

4/8/40  
HISTORY AND WORK OF THE SCRIPPS INSTITUTION

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In playing the role of historian, I shall claim the privilege, customarily accorded to senility, of talking at times in a reminiscent vein. However, my own personal acquaintance with the Scripps Institution goes back only as far as what we may call the medieval period of its existence. The Institution's truly ancient history I know only from the records of our first director, Dr. Ritter. Fortunately for the purpose at hand, these records are rather full.

The Scripps Institution for Biological Research, as our plant was originally named, was the outcome of a series of endeavors by Dr. Ritter and some others to create a seaside laboratory in connection with the Zoology department of the University of California. These earlier ventures, commencing as far back as 1892, included the establishment of very temporary quarters at Pacific Grove, Santa Catalina Island, San Pedro, Coronado, and then at length at La Jolla, in the little park within the village. Associated with Dr. Ritter in these pioneer activities were Dr. C. A. Kofoed, Dr. H. B. Torrey and some others from the University of California, and a number of prominent San Diegans, foremost among whom may be mentioned Dr. Fred Baker and <sup>Mr.</sup> Julius Wangenheim.

Dr. Ritter's account of the early struggles and final triumph of this little group of biologists and their sympathizers reads almost like one of the familiar "success" stories.

The real turning-point in the fortunes of our group of scientific prospectors came, of course, when they enlisted the active interest of Mr. and Miss Scripps. What had been a migratory summer camp became a permanent station with a permanent resident staff. Our present site, a former city

"pueblo lot", was acquired in 1907, and the first of the present laboratory buildings, now called "Scripps Hall", was erected two years later. Some two years later still, the entire property was deeded to the University of California, and became a department of that great educational and research establishment. It had up to that time been the property of a corporation known as the "San Diego Marine Biological Association", and the laboratory was originally intended as a place for the study of marine life.

But with its annexation to the state university, the scope of the Institution was deliberately broadened, and the word "marine" was dropped from its official title, which now became "Scripps Institution for Biological Research". The purpose of the University, at that time, 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".

Locally, the Institution was known as the "Biological Station", when it was not called by the more flippant name of "Bug House", and the grade by which the north-bound highway passes through the Institution's grounds became the "Biological Grade"--a name which has doubtless puzzled many a traveller.

It was during this period of unrestricted biological outlook on the part of the Institution that I became a member of its staff. For some years thereafter, my studies of the races of wild mice were regarded as altogether relevant to the liberal if somewhat nebulous "program" of the "Biological Station". Indeed I was given an express mandate to carry on this particular project of investigation, and generous funds were allotted for many years to its support.

Mr. Scripps at that time even became mildly interested in a project to establish a colony of anthropoid apes upon our campus. There was some correspondence with a nationally known student of these animals, and "E.W." was prepared to supply some thousands of dollars toward the initiation of the project. But he was not disposed to furnish the very considerable funds necessary to carry it through on a sufficient scale, and the ape colony was finally located in Florida.

Dr. Ritter has recently quoted a letter from Mr. Scripps in which the latter stated: "I have desired to found or incorporate with the Scripps Institute for Biological Research a department of sociology". This last was later founded by him at Miami University, Oxford, Ohio.

These facts, and the further fact that Dr. Ritter's own biological researches were at this time mainly unrelated to marine life will give some idea of how far the Scripps Institution was at this period from being an oceanographic station. Concerning the circumstances which led to the later complete volte-face in the Institution's policy I shall speak shortly.

The Scripps Institution, in those earlier days, was an altogether unique establishment. It might have been characterized as an unrealized dream. It was often difficult for the outsider to reconcile what seemed to him the rather vague and grandiose official accounts of the institution with the actual personnel and plant which he found there. Indeed there seemed to be, in those days, at least two quite distinct Scripps Institutions. On the one hand, was the director's ideal, which he often seemed to forget had not yet materialized. This was a thing without apparent limitations as to personnel or physical equipment, an establishment of national if not international importance, having a special mission to fulfill in the scientific

world--a place of great achievements, guided by a unique set of fructifying ideas. On the other hand, was the visible, concrete Scripps Institution, with its tiny staff, which was not composed of supermen, and its budget which was but a very small fraction of a million dollars a year. One might be tempted to call this last the real Scripps Institution. But I must insist upon attributing a certain measure of reality to the first. To the credit of both Dr. Ritter and his successors, it must be recognized that the gulf between the ideal and the actual, though still wide, has steadily diminished.

