throughout the book — which is not surprising; in comparison with basic research, and despite their undoubted worth, evaluation studies have been woefully underfunded.

The final phase of our model, continued monitoring or surveillance, may be the most neglected. Herbert Klarman, in his chapter "Measuring Economic Effects of Biomedical Innovation", declares that monitoring the effects of technology is inherently superior to forecasting as a basis for planning. He even suggests that monitoring could serve as a basis for reimbursement of physicians and hospitals, and that this might be a better way to regulate biomedical innovation than certificate-of-need, which depends on forecasting. Great Britain has, of course, already opted for earlier introduction of drugs, relying more heavily on post-marketing surveillance. In the United States, unfortunately, and despite extensive professional debate and encouragement, no comprehensive programme of post-marketing surveillance is yet in sight.

The method used by Young and by Levy and Sondik, as well as by several of the other authors in *Biomedical Innovation,* is "research on research" — the study of the research process as revealed in the medical literature. Much of their material has been published in other forms previously, and sadly the opportunity to use this collection to develop a cohesive and comprehensive thesis has been largely missed. But it is too much to expect a multi-authored book emerging from a three-day conference to read as if it were the product of a single, all-knowing intelligence. Rather, it is a valuable collection of essays that contains much useful information and many insights. It will be a convenient source-book for those who wish to understand the current process of biomedical innovation or who choose to write about it in the future. □

John P. Bunker and Jinnet Fowles are in the Health Services Research Program at Stanford University.

Mulliken on molecular orbitals

W. G. Richards

Polyatomic Molecules: Results of ab Initio *Calculations.* By Robert S. Mulliken and Walter C. Ermler. Pp.431. ISBN 0-12-509860-X. (Academic: 1982.) $49, £32.40.

CHARLES Coulson once suggested that the acronym MO should stand for Mulliken Orbitals rather than for Molecular Orbitals. Robert Mulliken was one of the originators of the method of obtaining solutions of the Schrödinger equation for molecules in a manner paralleling that used for atoms, each electron having its own individual function or orbital. How heartening, then, that the great man should still be active and at the forefront of the discipline. Not for Mulliken the contempt for computers; he seizes on the power which can produce accurate functions and a precision in computed properties which may on occasion rival that available from experiment.

Together with Walter Ermler, in this book he presents a comprehensive survey of *ab initio* calculations on polyatomic molecules. The epithet *ab initio* may sometimes give a spurious impression of quality; merely performing all the integrations implied in a Roothaan–Hartree–Fock calculation does not cover over defects in the original theory. In an introduction the authors do go beyond the minimum required by their title, discussing matters such as configuration interaction, electron pair and many-body approaches to improvement of wavefunction, as well as pseudopotentials.

Subsequent chapters each treat general classes of molecules, for example AH_2; AB_2; ABC; molecules with specified symmetry; reaction surfaces and organic compounds. In every case general considerations are followed by specific results obtained for individual molecules. Copious references mean that this is a very comprehensive survey, invaluable to theoretical chemists, to spectroscopists and to the growing band of those who describe themselves as computational chemists.

The appetite for this type of work shows no sign of abating and indeed it is being stimulated by developments in computer hardware. Cheaper and more powerful minicomputers mean that experimental chemists can run *ab initio* calculations for themselves using freely available programs obtainable from the admirable Quantum Chemistry Program Exchange run from the University of Indiana. At the same time, the new breed of supercomputer with vector and array processors offers the chance of doing extremely accurate calculations on molecules which were until recently too complex to be contemplated.

Although there is no hint of a plateau in the output of quantum mechanical calculations the book is timely in that it surveys the field, describing what has been done before the new machines have a major impact. □

W. Graham Richards is a Lecturer in the Physical Chemistry Laboratory at Oxford University. *The latest volume of his* Bibliography of *Ab Initio* Molecular Wavefunctions *covering 1978–1980 was published by Oxford University Press last year.*

More for less

Peter W.J. Rigby

DNA Tumor Viruses, 2nd Edn revised. Edited by John Tooze. Pp.1,073. Hbk ISBN 0-87969-142-5; pbk ISBN 0-87969-141-7. (Cold Spring Harbor Laboratory: 1981.) US hbk $75, pbk $32.50; elsewhere hbk $90, pbk $39.

THIS revision of the bible of DNA tumour virology is to be warmly welcomed. That reprinting should be necessary within 18 months of publication of the original edition emphasizes the value of the book, and the editor is to be congratulated on having seized this opportunity to improve the text considerably.

The basic material is unaltered but the book has been updated by adding supplements to nine of the thirteen chapters. These supplements vary considerably in length and comprehensiveness, but they do describe the recent major advances in the field. The additional material deals effectively with such topics as polyoma middle T-antigen, the p53 protein associated with large T-antigen in SV40-transformed cells and the molecular biology of BKV, thus obviating criticisms expressed in my review of the original book (*Nature* **289**, 332; 1981). The appendices of DNA sequence data have been considerably enlarged. The SV40 sequence has been modified to take account of the extra nucleotides, and another welcome addition to this section is a tabulation of restriction fragments. The sections on human adenoviruses contain a large amount of fresh sequence data and there are new appendices dealing with simian and murine adenoviruses and adenovirus–SV40 hybrids.

The book now contains some 1,100 pages which, at a price of less than $40 for the paperback edition, represents extraordinary value. The appearance of a paperback version is the most pleasing aspect of the revision as the book is now within the economic reach of the many advanced undergraduate and graduate students who ought to own a copy. This excellent volume will be, for many years to come, compulsory reading for everyone with an interest in any aspect of DNA tumour virology. □

Peter W.J. Rigby is a member of the Cancer Research Campaign Eukaryotic Molecular Genetics Research Group and a Senior Lecturer in Biochemistry at Imperial College, University of London.

● The National Physical Laboratory has recently issued a second edition of their information poster, *Units of Measurement.* The chart summarizes the SI system and illustrates how the units are realized at the NPL. It may be obtained by writing to Information Services, NPL, Teddington, Middlesex TW11 0LW, enclosing a stamped, addressed C4 envelope.