even, the book will be welcomed by experimental workers. It will be useful for reference purposes to those concerned with engineering aspects of work at very low temperatures, and it could be used for supplementary reading by students. The book was not intended to be a textbook, and it would be difficult to use as such. There are many well-chosen photographs of cryogenic equipment, and line drawings are used generously and effectively to illustrate the text.

F. W. HUTCHINSON
Department of Mechanical Engineering, University of California, Berkeley

Banach Spaces and Algebras

Spectral Theory. Edgar Raymond Lorch. Oxford University Press, New York, 1962. xii + 158 pp. $5.50.

This is a valuable addition to the family of books on algebraic analysis. It provides an introduction to the theory of Banach spaces and Banach algebras, for the advanced undergraduate or young graduate student of mathematics and, perhaps, for some students of engineering or physics. Contrasted with recent tomes on the subject, it presents, with careful attention to detail, only the most basic results of the theory, in Lorch's inimitable style, which precludes the boredom common to many brief axiomatic developments.

The material is treated through the spectral theory of linear operators, rather than by the other popular approach in which Banach algebras are made the basic vehicle. This is made clear in the following summary from the preface.

". . . in the chapters on Banach spaces and linear transformation theory one will find the Hahn-Banach theorem, the inverse boundedness theorem, and the uniform boundedness principle; also the standard material on reflexivity, adjoint transformations, projections, reducibility, and even a formulation of the mean-ergodic theorem. The chapter on Hilbert space presents all the classic facts on linear functionals and orthonormal sets as well as the preliminary theory of self-adjoint transformations (bounded or not) and resolutions of the identity.

"Chapter IV is devoted to the Cauchy theory for operators. It contains the central facts of spectral theory: spectrum, resolvent, the fundamental projections, spectral radius, and the operational calculus. This theory is then applied to the problem of determining the structure of an arbitrary self-adjoint transformation in Hilbert space. Finally, in chapter VI, we consider Banach algebras. These are exclusively commutative and have a unit. We find here a discussion of reducibility, normed fields, ideals, residue rings, homomorphisms, and maximal ideals, the radical, the structure space, and the representation theory."

I would like to have seen a more detailed discussion of the examples from which the theory evolved. Also, it would have been nice to have this concise introduction to algebraic analysis include other basic tools of the discipline, such as the Stone-Weierstrass theorem and the Krein-Milman theorem. But, perhaps their inclusion would have sacrificed the brevity that is the book's most valuable asset.

KENNETH HOFFMAN
Department of Mathematics, Massachusetts Institute of Technology

Man and Machine

Modern Technology and Civilization. An introduction to human problems in the machine age. Charles R. Walker. McGraw-Hill, New York, 1962. xi + 469 pp. Paper, $4.75; cloth, $7.50.

For more than a decade the Technology Project at Yale University, of which Charles R. Walker is director, has studied the impact of technology on social organization and personality and the corresponding social and psychological conditions of productivity and technological performance. Out of this work have come a number of important books—mostly by Walker himself in collaboration with other members of the group [*Steeltown* (1950); *The Man on the Assembly Line* (1952); *Towards the Automatic Factory* (1957)—and a good many articles and monographs. We owe to this work basic theoretical insight into the human and social meaning of technology and into the technological dimension of personality and cultural values. We owe to it also important practical lessons that have found wide application in industry: (i) the concept of "job enlargement" for repetitive, unskilled jobs, with its resultant increase in both job satisfaction and job performance, and (ii) the understanding that automation, especially in clerical work and data processing, is as much a change of social structure, relations, and attitudes as it is a change in methods and instruments. This understanding has helped speed greatly the transition from conventional to electronic data processing in a number of business and government offices. Finally, we owe to Walker's work the understanding that, in selecting workers for a new industrial process, social skill—for example, experience in a mass-production plant—is a more important qualification than kindred technical skill acquired in an alien social environment; this principle has been applied most successfully in staffing a new aluminum operation in a preindustrial country of West Africa.

In the present book Walker has attempted to pull together the major work done on the relationship of technology—especially of modern industrial technology—and personality, social order, and culture. He has chosen an unusual method of doing this: the book is essentially an anthology of writings from a great many sources (mainly American sources, one regrets) connected by a commentary written by Walker and supported by separate (and excellent) bibliographies. This makes for a kaleidoscopic, but unfortunately not for a clear or cohesive, presentation.

There is simply not enough from any one author to produce a readable anthology. In ranging from the history of technology (for example, Mumford and the *History of Technology*) through Frederick W. Taylor, Henry Ford, the modern American "Human Relations" school, and (alas) to the cosmic problems "Whither Technology" and "Whither the Human Race," Walker's book contains far more than any one can digest, and yet only bits and pieces by any one writer. The uninitiated, for whom the book is apparently intended, is likely to be lost, but anyone even slightly familiar with the field will certainly have read most of the authors from whom the excerpts are taken. Yet, some of the scholars whom Walker himself considers most important are left unrepresented. Thus, Georges Friedmann, the distinguished French student of work, is cited in most of Walker's commentary chapters and referred to in most of his bibliographical notes;

but, like the hero in Samuel Beckett's *Waiting for Godot*, Friedmann remains offstage, and the reader is left wondering what he has to say and what makes him so important.

