dom words spoken to them by the experimenter—hardly natural tasks.

Perhaps the dominant feature of the book is Neisser's attempt to revise his earlier views to bring them in line with Gibson's position. This is a difficult task. Neisser's earlier work took a constructionist view of perception. He endorsed the analogy of the perceiver to the paleontologist who extracts a few fragments from a mass of otherwise irrelevant rubble and reconstructs the dinosaur that eventually appears in the museum. In contrast, Gibson rejects the constructionist position outright. He argues that all of the information necessary for perception is in the optic array, that there are temporal invariances produced in the optic array by the objects in the world, and that the observer perceives simply by picking up these invariances. No construction is involved.

Neisser's attempted reconciliation is somewhat strained. It is better characterized as a statement of ambivalence about the two positions than as a positive synthesis. It is perhaps not unfair to say that he maintains the constructionist position while emphasizing the informativeness of the optic array—especially as it occurs in natural situations. The paleontologist must still put the dinosaur together, but normally there is only one way to do it.

In a sense, *Cognition and Reality* is a microcosm of the debate in cognitive psychology over the constructionist and Gibsonian views of perception. Neisser makes arguments for each and I suspect satisfies proponents of neither.

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## North American Archeology

**Prehistory of the Far West**. Homes of Vanished Peoples. L. S. CRESSMAN. University of Utah Press, Salt Lake City, 1977. xx, 248 pp., illus. $15.

Luther Cressman, drawing on his over 40 years of experience in the Far West of North America, has attempted to fill the need for a synthesis of the complex and still relatively unknown prehistory of that portion of the continent. His contribution is to be welcomed into the archeological literature in the hope that it will stimulate further attempts in this direction to take into account the ever-increasing amount of information that is becoming available through both academic archeological research and conservation archeology.

This handsome yet reasonably priced volume is essentially a narrative representing the culmination of Cressman's experience in the archeology of western North America. Written in what has been described as a humanistic style suitable for general readers as well as professional archeologists, the book consists of seven major chapters with an introduction and concluding summary.

The first two chapters deal with the general physiography and geomorphology of the region and with the dating of the various glaciations, pluvial lakes, sea level and temperature fluctuations, volcanic ash falls, and so on in relation to possible environmental changes. Both chapters are brief but informative. Various subareas are discussed in some detail, with the emphasis being on the Pacific Northwest, an area with which the author is intimately familiar. The figures and maps are adequate throughout, although perhaps there is an overabundance of glaciation photographs at the expense of other, possibly more useful illustrations.

The chapter entitled "The wanderers" is a reasonably detailed discussion of man's probable entry into the New World via the Bering land corridor and associated topics. Cressman's discussion of sites thought to have been occupied by early man (for example, Santa Rosa Island, Texas Street, Valsequillo, and Tlapacoya) is enlightening not only because of his opinions about their validity but also for the reminiscences he provides about investigations of them. Personal views of this type are often lacking from the writings of archeologists, and it is interesting to have a glimpse or two behind the scenes. A lack of adequate maps detailing site locations and possible migration routes impedes the understanding of this chapter.

The following chapter, "The people," discusses various anthropometric studies of both the living and the nonliving peoples in the region, with the emphasis on California and the Pacific Northwest. As Cressman himself notes, "While the prospect for gaining a detailed knowledge of the physical anthropology of ancient far westerners is not bright, the prospect for understanding the *cultural* achievements of these people does not depend on such knowledge" (p. 77). This brief chapter could well have been reduced or eliminated, for it adds little to the value of the work.

The chapter "Linguistic prehistory" is well done. Cressman adequately discusses the reconstruction of the linguistic prehistory of the region as well as the migrations and dispersals of various peoples of the Far West as inferred from the present linguistic evidence.

"Subsistence and adaptation" presents information on both the technological and the social aspects of subsistence activities in the various subareas. Adaptation as related to environmental change, primarily that associated with the Altithermal, and the relation between ecological adaptation and social organization are also briefly dealt with. On the whole, the chapter is well organized and informative, but it emphasizes fishing, especially in the Pacific Northwest, at the expense of the other activities. Gathering is treated only summarily, with almost no information given on the plants utilized or their relation to seasonal migration and dispersion. While Cressman draws on the ethnographic literature for his discussion of fishing, he appears almost to ignore it in the subsection on gathering, especially with respect to the Great Basin, for which a substantial body of both ethnographic and ethnohistorical literature is available. I believe he underestimates the importance of gathering relative to hunting.

The heart of the monograph is contained in "Monuments to the dead," a chapter discussing the development and status of archeological research (up to 1969) in the various subareas of the Far West (Pacific Northwest, Great Basin, California, western Oregon). Cressman covers the history of archeological work in each subarea, the people and institutions involved, and the objectives of the research. His own views are, of course, clearly presented, along with a tremendous quantity of data. On the whole the chapter is a good review of the archeology, although various area specialists will doubtless disagree with the author on some points.

This monograph was apparently completed in 1969 (that is the cutoff date the author gives for the bibliography). Since then there have been major additions, both of data and of theory, to far western archeological research that put many of the matters Cressman discusses in a new perspective.

Another comment I have is that Cressman has attempted to do too much in writing a book for both the professional archeologist and the lay person. His humanistic style of writing is refreshing compared to the archeological writing to which we are accustomed, but sometimes, as in the case of the discussion of radiocarbon dating (pp. 26–27), the infor-

mation presented is too detailed for the general reader and unnecessary or not detailed enough for the professional.

