

There are shorter items by Burali-Forte, Padoa, Richard, König, Wiener, Fraenkel, Finsler, Weyl and Bernays. We also find letters by Dedekind and Cantor, and the famous correspondence between Russell and Frege. The volume is generously endowed with references and index.

J. Lambek, McGill University

The basic laws of arithmetic, by Gottlob Frege. Translated and edited by Montgomery Furth. University of California Press, 1967. lxiii + 144 pages. Paperback \$1.95.

This is a translation of approximately one-fifth of Frege's "Grundgesetze der Arithmetik". Its main portion is the "Exposition of the Begriffsschrift", and there is an appendix devoted to Russell's paradox. Frege's two-dimensional symbolism has not been tampered with. There is a long introduction by the editor.

J. Lambek, McGill University

On the syllogism, by Augustus de Morgan. Edited by Peter Heath. Yale University Press, 1966. Distributed by McGill University Press. xxxi + 355 pages. \$10.00.

De Morgan was born in India. He was a man of strong anti-establishment principles, on account of which he was barred from a fellowship and resigned his positions twice. He was engaged in a protracted controversy with the Scottish logician William Hamilton.

In the book under review he is mainly concerned with bringing the syllogism up-to-date, and there are the rudiments of a theory of relations. I could not find "De Morgan's Law", but it seems that this was already known to the scholastics.

J. Lambek, McGill University

The problem of the minimum of a quadratic functional, by S.G. Mikhlin, translated by A. Feinstein. Holden-Day, 1965. ix + 151 pages. \$9.50. (Original published in 1952 as Problema Minimuma Kvadratsionogo Funktsionala, State Publishing House, Moscow-Leningrad.)

In elementary calculus of variations we find extremals by solving the Euler-Lagrange equations. In other words, we reduce the problem of minimizing a functional to the integration of a differential equation or system of differential equations. This book is concerned with the reverse process. In particular, it is concerned with boundary-value problems of mathematical physics (of elliptic type) which can be reduced to the problem of finding the minimum of some functional.

The book is intended for students of applied mathematics and is relatively elementary: Hilbert space concepts are used but no familiarity with spectral theory is required. Of special interest is the inherently constructive nature of the methods that are developed. Chapter I: Statement and solution of variational problems. Chapter II: Certain auxiliary results. (Generalized derivatives, singular integrals.) Chapter III: Applications to equations of elliptic type. Chapter IV: Applications to elasticity theory. In this translation, a supplement has been added and some modifications made with the cooperation of the author, who receives no royalties from the sale of the book. (In theory at least, the Russians keep a fund for payment of royalties to American authors whose books are translated into Russian, from which they can collect if they sojourn in Russia.)

Although translators who do a good job are usually ignored in reviews, I would like to make an exception in this case. Dr. Feinstein is himself the author of a book on information theory, and this is his eighth translation to reach print (a ninth is in the process of publication and he is working on a tenth). Eminent in his own right, he got started translating books "to help pay the bills" but now does it mainly as a way to force himself to work through books that he feels may be of interest to him. I, for one, owe him a debt of gratitude.

H.F. Davis, University of Waterloo

Modular lie algebras, by G.B. Seligman. *Ergebnisse der Mathematik und ihrer Grenzgebiete*, Vol. 40, 1968. x + 166 pages. \$9.75.

This valuable book is essentially a survey of the present status of Lie algebras over fields of characteristic not equal to zero. The theory of such algebras is unexpectedly different from the theory of Lie algebras over fields of characteristic zero. As the author states in his foreword, "It is not simply the case that new methods must be found to establish analogues of the theorems for characteristic zero, but rather that almost the only analogues which remain true (with the same degree of generality) are those whose traditional proofs turn out to have been independent of the characteristic anyway".

The first chapter sketches out some of the fundamental results which are independent of the characteristic - e.g. the Poincaré-Birkhoff-Witt theorem, Engle's theorem, and the Cartan-Dieudonné theorem for algebras with a non-degenerate, symmetric, invariant, bilinear form - as well as some concepts, such as the restricted algebras, which are entirely modular in character.

Chapters 2 and 3, which are complete, deal with the classical Lie algebras and their automorphism groups respectively. These important Lie algebras are analogues of split semi-simple Lie algebras over fields of characteristic zero, and actually may be derived directly from them.