First, there is a simple verbal synonym that he himself uses later ("if all discriminations are imperfect") and second, the placement of the quantifier after the sentence leads to possible ambiguity. Indeed, the careless reader may well think that this is the negation of the claim that for every x and y belonging to T, $P(x, y)$ equals 0 or 1. Occasionally the steps and reasons in a proof are so arranged that the reader is misled as to the correspondence. There are a few violations of the rule of exposition that an item should be explained if it is less obvious than other items that have been explained.

KENNETH O. MAY

Rachunek Operatorów (*Operational calculus*). By Jan Mikusiński. 2d Polish edition. Monografie Matematyczne, vol. 30. Warsaw, 1957, 374 pp.

In several papers the author has published a theory containing a direct justification of the Heaviside Calculus as opposed to the various well known indirect methods using functional transforms. The purpose of the book under review is to present this theory and its applications both to engineers primarily interested in the use of efficient computational procedures and to readers desiring to understand why these procedures work. To reach such a heterogeneous readership, the author uses the text-book approach and leads the reader gently and with great skill from a completely elementary level to rather abstract concepts. There is a profusion of problems (solutions to them fill 28 pages) and an abundance of applications.

It was not the mandate of the reviewer to describe the details of the book. Its fundamental idea is as follows: The class of all continuous real or complex-valued functions defined on the real positive semi-axis forms a ring under the operations of pointwise addition and convolution. Since this ring has no divisors of 0 (theorem of Titchmarsh), it can be extended to a quotient field, whose elements are called "operators." The author shows that in this field (which comprises all Heaviside operators) an algebra and an analysis can be constructed in which operators play the same role as numbers in classical analysis. In particular, various problems often worked by Laplace transforms can be solved by this method in a simpler way and under less stringent assumptions.

While this review was being written, an English translation of the book was published as Volume 8 of the International Series of Monographs on Pure and Applied Mathematics, Pergamon Press, New York, 1959. (Enlarged by an appendix of 112 pages for the use of readers with theoretical interests.) It is very commendable that thus this interesting work has been made accessible to the English speaking community.

HENRY M. SCHAERF

An introduction to differential geometry. By T. J. Willmore. New York, Oxford University Press, 1959. 10+317 pp. $5.60.

Despite the renewed interest in differential geometry in the last decade, there has been but one text in English published since the war suitable for undergraduates. That one, by Struik, limits itself to topics in the classical theory of curves and surfaces. This is unfortunate, since a student familiar only with vector methods would find the geometric content of many modern research papers inaccessible merely on account of notation and terminology. Yet, current propaganda to the contrary, many geometers hestitate to do entirely without "line segments with arrows on the ends," especially in undergraduate lectures. For them, and for mathematicians in other branches who wish to find out a little of what's going on in the field, Willmore's new text is highly recommended.

No doubt the author will be accused of falling between the three fires of vector, tensor, and differential form notations, and it is clear that a book this size cannot do justice to all three. What is remarkable is how much is here, and how pertinent it is to modern trends in differential geometry.

The book is divided into two parts. The first is devoted to surface theory and uses vector notation almost exclusively. Chapter I covers some standard local theory of curves in three space, through the fundamental existence theorem. Topics not usually found in such a treatment are the discussions of differentiability hypotheses, existence of arc length, existence of the osculating plane, and an appendix giving an existence proof for solutions of systems of ordinary linear differential equations.

Chapter II, *Local intrinsic properties of a surface*, is an excellent introduction to Riemannian geometry. There is a good discussion of local isometric correspondence between surfaces as motivation for the study of intrinsic properties. Geodesics, geodesic curvature, the Gauss-Bonnet formula, conformal mapping, and geodesic mapping are treated, and an appendix proves the existence of normal coordinates (which, incidentally, are mentioned by name nowhere in the book).

Principal curvatures, developables, minimal surfaces (a minimal treatment), and ruled surfaces are covered in Chapter III, *Local non-intrinsic properties of a surface*. The fundamental existence theorem