PELSENEER ON MATHEMATICAL THOUGHT

Esquisse du Progrès de la Pensée Mathématique. Des Primitifs au IX^e Congrès des Mathématiciens. By J. Pelseneer. Paris, Hermann, 1935. 162 pp.

Anyone seeing this little volume in the window of a bookshop in Paris would be apt to look upon it as simply another popular survey of the history of elementary mathematics. Such surveys of various fields are numerous, particularly in France and Germany, and they serve a good purpose. A second glance at the title, however, should tempt the inquisitive observer to open the first few pages. If this be done, he will probably find much that is new to him and will see the beginning of a treatment of the subject not generally found in the popular books of the day.

M. Pelseneer begins by calling attention to Boutroux's *L'idéal scientifique des mathématiciens dans l'antiquité et dans les temps modernes* (Paris, 1920). This work sought to reveal the hidden spirit which, at different times, inspired and animated the researches of some of the world's great mathematicians. It is such a plan of approach to a new type of history, abandoning that of a series of statements in chronological order, that M. Pelseneer suggests and, to a limited degree, attempts. He seeks first the spirit of the times—or *"l'air du temps"*—in which some of the great discoveries were made and by which the leaders were influenced. Since, however, it is impossible in such a limited "esquisse" as this to set forth in detail all the influences that make for the discovery of even a single feature in the advance of mathematics, he aids the reader by references to a few recent publications from which material for further study can be drawn. These references are confined almost exclusively to French, German, and English sources, and all the quotations of modern material are in the first of these languages as being the most familiar to the author's readers. One remark which he makes in this connection is particularly interesting, namely, that mathematicians are the least tiresome of all conversationalists since they never talk about their own subjects; they may mention their achievements, but *"leur oeuvre s'accomplit dans le silence."*

The following list of chapters will serve to show the general scope of the work: I The primitives, with subtitles (1) Number (the logical aspect), (2) Number (the mystical aspect), (3) The absence of geometry; II. The pre-Greek period, including (1) The Egyptians, (2) The Sumerians and Babylonians; III. The Greeks; IV. The Cartesian period; V. The 19th and 20th centuries.

The closing chapters relate to modern times, and therefore offer relatively little that is new with respect to material. This allows more space for the discussion of "la pensée mathématique" in the sense of the term as set forth in the early part of the book. For the mathematician this is naturally the most valuable feature of the work. It gives the author an opportunity of summarizing briefly some of the views of such scholars as Boutroux, Couturat, Darboux, B. Russell, Wavre, Poincaré, and the original works of several modern mathematicians.

The work lives up to its title so far as being a sketch, and also as relating largely to the primitives. Only a small part of the world is considered, however, no reference being made to the Far East or to various lands including or connected with the European centers. Relatively few of the names and achievements of the world's most prominent mathematicians are mentioned, although many more would naturally be expected in any consideration of the *Progrès de la Pensée Mathématique.* It is to be hoped that M. Pelseneer will carry out on a large scale a further and more complete study of the hidden spirit which has inspired the greatest scholars. For example, what was the spirit that inspired Menaechmus, Deinostratus, Diocles, Heron of Alexandria, and other Greeks whose names are not mentioned? As a single problem, who will undertake to consider the influences which surrounded Leonardo Fibonacci? If a man like Dr. Solomon Gandz, well known for his valuable contributions to *Isis* and other publications, and with the necessary equipment in the Semitic, Latin and Greek, and modern European languages could find the time to make this study for Fibonacci alone—and I know of no other similar field which promises such interesting results—the work would be of great value and interest.

In the later period there are also such leaders as Napier, Desargues, Barrow, Cotes, Jacobi, Plücker, and Bolyai—to name but a few—each offering a problem of historical interest almost equal to that of Fibonacci, but generally with less of what we may call mathematical romance. Will M. Pelseneer have the time to extend his studies so as to include these and others of equal standing?

The book has a good index of names, some of them of less importance than those mentioned above; but for an index of topics the reader must resort to the less satisfactory *Table des Matières.*

DAVID EUGENE SMITH

MONTEL ON UNIVALENT FUNCTIONS

Leçons sur les Fonctions Univalentes ou Multivalentes. By Paul Montel. Collection de Monographies sur la Théorie des Fonctions, publiée sous la direction de M. Émile Borel. Paris, Gauthiers-Villars, 1933. iv+159 pp.

This book reproduces, with some modifications, the author's course of lectures delivered at the Sorbonne during the winter of 1929. It contains an exposition of a multitude of interesting results of the theory of univalent functions and of their various extensions. This theory, the origin of which is in the general problem of conformal mapping of simply-connected domains, was given a powerful impetus by the "Verzerrungssatz" of Koebe and Bieberbach. Since then it has attracted the attention and efforts of many mathematicians and at present is perhaps one of the most developed branches of the modern theory of functions of a complex variable. The author starts with classical results, but gives a short account also of the most recent ones, of which, however, he often reproduces only statements, omitting proofs altogether. A consistent use of the theory of normal families which was introduced and developed with great success by the author contributes considerably to the general elegance and unity of exposition.

A brief description of contents follows. Chapter 1 (*Univalence et multivalence des fonctions analytiques*) contains the fundamental notion of the theory of univalent and multivalent functions together with simple facts concerning convex and star-shaped domains. Chapter 2 (*Ordre de multivalence des poly-*