

UNIVERSITY OF CALIFORNIA
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SCRIPPS INSTITUTION FOR BIOLOGICAL
RESEARCH

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LA JOLLA, July 1, 1921.

To the President of the University.

SIR: My report for the year July 1, 1920, to June 30, 1921, is respectfully submitted herewith, but owing to circumstances beyond my control the report will have to be brief and will be hardly more than an appendix of revision to the report of the preceding year.

First to be recorded in the events of the year at the Institution is the loss, sad and severe, of Mr. Ellis L. Michael, Zoologist and Administrative Assistant of the Institution almost from its foundation. He died at La Jolla on August 30, 1920, after a short, obscure illness.

A brief review and estimate of his work was published by the director in the journal *Ecology*, January, 1921. From this a single sentence may be quoted: "The significance for ecology, and especially for marine ecology, of Michael's life work, though now recognized as considerable, will, it seems probable, be more clearly and fully seen later on."

Oceanography and Hydrography.—All the phases of research in this field mentioned in last year's report have been kept up and vigorously pushed forward. Evidence of the growing appreciation of the significance of these researches by those best qualified to estimate their value, is seen in the prominent part taken by Dr. G. F. McEwen, Assistant Professor, Oceanographer and Curator of the Oceanographic Museum, in the section of Physical Oceanography of the Pan-Pacific Scientific Conference, held at Honolulu in August, 1920; by the attention these researches are receiving from the engineers of the water power companies of California; and by all technical students of west American climate and rainfall. As an illustration, both Dr. McEwen and Mr. Cummings took prominent parts in the half day's discussion of weather and precipitation in California at the San Francisco meeting, February, 1921, of the Pacific Division of the National Electric Light Association. The Director of the Institution was also invited to speak at this meeting on the broader aspects of water supply for California and the importance of oceanic researches in connection therewith.

This interest from the outside is taking substantial form in the way of aid to certain of the Institution's field work. The Volcan Water Company of San Diego is aiding the evaporation studies; the San Diego

Gas and Electric Company is taking temperatures, and water and plankton samples at Oceanside; and the Southern California Edison Company is doing the same at Santa Barbara. So definitive now are the problems in this field that such aids are highly valuable.

Planktology.—The outstanding single progressive event in this department during the year has been the publication of *The Free-Living Unarmed Dinoflagellata*, by Charles Atwood Kofoid and Olive Swezy (Memoirs of the University of California, Volume 5, quarto, 538 pp., 12 colored plates.) While the Institution cannot claim exclusive credit for the production of the magnificent monograph now before us, its share in it has been large and vital.

The issuance of this volume may be regarded as one focal point in the Institution's programme of investigation of "ocean pasturage" of the north-eastern Pacific; and I cannot refrain from quoting the sentence with which the introduction ends: "Few institutions and few localities in the world are so favorably located for the study of this group as is the laboratory at La Jolla." This pronouncement, based on the ample experience of the authors, goes far toward justifying the confidence which the supporters of the Institution have always had that very important results, scientific and practical, would finally reward persistent and capable research on the fundamental organisms of this part of the Pacific. Slow, in some ways tedious, and costly as the work is, by no other means can adequate knowledge of the producing methods and capacity of the sea ever be gained. And therein lies the renewed impetus and justification for pushing on.

The year's work by W. E. Allen, Biologist and Publicity Secretary, with such assistance as it has been possible for him to obtain, has progressed finely with the diatoms, the other predominating group of organisms of "ocean pasturage." The revision of methods of work begun by him last year has been carried further and the new methods are being used with gratifying results.

Reference was made under the heading of oceanography to assistance in the field work being given by various outside agencies. Plankton collecting is also benefiting by this, as was there mentioned.

Boat Work.—Both the oceanographic and the planktonic programmes have been notably furthered this year by a specially planned period of boat work eight weeks from May 15 to July 15, carried out under the direction of Captain W. C. Crandall, Business Agent.