Minor defects include lack of sufficiently detailed maps, of illustrations showing representatives of the various groups discussed in the physical anthropology chapter, and of drawings of the various bead types referred to in the discussion of California and the Great Basin and too sparse a use of references.

In spite of its faults the book is to be recommended as the first major attempt to present a prehistory of the Far West. It is a pioneer effort.

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## Ganglionic Cells

**SIF Cells**. Structure and Function of the Small, Intensely Fluorescent Sympathetic Cells. OLAVI ERÄNKÖ, Ed. National Institutes of Health, Bethesda, Md., 1976 (available from the Superintendent of Documents, Washington, D.C.). xiv, 260 pp., illus. $6.50. Fogarty International Center Proceedings, No. 30. DHEW Publication No. (NIH) 76-942.

Toward the end of the last century, histologists recognized that some sympathetic ganglia contain—in addition to large autonomic neurons—small cells that resemble chromaffin cells of the adrenal medulla. In the early 1960's, using the new method of demonstrating catecholamines in tissues by formaldehyde-induced fluorescence, Eränkö and Härkönen noted that the superior cervical ganglion of the rat contained some cells that had extremely bright fluorescence but were smaller than autonomic neurons. In 1965 they named such cells "small intensely fluorescent" (SIF) cells. Studies subsequently showed that SIF cells had ultrastructural features characteristic of both neurons and adrenal medullary cells and in many ganglia were much more numerous than could have been predicted from earlier studies of chromaffin cells. The preliminary morphological observations, interpreted in the light of existing neurophysiological evidence, led to the suggestion that SIF cells are interneurons that modulate neuronal activity in sympathetic ganglia.

This book results from a meeting held at the National Institutes of Health in February 1975, when Eränkö was a scholar-in-residence at the Fogarty International Center, and it reveals the sizable amount of interest that SIF cells attracted during the 10-year period leading up to the meeting. The collection of 20 papers shows the diversity of morphological, cytochemical, neurophysiological, and biochemical approaches that have been used to study SIF cells. Perhaps most important, the book lends further support to the idea that SIF cells comprise several different types of small, catecholamine-containing cells. For example, biochemical and histochemical studies show that some SIF cells synthesize and store dopamine and others make norepinephrine or possibly epinephrine. Furthermore, the book illustrates that SIF cells are present—though variable in number—in the superior cervical ganglia of many species and in the ganglia of pelvic viscera. However, the extensive distribution of SIF cells is not fully described in the book. There is no mention that SIF cells have been described in several parasympathetic and sensory ganglia—key observations that document the association of SIF cells with a variety of types of neurons. Reference is made to similarities between SIF cells and the principal glomus cells of the carotid body and paraganglia, but the reader is not made certain of the morphological criteria that cells must satisfy to be classified as SIF cells. In this regard, the chapters on aminergic neurons in the brain are excellent reviews of fascinating work, but their relation to the main subject of the book is unclear.

Compelling evidence that some SIF cells modulate the activity of sympathetic neurons is presented in neurophysiological, pharmacological, and biochemical studies of sympathetic ganglia. The data suggest that dopamine released by SIF cells produces long-lasting postsynaptic potentials in ganglion cells. An interneuronal function, attributed to SIF cells that are innervated by preganglionic nerves and in turn innervate sympathetic neurons, is consistent with these observations. However, ultrastructural evidence cited in the book indicates that not all SIF cells have this pattern of innervation. Some resemble neurosecretory cells because they have a synaptic input but no synaptic output. Others, such as the SIF-cell-like glomus cells of the carotid body, probably have a sensory innervation. Questions about innervation will persist until the synaptic connections of SIF cells in various locations have been adequately assessed by quantitative morphological studies of an experimental nature.

The chapters are well illustrated with light, fluorescence, and electron micrographs, many of which are technically excellent, but the mediocre quality of reproduction of the half-tone prints reflects efforts to limit costs. The inclusion of an overall summary distinguishing the issues that are resolved from those that are still controversial would have been helpful to readers not familiar with the field. The book is logically organized and clearly written and provides convenient access to a large quantity of data on SIF cells.

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## Biological Gerontology

**Cellular Ageing**. Concepts and Mechanisms. RICHARD G. CUTLER, Ed. In two parts. Part 1. General Concepts; Mechanisms 1, Fidelity of Information Flow. vi, 218 pp. Paper, $46.25. Part 2. Mechanisms 2, Translation, Transcription and Structural Properties. vi, 130 pp., Paper $30.50. Karger, Basel, 1976. Interdisciplinary Topics in Gerontology, vols. 9 and 10.

Although there are numerous studies dealing with the changes in biological properties that occur during aging, there is, as yet, no synthesis of the principles governing these changes. Further complications arise from difficulties in determining which observations are relevant and reliable. For example, only recently has it been generally recognized that the variables peculiar to the model system used must be rigidly controlled. Mean and maximum life-spans must be determined for each population used, and pathological changes in aging cells and tissues must be continually monitored. Otherwise the results obtained may be uninterpretable.

Perhaps one of the most fundamental questions in biological gerontology is whether the aging of the organism is due to the cumulative effect of the aging of individual cells. The editor of this treatise has set out to address this question by bringing together the views of 33 authors, expressed in 21 chapters.

The first section of part 1 covers a number of fundamental subjects and is an excellent introduction to the field. Especially good are chapters by Sohol and Sacher that deal with the kinetics and the thermodynamics of aging, respectively. Other interesting chapters deal with genetics and molecular aspects of aging. Two chapters by Adelman and Finch caution workers to examine critically what appear to be cellular changes, for