

of sequential analysis which is described here, oddly enough without reference to *Sequential Analysis* by Abraham Wald.

There are various minor errors of either translation or printing which might confuse the uninstructed beginner, since the sense can only be recovered by a critical examination of the text. A notable omission is that of the levels of significance from Table 6, pp. 264-267.

In discussing analysis of variance it is unfortunate that the author has chosen to describe what is clearly variation 'within columns' as variation 'between rows'; a term which bears a quite different meaning in English textbooks.

I found the English somewhat stilted and prolix, but perhaps this is a common feature of translations. Nevertheless, these various blemishes need not deter the prospective purchaser and the book will be an instructive addition to the chemist's bookshelf provided, as suggested here, it is not the only statistical text-book there.

O. F. NEWMAN

### Analytical Chemistry 1962

The Proceedings of the International Symposium held at Birmingham University (U.K.), April, 1962, in Honour of Fritz Feigl to Commemorate his 70th Birthday. Edited by Philip W. West, A. M. G. MacDonald and T. S. West. Pp. x+411. (Amsterdam and London: Elsevier Publishing Company, 1963.) 90s.

**T**HIS book is a compilation of sixty-five lectures presented at the Feigl Symposium and the resulting discussions. To fashion such a miscellany of papers on chemical analysis into book form, and at the same time preserve a certain continuity, presents difficulties, but the editors have surmounted these with considerable success.

After two introductory papers, including a biographical sketch of Dr. Feigl, the first section of twelve papers deals with spot-testing and qualitative analysis. It is in this section that most original work is reported on. Three papers on semiquantitative spot-test methods and then fifteen papers on organic reagents and their applications to chemical analysis follow. These latter groups of papers are mostly in the form of reviews.

The second half of the book is devoted, apart from three miscellaneous papers at the end, to physico-chemical analysis comprising thirty contributions on electrochemical, radiochemical and optical methods, separation processes and titrimetric analysis. Again, these papers are mainly reviews, most with a sizable and useful list of references. One criticism of this section is possibly its lack of balance with six papers on polarographic techniques and four on atomic absorption. This leads to a certain repetition especially within the contributions on the latter topic. In contrast only one paper on gas chromatography appears.

The book is well produced and remarkably free from typographical errors although C. instead of c. appears as the abbreviation for curie (pp. 23, 87 and 105). It can be recommended to analysts as providing an up-to-date account of most topics within the sphere of modern analytical chemistry.

R. WOOD

### How Chemical Reactions Occur

An Introduction to Chemical Kinetics and Reaction Mechanisms. By Edward L. King. (General Chemistry Monograph Series.) Pp. xi+148. (New York and Amsterdam: W. A. Benjamin, Inc., 1963.) 2.15 dollars paperback; 4.35 dollars cloth back.

**A**BLIE pupils in the sixth form, or students in their first year, will gain a great deal from *How Chemical Reactions Occur*. It makes no attempt to introduce a large number of reactions; the few chosen are well known and are used to the full. First the meaning of 'reaction mechanism' is established, and attractive diagrams add to the clarity. The rate laws are next introduced, and

adequate space is given to defining the terms involved: rate, concentration and velocity constant. Some methods of examining rates of reaction are given, and this subject is taken up again in a later chapter when very fast reactions are discussed. The treatment of molecular collision frequency will appeal to many students, and the discussion of activation energy which follows is equally well done. The remainder of the book is given to using the ideas so carefully introduced. The reactions chosen serve ideally. There are interesting chapters on catalysis and on the use of radioisotopes in the examination of mechanisms.

Each chapter ends with a number of problems, some of them well worn, many quite novel. There is an interesting glossary and a very detailed reading list. Some of the books suggested demand a great deal more mathematical ability than the one under discussion requires. Here is a book which will win its way into a great many personal libraries.

D. C. FIRTH

### The Structure of Molecules

An Introduction to Molecular Spectroscopy. By Gordon M. Barrow. (The General Chemistry Monograph Series.) Pp. xi+156. (New York and Amsterdam: W. A. Benjamin, Inc., 1963.) 2.15 dollars paperback; 4.35 dollars cloth back.

**D**R. BARROW has written this account of molecular spectroscopy with a simplicity and clarity possible only from a born teacher; but since he is also one of the subject's chief practitioners, he makes no apologies for the difficulties involved in analysing spectra of all but the simplest molecules. The monograph will be welcomed by first- and second-year students at universities and technical colleges.

The book covers rotational, vibrational, vibrational-rotational and electronic spectra, and explains how bond-lengths, bond-angles and force constants can be determined to a high degree of accuracy. The energy considerations of vibration and rotation are discussed in classical terms and the quantum limitations are imposed without recourse to the Schrödinger equation. Sixth-form mathematics is all that is required from the student. General practical details are given and each chapter gives an account of the possibilities of future research. Each chapter begins with a survey of the material to be presented and concludes with a summary and with numerical calculations from the text.

The introductory chapter deals with the nature of radiation, the ways energy can be stored within a molecule and how the quantum laws are applied. The final chapter on the electronically excited states of molecules will prompt the student to ask questions about the properties manifested by these entities.

Dr. Barrow retains a humility before his subject, and one marvels at "the way one is led very directly into the world of molecular dimensions", and how much of the geometry and movement within a molecule can be deduced from spectra.

D. M. RUSSELL

### Chemical Thermodynamics

By Prof. J. A. V. Butler. Fifth edition. Pp. xvii+601. (London: Macmillan and Co., Ltd.; New York: St. Martin's Press, Inc., 1962.) 25s. net.

**P**ROF. BUTLER'S *Chemical Thermodynamics* requires little introduction. It is a tribute to its popularity (perhaps more with university teachers than with their students) that the book has retained its position for so long and that its thirty-fifth anniversary should be celebrated with a fifth edition. The bulk of the book remains largely unaltered, and the author is unashamed that up-to-date values have not been substituted for some thermochemical quantities because the original data well suit the author's purpose of illustrating his arguments and principles. This reflects the function of the book—