wealth of detailed experimental data has left little speculative ground on which the theorist may gain a secure footing. From now on, auroral theories may have to be correct.

The book closes with a short summary, by Anders Omholt, of a few particular points of interest.

As I mentioned at the beginning of this review, this book is a brief progress report (with the exceptions of the more complete review papers by Anderson and Leadabrand). The papers will be of limited value to those who are not already familiar with auroral phenomena. This book would make a good companion to *Physics of the Aurora and Airglow*, by Joseph Chamberlain, along with the 1962 symposium "Theoretical Interpretation of Upper Atmosphere Emissions" which was published as volume 10 of the journal *Planetary and Space Science* (1963). My only negative comment is a mild one directed at the publisher: the cost of the book exceeds four cents per page, which seems too high in view of the quality of the printing and the format. Surely a way could be found to publish conference proceedings in less time and at a lower price.

A. J. DESSLER
Space Science Department,
Rice University,
Houston, Texas

Organic Chemistry: A Reference Book

The Acyclic Aliphatic Tertiary Amines. Leonard Spialter and Joseph A. Pappalardo. Macmillan, New York, 1965. xvi + 512 pp. Illus. $18.

This is not a book that anyone will read, or will intend to read, from cover to cover; it is a one-volume reference work, primarily a tabulation of 710 compounds, each one acyclic, aliphatic, and tertiary, ranging from C_3H_9N to $C_{87}H_{177}N$, as defined by the title. Entries are further limited to those that contain only carbon, hydrogen, and nitrogen, although both monoamines and polyamines up to $C_{21}H_{50}N_6$ are listed (with saturated and unsaturated hydrocarbon groups). The literature survey included *Chemical Abstracts* through mid-1961, so that all examples covered by the title and described through 1960 are likely to be included. There are approximately 1600 unduplicated references (pp. 451–501). The indexing is nicely handled by means of a formula index (pp. 511–512) so that entries are quickly located.

The first 93 pages will interest most organic chemists and advanced students, for those pages are devoted to historical background, nomenclature, general properties, and general preparative methods. The review of preparative methods (pp. 14–93) is complete and includes discussion of the scope and limitations of the many methods recited.

The first specific entry, obviously, is trimethylamine (p. 100), which occupies 13 pages that cover all physical properties, natural occurrence, methods of preparation, and derivatives; each item of information is supported by literature references. It appears that any worthwhile, published item about trimethylamine is cited here, either per se or by way of references. Most of the subsequent entries are very much shorter, of course; ethynyldimethylamine rates only a few lines (two derivatives, one reference).

I made a number of sample checks to locate assorted bits of published information with which I was already familiar; in each instance I was able to locate the item quickly. I noted only a very few misspelled words and typographical errors.

Clearly this book will be extremely useful (even indispensable) to those actively engaged in research in aliphatic amine chemistry. We will appreciate having it in the office and laboratory, within instant reach. Others will consider the price high and will forego the convenience of owning a personal copy, knowing that every good chemical research library will have the volume in its collection.

All those who use the volume will certainly hope that this is the first of a multivolume set which will provide similar coverage of all of amine chemistry. But this is unlikely; amine chemistry *in toto* is much too vast, and the job much too formidable, for any two-man team. The authors chose to cover a very small corner of this very large field, and they have done a painstaking and thorough job.

G. F. HENNION
Department of Chemistry,
University of Notre Dame

Prigogine School Techniques

Statistical Mechanics of Charged Particles. R. Balescu. Interscience (Wiley), New York, 1963. xiv + 477 pp. Illus. $15.

Statistical Mechanics of Charged Particles, by R. Balescu, volume 4 of the series Monographs in Statistical Physics and Thermodynamics, edited by I. Prigogine, is based on nonequilibrium statistical mechanics as developed by I. Prigogine and his coworkers at the Université Libre de Bruxelles. Balescu has contributed greatly to this new approach to statistical mechanics and is, therefore, in a position to give an accurate account of the subject. Indeed, he does this in a masterful and rigorous fashion.

The theory is not easy since it deals with the foundations of the subject. However, Balescu's book can be read profitably by serious, second-year, graduate students in this country. The book is largely self-contained and is very clear and readable. Many complex details and much additional material are relegated to appendices.

Much of the customary work in plasmas is based upon equations that are "derived" by intuitive arguments. The newer approaches in statistical mechanics seek to derive phenomenological equations rigorously, starting with the basic dynamical description of the entire system. The dynamical equations describing the system involve interactions among all the particles that comprise the system and in general are quite intractable. However, the perturbation methods of modern quantum theory provide a tool that enables one to solve the dynamical equations in a *formal* manner. The "solution" consists of infinitely many terms in a series whose convergence is quite doubtful. Nevertheless, in some real sense the series represents the solution to the equations. Very briefly, the method of the Prigogine school consists, first, in identifying terms in the perturbative expansion for the time evolution of various Fourier coefficients of the phase-space distribution function (Wigner distribution function for quantum systems). The terms in this expansion are identified and classified with the aid of a systematic diagram technique. A study of the properties of classes of diagrams then leads to a judicious choice of terms (usually infinite in number), which yield the largest contributions to a given type of physical

process. These terms are then summed to give a resulting phenomenological equation that describes the given process.

