

problems that Struve himself did so much to define.

Among the contributors who have attempted to trace such links explicitly are F. E. Roach and B. T. Lynds, in separate papers. In the early 1930's a simple photoelectric sky photometer was set up by Struve, Roach, and Elvey on the side of Mount Locke in Texas in order to measure the surface brightness of the night sky and of galactic nebulae. In the present volume Roach discusses new observations of the intensity of the light from the stars as diffused by interstellar matter, and Lynds develops further the theory of scattering in diffuse nebulae in order to study the surface brightness of two of the "dark" nebulae. This was one of the problems in which Struve was intensely interested, but even with the improved photometric data of today there remains ambiguity in defining the material density, the source of illumination, and the distance of the nebulous matter.

One of the most important papers in this book is contributed by E. Böhm-Vitense of the Institut für Theoretische Physik at Kiel. It is known that in most of the peculiar A-stars (distinguished from the other Ap stars in the Henry Draper Catalogue by Struve and Morgan), the magnetic fields, line intensities, and radial velocities usually vary with the same period. Of the several models proposed to explain this behavior, Böhm-Vitense prefers the simplicity of the one suggested by A. Deutsch, in which the star rotates slowly about an axis inclined obliquely to the magnetic axis.

It has been objected that no simple dipole field would predict all the effects observed, but Böhm-Vitense merely computes the actual field pattern that is needed to account for the variations measured from the Zeeman patterns of seven stars. Assuming only that the fields are cylindrically symmetrical about the magnetic axis, she finds that they must have maxima near magnetic latitudes $\pm 20^\circ$, and points out that these are nearly the latitudes at which the sun shows maximum prominence and spot activity. Whatever the significance of this coincidence, the oblique rotator with a field of this shape would show broad, flat maxima when we are looking at one of the polar regions. Since Eu II lines in several variables show their maximum at the times of the broad magnetic maxima, the implication is that Eu II lines are formed chiefly in the polar regions, while Cr II

lines originate predominately in the equatorial regions. Although explanations of these phenomena and of the origin of such magnetic fields remain to be given, it does appear that the computations of Böhm-Vitense increase the plausibility and the interest of the oblique rotator model.

Although there is not space to describe the papers in some of the other fields, such as spectroscopic binaries and stellar evolution, which are closely associated with the name of Struve, it would not be just to omit the two chapters on β Cep (or β CMa) stars. After Struve and Swings had collaborated in a discussion of the spectrum of β CMa in 1941, Struve turned again to the problems posed by those enigmatic variable stars, and wrote a series of papers in collaboration with his students at Berkeley between 1950 and 1955. In the current volume McNamara and Matthews discuss the absolute brightness of these stars, while van Hoof returns to one of the questions that most intrigued Struve—the presence of "beat periods" in their light curves and the relation of these to the periods of rotation of the stars.

From these examples it is clear that most of the papers in this volume are research papers rather than summarizing reviews. Whether this is an advantage or otherwise depends upon the reader's needs, but it can be said that almost every student of astrophysics would find some material of great interest and value in this volume, which is well printed and carefully edited.

P. C. KEENAN

*Department of Astronomy,
Ohio State University, Columbus*

Avian Biology

Proceedings of the Fourteenth International Ornithological Congress. Oxford, England, July 1966. D. W. SNOW, Ed. Blackwell Scientific Publications, Oxford, 1967. xxiv + 405 pp., illus. \$14.50.

Although the editors of this volume and the officials of the 14th International Ornithological Congress were successful on several scores, they were faced with a problem that they have solved only partially. As these congresses have expanded and the number of papers delivered has increased, the volumes of the proceedings have become larger and larger until two volumes were needed to contain the papers

presented at the 13th Congress in 1962. For the 14th Congress the decision was made to publish only the papers delivered at the plenary sessions. These papers were prepared by the president of the congress, David Lack, and 16 invited specialists in various currently important aspects of fundamental ornithological research. The general subjects covered are ethology and breeding biology (D. Lack and N. Tinbergen), systematics and taxonomy (W. Bock and E. Stresemann), avian physiology (J. Aschoff, D. S. Farner, and R. A. Hinde), population ecology (L. von Haartman, D. L. Serventy, and G. Zink), vocal communications (J.-C. Bremond, P. Marler, W. H. Thorpe, and F. Nottebohm), and orientation and navigation (F. Bellrose, C. Walcott, M. Michener, and H. G. Wallraff).

All the papers in the volume are valuable contributions in one way or another and should be of permanent interest. However, the eminence of the authors does not automatically make every paper the most up-to-date treatment of its subject. Indeed, there are serious defects inherent in all programs with invited speakers. When an expert is asked to give a major address at an international congress or other scientific gathering he feels he must comply even though he may have already summarized his knowledge of his subject at other recent symposia. The amount of new research that he himself has to report depends on fortuitous circumstances, that is, on whether he happens to conclude a phase of his own investigations at a time that coincides with his address.

More often than not what we end up with is a rehash that contains little that has not already been provided by the same author. Such reviews may be of immense value to nonspecialists and those with a peripheral interest in the subject, but they are not likely to be very stimulating to specialists. In brief, notable research discoveries and breakthroughs are seldom announced in proceedings of symposia. They are more likely to appear in journals, into which they find their way after slow, deliberate maturation that does not often coincide with a congress and an invitation to give a guest lecture.

