

and, indeed, of mathematics. Although none of the various theories, the logical theories of Russell and Whitehead and of J. Königs, the intuitional theory, suggested by Kronecker and developed by Brouwer and Weyl, the axiomatic theory brought forth by Zermelo and contributed to by Fraenkel and others and Hilbert's theory of proof, which are described here, is in a finished form, they all seem to lead to viewing mathematics and logic as a game in which the pieces and the rules of operation are defined as concretely as possible.

The book closes with a chapter of a few pages which contains a discussion of the connection between Mengenlehre and other branches of mathematics and a bibliography of the subject. These last pages are nearly identical with the corresponding ones of the first edition.

No errors in definitions or proofs have been noted, and the typography is excellent, as in previous volumes of the Springer series.

G. A. PFEIFFER

*Theorie der Differentialgleichungen. Vorlesungen aus dem Gesamtgebiet der gewöhnlichen und der partiellen Differentialgleichungen.*

By Ludwig Bieberbach. Berlin, Julius Springer. 1923. viii + 317 pp.

"To write a text book on differential equations which shall be a suitable textbook, and at the same time set forth the spirit, methods and results of the theory in all of their aspects, so that the student shall be prepared to read original papers intelligently—that appears to be an impossibility." With these words Bieberbach opens the preface to the book under review, which is intended only as an introduction to the subject. Its scope is best brought out by giving the titles of the four sections into which the book is divided.

Section I. Ordinary differential equations of the first order.

Section II. Ordinary differential equations of the second order.

Section III. Partial differential equations of the first order.

Section IV. Partial differential equations of the second order.

It is limited therefore to equations of the first and second order.

The author is much more interested in bringing out the meaning and the interpretation of differential equations than he is in setting exercises for the student; in fact, there are no exercises at all. Existence proofs are given, and discussions of the nature of the integral curves. He does not limit himself to real values of the variables, for in each of the first two sections he has a chapter dealing with the complex values of the variable and the nature of singularities.

While the book is elementary in character, its spirit is scholarly, and the book is well worth while to the student who has not gone deeply into the subject of differential equations.

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