Heredity and Environmental Influence.—Besides pushing forward the lines of work mentioned in previous reports, especially on hybridizing subspecies and on the inheritance of departures from bilateral symmetry, the year's work in this department has dealt with two new subjects that already have yielded interesting results and are promising for further efforts.

One of these is the supposed effects of dark backgrounds, like lava beds, on the color of animals inhabiting them. Critical study of an extensive series of deer mice collected by Dr. F. B. Sumner, Associate Professor of Biology, from lava fields and adjacent regions near Ludlow, California, failed to confirm prevalent expectation of darker color of animals living in such environments. Obviously the specific question raised bears on the general and important problem of environmental influence; and the excellent opportunities here presented for studying it ought to be, and, it is hoped, may be taken further advantage of.

The other new subject referred to concerns the method employed in the color studies just mentioned.

Dr. Sumner has been able to examine the color of his mouse skins far more critically than such specimens have heretofore been examined through the use of the Hess-Ives tint photometer. This is a rather complicated apparatus and requires care and skill in using. However, its accuracy and wide range of applicability in color investigations in natural history, suggest that it may come to play a large part in such work.

Mr. R. R. Huestis, candidate for the doctor's degree in genetics, and assistant, has rendered important aid in several of Dr. Sumner's investigations. Furthermore, he has undertaken to examine, really as an extension and refinement of studies begun by Mr. Collins several years ago, the minute structure of hair of the deer mice. The object now is to find whether unit character differentials between subspecies and mutants exist here. Miss Mary E. McDaniel, a special graduate student, has done most of the clerical work in so exhibiting the birth records of great numbers of mice as to make them reveal the sex ratios of these births, these ratios presenting interesting facts.

Exploration of the Pacific.—The Pacific Exploration Committee of the National Research Council mentioned in my last report has been reconstituted during the year and placed under the Division of Foreign Relations of the National Research Council—this because of the more than ever obviously international character of many of the problems of the Pacific. It is now called the Committee of Pacific Investigation.

The Director of the Institution is one of the two California members of the new committee, and by his sojourn in Washington, March to July, 1921, was able to take an active part in the committee's meetings.

The effort to bring the problems of the Pacific requiring scientific investigation onto a basis in our own and other nations bordering on this ocean, that will insure actual work toward their solution, is a task as large and difficult as it is important.

Library and Publication.—Five hundred and five volumes have been added to the library during the year, thereby bringing the total to 7781. New pamphlets added were 564, making the total 7165. The continued growth of the library has been largely due again this year to the special funds contributed by Mr. E. W. Scripps.

The problem of ways and means for publishing the results of the Institution's research work, referred to in my last report, has defined itself more clearly during the present year than it has been defined heretofore. For the present at least, while University funds for publication are so inadequate, it will be the policy of the Institution to present few or none of its papers to the University Press except those from the plankton investigations. For the sake of uniformity and continuity it seems desirable that these should continue to appear in the zoological series. Every effort will be made to prepare the manuscripts of even these in a way that will make their publication possible at the smallest expense consistent with the highest scientific requirements of publications of this class. This will involve, under the present scope of work, only the technical papers of Mr. Allen, Dr. C. O. Esterly, Zoologist, and Dr. Christine Essenberg, Librarian.

Museum, Aquarium, and Supply Departments.—Although the year has brought no radical changes in these departments, the growing significance of the museum and aquarium in an educational way is worthy of mention. This growth is shown by the increased appreciation of the exhibits by the public as evidenced by the increasing number of visitors, 16,000 having registered during the year.

Orders have been received by the Supply Department from all parts of the United States and from Australia, Canada, England, and Scotland. The Supply Department and the Aquarium have greatly benefited by the return to the service of the Institution of Mr. James Ross, Mechanician. His return has enabled Mr. Barnhart to devote more time to his proper duties as Collector and Curator, and to his work in connection with the Supply Department. The work of Mr. Ross has largely contributed toward keeping the Aquarium at a more uniform excellence than it has had before.

