The Water Encyclopedia

Editor David Keith Todd

Publisher Water Information Center

Pages 550

Price $27.50

Reviewer R. Philip Hammond

This book is a most unique and valuable addition to the reference material on water resources. It is not an encyclopedia in the usual sense of having an alphabetical listing of learned articles on various topics—in fact, it has no text whatever. The book consists entirely of tables of data gathered from scattered reference works relating to water resources, water utilization, water quality, water agencies, and similar information. The scope is worldwide, although there is a preponderance of purely United States data in some sections. The book should be useful to anyone concerned with water resources, regional planning, desalination, water quality, or related fields.

The material listed in the tables is primarily from government agency publications, reference works, and textbooks. The source agency is given, e.g., the Department of Agriculture, but not the actual reference publication or report number. Inclusion of the latter would have been valuable to permit checking of ultimate sources, accuracy, or restrictions given in the original work. The listed material should not be looked on as a source for recent information in fields that are rapidly changing, such as irrigation or desalination, since, for the most part, the author did not include information from periodical literature or current reports. He did, however, supply the date of origin of most entries, so that their timeliness can be noted.

The principal deficiencies noted are: (a) lack of detailed source references, as mentioned above, (b) lack of sufficient explanatory text, which would have helped materially in some cases, (c) almost no coverage of water transportation data, pipeline costs, etc., (d) no coverage of weather modification or of climatic conditions where it might be utilized or is being utilized, (e) a minor omission under Interstate Water Activities is the Western States Water Council.

Chapter headings are

1. Climate and Precipitation
2. Hydrologic Elements
3. Surface Water
4. Ground Water
5. Water Use
6. Water Quality and Pollution Control
7. Water Resources Management
8. Agencies and Organizations
9. Constants and Conversion Factors

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Quantum Fluids

Editors Nathan Wiser and D. J. Amit

Publishers Gordon and Breach

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Reviewer Carl T. Tomizuka

This volume represents the proceedings of Batsheva Seminar on Quantum Fluids held at the Technion in Haifa, Israel, summer 1968. Two major many-body phenomena are discussed primarily in the book, i.e., superconductivity and superfluidity. The book is divided into two parts. Part I is supposedly an introductory section for students with a limited background in many-body theory. Part II appears to be more like a series of research colloquia.

The entire volume is mostly theoretical in nature and the tone of the series is set by the leading article by David Lurié who presents an introductory chapter on the many-body theory. Even though the definition of Green's function is given, it is doubtful that a student who is not halfway well versed in the formalism of second quantization and a routine use of Green's function can manage the chapter, to say nothing of the theoretical aspect of this volume. Also, it appears necessary that the reader have some elementary familiarity with the Feynman diagram. To appreciate the presentation in this volume, the reader should at least be familiar to some extent with the single-particle propagator and the occupation number formalism such as presented in Richard Mattuck's excellent book.

Followed by this general theoretical introduction to the many-body approach to the problems of quantum fluids, phenomenological theory of superconductivity by C. G. Kuper is presented in an extremely concise manner, as can be seen by the fact that the Ginzburg-Landau theory occupies only three pages in this presentation. I think the reader will benefit more by Gunther's contribution. This is a fairly detailed introductory article on the theory of superconductivity. But, unfortunately, only those whose theoretical training in physics is equivalent to the third-year physics major in graduate school can benefit from the article. The same comments apply to Weger's article on the phenomenology of Type II superconductors.

In contrast to a highly specialized and compact superconductivity section, the sections on Fermi liquids by Lipson and the one by Luban are more palatable to the uninitiated. Perhaps the only worthwhile articles for those not practicing many-body theory in physics are by Fred Reif. His introductory chapter on superfluidity at the beginning of the volume gives an extremely lucid and yet elementary description of the

basic features of superfluidity. A more detailed, professional article by Reif at the beginning of Part II describing the various experimental studies of superfluid helium is an outstanding article which can be read by those with very little background in this discipline. It is clear and presented in physical terms rather than in mathematical terms. The reader who is tempted to give up this volume for lost is urged to look into Chap. 10 for this reason. It is written in the characteristic style of the author and makes a refreshing interlude from the general tone of the volume.

Most of the articles in Part II are of such specialized nature that unless the reader is involved in the theoretical aspects of quantum fluids, it is likely to be of little interest to him. Needless to say, there are some outstanding articles, especially the one by R. A. Ferrell on the phase transition in superconductors which has sufficiently new approaches to make the article stand by itself in the eyes of those specializing in the field.

As an interesting departure from superconductivity and superfluidity, W. Brenig's contribution to the Kondo effect gives an interesting view of the theoretical aspects of a well-known effect originally discovered experimentally as the resistivity minimum effect in normal metals at very low temperature. On the whole, I find that, except for those two articles by Fred Reif, the collection of articles are neither sympathetic nor responsive to the needs of those involved in the profession of nuclear engineering or nuclear science in general.

C. T. Tomizuka (PhD, physics, University of Illinois, 1954) remained at the University of Illinois as a research associate and later as research assistant professor working in the areas of diffusion in solids and transport properties in semiconductors. He joined the faculty of the University of Chicago as assistant professor of physics in 1956. He developed his interest in the physics of high pressure during his four years at the Institute for the Study of Metals (now called James Franck Institute) at the University of Chicago. He moved to the University of Arizona in January 1960 to become professor of physics and continued his research in the area of diffusion in solids and the study of defects in solids at high pressures. Since spring of 1970 he has been the head of the Department of Physics.