Astrophysics

The proceedings of the 13th conference on physics at the University of Brussels (1964 Solvay Conference) have been published in **The Structure and Evolution of Galaxies** [Interscience (Wiley), New York, 1965. 184 pp., illus. $9].

The contributors include the most eminent researchers in the field of astrophysics, and they address themselves to the problem of how knowledge of the laws of physics can be advanced by considering phenomena on a galactic and cosmic scale. Although the general problem of the nature of the galaxies is considered, most attention is concentrated on the more or less recently discovered subjects of radio sources, supernovae, and quasars—all phenomena which indicate release of great amounts of energy or extreme physical conditions. It is apparent that the approach of the conference oscillates between explaining such events as the result of collapse or condensation and explaining them as the result of explosions or ejections.

Differences in the style of the participants are also marked. Some give complex detailed observational pictures; some give intricate theoretical discussions. But Ambartsumian's introductory report, on the nuclei of galaxies and their activity, is outstanding. It courageously deals with the most important subject of all—the assumptions which underlie the description and attempted explanations of the phenomena. It is my opinion that what appear to be brilliant intuitions about ejection in galaxies, the role of nuclei, associations of spiral arms, blue objects, and quasars are really the result of Ambartsumian's considering the problem in great generality and, above all, of his careful reasoning coupled with the visual inspection and study of a very large number of actual galaxy forms.

The book is valuable for those interested in the important and difficult problems in cosmic physics today, the pertinent information available in 1964, and the attitudes of the most knowledgeable scientists toward these problems and data.

The papers in the volume include, in addition to Ambartsumian's, "Some topics concerning the structure and evolution of galaxies," by J. H. Oort; "The role of magnetic fields and cosmic rays," by L. Woltjer; "Formation of stars," by L. Spitzer; "Stellar evolution," by E. E. Salpeter; "Supernovae," by R. Minkowski; "Supernovae and supernovae remnants," by F. Hoyle; "Extra-galactic radio-sources," by J. G. Bolton; "Spectroscopic observations of extra-galactic radio-sources," by M. Schmidt; and "The mechanisms of extra-galactic radio sources," by G. and M. Burbidge. The recorded discussions that followed each paper, and the general discussion, introduced by R. Oppenheimer, are also included.

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Biochemical Symposium

Mechanisms of Release of Biogenic Amines (U. S. von Euler, S. Rosell, and B. Uvnas, Eds. Pergamon, New York, 1966. 490 pp., illus. $20) contains the proceedings of a symposium, the fifth in a series sponsored by the International Wenner-Gren Center, held in Stockholm in February 1965. This symposium was characterized by an impressive interdisciplinary representation of pharmacologists, physiologists, biochemists, and morphologists, who contributed in all about 40 papers.

As is often the case with such symposiums, by and large it is more interesting to read the discussions, which often uncover many of the basic problems in the field, than the actual papers, which are frequently warmed-over versions of material already in the literature. For example, it was refreshing to read in the general discussion how a concern has arisen over whether the extragranular compartment of catecholamines may not be "free" in a physicochemical sense, but may be, rather, bound to a macromolecule, perhaps soluble in the cytoplasm.

This is not to say that valuable and incisive papers are not included in the volume. One needs only to read Whittaker's paper on acetylcholine-binding by brain particles, Kopin's report on biochemical aspects of storage and release of biogenic amines, and Douglas' lucid account of calcium-dependent links in stimulus-secretion coupling in the adrenal medulla to realize that the volume is a success. Perhaps these three papers were preeminent to me because in each case the investigator made a commendable effort to present a working model to explain the release of the appropriate biogenic amine, thereby fulfilling the seductive title of the volume. These models are remarkable for their encompassing of most of the known, and sometimes divergent, facts in the fields involved.

Another impression which reading the volume left was that the accumulated information about histamine does not seem to fit into the same context as that concerning acetylcholine, serotonin, and catecholamines, perhaps because mast cells, on which so much of the work on histamine has been done, are not neurones. The attempt by Brodie and his colleagues to ascribe a transmitter role to histamine on the basis of the submaxillary gland's secreting labeled histamine, which had been injected prior to stimulation of the chorda tympani, seems rather premature, if not strained. As a matter of fact, the attempt on the part of some of the Swedish investigators to ascribe a transmitter role to serotonin in the central nervous system on the basis of the presence of this amine in neurones demonstrated by fluorescence microscopy is equally unwarranted. The microbiologists have to satisfy Koch's postulates to identify a microorganism as the etiologic agent in an infection; perhaps the "transmitterologists" should feel compelled to satisfy equally rigorous criteria before happily conferring the title of transmitter on biogenic amines and other metabolites.

These criticisms are minor, however, and do not detract from the overall excellence of this volume. The book should prove of value to student and investigator alike.

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Oceanography Textbook

Principles of Physical Oceanography by Gerhard Neumann and Willard J. Pierson, Jr. (Prentice-Hall, Englewood Cliffs, N.J. 557 pp., illus. $30) is the first really complete and reasonably proportioned book for the *teaching* of physical oceanography in an advanced formal course. Although several valuable reference compendia enjoy honored places in the rather limited library of volumes in oceanography, this is the first book of a comprehensive nature that is organized primarily as a teaching medium. The book begins with a concise historical summary