Visiting Investigators.—In no previous year, probably, has the Institution been used by visiting scientists so extensively, as during the year now closing. The list of these, with subjects of study, follows:

Dr. Ida H. Hyde, plankton; Dr. Myrtle Johnson and Mr. H. J. Snook, general marine zoology; Dr. H. S. Reed, mathematical problems on soils; Miss Mary McDaniels, special work with Dr. Sumner; Professor H. H. Laughlin, genetics; Professor Harlow Shapley, ants; Dr. H. W. Norris, nervous system of sharks; Miss Hazel Field, lake plankton with Mr. Moberg; Miss Darlington, general collections; Miss Seorart and Miss Reinhart, general collections; Mr. M. Gerard, chemistry; Dr. E. G. Conklin, general biology; Dr. Walter P. Taylor, biological survey; Dr. C. T. Voorhies, work with Dr. Taylor; Dr. S. S. Maxwell, reflex action of sharks; Dr. A. Mann, diatoms; Dr. Tage Skogsberg, general; Dr. J. F. Daniel, anatomy of sharks.

Special Gifts by E. W. Scripps.—Special contributions to the work of the institution made during the year by Mr. Scripps are as follows:

Assistance in Genetics	\$1,500.00
Assistance in Oceanography	1,500.00
Stenographic work	1,500.00
Library	1,800.00
	\$6,300.00

Educational and Miscellaneous.—Brief reference has already been made to the Museum and Aquarium as educational agencies. But the subject merits further attention. To the 16,000 people more or less, who annually not only visit the collections but use them and the curator, Mr. Barnhart, and the guide, Mr. Michael, as a sort of dictionary of the marine and other life of the region, the information gained can by no means be insignificant. The fact that many hundreds of the visitors are from the far interior of the continent and have never before had a chance to see “in the flesh” any of the ocean’s strange life, adds especially to the educative value of the collections—to those of the Aquarium most of all. But the constant utilization of the Institution’s sources of information by naturalists, teachers, school children and others of the neighborhood, must also be truly valuable.

The experiment, begun in 1919 and mentioned in my last report, of designating a member of the scientific staff of the Institution as its publicity secretary is being continued with results that seem really promising toward utilizing the daily press for educating the public in science. For example, Mr. W. E. Allen, who is carrying on this experiment, is now able to report: “For the past year and a half ten or more widely distributed California newspapers have published once a month (or more often) certain articles on biological topics contributed by me”; and “many people of widely different occupation and interest have remarked about things they had learned from these articles.”

As Mr. Allen has set up for himself a definite educative aim and standard in this work, and, besides contributing his “stories,” is making a study of various aspects of the general problem of newspaper science, it seems as though the effort is really worth while.

As yet it has not appeared desirable to Mr. Allen that this experiment should identify itself with the much more pretentious *Science Service*, the organization into which *The Science News Service* mentioned in my last report, transformed during the year.

During the year Dr. McEwen has given two lectures at the California Academy of Sciences, San Francisco, one of them being at one of the Sunday afternoon meetings which have been popular at the Academy for several years.

Dr. Sumner represented the University of California and the Institution in a Science Conference at the University of Southern California during the commencement of 1921, and was one of the chief speakers. He has published during the year as Bulletin 10 of the Scripps Institution, a significant semi-popular essay under the title *Heredity, Environment and Responsibility*. He took an active part, as did also Mr. Allen, in the newspaper campaign against the proposed laws hostile to experimental biology and medicine, in the state election of the fall of 1920.

The Director's position as president of *Science Service* and also of the Pacific Division, American Association for the Advancement of Science for 1920-21, has given him opportunity to address the public quite broadly from the platform and through the press.

Respectfully submitted,

WILLIAM E. RITTER,
Director.