

BOOK REVIEWS

Orthogonal Polynomials. By Gabor Szegő. (American Mathematical Society Colloquium Publications, vol. 23.) New York, American Mathematical Society, 1939. 10+401 pp.

The general concept of orthogonal polynomials (OP) was introduced in Analysis in the fifties of the 19th century by Tchebyscheff, then professor at the University of St. Petersburg. Naturally his pupils have carried on his research in this field. Thus in 1868 J. Sokhotsky in his thesis gives a general approach to OP, in some respects even more general than the one which prevails today. In 1884 Markoff's thesis again treats the general OP corresponding to absolutely continuous as well as discrete distribution-functions. In 1886 C. Possé published a monograph: *Sur quelques applications des fractions continues algébriques* where he considers the general OP related to

$$\int_a^b [f(y)/(x-y)] dy.$$

None of these works may be considered as a systematic treatment of the subject. In fact, time was not yet ripe for such treatment (it took almost a hundred years after the introduction of Legendre polynomials before a systematic treatment of these appeared—Heine's *Handbuch der Kugelfunktionen*). In 1932 N. Abramesco published an article in the *Annales de Toulouse* on the general OP. In 1934 the writer of these lines published a monograph in the *Mémorial des Sciences Mathématiques* designed to treat the theory of OP (applications are reserved for a second monograph in this collection) systematically and with as many details as limitation of space permitted.

The book under review gives in 400 pages a detailed and systematic treatment of the theory and applications of OP. It offers a very lucid and elegant exposition of the subject, to which Szegő himself made so many contributions. It is by no means a compilation of results already known. It presents much material which is new and important; many old results are presented in a novel setting: more precise or more general statements, new proofs. The author tried to bring the book as much up-to-date as possible and has generally succeeded.

Szegő's book consists of 16 chapters, the content of which may be summarized as follows. In Chapter I the author is marshaling the