student gets through his calculus without being able to apply it to numerical problems, especially when they occur in a course not designated as mathematics. This should not be so, and is undoubtedly the reason why mathematics in our technical schools is in such disfavor with the students. This situation is most probably due partly to the mathematics teachers, partly to the engineering teachers and partly to the textbooks. Wherever the fault lies, any textbook written for engineering students should bridge this gap or wholly close it. If there is any essential difference between the calculus for the engineer and the calculus for the pure mathematician, then our textbooks for engineers should be written as such and should not be attempts to compile books that can be sold to both classes of students. The teacher of mathematics in an engineering school who is seeking to present the calculus to his students in a way that will make it appeal to them as being a subject they need instead of one they must take will find this book a help in that direction.

The first two chapters, especially the second on "Limits and continuous functions," are an attempt to get the student familiar with subjects that often remain hazy until the end of his course in calculus. They present the matter in a very clear way by means of many examples with full explanations. The remaining chapters are treated in much the same way. The book is so arranged that a shorter course can be had by omitting certain chapters without destroying the continuity of presentation. The book contains more material than most of our engineering schools could cover in the time now allotted to mathematics. The author seems to have had liberty from his publishers to give as much space as he desired to illustrative problems and lists of exercises. This is a very good feature of the book. On the whole the book should prove very teachable.

T. E. MASON.

Die Rechenmaschinen und das Maschinenrechnen. Von Dipl. Ing. LENZ. Band 490, Sammlung aus Natur und Geisteswelt. Leipzig, Teubner, 1915. vi+114 pp.

OVER 500 separate numbers of this collection of booklets on science, the arts, and technology have been published and the set is not yet closed. Each volume is complete in itself and retails at M. 1.25.

No. 490—the one under review—aims to give its readers

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