquake waves, until he can appreciate finally the more subtle refinements that the geologist must make allowance for. These include stress patterns near boreholes, tunnels and cracks, the dependence of elastic moduli on strain, strain rate and temperature (attributed largely to the presence of pores in rocks), ductility and strength, planes of weakness, liquid flow through porous media, the difference between laboratory tests on sound specimens and field tests on rock formations with breaks and other imperfections, and progressive finite deformation over geological periods of time (to be explored with veins, fossils and inhomogeneities as the only visible indicators). Wherever possible, both theoretical and observational considerations are brought together on each topic.

The argument is developed throughout with full mathematical detail, a high standard of accuracy and freedom from misprints, always in a clear, easily readable style. A glossary of the chief symbols used and separate author and subject indexes are appended. References to original papers and other works are included in the text.

This book can be recommended as giving a sound and clear account of deformation and flow in theory and in practice, admirably suitable for the geologist and the engineer and worthy of the attention of students of other disciplines seeking a balanced introduction to the general deformation of solids.

J. G. OLDROYD

SPECTRAL ANALYSIS

Rotational Structure in the Spectra of Diatomic Molecules

By István Kovács. Pp. 320. (Hilger: London, November 1969.) 104s.

THE name of Professor Kovács is well known to spectroscopists who analyse the rotational fine structure of the electronic spectra of diatomic molecules. In this book, all his own work on multiplet formulae, line intensities and on spectroscopic perturbations is included, together with similar equations derived by other workers in the most fundamental area of spectroscopy.

The first chapter deals with the solution of the wave equation for a diatomic molecule and includes many of the small interactions which are frequently neglected in approximate treatments. The rest of the book consists of applications of perturbation calculations to various types of interaction for all the commonly observed species of spectroscopic state and for many which are rarely seen or as yet unknown. Multiplet term formulae are derived for states with all multiplicities from singlet to septet. Each formula is tested by application to observed spectra and in most cases the agreement with theory is impressive. The intensity distribution formulae, which are presented very fully, should be the most useful part of the book. In particular, this section will be welcomed by astrophysicists, who are increasingly interested in the spectra of diatomic molecules.

A regrettable omission in a book published in 1969 is any account of nuclear hyperfine structure, which can alter the appearance of rotational structure and lead to incorrect analysis as in LaO. Again, a difficulty in this type of work is that many of the interactions are introduced as configuration interaction with other states. Such interactions are limited to one or two states, whereas, in reality, a whole spectrum of energy levels will interact. To include more than a few interacting states would make formulae which are already formidable into some-

thing quite unmanageable, but it does mean that if the formulae are ever found to fail an excuse in terms of configuration interaction can usually be made.

W. G. RICHARDS

Obituaries

Professor E. H. F. Baldwin

ERNEST BALDWIN, who died suddenly on December 7, 1969, will be remembered not only as one of the chief protagonists of comparative biochemistry but for his outstanding contributions to teaching. Educated at the Crypt Grammar School, Gloucester, he went up to St John's College, Cambridge, as an exhibitioner in 1928. He took a first in both parts of the Natural Sciences Tripos, including Part II Biochemistry. In 1936 he became a research fellow of his college and in 1943 a lecturer on the staff of the Biochemical Department under Sir Frederick Gowland Hopkins. Greatly influenced by Hopkins's wide ranging approach to biochemistry, Baldwin applied his zoological knowledge to extending the comparative aspects of the subject and in particular nitrogen metabolism. One of the earliest results of this was his little book *Comparative Biochemistry* (1937), which is still recognized as a classic introduction to the subject.

During this time Baldwin was also acquiring a wide reputation as a teacher. His sense of the modern and interesting and his quietly dramatic presentation appealed strongly to students, and the theatre was always full. During the war years much of the teaching burden in biochemistry fell on him, so that he had to cover a wide field. One product of this was *Dynamic Aspects of Biochemistry* (1947), a book that had a worldwide impact on the teaching of the subject. The presentation, based on his inspiring lectures at Cambridge, was entirely new and it was received with unusual warmth. Its sales have by now exceeded 80,000 copies in five editions and five reprints; and it has been translated into seven languages (German, Italian, Spanish, Russian, Serbo-Croat, Japanese and Malay), thus winning acclaim for British biochemical teaching. A considerable part of its success lay in its undoubted literary merit, and indeed it gained for Baldwin the European Cortina-Ulisse prize in 1952.

In 1950 Baldwin was called to the chair of biochemistry at University College, London. His appointment belied the received idea that university teachers are elevated to chairs solely on the basis of their research contributions, for there is no doubt that Baldwin's great merits as a teacher weighed heavily in his selection. University College, under F. G. Young, had taken the first steps towards the establishment of a BSc special degree in biochemistry. It needed a professor with a high reputation as a teacher to carry through the negotiations with the university to a satisfactory conclusion and to establish the new course on a sound footing.

Baldwin remained at UCL for the next twenty years. During that time, in spite of frequent ill-health, he added much to our knowledge of the comparative biochemistry of nitrogen metabolism and the relation between ureotelic metabolism and water shortage, building up an internationally known school of research workers in such subjects. Curiously, this endeavour was always valued more highly in the United States and on the Continent than in Britain. In it Baldwin was ahead of his more conservative contemporaries, and it is only of very recent years that the movement to cross boundaries has made much progress here. Baldwin's influence at UCL was particularly important, for he saw biochemistry as a "biological" subject and his views were thus a valuable counter to the prevailing London conception of biochemistry as a branch of chemistry.

Bearded and amiable, quizzical and fastidious, the figure