to consider what the subject must include in another decade; and how will our students' students cope with the material available a generation from now?

Surely the most difficult feeling one should try to instill in a graduate student is a grasp of where the general development of a field stands, and where he might start his own research. Clark has accomplished what few of us would have either the courage or the ability to begin: a broad and yet a detailed summary of the uses of x-rays. His knowledge, enthusiasm, and care will be of great value to our students. Some chapters, such as the one on the chemical effects of x-rays, summarize information not as yet collected elsewhere and so will be useful to a larger group of readers.

The volume has the usual excellent format of the *International Series.*

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Vorlesungen über Differential- und Integralrechnung. Alexander Ostrowski. vol. 1 (1945) *Funktionen einer Variablen,* xii + 373 pp., F. 36.40. vol. 2 (1951) *Differentialrechnung auf dem Gebiete mehrerer Variablen,* 484 pp., F. 69.70. vol. 3 (1954) *Integralrechnung auf dem Gebiete mehrerer Variablen,* 475 pp., F. 78. Birkhäuser, Basel.

This full-scale treatise on the calculus represents an extended form of lectures given by Ostrowski during the past 20 years in Basel. The scope is so large that it covers a good part of the material studied in American colleges in all 4 years.

The first volume presents the key notions of differential and integral calculus of functions of one variable. The emphasis is on gaining an intuitive feeling, and, although rigor is stressed, the proofs of many fundamental theorems are postponed to the later volumes.

The second volume is devoted to the differential calculus of functions of several variables. This is prefaced by a thorough discussion of point sets, with proofs of such theorems as that of Heine and Borel. Extensive applications of the calculus to differential geometry are given in concluding chapters.

The third volume goes quite deeply into the theory of integration. In particular, double integrals are defined for bounded regions G having a null set as boundary and for functions bounded in G and continuous except for a null set; null sets are understood in the sense of Jordan (based on finite coverings) and the integral is obtained as a limit of Riemann sums. Further topics studied are line and surface integrals, substitution in multiple integrals, improper multiple integrals, special functions defined by integrals, and Fourier series and integrals.

The most striking feature of this work is its extreme thoroughness. For each topic a very careful foundation is laid, the standard theorems are established, and then a study is made of many refinements of the theory; for example, the section on integration by partial fractions leads up to the theorem of Ostogradski that the rational terms of the integral are obtainable by rational operations on the coefficients. The refinements are further pursued in the exercises that occupy almost one-fourth of the work. The great value of these would be much enhanced by appendage of "solutions"; the author states his intention of providing them in a separate publication.

The three-volume work stands as a major contribution to the textbook literature, and it will also be of much value as a reference work for those interested in classical analysis.

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Acetylenic Compounds in Organic Synthesis. R. A. Raphael. Academic Press, New York; Butterworths, London, 1954. xii + 219 pp. $6.20.

The chemistry of acetylenic compounds has developed rapidly in recent years. A feature of this expansion has been the wide application of these compounds in the synthesis of many more complicated unsaturated compounds and especially of naturally occurring substances. R. A. Raphael is particularly well suited for the task of summarizing these recent advances critically and from a practical viewpoint, because he has been closely associated with the main currents of research in acetylene chemistry for the past 10 years, has had wide experience with these compounds, and has contributed a number of notable syntheses that make use of acetylenic compounds; methods for carbohydrates, polyhydric alcohols, unsaturated fatty acids, and penicillic acid may be mentioned.

This volume is divided conveniently into a general section on the preparation and properties of acetylenes, a series of chapters on the synthesis of aliphatic compounds, conjugated systems including allenes, carbocyclic compounds and heterocyclic derivatives, and a final section on practical techniques. There are frequent references to unpublished material. Critical descriptions of the best procedures are given, and the book will be invaluable to the synthetic organic chemist who has only a general familiarity with acetylene chemistry and wants to choose the most convenient method for a synthesis involving an acetylene. Many unusual reactions offering wide possibilities for development are mentioned, and the volume will be interesting reading for all organic chemists, including the rising generation of mechanism-minded individuals who will encounter many unexplained transformations.

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Lectures on Partial Differential Equations. I. G. Petrovsky. Trans. by A. Shenitzer. Interscience, New York–London, 1st English ed., 1954. x + 245 pp. Illus. $5.75.

The theory of partial differential equations is almost as old as the calculus itself but is still in the process of rapid development. The interest in this theory is twofold: it is an important part of mathematical analysis and is also a basic tool in the rational description of natural processes. The literature of the subject is extremely voluminous, but there was a definite need for a short introductory textbook. The present book fills this need admirably.

I. G. Petrovsky is one of the most eminent representatives of the brilliant mathematical tradition of Russia and has contributed significantly to the theory of partial differential equations. This book is based on lectures given at the Moscow State University. It is remarkable that the author succeeded in conveying to the reader some of the basic ideas of a far-flung mathematical discipline in only 245 pages. The book is written with a high standard of rigor; at the same time the connection with physics, which provides the motivation for much of the theory, is emphasized throughout.

The first chapter contains examples of partial differential equations arising in physics, the fundamental Cauchy-Kowalewski theorem, and the classification of linear equations of second order. The second chapter, the largest and most original in the book, deals with hyperbolic equations. The Cauchy problem in the domain of nonanalytic functions and the theory of vibrations of bounded bodies are discussed. The chapter on elliptic equations (Chap. 3) contains a thorough description of various methods for solving the first and second boundary value problems. The final chapter on parabolic equations is much shorter but provides an adequate introduction.

In the body of the text the author dis-