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remarkably up-to-date discussion of the observable consequences of the theory. In addition to the classical results, the author mentions the laboratory red-shift experiment of Pound and Snider (1967), the red-shift observation on white dwarfs (1967), Shapiro's bending-of-light experiment (1968) and Robert Dicke's oblateness measurements of the sun (1967).

According to the introduction, the book provides a survey for a young student or a layman; this aim is admirably fulfilled. The style is attractive, the content organization excellent and the point of view unexpected. It is a book profitable for the beginner and a pleasure to the more advanced.

NANDOR L. BALAZS
Professor of Physics

State University of
New York, Stony Brook

Physical Acoustics, Vol. 5: Principles and Methods

Warren P. Mason, ed.

301 pp. Academic, New York, 1969.
\$14.50

In a series like *Physical Acoustics*, some chapters or even volumes are addressed to specialists and others can be considered to be general-interest chapters.

This volume, which is really the ninth book in this series, presents four sections in the general-interest category and two specialized chapters. The latter are discussions of the effects of impurities on ultrasonic-propagation characteristics in quartz and the use of x-ray topography in the investigation of defects in single crystals. I consider them specialized because the more fundamental discussions of impurities and defects can be found in other volumes in the series.

The rest of the volume is devoted to topics of a more general nature. Two chapters on wave-packet propagation and ultrasonic waves in magnetic fields present a good mixture of review and new results of experiments, as well as theory that will be appreciated by solid-state physicists who have some background in physical acoustics. The last two chapters deal with "ultramicro-wave-frequency" sound propagation. Of particular interest is the use of heat pulses to produce and investigate extremely high-frequency sound waves.

The reader should not expect all of the individual chapters to be reason-

THE ORIGIN OF COSMIC RAYS1969 104 pp. Cloth \$7.00/Prepaid \$5.60
Paper \$4.00/Prepaid \$3.20**CONTENTS:**

COSMIC RAYS NEAR THE EARTH. COSMIC RAYS IN THE UNIVERSE. THE ORIGIN OF COSMIC RAYS. References. METAGALACTIC COSMIC RAYS (THE UNIFORM MODEL). METAGALACTIC COSMIC RAYS (LOCAL MODELS). GALACTIC MODELS. Bibliography. Index.

CODE NUMBER: 0197

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ELEMENTARY PROCESS OF IMPORTANCE FOR COSMIC RAY ASTROPHYSICS AND GAMMA AND X-RAY ASTRONOMY

1969, 132 pp. Cloth \$10.50/Prepaid \$8.40 Paper \$7.00/Prepaid \$5.60

This work is based on material given in a lecture course at the summer school at Les Houches. Though no attempt was made to alter the basic structure of the data, the author has made a number of minor clarifications. In addition, a new article by V. L. Ginzburg, V. N. Sazonov and S. I. Syrovatski, "Magnetobremes (Synchrotron) Emission and Reabsorption", has been included because of its extreme importance. CODE NUMBER: 0198

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though not altogether successful, effort to calculate the weak-interaction Cabibbo angle θ from more basic principles. The premise is that a spontaneous strong breaking of $SU(3)$ in the presence of weak and electromagnetic perturbations would choose a definite θ value. If this is what happens, θ can be computed.

For most readers the highlight will be the closing lecture, "Present Status of the Fundamental Interactions" by Gell-Mann. Two central themes and morals should be drawn from his talk. First, there should be more emphasis among particle physicists to tackle very deep and, hence, difficult problems even when the reward may be only one of partial success. He especially commended Cabibbo for his effort.

Secondly, Gell-Mann reflects that we have a few methods for dealing with the strong interaction, methods that are not easily comparable with each other, but each one works in its own domain; we have other methods for the weak interaction, for electromagnetism, for gravitation; some feeble speculation about the Fitch-Cronin interaction, and very few ideas about how all these things fit together! In other words, what is the grand synthesis? A humorous variant on this (one actually taken seriously by some workers in Honolulu and Moscow) is Gell-Mann's postulate of the Chimeron—that all embracing particle that is at the same time the quark, the intermediate boson, the magnetic monopole and Tsung Dao Lee's postulated a particle.

SAN-FU TUAN

WALTER A. SIMMONS

*Theoretical High-Energy
Physics Group
University of Hawaii***The Conquest of Energy**By **George Russell Harrison**297 pp. Wm. Morrow, New York, 1968.
\$6.95

There is good ground for maintaining that energy is the most far reaching concept in the whole of science. George Harrison's goal in this book is to provide a popular, but accurate, account of the enormous influence of the recently increased magnitude and efficiency of the transformation and transfer of energy in their technological applications. This is essentially

ably complete treatments of a given topic, and if he wants more than the given information he can probably find it by reading the other eight volumes.

WALTER G. MAYER

*Associate Professor of Physics
Georgetown University***Hadrons and Their Interaction**

A. Zichichi, ed.

(Conf. Proc.) 718 pp. Academic Press, 1968. \$26.50

This volume is a detailed report on the Majorana Summer School in Theoretical Physics of July 1967 that dealt primarily with the field and current algebras, soft pions and hadron spectroscopy.

The summer school gathered together a number of highly qualified lecturers, among them, Nicola Cabibbo, Sidney Coleman, Murray Gell-Mann, Shelly Glashow, I. S. Hughes, B. Touschek and Bruno Zumino. In view of the great potential for communication this volume might have afforded, the results are a little disappointing.

For one thing, about 300 pages are devoted to reproducing seminars that have suffered by the 17-month publication delay. Another fault is that the notes for some of the principal lectures are rather limited in readership appeal as well as in freshness of presentation.

Among the most valuable parts are the essentially pedagogical lectures on soft pions and on phenomenological Lagrangians by Coleman and Zumino. Although there have been developments since the summer of 1967, they have been largely in the nature of extensions and clarifications rather than major modifications. Coleman's lectures cover the "standard" results of the current algebra-soft pion technique. Zumino's lectures are, unfortunately, rather brief, especially his treatment of the algebra of fields, which was billed as a major topic of the summer school.

The one series of experimental lectures on meson resonances by Hughes is very good. He proceeds in a crisp and workmanlike fashion to present a fairly self-contained account of the situation regarding the meson resonances from the point of view of an experimentalist.

Cabibbo makes a courageous,