Although the present proceedings contain excellent review articles, such as the one by Farner on the control of avian reproductive cycles, the specialist will probably find the papers by Aschoff on circadian rhythms in birds

and the one by Hinde on aspects of the control of reproductive development more exciting because they contain fountainheads of new research data. It is disappointing to find certain important subjects of research without representation or inadequately covered; bird migration, for example, is represented only by a single paper treating aircraft-type (APS-31) radar investigations and two papers on homing in pigeons. The latter papers, though, are important if for no other reason than for showing that none of the current hypotheses is able to explain all the phenomena of homing behavior that have been found in experimental studies. These papers could do much to stimulate further investigations that will lead eventually to the resolution of this biological enigma.

The topic of evolutionary avian biology is represented by two excellent discourses by two very able workers, Bock and Stresemann, but one might have hoped for additional coverage of the subject. An examination of the titles of the papers offered in the sectional sessions of this congress reveals several that might well have merited inclusion among the select group. Perhaps some sort of happy medium between publishing all papers delivered at a congress and publishing only those that were invited would be the best policy to follow.

GEORGE H. LOWERY, JR.
*Museum of Zoology, Louisiana
State University, Baton Rouge*

Cells in Development

Morphological and Biochemical Aspects of Cytodifferentiation. Papers presented at a round-table conference, Valbella, Switzerland, Sept. 1966. E. HAGEN, W. WECHSLER, P. ZILLIKEN, and A. F. GARDNER, Eds. Karger, Basel, 1967 (available from Phiebig Books, White Plains, N.Y.). viii + 271 pp., illus. \$9.40. *Experimental Biology and Medicine*, vol. 1.

Papers presented at a conference on problems of cellular differentiation were compiled to form the first volume of the new series *Experimental Biology and Medicine: A Series of Interdisciplinary Topics*. The topic of this first volume was well chosen, as can be seen from the discussions of cytological, electron microscopic, biochemical, and genetic approaches to problems of cellular differentiation.

The first section of the book is de-

voted to the morphological and biochemical analysis of primary inductions. Over half a century has passed since the classic experiments of Spemann revealed the importance of cellular interactions during early embryonic development. From the time of these discoveries, attempts have been made to study the biochemical mechanisms of this aspect of embryonic development. The limitation of earlier studies was a lack of biochemical technology; the limitation that will always exist is the lack of large quantities of material to work with. To overcome some of these difficulties, factors which influence neural and mesodermal inductions have been isolated from adult tissues. Descriptions of the isolation and partial characterization of these factors, as well as of their ability to regulate primary inductions, are presented along with morphological analyses. The papers presented in this section represent the techniques and procedures, as well as the progress which has been made from the time of Spemann's first discoveries to the present-day approach to problems of embryonic induction. Macromolecular factors have also been implicated in the regulation of growth and differentiation during later stages of embryogenesis. Neuralizing and mesodermalizing factors, for example, influence early cellular determination; nerve growth factor, whose chemical properties are well worked out, stimulates the growth of nerve fibers from sensory and sympathetic ganglia. More recently, erythropoietin has been implicated in the regulation of the terminal cellular differentiation of the reticulocyte. Both the nerve growth factor and erythropoietin exert their influence on cells which have already undergone the initial stages of determination. The mechanism of action of these factors is one of the many interesting approaches to experimental embryology today. Although mechanisms are postulated, there is no evidence regarding the degree of similarity or dissimilarity of the regulatory effect these factors exert.

The importance of an interdisciplinary approach to experimental embryology is stressed throughout this book, especially with respect to biochemistry and genetics. Cellular determination and subsequent stages of cytodifferentiation indicate that genetic expression is under strict regulation. The regulation of nucleic acid and protein synthesis during early embryogenesis

and during organogenesis has been one of the most active subjects of research during the past decade. This is clearly shown by the discussions presented on the regulation of nucleic acid and protein synthesis during the early development of the sea urchin embryo, as well as in reticulocyte, pancreas, lens, and cartilage differentiation. The problems in these cases are quite similar. The authors discuss the regulation of messenger and ribosomal RNA synthesis, the stability of messenger RNA, the initiation of synthesis of tissue-specific structural proteins and enzymes, and the possible control of synthesis of these proteins through transcriptional as well as translational mechanisms.

The papers in this volume are concisely written and provide a good representation of the types of developing systems amenable to biochemical and genetic analyses. This is one of many published symposia and conferences dealing with the biochemical aspects of cellular differentiation. The multiplicity is to be expected, however, in view of the continuing upsurge of interest in experimental embryology. Students of developmental biology as well as those indirectly interested in this field will find this an interesting collection of papers.

JOHN PAPACONSTANTINOU
*Biology Division,
Oak Ridge National Laboratory,
Oak Ridge, Tennessee*

Immunology

Cross-Reacting Antigens and Neoantigens. With Implications for Autoimmunity and Cancer Immunity. Proceedings of a conference, Washington, D.C., May 1967. JOHN J. TRENTIN, Ed. Williams and Wilkins, Baltimore, 1967. xvi + 122 pp., illus. Cloth, \$9.25; paper, \$6.75.

The conference of which *Cross-Reacting Antigens and Neoantigens* is the proceedings was convened to discuss the chemical and immunological relationships between bacterial and mammalian tissue antigens on the one hand and neoantigens that appear following viral infections of cells on the other, and the possible roles of these antigens in some disease states and transplantation immunity phenomena. The 11 formal contributions can be grouped according to three general subjects: (i) the nature and scope of antigenic cross reactivity, predominantly as it relates