

material; only essentially important topics are treated and these carefully and fully. There are no exercises per se, but the author leaves much in the text to the student and furnishes frequent suggestions for further study. The methods followed are for the most part analytic, but are inspired by a keen geometric insight. The proofs and deductions are concise, rigorous, facile, and in some cases, novel.

The author has followed an established custom in the descriptive, rather than logical, introduction of imaginary elements. This has led here, as frequently, to a lack of proper respect for the eccentricities of the complex domain, resulting in some unguarded, if not inaccurate, statements. It is to be hoped that the time is not far distant, when geometers who feel themselves forced into the complex domain will accord to it a logical and rigorous foundation.

The book makes delightful reading. It should prove of value to advanced students and to teachers of Cartesian and modern geometry in this country.

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*Applied Calculus.* By F. F. P. Bisacre. Glasgow and Bombay, Blackie and Son, Ltd., 1921. xiv + 446 pp.

It is not in general the policy of the BULLETIN to review elementary textbooks on the calculus. In the present instance, however, it seems desirable to make an exception and to give a brief notice to Mr. Bisacre's text. It differs in several particulars from the usual elementary textbook. Its avowed intention is to provide an introductory course in the calculus for the use of students in the natural and applied science whose knowledge of mathematics is slight. The author does not presuppose anything beyond elementary algebra, trigonometry, geometry and graphs. In particular no previous course in analytic geometry is presupposed. The first part of the text as far as its selection of material is concerned does not differ very greatly from the ordinary textbook. It is, however, distinguished by a remarkable vividness of presentation. The author uses a quotation from the *Merchant of Venice*, for example, to illustrate the notion of units and large and small quantities, in particular the notion of allowable error, etc. In the latter part of the text, the selection of material, however, differs widely from the conventional. There is a chapter of thirty-two pages on problems in electricity and magnetism, a chapter of twenty-one pages on problems in chemical dynamics and a chapter of sixty-five pages on problems in thermodynamics. The treatment is remarkably accurate and rigorous considering its elementary character. Its interest is further enhanced by biographical notes and portraits of mathematicians who have contributed to the development of the calculus and to the physical theories covered.

It is doubtful whether the book could be advantageously used in courses on the calculus in this country and yet it is not at all clear that some schools of applied science or technology might not find it distinctly available in their work.

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