

Date <sup>2</sup>

THE SCRIPPS INSTITUTION

I hope that you will take me literally when I tell you that I have found the preparation of even this brief account of the Scripps Institution to be a task of extreme difficulty. For it may surprise some of you to learn that there are several quite distinct Scripps Institutions, having but little resemblance to one another.

In the first place, we have the ideal Scripps Institution, a thing without seeming limitations, either as to personnel or physical equipment. It works in accordance with a somewhat inscrutable "program", and has a philosophy and scientific method all its own. The mission of this Institution is to work on a cooperative basis toward a truer understanding of nature, and incidentally to expose the errors of our less favored colleagues elsewhere. This we may also call the "official" Scripps Institution. It is the Institution as portrayed in various published reports of wide circulation.

But curiously enough there exists, alongside of that first Institution — or rather coextensive with it, both in space and time — an Institution of a quite different type. This one is a mighty asset in our local industrial development. It is engaged, in some quite indefinable way, in revealing the economic resources of the sea, in making two fish grow where only one grew before. Its principal mission in the world, in fact, is to help the fisherman, the canner and the Chamber of Commerce. Incidentally, it further serves the general public through the

maintenance of a museum, aquarium and fishing pier. This is the Scripps Institution as portrayed by our local press, the one which is seen through the eyes of our countless visitors.

Finally, as a rather appalling anti-climax, we have the visible concrete Scripps Institution (yes, both the buildings and the pier are concrete!), with its small resident staff, which is not composed of supermen, and its limited income, which falls considerably below a million dollars a year.

It is of this last Institution — what you will perhaps call the real Institution — that I doubt not you want to hear me speak. But, before proceeding, I wish to insist that the other two Institutions are likewise very real, and that the three have interacted on one another throughout most of our development. On the one hand, the ideals of our first director have surely influenced us for the good, however far they may ever be from full realization. On the other hand, the misconceptions of the press and of the public at large have doubtless worked us considerable injury.

Of the history of the Scripps Institution, up to the time of its occupying its permanent home, Dr. Ritter has published a very readable account. The salient features of this history may be stated very briefly. About the year 1892, it would seem, the zoology department of the University of California began to look around for an "outlet to the sea". Thereafter, during several successive summers, various points along the California coast were chosen as the sites for temporary marine laboratories. This nomadic existence seemed to pall on the scientists concerned,



and in 1901, it was decided to establish more permanent headquarters at San Pedro. After two years, however, another move was made, this time to Coronado. Later a site was occupied in La Jolla village, and finally the present tract of land was purchased at a nominal price from the city of San Diego in 1907.

Some time prior to this date, the active support of Miss Ellen B. Scripps and Mr. E. W. Scripps had been enlisted, and the laboratory for several years was maintained exclusively through their generosity. In 1912, however, the Marine Biological Station of San Diego became a department of the University of California, under the name of the Scripps Institution for Biological Research. The purpose of the University as officially stated by the Regents, was to make of the Institution "an instrument for the most liberal biological research and the free expression and publication of the results of such research, as intended by the founders". From that time on, an increasing proportion of the regular annual income was derived from the state.

The first permanent building, the present laboratory, was erected in 1909-1910, while the larger library and museum building, together with the pier, were completed in 1916, the cost of all these structures being defrayed by Miss Scripps. Further historical details are not possible in the space at my disposal.

It has always been the prevailing belief that the Scripps Institution concerned itself mainly if not wholly with the sea.

Some of my colleagues have complained, indeed, at the difficulty which they have experienced in justifying to visitors the existence of an experimental mouse-farm as part of a marine biological station. Such a situation would doubtless be rather hard to explain -- granting its reality. But the perplexity of our marine biologists is not a circumstance to what I have had to endure in trying to tell visiting mammalogists just why a thousand-foot pier is essential to the breeding of mice!

Whatever its historical origin, and whatever may be in store for it in the future, the Scripps Institution has not, during the past ten years, concerned itself exclusively or even primarily with marine biology. Thus, Dr. Ritter's series of published volumes, "War, Science and Civilization", "The Unity of the Organism" and the rest do not smack of salt water. Nor does the California woodpecker belong to the category of marine organisms, even though the director of the Scripps Institution has contributed largely to our knowledge of this interesting bird.

