

IN HONOR OF CARL L. HUBBS

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This issue of the Bulletin of the Southern California Academy of Sciences is dedicated to Carl Leavitt Hubbs whose long and productive career is a landmark in the fields of aquatic and vertebrate biology in this century. Since his first publication in 1915, Carl Hubbs has contributed a steady stream of papers on a wide variety of subjects such that his bibliography now includes about 700 titles. His range of interests perhaps can be best identified by listing here the areas of endeavor given in his biographic sketch published in the 12th edition of *American Men and Women of Science*: taxonomy, distribution, ecology, variation, life history and evolution of fishes; fishery biology; marine mammals; paleohydrography; oceanography; human ecology; and paleoclimatology. His principal focus over the years has been the study of fishes inhabiting both marine and freshwater environments. It is safe to say that he has been the foremost figure in North American ichthyology in the middle half of the twentieth century. He has followed in the footsteps of his mentor, David Starr Jordan, who dominated the field in the late 1800's and early 1900's. Certainly, no other person has made a greater contribution to the growth and development of ichthyology in this country than Carl Hubbs. His long commitment to and involvement with the American Society of Ichthyologists and Herpetologists (ASIH) have been shaping forces in this organization almost since its inception in 1913. The ASIH dedicated its 1974(3) issue of *Copeia* to Hubbs on the occasion of his 80th birthday.

While it is difficult to single out studies from the extensive list of significant contributions by Carl Hubbs, a number of particular areas of research come to my mind when considering his accomplishments. These include studies on speciation, hybridization and geographic variation in fishes; fish distributions and hydrographic history in the Great Basin region; zoogeography in the Eastern Pacific, including the relationship

of temperature to coastal fish distributions; population status and related aspects of marine mammals such as the northern elephant seal, Guadalupe fur seal, and Pacific gray whale; taxonomy and distribution of lampreys; and the taxonomy, distribution and reproduction of cyprinodontid fishes. His research on the cyprinodonts included discovery of the Formosa molly (*Poecilia formosa*), an all-female species maintained by males of another species. Hubbs' interest in cyprinodontids is epitomized by his early and continuing efforts to protect the desert pupfishes. The treatise on fishes of the Great Lakes region co-authored with Karl F. Lagler has not only continued to be an important synthesis of the fish fauna of that region since the first edition in 1941, but also the standard reference on methods for making counts and measurements of fish specimens. Hubbs' concerted studies on distributional patterns of fishes and marine mammals resulted in his editorship in 1958 of a volume on zoogeography. In 1968, he co-edited, with Wheeler J. North, an important bulletin on the utilization of kelp bed resources in southern California. During his career, Carl Hubbs has written more than 140 book reviews. These evaluations have been characterized by critical analysis and have frequently contained original concepts. Elizabeth N. Shor compiled a selected bibliography of Hubbs which appears in the 1974(3) issue of *Copeia* and is not duplicated here.

Carl Hubbs was born 18 October 1894 in Williams, Arizona. He received his A.B. and A.M. degrees from Stanford University in 1916 and 1917, respectively, and his Ph.D. in zoology from the University of Michigan in 1927. His principal positions have been curatorial and professorial at the University of Michigan (1920-1944) and the Scripps Institution of Oceanography (1944-1969; emeritus professor 1969—present). Hubbs has been an active member of

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Carl L. Hubbs aboard the "Orca" at Guadalupe Island June 1955

a wide variety of professional organizations and has held office in the ASIH (secretary, 1928-31, president, 1934-35, 1946-48), the American Society of Naturalists (vice-president, 1964), the Society for the Study of Evolution (vice-president, 1953, 1955) and the Society of Systematic Zoology (president, 1951). He was editor of *Copeia* from 1930 to 1937 and review editor of the *American Naturalist* from 1941 to 1947. Carl Hubbs has been a strong voice in a number of conservation groups including the Nature Conservancy, the Torrey Pines Association and the Desert Fishes Council.

Honors presented to Carl Hubbs have been many and include receipt of the Henry Russell Award at Michigan (1929-30), election to the National Academy of Sciences (1952), receipt of a Guggenheim fellowship (1952-53), the Joseph Leidy Award and Medal of the Academy of Natural Sciences, Philadelphia (1964), membership in the Linnean Society of London (1965), the Gold Medal of the San Diego Zoological Society (1970), the Shinkishi Hatai medal of Japan (1971), and the American Fisheries Society Award of Excellence (1973). According to Kenneth Norris who wrote an account of Hubbs' life in the 1974(3) issue of *Copeia*, five genera of fishes, one of lichens, 22 species of fishes, one bird, one whale, two molluscs, one crab, three cave arthropods, two insects, three species of algae, one species of lichen and one dry, Nevada lake have been named in honor of Hubbs.

Carl Hubbs has shared nearly 60 years of his life with a remarkable woman, his wife Laura, who throughout the years has carefully recorded field notes, meticulously organized reprints and correspondence, and frequently joined Carl on research projects. They have one daughter, Frances, and two sons, Clark and Earl. The family is biologically oriented. Earl is a biology teacher, and Clark and Robert Rush Miller (husband of Frances) are both well-known ichthyologists. Miller has collaborated with the senior Hubbs on a variety of studies of freshwater fishes.

Of perhaps equal importance to his scientific contributions, have been the encouragement and assistance Carl Hubbs has given to countless colleagues and students. His straightforward manner, dedication to solid science, and enthusiasm for the efforts of others have been significant for the continued development of the careers of many people.

Carl Hubbs' awareness and currency in the field of ichthyology was first fully appreciated by me a few years ago when I visited him at Scripps

Institution soon after I had published my doctoral dissertation. I was pleased, of course, that he knew of my paper, but I was rather unprepared for his questioning of me on three small, but important, points contained well inside the covers of the article. It became obvious to me that he had read the entire paper. I was amazed—and convinced—of his attention to the field. At the end of our meeting, I received an armload of carefully selected reprints from the Hubbs stock and happily went off realizing that I had marked a kind of milestone in my ichthyological career.

Beyond this influence that Carl Hubbs has in direct exchange with colleagues and students, are the inspiration and enthusiasm that he effects simply by his presence. Many students, aware of the longevity and accomplishments of Carl Hubbs, figure they are at the "right" meeting if he also happens to be in attendance; better yet, if they present their first paper with him in the audience. What is often the best reward of all for them, however, is the informality and friendliness with which they are received when introduced to Carl and Laura after a paper session at the meeting.

Carl Hubbs has received many honors in his long career but he has never rested on them. He has no time for that. A quote attributed to him attests to his singular desire to energetically get on with the business of living. Upon receiving the 1975 Headliner Award from the San Diego Press Club, he is reported to have said apologetically, "I really don't know why I'm receiving this. All I've ever done in my life was exactly what I wanted to do." At this writing, he is preparing for an extensive trip with his family to Alaska and other parts of the United States. Descriptions of new species are waiting as are the completion of the exhaustive checklist of California fishes and other projects that I neither have space to list nor know about.

The 18 papers contained in this issue are partially representative of the multifaceted interests of Carl Hubbs. The results of systematic, ecological, behavioral, and physiological studies of both marine and freshwater fishes are included. The authors, ranging from graduate students to senior scientists, work in a diverse range of subject areas within the field of ichthyology. I trust that the papers will be of interest and value to Carl Hubbs and others in the scientific community. On behalf of the Southern California Academy of Sciences and the authors of these papers, I respectfully dedicate this issue to Carl L. Hubbs in honor of his distinguished life and scientific career.