Books

Progress in Low Temperature Physics. Vol. 2. Edited by C. J. Gorter. 480 pp. (North-Holland, Holland) Interscience Publishers, Inc., New York, 1957. $10.75. *Reviewed by E. A. Lynton, Rutgers University.*

In little more than a year, the book shelf of the low-temperature physicist has been enriched with a number of such excellent volumes that the concomitant drain on his pocketbook has been painful but eminently worthwhile. The first in the series of *Progress in Low Temperature Physics* was soon followed by two *Handbuch* volumes devoted to cryogenics, and to these has now been added the second compilation of review articles edited by Professor Gorter. Perhaps the most astonishing collective feature of these four books, aside from their uniformly high quality, is the manner in which they complement one another with little overlap. Both *Progress* volumes contain excellent and informative articles on liquid and solid helium, a subject only sketchily covered in the *Handbuecher*, while the latter in turn contain a lot of material on cryogenic techniques which is deliberately left out of the former. And where there is duplication, as, e.g., in electronic transport phenomena, the approach and treatment are generally sufficiently different to make the repetition useful.

The volume under review contains five articles on helium: De Boer on quantum and exchange effects on the thermodynamic properties of liquid helium, Kramers on liquid helium below 1°K, Winkel and Wansink on liquid transport phenomena in slits and capillaries, Atkins on the helium film, and Domb and Dugdale on solid helium. Matthias discusses empirical criteria for superconductivity, Sondheimer throws much light on electron transport phenomena in metals, Johnson and Lark-Horovitz review low-temperature data on semiconductors, and Spedding and co-workers provide welcome compilation of the properties of the rare earth metals. The De Haas-Van Alphen effect is reviewed by Shoenberg, paramagnetic relaxation by Gorter, nuclear orientation by Steenland and Tolhoek, specific heats and thermal expansion of solids by Byl, and the helium temperature scale by Van Dyk and Durieux.

With only few exceptions, each of these chapters is either a useful clarifying review of a complex subject, or a theoretical progress report generally containing original and interesting speculations. Outstanding in clarity is Sondheimer's discussion of electronic transport phenomena, which is almost matched by Shoenberg's and Atkins' contributions, each of whom manages to present very clearly a great deal of experimental data and their theoretical implications. Highly interesting also are De Boer's molecular approach to the problem of liquid helium and Byl's suggestion of a novel way to lessen the confusion about the Debye temperature of a solid. The articles mentioned I enjoyed particularly, but my reaction to most of the other contributions was almost as enthusiastic.

The principal weakness of the book is one for which it can hardly be blamed. Several of its chapters appear today tantalizingly incomplete because in the few months which have elapsed since most of the material was written, major theoretical and experimental advances have been or are just on the point of being made in various fields. Experiments at the Bureau of Standards with oriented nuclei have confirmed parity-nonconservation in weak interactions. The group at Duke University has established the logarithmic nature of the specific heat singularity at the λ-point of He^4; and has obtained fascinating clues about the nature of He^3. Brueckner has been able to calculate a reasonably accurate dispersion relation for He^4 from first principles. Bardeen and co-workers have achieved a microscopic theory of superconductivity with which Pines has been able to explain Matthias' empirical criteria. To blame anyone for the omission of these matters from Volume 2 of *Progress in Low Temperature Physics* is to expect a measure of extrasensory perception not commonly found, but there is certainly much reason to look forward eagerly to Volume 3! In the meantime one must applaud the present book as an outstanding and valuable addition to cryogenic literature.

Theories of the Universe: From Babylonian Myth to Modern Science. Edited by Milton K. Munitz. 437 pp. The Free Press, Glencoe, Ill., 1957. $6.50. *Reviewed by C. Payne-Gaposchkin, Harvard College Observatory.*

A description of the development of human thought about the nature of the universe is an extremely interesting and ambitious project. The volume now reviewed presents a series of excerpts, either from original writings or from scholarly summaries. It is not the first of such "source books", but it is one of the most satisfactory because its scope has been limited to a single theme.

The book falls into four sections that deal with early speculations; classical and mediaeval ideas; the "Copernican revolution"; and modern theories.

The selections are interesting; few of them are hackneyed, as they might well have been. The extracts from Ptolemy's "Almagest", from Cusanus, Bruno, Huygens, and Thomas Wright are well chosen, and the selection of Newton's "Four Letters to Richard Bently" is a happy one.

But there is a danger in putting such a book into the hands of the "general reader". Even though he may follow the short extracts that have been chosen, he can hardly appreciate them out of their context. If the book had covered only one of its four sections it could