

AUERBACH ON MATHEMATICAL PHYSICS

Die Methoden der theoretischen Physik. By Felix Auerbach. Leipzig, Akademische Verlagsgesellschaft, 1925. x + 436 pp.

The book to be reviewed is written by a physicist for students of physics and is meant as an introduction to theoretical, i. e. mathematical physics. The author's program is to present the underlying notions and principles as well as to give a compendium of the mathematical devices which the student is likely to need in a more profound study of the subject. The following extract from the table of contents will show that the ground covered by the author is very extensive:

I. Notions and principles, 27 pp. II. Formal methods, 14 pp.* III. Elementary equations, 26 pp. IV. Difference, differential, and integral calculus, 57 pp. V. Ordinary differential equations, 56 pp. VI. Partial differential equations, 125 pp. VII. Integral and functional equations, 23 pp. VIII. Theory of molecules; Statistical methods, 47 pp. IX. Geometrical, graphical, and vector methods, 51 pp. X. Concluding remarks, 6 pp. Index, 4 pp.

It is rather obvious that the task of treating such a wide range of ideas in an adequate manner is a very trying one. The best parts of the book are those where the author is concerned with the applications of some special theory to particular problems. In fairness it must be said that such problems occupy the greater portion of the book. The examples are usually well chosen and the calculations are carried out in quite an elegant manner. But every now and then we encounter a piece of a general mathematical theory which is presented in an awkward and doubtful manner. The reviewer is perfectly aware of the fact that mathematical rigor can not and perhaps should not be the primary concern of the physicist. But in a book which is meant to introduce a young student into the realm of theoretical physics where he is going to use mathematical tools in all his work, it is only fair to the student to tell him something about the limitations of these tools as instruments of research. This of course applies essentially to questions involving some kind of infinite process or limiting passage where the student needs a timely warning. The author's habit of stating results without mentioning the conditions under which these results hold, is deplorable; it makes the value of the information imparted illusory, and it is scarcely conducive to sound mental habits

* *Wortsprachliche Methodik.* What is meant is methods based upon reduction to general principles by means of qualitative discussion without the use of calculations.