To all who really know him William E. Ritter looms large, not only as a most lovable personality, but as a man of considerable originality and mental vigor. His constant interest, both in the scientific achievements and the personal welfare of the members of his staff was an outstanding feature of our lives at the institution, throughout his term as director. Every new bit of information gathered by one of us, whatever its subject-matter, seemed to fit in some way into his framework of thought, and often as not served to illustrate some one of his favorite ideas. He was fond of discoursing with us, singly or in groups. These discourses were often stimulating. But we did not always find them easy to follow. One of the presidents of the university, so I am told, once characterized Ritter as "a great soul struggling for utterance". Relatively few scientific men seem to have taken the trouble to understand what he has endeavored to say. But these few include some of our foremost philosophical biologists.

In theory, the work of the Scripps Institution followed a unified, if somewhat inscrutable "program" of research. In the earlier days, this unity went no further than a wholehearted agreement upon certain cardinal principles, such as stressing the relations of organism to environment, and

an insistence upon the necessity of combining laboratory and field methods in the study of these relations. In reality, the subjects under investigation were extraordinarily diversified, comprizing such topics as the philosophical implications of biology, the vertical migrations of marine plankton organisms, ocean temperature and circulation, the instinctive behavior of the California woodpecker, and my own studies of geographic variation and heredity in our native races of mice. With the existing personnel, such diversification was inevitable and indeed altogether desirable. A truly cooperative scientific program seems unlikely of attainment unless it is the spontaneous outgrowth of common interests and needs, arising in a group which finds itself personally fitted to carry on teamwork.

One of Dr. Ritter's progressive ideas led to the establishment of a considerable measure of local self-government for the Scripps Institution, and this was maintained for a number of years after the institution had become an organic part of the University of California. Our scientific staff, along with the president of the university, Mr. E. W. Scripps, Miss Ellen Scripps and a few others, constituted a "Local Board", which discussed our problems, scientific, financial and administrative, and took action upon them. In most cases, as I recall, the director's recommendations were endorsed by the board, though this was not always true, for Mr. Scripps and others had definite views on many of these matters and were free in expressing them. In any case, most matters of any considerable importance were subjected to frank discussion before being voted on. This board functioned, efficiently on the whole, I believe, until it was abolished by the university, and sole responsibility was centered in the director. The board meetings were then replaced by staff-meetings having only advisory powers. Whether this change was for the better or worse, in our particular case, I am not altogether certain.

For a number of years, one of the most interesting features of my own connection with the Scripps Institution was my acquaintance with that remarkable man, E. W. Scripps. I shall not pretend that Mr. Scripps and I were ever "thick". Without doubt, "I was the thickest of the two", as Harry Lauder would say. But for a number of years I saw him at intervals, and had some extended conversations with him. "Conversations", did I say? Well, no, not exactly that. They were not dialogues, they were monologues. But I was nearly always an interested listener. The wealth of the man's information was immense. And the fertility of his ideas was almost equally impressive, even if at times they seemed to me utterly indefensible. Indeed, I think that he himself frequently recognized them as such, and merely wished to try them out in the presence of an auditor and see where they would lead him.

Scripps's primary interest at the institution was in Ritter. He more than once said that what he and his sister were really doing was "endowing Ritter", implying that their interest was a personal one, without much regard for the research establishment which bore the family name. This could not have been altogether true, however, for very substantial donations were made to the station after Ritter's resignation, both by the older and the younger generations of the family.

For a number of years, "E. W." was a familiar figure at the institution, with his high boots, his still somewhat reddish beard, his rather querulous voice, and his half-buttoned vest, liberally sprinkled with cigar ashes. He would drive over in his limousine from his home at Miramar, ascend the stairway of the laboratory building and call for Ritter. In Ritter's absence, I was frequently the second choice. In such cases, we sat down for

an hour or two, or three, and talked. Or at least he talked. Fortunately I was not expected to say much. Occasionally his visits would last far beyond the dinner hours. My wife could watch Mr. Scripps's car from our house on the hill to the north, and plan for my dinner accordingly. But the Scripps family at Miramar were not so fortunately situated. I remember on one occasion replying to an anxious telephone call from his home some time after seven o'clock, asking what had happened to him. I must have been an exceptionally good listener.

However, I really profited greatly from these prolonged visits from "E. W.", even though they were not always convenient as to the hour of the day, and I much regretted his departure for the East some years before his death. My own indebtedness to him extended far beyond the intellectual stimulus derived from his monologues. He was a generous supporter of my scientific work, particularly in defraying the cost of my far-flung collecting-trips in quest of Peromyscus. Even here, there was sometimes a thoughtful personal touch. On one occasion, he insisted that my wife should participate in a fieldtrip to the mountains, on another that I should invite Professor C. J. Horrick, who happened to be at La Jolla--the bills, of course, to be paid by E.W.

