Gerontology: Sociological, Economic, and Medical Aspects

Advances in Gerontological Research. vol. 1. Bernard L. Strehler, Ed. Academic Press, New York, 1964. xii + 410 pp. Illus. $13.50.

Within the last decade the problems associated with aging have had an impact on the sociological, economic, and medical aspects of our nation's life to an extent never before realized. The scientific community has recognized the urgency of these problems and extensive research, here and abroad, is now underway. The technical difficulties involved in such research are so enormous that only with the most imaginative techniques, and the recent developments in instrumentation, have new advances been achieved. These very advances, with their highly specialized methodology, have created a further problem, that of communication. In addition to the compendium of information in volume 1 of *Advances in Gerontological Research*, the book also serves to establish a dialogue between scientists of diverse background and training who are concerned with a common problem.

In chapter 1, William Bondareff reviews much of the current knowledge of aging effects in the central nervous system. If we consider the importance of the nervous system and its uniqueness as a test system (for example, it is not regenerated throughout life as is the intestinal mucosa, or the skin) it is surprising that the understanding of the aging phenomenon in this tissue should be so sparse. Bondareff's review serves admirably to emphasize the necessity for further research in this area.

The proteins and protein metabolism associated with various phases of ontogenesis are discussed in chapters by Simion Oeriu and F. M. Sinex. An extensive documentation of protein biochemistry during aging precedes Oeriu's proposal that, to a considerable degree, senescence is a function of the accumulation of disulfide bonds. His evidence is impressive, and the implications of this thesis immediately suggest a host of promising avenues for further investigation. A different but complementary view of the mechanism of aging is that taken by F. Marott Sinex who emphasizes the significance of cross-linkages between the large molecules, especially with respect to the connective tissues, as a characteristic feature of the aging process. One of the significant aspects of this response is that agents which promote cross-linking may also interact with DNA or RNA and thereby contribute to the progressive disorganization of cellular function.

The nuclear changes during aging are considered by Warren Andrew who summarizes observations based on cells from a broad phylogenetic spectrum. Among the several changes that progress with senescence is the increasing frequency of internuclear inclusions. These apparently develop by an invagination of the nuclear membrane and eventually the closing off of the sac with its cytoplasmic contents to form the inclusion body.

Among the recognizable changes occurring on the cells of old animals is the accumulation of pigment particles —"age pigment" or "lipofuscin." In a concise but lucid chapter Sören Björkerud deals with the isolation and physical and chemical properties of the lipofuscin granules. In another chapter Bernard L. Strehler provides a comprehensive review of the histochemistry and ultrastructure of the age pigment in relationship to the aging process. This is illustrated by photomicrographs of excellent quality. A hypothesis for the possible origin of these granules is discussed, with implications that suggest areas for further investigation.

In a chapter dealing with the role of nucleic acids in aging, Zh. A. Medvedev develops the concept that the accumulation of noise, random disorganization of the genetic information, is the basis of the senescence. The thesis is supported by considerable data, and models are proposed for the possible mechanisms by which this noise develops in the genetic program of the cell. Disorganization of the genetic information may lead to the production of altered proteins. This is considered by Blumenthal and Berns who discuss the possibility that the degenerative changes which accompany aging are due, in part, to autoimmune reactions. Still another facet of this same broad generalization is treated by A. M. Clark in his consideration of genetic factors associated with aging. Of special interest is Clark's suggestion that modification of gene action rather than mutation in somatic cells is the critical factor in senescence.

In ionizing radiation the gerontologist has a unique tool, amenable to precise quantitation, by which those physiological changes that accompany aging may be induced at an earlier time than would be characteristic of the species. G. W. Casarett has examined these changes and subjected them to critical evaluation. From a comparison of the differences and similarities between radiological aging and chronological aging, he concludes that some, but not all, of the processes involved have a common pathogenesis.

In summary, the volume is timely, and although the arrangement of the chapters results in some sacrifice of continuity, the book is still readable. Strehler deserves much credit for his accomplishment in this ambitious book.

D. G. BAKER
Department of Biology,
Brookhaven National Laboratory

Pacific Insects Monograph

Insects of Campbell Island (Pacific Insects Monograph, No. 7). J. Linsley Gressitt and collaborators. Bernice P. Bishop Museum, Honolulu, 1964. 663 pp. Illus. Paper, $9; cloth, $10.

The fauna of the sub-Antarctic islands south of New Zealand is of considerable interest to the zoogeographer and the evolutionist. On a series of collecting trips, Gressitt and his associates have done much to add to our knowledge of this fauna. More than 300 species of terrestrial arthropods (insects, mites, and the like), about half of them endemic, are now known from Campbell Island. The relationships are overwhelmingly with New Zealand and other nearby islands, particularly the Auckland Islands. The very high percentage of new species and even genera underscores once more how little of the fauna of our globe is as yet known. Would not the further exploration of the earth seem as urgent a task as the shooting of very expensive gadgets into space?

Campbell Island is the remainder of a volcanic area built up on an older platform. It was heavily glaciated during the Pleistocene, and much of its fauna arrived there since the end of the glaciation. The considerable number of flightless, and even wingless,