calculating the resonance integral for "thick" blocks, and Orlov's extension of Wigner's method giving a formula for the effective resonance integral which can be used for U^{238} blocks of any thickness. Further, a method is given which was developed by Marchuk and Orlov for calculating the resonance capture of neutrons in a plane lattice of uranium blocks. Sedel'nikov's extension of the Gurevich-Pomeranchuk theory to take account of self-shielding in intermediate neutron reactors is described. Effective boundary conditions for "black" and "grey" bodies are considered. Finally, the Wigner-Seitz method is applied to a cell of a heterogeneous reactor to obtain effective constants for an equivalent homogeneous reactor.

Chapter XIII contains a discussion of the calculation of the neutron flux in fast nuclear reactors. The transport equation including terms for inelastic scattering is given. Corresponding multigroup equations are obtained. For solving these equations both the method of spherical harmonics and Carlson's S_n method are described.

A final chapter on calculations for intermediate and thermal reactors with hydrogenous moderators is included. This chapter was added after the original manuscript had been prepared for publication.

It is unfortunate that this book was not more carefully edited. For example, there is confusion in the use of the terms 'flux' and 'current'; on page 104 the following statement appears, "we wish to find a solution of (30.1) which has a continuous flux

$$I = r^{a} D \frac{d\phi}{dr}."$$

Throughout the text, the equations which are usually referred to as "transport" equations are called "kinetic" equations. Too frequently proper names are spelled phonetically as a result of the transliteration process, rather than with their usual English spelling; for example, R. E. Marshak appears as R. E. Marchak (p. 6), R. Ehrlich appears as R. Erlich (p. 6), Neumann appears as Neiman (p. 142), etc. Also, it is unfortunate that the publishers did not take more care in their representation of symbols. The equations were apparently reproduced photographically. A parameter represented by a script letter in an equation is frequently represented in another form in the text. On pages 132 and 134 a parameter which appears in the equations as a "chi" is represented as a "kappa" in the text.

This book is a very useful addition to our literature. It is hoped that its presence and imperfections will act as a stimulus for the publication of another book in the area of numerical methods for nuclear reactor calculations which will give a more satisfying mathematical treatment of this subject, and which will be made available at a more reasonable price.

E. Cuthill

Applied Mathematics Laboratory
David Taylor Model Basin
Washington 7, District of Columbia

25[W].—E. Burger, *Einfuhrung in die Theorie der Spiele*, Walter de Gruyter & Co., Berlin, 1959, 169 p., 23 cm. Price DM 28.

This is the first book on the theory of games to appear in the German language. The author, professor of mathematics at the University of Frankfurt, has previously given several courses on the subject for economists, but the emphasis in this book is to bring out the mathematical structure of the theory. He has succeeded in this in an admirable way. The comparatively few applications are meant as illustrations rather than as developments of the empirical fields for which the theory of games is particularly suited. There is an extensive discussion of zero-sum two-person games, and of equilibrium points for non-cooperative games. The presentation of linear programming is also clear and rather exhaustive. The theory of cooperative games, that is, those in which the formation of coalitions is advantageous and allowable, and in which side-payments by the players are freely admitted, is developed in fair detail, even including a discussion of Shapley's value of an n-person game. At this point the author confesses that he is less sure of the intuitive background against which this theory has been placed, a position that is common to many mathematicians who have studied the problem of n-person games. However, this is a difficult issue and the author is wise not to have taken too definite a stand, rather withdrawing to the strictly mathematical aspects involved. These problems can only be solved by recourse to an improved description of the socio-economic world. If it turns out that the real problem involves a high degree of cooperation—and I have no doubts whatsoever that this will be the case—then the mathematical theory will have to accommodate itself to these facts, even if the mathematical structure is uncommon and cumbersome, until fundamentally new concepts are established.

Dr. Burger possesses a very high didactic skill; the great clarity which pervades his whole book should make it a welcome tool for the novice in game theory who commands the mathematical knowledge expected of first or second year graduate students. A translation of the work should be seriously considered, since there is no similar book in English which accomplishes as much in such small compass as Dr. Burger's does.

OSKAR MORGENSTERN

Princeton University
Princeton, N. J.

26[X].—R. P. BOAS, JR. & R. C. BUCK, *Polynomial Expansions of Analytic Functions*, Springer-Verlag, Berlin, 1958, viii + 77 p., 23 cm. Price DM 19.80.

A great part of numerical analysis is concerned with polynomial approximation to analytic functions, and so this booklet appears of immediate interest to the numerical analyst. However, with numerical analysis in its present state, it is more relevant for studies in the general theory of functions of a complex variable or in the theory of special functions.

Given a set of polynomials $\{p_n(z)\}$ and a function $f(z)$, it is reasonable to ask whether we can find coefficients $\{c_n\}$ such that

$$f(z) = \sum c_n p_n(z) \tag{1}$$

in some sense. This is the "expansion problem".

It is also reasonable to ask whether, given linear functionals $\{L_n(f)\}$, for example,

$$L_n(f) = f^{(n)}(0) \tag{2}$$

or

$$L_{2n}(f) = f^{(2n)}(0), \qquad L_{2n+1}(f) = f^{(2n)}(1), \tag{3}$$