

complement of the Bragg (glancing) angle. This will not mislead those who know what is correct but it certainly would be a source of trouble to anyone who wants to learn from this encyclopedia.

An effort has very definitely been made to make the volume up to date. It is really miraculous to see references to work published in 1960 in a book published in the same year. However, the enthusiasm engendered by this up-to-date quality loses some of its impetus when one notes, for example, that the one-page article on the optical maser (laser) uses as its complete source of facts the *New Scientist* and *The Denver Post*.

Despite these critical remarks the encyclopedia is a useful book. There are many fine articles in its seven hundred odd pages, mostly, however, of an applied nature. It could have been infinitely more useful if an index had been supplied. There is only a list of articles and authors. Professor Clark, himself, contributed about twenty of the approximately one hundred and twenty articles in this volume. This was a massive task. It is quite clear that some of these were last-minute fill-ins. It would have been far better to hold up publication than to include, in what should have been an authoritative volume, articles that just "aren't up to snuff".

Encyclopedia of Physics, Volume XLV/1, Cosmic Rays 1. S. Flügge, ed. 333 pp. Springer-Verlag, Berlin, 1961. DM 98.00. *Reviewed by Herman Yagoda, Air Force Cambridge Research Laboratories.*

THIS volume of the *Handbuch der Physik* is not a comprehensive text dealing with the cosmic radiation, for which a real need exists, but is essentially a review of select topics similar to the well-known annual, *Progress in Cosmic Ray Physics*, a series of volumes edited in England by J. G. Wilson. Indeed, some of the topics in the German work have been treated in the former volumes during the past few years, but are not repetitions, in so far as they represent fresh expositions by different writers, and in several instances the review profits from the more copious experimental data secured in recent years.

Of the series of six essays, Philip Morrison's chapter on the origin of cosmic rays is particularly outstanding for its lucidity of style, a commodity steadily becoming rarer in the scientific literature. Morrison's picture of the origin of the cosmic radiation does not favor any single source such as the sun or the remnant of the supernova now known as the Crab Nebula. His pantheistic synthesis, suggesting that the elemental composition of the radiation will not be outstandingly characteristic of a single source and that the charge spectra may vary in different energy regions, thus encompasses the gambit of speculation by many theorists. In Morrison's words: "Most of the authors who have suggested such processes—not all—will turn out to be right, but each one only in part."

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of the behavior of charged particles in the earth's magnetic field is addressed to a rather limited audience and offers little solace to the cosmic-ray physicist confronted with a vague magnetic equator and experimentally determined energy cutoffs at variance with geomagnetic theory. A modernization of Alpher's working-level exposition is badly needed, not only for directional cutoff energies at ground level, but also at high altitudes now accessible to rockets and satellites where the intensity of the earth's magnetic field is appreciably weakened.

The third section deals with experimental data on directional intensities, ionization, star production, and the charge spectrum of cosmic-ray primaries as established by instrumentation exposed in the stratosphere. It is a useful review but adds little new information beyond that summarized in similar efforts written during the past decade. The last three sections deal with penetrating showers, extensive air showers, and the deeply penetrating μ -meson component. While these subjects have been reviewed in recent years, the present treatments are more detailed and contain critical discussion of experimental work in these specialties.

The texts are in English, the figures and illustrations are well prepared, and the subject index is rather detailed. Despite occasional duplication of subject matter, the review will make a useful addition to the reference shelves of cosmic-ray laboratories.

Acoustics. Conf. Proc. (Stuttgart, Sept. 1959). L. Cremer, ed. Vol. 1, Principles, 604 pp., Vol. 2, Applications, 716 pp. American Elsevier Publishing Co., Inc., New York, 1961. \$39.00. *Reviewed by Walter G. Mayer, Michigan State University.*

MORE than 300 papers presented during the Third International Congress on Acoustics which was held in Stuttgart in 1959 make up these two volumes. The invited papers are reproduced in their entirety while the contributed papers were reduced to approximately three pages each. This reduction resulted in condensed contributions which are longer than abstracts but shorter than full-length papers. However, the quality of the papers does not appear to have suffered by limiting their contents to essential information—although the resulting omission of certain usual introductory and explanatory remarks may occasionally require a somewhat greater effort on the part of the reader.

The type of problem treated in the individual papers determined whether an article was to appear in the first volume on "Principles" or in the second on "Applications". The editor points out that "this does not imply that the first volume contains no applications or the second nothing fundamental".

The first section of Volume 1 deals with physiological acoustics. It is followed by a longer section on psychological acoustics. The third section contains

papers on fundamentals and applications of speech. The next section is on propagation in fluids and gases; it also contains papers on underwater acoustics. Articles on the topic of vibrations are presented in the fifth section. The last part of Volume 1 contains over 50 contributions on physics and acoustics. Most of these papers were originally presented at the Congress under the general heading of molecular acoustics.

Volume 2 starts with a section entitled "Electroacoustics and Measurements". The few papers on musical acoustics are included either in this or in the next section on room acoustics. The next section is devoted to building acoustics, followed by noise control. The last section on ultrasonics may be regarded as an extension of the chapters on physics and acoustics, and vibrations, which include more papers on ultrasonics than the section so entitled.

The articles are printed in either English, German, or French; the frequency ratio is about 9:5:1. Neither abstracts nor translations of titles are provided. The editor did not prepare a separate index for the three languages; instead, *all* entries, regardless of language, were collected in one common index. Another feature of the index should be mentioned by means of just one illustration: one finds a great number of entries under "noise" but they only refer to articles written in English. The non-English articles on noise do not deal with "noise" but with "Lärm, bruit, Geräusch" and are, accordingly, only indexed under these headings. This may be a little confusing but should not handicap the philologically inclined reader.

Taken as a whole, the editor succeeded in presenting a condensed report of the Congress proceedings, and one can only agree with the statement that this work of over 1300 pages "is fully representative of the research trends and technological applications developing in acoustics at the present time".

Progress in Very High Pressure Research. Conf. Proc. (Bolton Landing, N. Y., June 1960). F. P. Bundy, W. R. Hibbard, Jr., H. M. Strong, eds. 314 pp. John Wiley & Sons, Inc., New York, 1961. \$12.00. *Reviewed by W. B. Daniels, Princeton University.*

THE Bolton Landing Conference took place at a time when interest in high-pressure research was heightened for many by the recent release of the "Belt" apparatus, about which a veil of mystery had grown since its use in the early diamond synthesis by Hall et al., and the subsequent placement of a secrecy order covering it. Several of the 27 technical papers presented involve work performed using this and other high-pressure, high-temperature apparatus associated with the relatively recently opened field of pressures greater than 50 kilobars simultaneously with temperatures above 1000 degrees Centigrade, and consider such diverse effects as melting phenomena at high pressures and effects of high pressure and temperature on alloys. Discussions are given of special character-