Walker himself, unfortunately, falls victim of his own method, to the extent that his essential contribution to the field is misrepresented by this book. Walker is important above all because he is neither technocrat nor human relations faddist. He has emphasized from the first that human relations are not enough and that the job, the work, the tool, the economic performance, are as important as psychological or sociocultural satisfactions and values. He never forgets that a shoe factory employs people to turn out decent shoes at low cost rather than to make the employees happy. He knows—in sharp contrast to a great many behavioral scientists—that technology is also a creation of man, which represents human values, human achievements, human aspirations—and that economic satisfactions are also human satisfactions. Few readers, unacquainted with Walker's writings, would guess this from the present book, which is heavily biased toward the kind of human relations writing that treats the work itself and the tools, technology, and economic performance as irrelevant to the interpersonal relations, cultural values, and human experiences of the worker. Walker lets a group of English scholars say in one of the excerpts: "So close is the relationship between the various aspects (of production) that the social and the psychological can be understood only in terms of the detailed engineering facts and of the way the technological system as a whole behaves in the environment . . ." [E. L. Trist and K. W. Banforth, *Human Relations* **4**, 3 (1951)]. But this quotation, which should have been the key to Walker's book, does not occur until page 424; and even then there is nothing to tell the reader that it derives from Walker and sums up Walker's own basic position and contribution.

Still, this is a fascinating book, in the way a kaleidoscope fascinates. And it does succeed in conveying the importance of the subject as well as the amazing fact that work, that most familiar and most general activity of man, is also the least known, the least understood, and still the least studied area of life and society.

PETER F. DRUCKER
Montclair, New Jersey

Deutsche Ausführlichkeit

Ion Exchange. F. G. Helfferich. McGraw-Hill, New York, 1962. ix + 624 pp. Illus. $16.

It is remarkable that the field of ion exchange is still so much alive. The phenomenon has been known for more than a century, its applications have been exploited for nearly as long, and the last 20 years have seen intensive and continued research into what seems to be at first sight so simple, the ion exchange process itself.

Ion Exchange is a book about fundamentals. It first appeared in the German language as *Ionenaustauscher*. vol. 1. *Grundlagen* (Verlag Chemie, 1959). This was the bible of ion exchange, a model of "deutsche Ausführlichkeit" at its inspired best. And *Ion Exchange* is not just a translation; it is a new edition, rewritten by the author himself, in lucid and flawless English, and brought completely up-to-date. The publishers, to their great credit, wasted no time in getting the manuscript into print.

The first chapters are relatively brief and describe the structure of natural and synthetic ion-exchanging materials, including membranes. Then follows a long chapter on ion-exchange equilibrium, which takes up one-fourth of the book and which includes a list of 306 references. Chapters on kinetics, membranes, and ion-exchange columns follow, and then chapters on electrochemical properties, nonaqueous solvents, catalysis, and electron-exchange polymers. Detailed mathematical treatments are given, but the nonspecialist reader may skip these if he wishes; they are accompanied by well-written qualitative explanations and helpful comments on experimental techniques. There are many graphs and diagrams; these are not merely copied from the original papers but have been redrawn and are often much more lucid than the originals. Each chapter closes with a two- or three-page summary.

The book is authoritative, as it should be, for Helfferich has contributed to the field in several ways, including his work on kinetics, membrane theory, catalysis, and the new technique of "ligand exchange." Yet he does not overemphasize his own contributions; the presentation is well-balanced and even, and in many sections, such as that on the Nernst-Planck treatment of membranes, it is nothing short of masterly.

Specialists in ion exchange seeking background information for their research will find it quickly in this book. Workers in other fields who wish to use ion exchange as a tool will not find detailed prescriptions or procedures, but they will gain an unusually clear insight into the nature of the effects they plan to use, together with a wealth of practical information and leading references to speed them on their way.

HAROLD F. WALTON
Department of Chemistry,
University of Colorado

Encyclopedic Summary

Atoll Environment and Ecology. Herold J. Wiens. Yale University Press, New Haven, Conn., 1962. xxii + 532 pp. Illus. Plates. $15.

As the author, Herold Wiens, states, his book is essentially a reference book or encyclopedia of atolls, an attempt to bring together between two covers information on all facets of atoll ecology. It is not particularly concerned with the history of exploration and of scientific study but mainly summarizes the results of recent studies made in the Central Pacific Ocean. A very large source of information is that provided by field studies made since 1950 under the auspices of the Pacific Science Board and the Office of Naval Research, the results of which have been distributed in the mimeographed *Atoll Research Bulletin*. Much other work has been done by the U.S. Geological Survey's Military Geology Branch, beginning during World War II and continuing afterward, in the Marshall Islands, the Marianas, and other areas of military interest. Results of these two decades of field work had not been assembled and compared prior to Wiens' book.

The scope is indicated by listing the number of pages devoted to each topic: geology, 135; weather and climate, 51; physical oceanography, 42; marine fauna, 67; birds, 21; ground water and soils, 35; land plants, 52; land animals, 52; and man, 13. When I noted this wide range of subject matter in the table of contents, I thought the treatment would have to be sketchy. However, the text itself proved to be a thorough and well-written treatment. In fact, my interest was such that, at times, it was hard to lay the book down. Di-