Indeed, we may make all possible combinations and permutations of the two words "marine" and "biological", in their application to the work of the Scripps Institution. Much of it, to be sure, is both marine and biological. But some of it is marine without being biological, and some of it is biological without being marine, while latterly considerable time has been devoted to one piece of work which is neither marine nor biological.



These comments upon the diversity of our work are not made in any spirit of disparagement. I have never been one of those who have urged adherence to a unified program, to which every individual piece of work should be relevant. On the contrary, I have thoroughly bored my colleagues by reiterating the ponderous platitude that a research institution should be more concerned about the quality and quantity of its scientific output than about the precise field of knowledge to which each contribution might be assigned. As measured by this standard, the competence of the individual investigator counts for vastly more than the "relevance" of his work to any particular paper "program".

And now let me pass to a brief mention of some of the actual lines of investigation which have been pursued at the Scripps Institution. It will here be necessary, however, to restrict myself to the work of the permanent staff, and to omit any discussion of the numerous visiting scientists who have availed themselves of laboratory privileges for longer and shorter periods. This limitation is unfortunate, since our visitors have included investigators of the rank of Wilson and Morgan and Conklin and Parker and Jennings and Child and Guyer and Herrick, and many others from the east; as well as a large proportion of our leading biologists on the Pacific Coast.

Let us, then, pass in review our entire scientific staff of recent years, along with the barest outlines of their respective lines of research. In order to avoid any invidious

distinctions as to age, rank or scientific attainment, I shall line them up alphabetically. This I can do with an easy conscience, since I come so near the foot of the list myself.

W. E. Allen is engaged in studies of phytoplankton, particularly the diatoms; has developed exact quantitative methods for determining the number of individuals per unit volume of sea-water; has determined the geographic, bathymetric and seasonal abundance of some of the species encountered, as well as recording the periodic variations in the abundance of the "ocean pasturage" as a whole; is aiming to discover the causes which determine these fluctuations. Mr. Allen is likewise supplying certain California newspapers with popular articles upon biological subjects of current interest.

P. S. Barnhart is curator of the museum and aquarium and collector of biological material for the laboratory and the supply department; has long kept records of the seasonal occurrence of local marine animals, particularly fishes.

W. C. Crandall is business manager of the institution; has conducted extensive surveys of the kelp beds of the southern California coast, with reference to the abundance, rate of growth and availability for commercial purposes.

E. W. Cummings, assistant to Dr. McEwen, and graduate student in the University of California, has investigated the rate of evaporation from some of the fresh-water reservoirs of San Diego County, and endeavored to formulate, in mathematical



terms, the action of the various physical factors concerned.

Christine Essenberg has written taxonomic and distributional papers upon certain marine annelids, and upon the chordate groups of Appendicularia. A monograph upon the latter animals, now in press, contains descriptions of many new species.

C.O. Esterly has devoted his attention to the description and classification of several groups of pelagic crustaceans, notably the copepods; but more especially to seasonal and diurnal variations in the occurrence of the last-named animals. An attempt has been made by him, by the use of laboratory methods, to interpret the daily vertical migration of the pelagic crustaceans.

R.R. Huastis, assistant to Dr. Sumner, and graduate student in the University, has subjected to microscopical examination and measurement the hairs of various geographic races of deer-mice, as well as of hybrids between certain of these races. The resulting data have been <sup>dealt with by</sup> ~~subjected to~~ statistical analysis, and light thus thrown upon the mode of inheritance of certain characters which determine the coat color of these rodents.

G. F. McEwen, oceanographer and physicist, has striven to interpret the known facts relative to ocean temperature, salinity, and circulation in the light of general physical principles. Both for his own purposes and those of others, he has developed a considerable amount of special mathematical technique. Dr. McEwen has, among other things, accumulated some data which suggest the possibility of forecasting the

winter rainfall in southern California from the ocean temperatures of the preceding winter. *fall.*

E. L. Michael, now deceased, was concerned primarily with the taxonomy, distribution and behavior of the pelagic group of arrow-worms, or chaetognaths. His method of attack was <sup>the</sup> statistical analysis of data, rather than observation and description. ~~and~~, In collaboration with McEwen, he developed methods by which he sought to interpret differences in the relative abundance of particular organisms in particular net hauls. In his last years Michael largely abandoned objective nature in favor of statistical technique, and his excessive concentration upon abstruse matters of methodology ~~was~~ <sup>was</sup> doubtless largely responsible for <sup>tragic</sup> the breakdown of his physical and mental health.

