as to the training of students in another land and to learn to appreciate the Latin mind. Here the lesson is rich and the knowledge it imparts adds to the stature of a human being. One might add that the lesson is never learned, being too extensive. We look forward to the appearance of volumes 2 and 3, which we are certain will reveal once more all the personal warmth and all the pedagogical cunning of these two authors.

E. R. LORCH

Mathematical aspects of the quantum theory of fields. By K. O. Friedrichs. New York, Interscience, 1953. 8+272 pp. $5.00.

Attempting a mathematical treatment of quantum fields may be a bit like trying to run a cross-country mile in 4 minutes. One of the main obstacles is the psychological one arising from the prevailing opinion that it can't really be done. This book is one of the first serious attempts to get in training for a successful run, and is the only one of such scope. A number of shorter stretches are run in good enough time to be encouraging, and some of the longer practice runs show interesting technique and suggest novel possibilities. If at times the pace slows down almost to a fast walk and if not all of the mile is covered, the degree of success is still greater than one had a right to expect at this stage of the enterprise.

The subject does not at present admit a systematic or rigorous presentation. To a considerable extent it is not even so much a subject in the mathematical sense as a set of techniques for dealing with specific problems with various elements in common. The most incisive of these techniques, and in particular the renormalization approach developed within the past ten years, look just as firmly mathematically unrigorizable now as did the theory of *interacting* quantum fields when it was initiated over 25 years ago. It is even a significant accomplishment to present, as this book does, a quasi-rigorous treatment of selected parts of the theory of an individual quantum field.

The material is presented in a relatively mathematical language and style. It is thereby more readable for most mathematicians than most of the corresponding articles in the physical literature, even if definitions and statements are not always mathematically precise and if proofs of some of the more technical statements are omitted. The author apparently intends to give a more mathematical description to some of the simpler parts of the existing theory, and the only substantial really novel feature is the treatment of quantum statistics. The basic annihilation and creation operators of conventional physics exist only in a formal sense, but smoothed-out versions of them can be

identified with perfectly good mathematical operators (unbounded, but closed and densely defined). This development was independently arrived at by J. M. Cook, whose approach was perhaps less concrete but more invariant, using tensors over a Hilbert space rather than square-integrable functions of several variables. The large number of applications and comments that are made in the book may be judged from the fact that the mathematical part of Cook's paper is 10 pages long while the corresponding material in the book is scattered through some fifty odd pages, without including proofs of such results as the self-adjointness of the canonical P's and Q's.

There is no doubt that the author has succeeded in his aim "to present basic sections of field quantum theory in a consistent mathematical language without carrying out all mathematical deductions with complete rigor." It is regrettable that the standard of rigor and the mode of presentation are not such as to make the mathematical consistency of many of the sections wholly manifest and explicit, but one must be thankful that the ice has been broken with this first large-scale attempt to deal mathematically with quantum fields. While the book is not easy reading in detail and is not closely integrated in the large (the relation between statistics and dynamics seemed blurred to the reviewer), a mathematician interested in a more rigorous and searching approach to the specific problems of quantum field theory may well find this a stimulating and useful book.

I. E. SEGAL

Collected mathematical works. By H. Bohr. Ed. by E. Følner and B. Jessen. Copenhagen, Dansk Matematisk Forening, 1952. Vol. I, 34+771 pp., 1 plate; vol. II, 9+852 pp., 1 plate; vol. III, 10+985 pp., 1 plate. 110 kr.

These volumes are an impressive reminder that Harald Bohr was one of the great mathematicians of the first half of this century. Most of his work is now generally regarded as "classical" and much of it has been superseded or subsumed in more general results, but this fact is in itself a tribute to the importance and fundamental character of his work and to the stimulation which it gave to other mathematicians. His papers are sure to be admired by generations of future mathematicians and the publication of his collected works is accordingly most welcome.

Aside from the intrinsic interest of Bohr's papers, they are models of mathematical exposition. Their eminent readability makes them excellent reading for students of analysis at practically all levels. While this readability is largely due just to good mathematical writ-