Those are interesting days to look back upon. And they were <sup>—</sup>within <sub>^</sub>limits-profitable and enjoyable days. But one must bear in mind the blighting effects of our isolated life out here on the fringe of La Jolla, particularly in the days when none of us but the director owned a car. Here was a small group of ultra-specialized specialists, dwelling alongside a community of laymen who know little of our work and cared even less. Save for the director's sympathetic interest in everything that was going on in the laboratory, there was very little real comradeship among the staff. Despite the theoretical

cooperative program in which we were all supposed to be engaged, each of us kept to his own little cubicle and seldom left it. We lacked both the stimulation and the corrective restraint which come from competitive endeavor and intelligent criticism by fellow-specialists. Rarely did we visit other centers of learning, even as near as Los Angeles or Berkeley, and rarely did we see scientific quests, except as transients, making us a few hours' visit.

And so we tended to become more and more introverted and more and more lacking in perspective. The rigid limitations of the Scripps Institution and its component members were often forgotten. At times we seemed to feel ourselves divinely commissioned to expose the errors of our less favored scientific colleagues elsewhere. However, only one of our number ever accepted this commission seriously. It chanced that before the crisis came, he had been detailed to give a semester's work to undergraduate students at Berkeley-- a well-intentioned effort on the part of our director to divert this young man's exclusive attention from the intra-cranial world. But this prophylactic measure came too late. After a hectic career in the class-room, and a fantastic plan to end the World War by the application of mathematics to biology, our colleague had to be sent to a sanitarium for psychopathic patients. After a few months, to be sure, he had recovered sufficiently to return to La Jolla. He died from other causes some two years later.

This one case is not, of course, offered as typical. Indeed, it was altogether unique in the history of our institution. It was the effect of prolonged isolation and introversion upon a brain which must have been at the outset somewhat unstable. But we were all, I believe, more or less seriously handicapped by this isolation, if only because we were deprived of much needed standards of excellence in our work. In how far these disad-



vantages were counterbalanced by our comparative freedom from interruptions and distractions it would be hard to say.

Commencing with the year 1922 or earlier, there gradually developed a rather sweeping change of outlook on the part of those in control of the destinies of the Scripps Institution. Mr. E. W. Scripps, in failing health, moved east to stay, and with this move he lost his active interest in the institution which he had played such an important part in founding. But his close friendship for Ritter continued, as also his financial support of some of Ritter's scientific projects. For several years, Dr. Ritter was cooperating with Mr. Scripps in the founding of a news service for the dissemination of accurate reports of scientific progress. Thus came into being the now well and favorably known Science Service. Ritter too spent much of his time in the east during this period, and thus lost contact to a large degree with the "biological station" of which he was still director. But he was thinking of its future, to follow his own impending retirement.

As I have already mentioned, the first plan of Ritter and his associates contemplated the building up of a marine biological station. Writing as late as 1911, Ritter stated his program as being in essentials "a biological survey of the waters of the Pacific adjacent to the coast of Southern California". Rather a stupendous project those will say who have had anything to do with biological surveys! Only a year later, however, when the Institution was merged with the University of California, the word "marine" was deleted from its name. Mice and monkeys were regarded as relevant to our "program". But the next tack on our institution's somewhat variable course took it well to seaward again.

Dr. Ritter had for years been evolving a system of biological philosophy, the central tenet of which was that the unit of biological investigation should be the organism itself, rather than its component cells, genes, molecules or what not. He insisted that the whole is just as essential in accounting for the activity of the parts as the parts are necessary in accounting for the activity of the whole. Ritter's contributions in the field of biological philosophy have been real ones and have received the attention of a number of prominent thinkers in this field. But appreciative readers appear to have been in the minority, and the launching of the "organismal" view of life seems to have created scarcely a ripple in the biological world. Moreover, Ritter has always been disposed, I believe, to magnify the differences between his own views and those which were held by the majority of biologists. The others too often seemed to him to be worshipping false gods.

All this, I believe, had a most important bearing upon the fate of the Scripps Institution for Biological Research. The uniqueness of the Institution must be maintained at all costs! It must not be allowed to degenerate into just another biological laboratory, devoted to the ordinary run of biological problems and results. La Jolla must not become "another Woods Hole". And so, on one fateful day, the director called the staff together and told us that it had been decided to convert the "Biological Station" into an institution for oceanography--the first in the United States.

This, then, brings us down to what we may call the modern period of the institution's history--the one in which we now live. Dr. Vaughan's appointment as director in 1923 initiated this new regime, and the Institution received its present official name in 1925. Our second director, though

primarily a geologist, had extensive biological interests and had made important contributions to our knowledge of at least two groups of marine organisms. It soon became evident that, despite this change of emphasis in the institution's activities, the biological part of the program was not to be curtailed, but rather extended.