Balescu, using the techniques developed by the Prigogine school, has quite successfully elucidated the properties of systems of charged particles. For example, his derivation of an expression for the collision term in the kinetic equation for a plasma is classic. The topics described in his book cover many interesting and important aspects of the subject and include treatments of both classical and quantum systems. A few of these topics include the Vlasov equation, the dispersion relation, the Landau (Fokker-Planck) equation, the ring approximation and equilibrium, quantum plasmas, and binary correlations.

This book can be warmly recommended not only to workers in the fields of statistical mechanics and plasma physics but also to students of physics and chemistry who wish to learn firsthand, and in depth, something about the new kinetic theory of charged particles.

WESLEY E. BRITTIN
Department of Physics and Astrophysics, University of Colorado

The New Mathematics

A New Look at Elementary Mathematics. Benjamin E. Mitchell and Haskell Cohen. Prentice-Hall, Englewood Cliffs, N.J., 1965. xii + 354 pp. Illus. $7.95.

Within the compass of one small volume (281 pages of actual text) Mitchell and Cohen have compressed a mathematical package of surprising magnitude and diversity. Theirs is also a work of solid and genuine achievement. Among other things, the book attempts to combine axiomatic concepts with a down-to-earth examination of computational processes, and the resulting blend of theory and application is a very successful one. In short, what might have been a miscegenation of structure and stunts has emerged a happy hybrid.

In effectively forging the connection between abstract algebra and fourth grade arithmetic, the authors have made a significant contribution to the ever-growing arsenal of materials for the training of teachers. The overall content is one of considerable scope, taking in a wide range of territory. In fact, there is something here for every member of the family: a comforting explanation for mother to allay anxieties over her daughter's "new-fangled" method of long division; games of 11-penny pickup and magic-age cards for the youngsters; mathematics of finance for the junior accountant, complete with annuity and compound interest tables; and a nice bit of operations research and management science for father.

More to the point, the variety of subject matter should give the prospective and in-service teacher a wealth of ideas with which he can enrich the classroom, while the theoretical foundations should furnish a welcome sense of security in dealing with insistent questions of "Why?"

Combining easy readability with mathematical exactitude and careful terminology, the authors offer a sound treatment of many important mathematical topics, including sets, numeration and number theory, measurement, approximations, functions and graphs, and a bit of probability, statistics, and linear programming.

In any ambitious project of this sort, which attempts so much in so little space, it is inevitable that something has to give. In this case I feel that there is perhaps a costly condensation in the development of some of the more abstract theoretical concepts. One moves, for example, from the counting numbers through the integers to the rationals, at a nearly breathtaking pace and without much time allowed for the customary motivations along the way.

In the same spirit of economy the authors have allotted one small paragraph to the subject of groups, which one feels might have been afforded a somewhat more generous treatment. Inequalities, which appear fleetingly toward the end of the book, could perhaps have also been examined in greater detail.

One cannot have everything, however, and surely a work such as this can do much to eliminate many of the misconceptions, misinterpretations, and misanthropic attitudes that are surging about regarding the "new mathematics." The book may also bring increasing insight and interest into the lives and professional practices of our future teachers.

JOHN E. YARNELLE
Department of Mathematics, Hanover College, Hanover, Indiana

Tissue Transplantation

Give and Take: The Development of Tissue Transplantation. Francis D. Moore. Saunders, Philadelphia, 1964. xii + 182 pp. Illus. $5.50.

Although the idea of homotransplantation of organs and tissues in man, for the purpose of alleviating suffering, is an old one, its feasibility was dependent on the great scientific advances made during the late 19th century in surgical technique and asepsis. Consequently, the field of transplantation represents a body of knowledge accumulated during little more than half a century. The tremendous surge of interest in this field during the last decade which resulted from significant breakthroughs made in the experimental laboratories in the late 1940's and early 1950's, has brought human transplantation to the threshold of clinical success. It is this fascinating story that Moore has set down in his book.

This book is directed at a wide range of readers, including students, physicians not intimately involved with clinical transplantation, interested individuals, and, most importantly, patients and their relatives and prospective donors. Written in more or less chronological fashion, *Give and Take* is primarily the story of the development of renal homotransplantation in man, the area that Moore has personnally had a role in shaping. In this framework, he presents the major discoveries of the many basic scientists whose works were subsequently put to successful clinical application; the book is liberally sprinkled with famous names and institutions, and reads somewhat like a "Who's Who" in transplantation. Illustrations, drawings, and pictures are handled tastefully and used efficiently to enhance the text. Although many of the specialized terms must be separately explained to the uninitiated reader, these explanations and definitions are handled with unusual care, either within the text or in footnotes. The bibliography is adequate but not extensive, and the index is complete.

This book will be welcomed by many, but especially by patients and others personally involved with each clinical situation, where hurried explanations made by busy, concerned physicians too often are misunderstood and misinterpreted.

J. WAYNE STREILEIN
Wistar Institute of Anatomy and Biology, Philadelphia, Pennsylvania