tables can be lessened by using ranges instead of variances. This may be true for simple ANOVA tables. It is not so true for the more complex experiments as can be seen in the author's examples of 3-factor ANOVA tables (pp. 70–84).

The remainder of the book is an explanation of how to use ranges, in place of variances, in all kinds of statistical tests of significance. Chapters are devoted to the comparison of two averages, simple and complex factorial experiments and linear regression.

The final chapters are on sampling and the control of routine analyses. The statistical aspects of attribute and variable sampling are discussed; but little help is given to solve the practical problems of sampling for chemical analysis. The use of control charts and the Studentized range to help control routine analyses is explained.

A great many numerical examples are worked out in detail throughout the entire book to illustrate the statistical techniques.

The following tables are given in the appendix

I	Factors for Confidence Limits of an Average (using-ranges)
II	Factors for Confidence Limits for Individuals (using ranges)
III	Values for $L = (\bar{x}_1 - \bar{x}_2)/R$ which will be exceeded with a probability P
IV	Values of $M = (\bar{x}_1 - \bar{x}_2)/(R_1 + R_2)$ which will be exceeded with a probability P
V and VI	Factors to Estimate Standard Deviation from Range
VII	Critical Values of the Studentized Range
VIII	Critical Values of F
IX	Factors for Computing Control Chart Limits

The author hopes (p. v) that this manual will serve as a statistical primer; but it is doubtful whether the chemist, with no prior knowledge of statistical methodology, will succeed in learning to use it correctly, by himself. The chemist, already well trained in conventional methods of computing ANOVA, may not want to take time to learn how to use ranges in place of variations. However, the book may be useful to the chemist who has some background in statistics and is willing to take time to learn how to use the range methods explained in the book.

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The Neurochemistry of Nucleotides and Amino Acids. A Symposium of the Section on Neurochemistry, American Academy of Neurology. Edited by ROSCOE O. BRADY, M.D., and DONALD B. TOWER, M.D., National Institute of Neurological Diseases and Blindness, Bethesda, Maryland. John Wiley and Sons. Inc., 440 Fourth Ave., New York 16, N. Y. 15.5 × 23.5 cm. Price, $10.00.

This title is either forward looking or misleading. The first symposium reviews, to 1958, recent elucidations of metabolic functions of nucleotides of uracil, guanine and cytosine. Classes of compounds emphasized are present in, but not necessarily peculiar to, brain. D. R. Sanadi, in particular, emphasizes the importance of high purity preparations in detection of the roles of catalytic quantities of nucleotides of the various bases. The long known high proportion of nucleotides of guanine in the brain, and the fact that nucleosides of the pyrimidines can play a role in maintaining electrical activity in brain, remain the most unique observations. The character of the ribonucleic acid-like material in the Nissl substance receives attention.

The second symposium better justifies the title. There is considerable evidence for some unique roles for certain amino acids in neural tissues. The pertinent metabolism of phenylalanine and tyrosine, of tryptophan and serotonin, and of glutamic acid and β-aminobutyric acid are thoroughly reviewed.

The volume suffers from the pernicious habit of liberal "coding" with abbreviations which divert the reader from the context. Nomenclature errors are even found in titles (and are objected to in an authors' footnote on page 28).

SLOAN-KETTERING DIVISION OF
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NEW YORK, NEW YORK GEORGE BOSWORTH BROWN

Quantum Chemistry. Methods and Applications. By R. DAUDEL, R. LEFEBVRE and C. MOSER, Centre de Mécanique Ondulatoire Appliquée du Centre National de la Recherche Scientifique, Paris. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y., 1959. xiii + 572 pp. 16 × 23.5 cm. Price, $14.50.

It is a pleasure to see at last a book with the title "Quantum Chemistry" that deals primarily with the application of quantum theory to chemical problems, rather than to spectroscopy and atomic structure. A book of this kind is urgently needed since the subject has developed rapidly in recent years. This book by three distinguished experts in the field is clearly an attempt to meet this need.

The book falls into two parts. The first thirteen chapters deal with the simple Hückel treatment and its application to specific problems of chemistry; there are chapters on interatomic distances, bond angles, dipole moments; on bond dissociation, resonance and ionization energies; on chemical reactivity, reaction rates equilibria, molecular spectra and biological applications. The second part deals with modern orbital theory, covering the present position in a very satisfactory manner. Most of the more important recent developments are discussed, including the Pariser–Parr treatment and Moffitt's atoms-in-molecules method. The presentation is clear and the book well produced.

The main failing of the book—and this unfortunately a serious one—is a lack of references to recent work on the chemical applications of quantum theory. Out of about 300 references in the first part of the book only some 25 are to papers published since 1952—and there are serious omissions before that. The situation is made worse by the randomness of the cover; partisanship would at least have ensured an up-to-date account of one point of view. One particularly unfortunate consequence is the omission of any reference to crystal field theory or the MO treatment of transition metal complexes; even ferrocene escapes mention. The whole of this field has developed largely in the last eight years.

Criticism could also be leveled at the general account of quantum theory in chapters 14–16 (125 pages of text). This would not be an adequate preparation for a reader unversed in quantum theory who wanted to read the chapters dealing with the mathematics of MO theory; since there are numerous good text books on quantum theory available, the space could have been better used either on a more detailed account of the techniques of calculation or on such recent topics as transition metal complexes, magnetic resonance spectroscopy and optical activity.

Nevertheless this is a useful contribution to the chemical literature, containing much material that has never before appeared in book form. It can be recommended to all chemists interested in the field.

DEPARTMENT OF CHEMISTRY
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Catalysis. Volume VII. Oxidation, Hydration, Dehydration and Cracking Catalysts. Edited by PAUL H. EMMETT, W. R. Grace Professor of Chemistry, The Johns Hopkins University, Baltimore, Maryland. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1960. vi + 378 pp. 16 × 23.5 cm. Price, $13.50.

This volume completes a notable series of books entitled "Catalysis." The present book contains six chapters. The first chapter written by Ryland, Tamele and Wilson deals with cracking catalysts and presents a rather detailed description of their preparation, nature, and probable activity mechanisms. In chapter two Winfield discusses the mechanisms of catalytic dehydration and hydration with the aid of numerous reactions, catalysts, and tables. The last half of the book, comprising four chapters, has been written by Dixon and Longfield. Chapter three, covering nearly a hundred pages, is devoted to the vapor phase oxidation of hydrocarbons at solid surfaces. The behavior of numerous catalysts for the oxidation of such substances as benzene, naphthalene, toluene, ethylene, propylene, polynuclear and substituted aromatic hydrocarbons, naphthenes, terpenes and heterocyclic compounds is presented, with the aid of several tables. The effect of hydrocarbon structure is emphasized. In chapter four a number of