there is to be any condition whatever (such as continuity, etc.) connecting values in the interior with values on the boundary. The solutions are formal; for example, on page 39 we find the assertion that a function v defined by an infinite series $v=\sum A_n v_n$ (the A's being undetermined arbitrary constants and the v's being functions of r and t) satisfies a differential equation and the condition $\lim_{t\to\infty} v(r, t)=0$ "since this is true of every term."

Chapter III (16 pages) discusses briefly Bessel functions of order 0 when the argument is pure imaginary, and gives applications to problems in alternating currents. Chapters IV and V (30 pages) give definite integrals and asymptotic expansions involving Bessel functions of order 0. Chapter VI (35 pages) gives fundamental properties of Bessel functions of real orders, and finally Chapter VII (13 pages) gives applications of them.

The book contains about 150 exercises and problems, many of which consist of several parts and most of which require proofs of identities involving series or integrals. The emphasis in the book is on formulas and identities rather than on rigorous methods of obtaining them. The reviewer feels that the book would be made more useful if numbers of displayed formulas were placed before rather than after the formulas, and the space after the formulas were used to specify the ranges of the parameters for which the formulas hold. The choice of notations and printing is good except for an annoying similarity of two microscopically different Y's which denote different Bessel functions. Finally, the reviewer must report (for the attention of authors and publishers) that the binding of his copy of the book cracked badly in spite of a careful attempt to open the book without tearing it apart.

R. P. AGNEW

Advanced Analytic Geometry. By A. D. Campbell. New York, Wiley; London, Chapman and Hall, 1938. 10+310 pp.

Professor Campbell envisages a student who had a rudimentary course in plane analytic geometry in which oblique axes have not been mentioned. The algebraic equipment of the student may exceed somewhat the usual course in College Algebra of our American schools, say, in the matter of determinants, but he cannot be relied upon to be familiar with Sylvester's method of elimination (p. 93). His knowledge of derivatives hardly goes beyond the definition of the term.

This student Professor Campbell undertakes to "introduce to the analytic side of projective geometry." The author realizes that he will have to confront his student with a vast number of new ideas, both analytical and geometrical, and that the student may have difficulties in assimilating new concepts coming in such rapid succession. To meet the situation the author deliberately sets out to remove from the path of the learner every obstacle that can possibly be removed. He begins by picking out a considerable number of topics which are usually dealt with, or made use of, in analytic projective geometry, but which can be treated independently of that subject. He puts this material in the front part of the book, to form preliminaries, or an introduction, to the subject proper. Thus he discusses affine geometry, linear transformations, groups, anharmonic ratio, families of conics, etc. Then he develops each topic gradually, with plenty of examples, without sudden jumps, and with constant regard to the mathematical equipment of the learner. By the time this part of the task is done, the author has not only completed about half of his book, but has produced something that constitutes a rounded whole in itself, and well worth the while of anyone who would drop the subject right there.

The second part of the book takes up the subject of projective analytic geometry, by discussing the usual topics, such as the triangle of reference, homogeneous coordinates, duality, the line at infinity, etc. Some of the topics already considered in the first part are developed further. All this is written with the same preoccupation for clarity and simplicity as the first part. The student will find many judicious remarks, many striking "asides" which cannot but interest him. Constant appeal is made to the student's geometric intuition. Synthetic methods are often made use of, and even synthetic proofs are given, when this procedure seems to simplify and expedite matters. Exercises are numerous throughout the book and often used to supply details of proofs and to clarify the text generally.

It is possible to raise the question whether the author, by making the presentation too easy, has not deprived the student of his birthright to come to grip with difficulties. This reviewer, for one, shares the author's view that such fears are futile. The difficulties inherent in the subject matter discussed, and in Mathematics, in general, are a sufficient guaranty that the learner will have to put forward his best efforts, if he is to get anywhere, and it is not necessary to pile up difficulties of presentation, just for the pleasure of having them there. It is more reasonable to smoothen the learner's path when possible and thus enable him to reach more quickly a higher level in his studies.

However, the reviewer does not share the author's view that it is always advisable to assume as meager a preparation on the part of the student as possible. The author followed a custom which has attained the dignity and the rigidity of a dogma. This "starting from scratch" is a burdensome procedure that impedes progress, and is often unnecessary.

The book as a whole is well thought out, well planned, and well written.

N. A. Court

Introductory Quantum Mechanics. By V. Rojansky. New York, Prentice-Hall, 1938. 529 pp.

The prerequisites for a study of this book are "the elements of calculus and of ordinary differential equations, and a recognition of the failure of classical mechanics in the domain of atomic physics." The book is for those who are willing to devote the necessary time for getting a sound working knowledge of the subject. The emphasis is on ideas and fundamentals. Thus the problems are selected for mathematical simplicity and for their appropriateness in illustrating the theory. The free particle and the harmonic oscillator are most often used.

Mathematical and physical difficulties receive separate treatment. The mathematics of operators, eigenfunctions and eigenvalues, and matrices is treated fully enough for the comfortable reading of the physical part. The book closes with chapters on the states of the normal hydrogen atom, electron spin, and Dirac's theory of the electron.

It seems to the reviewer that the author has succeeded in his aim to introduce the reader to Quantum Mechanics, and that most readers would save time and get better results by working through this book before going to a more "comprehensive and critical survey of the theory, or a study of its applications" for which it is an introduction. The coherence of the book is to be praised. The author has made the subject his own and has not written a compilation.

K. W. Lamson