E. G. Moberg, fellow and graduate student, has been engaged for some years in the determination of nitrogen and of hydrogen-ion concentration in sea-water.

W. E. Ritter, now retired, was, more than any other single person, responsible for the founding and subsequent guidance of the Scripps Institution. Aside from administrative duties and his share in the cooperative projects, Dr. Ritter's time was divided between his <sup>biological observations</sup> and his philosophical writings. Under the former head, he gave considerable time at first to the marine group of tunicata, but latterly his interest largely shifted to behavioristic studies, particularly of certain birds and of ants. In the philosophic field, Dr. Ritter's chief contribution was the development of what he termed the



"organismal" theory of life.

F. B. Sumner is now serving as a stop-gap during the interim between the past and the future director. He furnishes somewhat of a problem, at present, from the administrative point of view, owing to the incorrigibly terrestrial habits of his chief objects of study, the deer-mice. Dr. Sumner calls himself a geneticist when he is sure no geneticists are within hearing; also a mammalogist when no mammalogists are present. He is admitted to the fellowship of neither, and has some of the intellectual vices of both. Studies geographic variation, heredity, etc., chiefly among mice of the genus Peromyscus.

T. Wayland Vaughan, director-elect of the Scripps Institution. Catalogues himself as a geologist, when he is writing for "Who's Who", or "American Men of Science", but is a biologist in spite of himself. Was forced to study the corals, owing to their part in the formation of land-masses, and has become our leading American authority on this group. Aside from geological, physiographic<sup>al</sup> and paleontological studies, he has worked upon the purely biological aspects of his chosen group, including their distribution and ecology and even their growth-rate. None of Dr. Vaughan's studies, however, have thus far been conducted at the Scripps Institution, since he has not yet taken up residence at La Jolla.

No mention of our activities would be complete without reference to the work of two biologists who, to be sure, have

never belonged to the salaried staff of the Institution, but who have none the less spent much time with us during the past six or eight years. I refer to Dr. Myrtle Johnson and Mr. Harry Snook, who have just prepared for press an admirable hand-book of the animal life of our Pacific Coast littoral. This will be of great service to scientist and layman alike, and the Scripps Institution is glad to be identified with the work of these authors.

We have surely passed in review a heterogeneous ~~mixture~~ *assemblage* of personalities and ~~of~~ research projects. Have these various investigators anything in common, beyond working under the same roof and being supported from the same funds? We have always assured ourselves that we had. Indeed, the Scripps Institution has had a creed, which its members have repeated with child-like faith, following the words of their father-confessor. One of the articles of this creed has been the importance of studying the relations between the organism and its environment. Another has been a recognition of the one-sidedness of either field or laboratory study, considered by itself, and the consequent need of combining the two for a proper understanding of vital phenomena. Still another has been the necessity of employing rigidly quantitative methods, so far as these are applicable.

Now I think that most of us, at least, may fairly claim to have adopted the foregoing as working principles. Whether or not the Scripps Institution has any copyright on the particular set of principles is another matter, and one which I



shall not discuss.

As to the future of the Institution I am not qualified to speak. It is ~~xxx~~<sup>most</sup> unfortunate that our new director cannot be present today to outline his policy. It has been announced semi-officially that our station is to restrict itself henceforth to oceanographic research, and that projects unrelated to this will be transferred elsewhere, as soon as adequate provision can be made for them. Such expansion as is contemplated would seem to be largely in the direction of physics, chemistry and physiography.

There is doubtless need enough for an oceanographic institute, of national, or perhaps international scope, and it may well be that the Scripps Institution has been wisely chosen as the nucleus of such an organization. But it may be permissible to say, in conclusion, that if such a course is adopted there will be left a great gap to be filled. We shall then need a new Institution which shall be, in the words of our Regents, "an instrument for the most liberal biological research", one in which the problems of biology are kept in the foreground, and where the material for study may be chosen without reference to whether it chanced to be marine or terrestrial in its habitat.

F. B. SUMNER.