

MATHEMATICS FOR ENGINEERS

Lezioni di Analisi Matematica. By Guido Fubini. Torino, Società Tipografico-Editrice Nazionale, 1923. viii + 470 pp.

Grundriss der Differentialrechnung. By Ludwig Kiepert. Hannover, Helwingsche Verlagsbuchhandlung, 1923. viii + 348 pp. II. Band: *Einige grundlegende Untersuchungen aus der Algebra und Funktionen von mehreren unabhängigen Veränderlichen.*

Both of these books were written primarily for engineering and technical students. The former follows the course as given in the Polytechnic school at Turin, and the latter is written by a trained engineer for engineering students. It has been remarked so often that our scientific students do not know enough mathematics to enable them to go very far; particularly is this true of our physicists and engineers. A Ph.D. in chemistry complains that he cannot read beyond the first hundred pages of Sommerfeld's *Structure of the Atom and Spectral Lines*, because there is too much mathematics. How far this is true may be judged by comparing the mathematical equipment of the above courses with one obtained in a calculus course in an American university.

The present edition of the first book is the fourth; previous editions appeared in 1913, 1915, 1920, which indicates its wide use in Italy. The difference in content between these texts and our American texts is not so marked. There is perhaps a greater emphasis on applications of calculus to algebraic problems in these foreign books, but the chief difference is in the point of view.

It is rather strange that we should be laboring under severe handicaps in the teaching of the pivotal course of our mathematical curriculum, the calculus. Our difficulties are two-fold. First, there is in vogue, what I may call the "double standard" amongst us. Mathematicians of repute will not hesitate to pursue a policy in their teaching which amounts to keeping their right hands in ignorance of what their left hands are doing. Two examples will illustrate this difficulty. An author of a calculus text writes in a footnote that the equation in the paragraph above "to be strictly accurate" requires some modification. Again, how often do we find theorems stated as true, which in the proof make use of a uniformity condition, which bobs up serenely from nowhere, and which disappears again in applications to nowhere.

Our second difficulty is that too many of us bury our heads ostrich-like in the sand and keep the eyes of our students closed to the fundamental assumptions on which the basic principles of the course are founded. This tends to superficiality and the "hand-book" method