

clear and definite notions concerning the mathematical and mechanical principles underlying the construction of the many types of machines designed to perform automatically the operations of addition, subtraction, multiplication, and division.

No great mathematical or technical knowledge is required to read the book with ease; though it possesses much more of scientific interest and spirit than one might expect to find in a so-called "popular" treatise.

Representative machines, mostly of German or American make, varying in complexity from the abacus to the Burroughs—all designed to add or subtract—are described in detail, and the mechanical principles according to which they operate are discussed. Similarly there are separate chapters on machines designed to perform multiplication and division, the highest type of which is represented by the "millionaire" computing machine so often found in our mathematical laboratories. The text is illustrated by 45 excellent figures.

The author summarizes the present state of development to which mechanical computation has been carried; points out many imperfections which still exist, and suggests the requirements which the ideal machine should fulfill. He closes with a rather brief discussion of the principles underlying the construction and use of the slide rule. It seems to the reviewer that this chapter is rather inadequate and hardly up-to-date.

ERNEST W. PONZER.

*Die mathematische Ausbildung der Deutschen Landmesser.*

Von PH. FURTWÄNGLER und G. RUHM. Band IV, Heft 8, I. M. U. K. Leipzig, Teubner, 1914. vi+50 pp.

IN this pamphlet is given a summary of the training, both practical and theoretical, together with the courses of study prescribed for the German engineer who wishes to specialize in land surveying. Though the various German states differ in their minimum requirements for the holder of this office, who must pass a rigid examination, yet nowhere are there evidences of the existence of an elective sinecure such as is represented by that of our own county surveyor, an office too often filled by some derelict engineer with a political pull. The work is systematized and is more of the grade of that of our Coast and Geodetic Survey.

Special courses are offered at the technical high schools in