

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. Syrovatskiĭ, "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,

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science concepts demonstrated in the laboratory activities.

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DAMON



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what he means by the "conquest" of energy. Harrison is a distinguished optical physicist, former Dean of Science at MIT and former chairman of the governing board of the American Institute of Physics.

As was to be expected, Harrison has written a very readable and illuminating volume. The wealth of facts and figures is somewhat overwhelming, but the brilliant expository style makes it easy for the intelligent reader to absorb the overall picture.

He begins with a brief account of the development of energy technology as man's endeavor to transfer the burden of work to ingenious mechanical devices. The discussion continues with the many ways energy transformations are used in industry, transportation and the economy of the home. A complete chapter is devoted to the role of energy in assuring an adequate water supply. Practical sources of energy are discussed at length, including fossil fuels, falling water and nuclear fuels.

The physicist will be glad to see a clear exposition of the essential physical meaning of energy in terms of conservation or invariance in the midst of change. The loss of energy availability associated with every transformation, as exemplified by the second law of thermodynamics, is also adequately presented. Other chapters contain material on devices for the storage and transfer of energy, solar energy and atomic and nuclear energy. Both fission and fusion processes are well described, and there is a thorough presentation of plasma physics.

Harrison's book should make a decided appeal to many readers.

R. BRUCE LINDSAY
Hazard Professor of Physics
Brown University

Basic Concepts of Measurement

By Brian Ellis

219 pp. Cambridge Univ. Press, New York, 1968. \$2.45

This is a paperback edition of Brian Ellis's book of 1966. In it he discusses the basic principles of measurement from a mainly logical point of view. He has some searching criticism to make on scales, quantities, units, dimensions, number and probability, but it is not easy reading for the ordinary scientist. On dimensions, the author does not appear to be

very well informed. He says, for instance, that "... dimensions are thought to be some sort of intrinsic characteristic of quantities." This mystical outlook was dismissed as long ago as 1941, (see G. B. Brown, "A New Treatment of the Theory of Dimensions," *Proc. Phys. Soc.* 53, 418, 1941) where some clear definitions were substituted, but this is not mentioned in the bibliography.

With the help of M. J. Scott-Taggart, the author provides, as an appendix, a welcome translation of the important critique of the temperature concept by Mach in his *Die Principien der Wärmelehre*.

Ellis's book is a useful stimulant to discussion of a difficult subject.

G. BURNISTON BROWN
London, England

Photoemissive Materials: Preparation, Properties, and Uses

By A. H. Sommer

256 pp. Wiley, New York, 1968. \$12.95

A. H. Sommer is well known as one of the most knowledgeable persons on photoemissive materials. A book by him on this subject was long overdue and I, for one, am extremely pleased to see it appear.

After a relatively brief treatment of the fundamentals of photoelectric emission, additional space is devoted to the emission of photoelectrons from metals and to the technology of the preparation of suitable metal surfaces. The three chapters on metals are followed by seven chapters on semiconductor emitters. Their properties, chemical, electrical, optical and crystallographic, are discussed quite extensively, together with the technology of their preparation. The many diagrams, illustrating their spectral response and quantum yield, should help anyone in adapting an existing commercial product to his own requirements.

The next two chapters deal with ultraviolet-sensitive and with miscellaneous semiconductor photoemitters. My inclination would have been to reverse the order of these two chapters and to join chapter 13 (semiconductors) to the other semiconductor materials. However, chapter 12 on ultraviolet photoemitters can be very useful to the practitioners of vacuum-ultraviolet spectroscopy.

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Proceedings of the Relativity Conference in the Midwest

Edited by Moshe Carmeli, Stuart I. Fickler, both of the Aerospace Research Laboratories, Office of Aerospace Research, Wright-Patterson AFB, Ohio and Louis Witten, Physics Department, Univ. of Cincinnati, Ohio

Presents an extensive review of those topics receiving the greatest attention in current research in the field of relativity. Included are the dynamics of the gravitational field, cosmological models, experimental tests of general relativity, relativistic kinetic theory, and philosophical foundations of general relativity. In addition, there is a special section devoted to "superspace". Providing an excellent supplemental reading for any course in relativity, this volume is also suitable as a reference for research workers.

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Proceedings of the Third International Conference on High Energy Physics and Nuclear Structure, Columbia Univ., September 1969

Edited by Samuel Devons, Department of Physics, Columbia University, New York

Representing a broad spectrum of modern physics, contributions to this volume emphasize research on coherent production of unstable particles and nuclear interactions at very high energies. Topics considered range from study of nuclear electromagnetic properties using high-energy probes to pionic x-ray spectra, fundamental symmetry properties of nuclear interactions, and new accelerator developments in the intermediate energy range.

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The first book to offer a comprehensive textbook treatment of the entire field of radiation chemistry, this volume analyzes the complex high energy reactions induced by radiation in terms of physical-chemical principles. Treated in detail are such topics as the theory of ion molecule reactions, mass spectrometry, pulsed radiolysis, energy transfer in liquids, and kinetics of polymer formation. Included are numerous examples and end-of-chapter problems.

475 PAGES JANUARY 1970 \$22.50

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