Dr. Vaughan's experience in administrative affairs, while in Washington, and his extensive contacts with scientific men and scientific organizations at home and abroad, made it possible for him to carry out an ambitious program of expansion at La Jolla. We surely have a "bigger and better" institution than when he arrived here, and I am using both of these words very literally.

Dr. Sverdrup, as you all know, succeeded Dr. Vaughan in 1936 as the third director of the Scripps Institution. Most fortunately his advent does not represent any further drastic change in the Institution's policies. There were, perhaps, short-lived misgivings on the part of some of us biologists when the appointment of a physical oceanographer as director was announced. But these misgivings were very promptly dispelled, and we soon came to face the future with the fullest confidence. We still live in the "modern" era of our history. No "futuristic" tendencies have shown themselves. Nor do we expect them.

However, I must not give the impression that no important changes have occurred since the advent of Dr. Sverdrup. Quite the contrary is true. The Scripps Institution is still on the march. Leaving aside the most outstanding recent addition to our physical equipment--the splendid new boat donated by Mr. Robert Scripps--there are various intangible changes of possibly even greater importance to the effectiveness of our work. Striking

improvements have been brought about in our relations with the University, and our status as a unit in that great establishment has been more clearly defined. Best of all, perhaps, is a subtle psychological change which is, I think, felt and appreciated by all of us. The spirit of friendly and neighborly

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cooperation has emerged to an extent which has never before been manifest in the institution's history. And I believe that we must credit our present director with playing the important role of an enzyme or catalyzer in bringing about these changes.

Let us proceed with a brief narration of the chief steps in the growth of our physical equipment, and of the personnel of our staff.

The first permanent building, now known as Scripps Hall, was completed in 1909, the cost being defrayed by Miss Ellen Scripps. Our present library and museum building was erected in 1916, and our concrete pier was built in the summer of the same year. The little aquarium of local marine life dates back to about the same time. All these likewise were made possible through the generosity of Miss Scripps, who contributed at that time a hundred thousand dollars toward the development of the Institution.

Some time between the foregoing two dates--I was not a witness to the event--there were hastily thrown together about a dozen cheap little wooden shacks which were at the time referred to as the "temporary cottages". It was planned to replace these at an early date with dwellings having at least some slight esthetic appeal and offering more than a bare minimum of comfort to the tenants. But these "temporary cottages" still clutter up the landscape after twenty-five years of service. There have always been more urgent uses for our limited funds than the replacing of these. The moral is obvious: never build "temporary" structures! *(Remark on other cottages)*

Ritter Hall, the most recent of our permanent buildings, was erected in 1931 to house the <sup>existing</sup> divisions of dynamical oceanography and chemistry, as well as the newly created divisions of bacteriology, marine physiology and biochemistry, plant physiology and zooplankton. The funds for the construction of Ritter Hall were provided, in equal amounts, by the Scripps family,

the Rockefeller Foundation and the State of California. In the same year, the old Scripps Hall was reconditioned so as to house the existing division of phyto-plankton and the more recently created divisions of marine sediments and biology of fishes.

A highly important, though less spectacular addition to our equipment was the installation of a new pumping plant, in 1932, and the construction of a 60,000-gallon concrete tank. Up to that time, the station's supply of sea-water had been inadequate in quality, and unreliable in delivery. It became at last possible to conduct experimental studies of marine life without constant danger of their being brought to an untimely end. The addition of a heating plant, too, was immensely appreciated by those of us who do not subscribe to the myth that artificial heat is unnecessary in Southern California.

The Scripps Institution has owned three sea-going boats, besides a few which it has rented for brief periods. The first of its own vessels, the Alexander Agassiz, while employed more or less profitably for a number of years, was not well adapted to its intended use and was sold during the War. The second, a converted fishing vessel, the "Scripps", was purchased in 1925 and, as you may know, was tragically destroyed by fire late in 1936. The third and by far the best of these vessels is a converted yacht, the "E.W.Scripps", which was a gift of Mr. Robert Scripps. It was soon thoroughly equipped for oceanographic work and has been in active service for more than two years.

Let me next pass in review the personnel of our research staff and record very sketchily the nature of the scientific problems with which they have been occupied.

The scientific staff, at the time of my joining it, toward the end of 1913, consisted of the director, Dr. William E. Ritter, together with

Dr. George F. McEwen and Mr. Ellis L. Michael, in residence, and Dr. Calvin O. Esterly, professor of zoology at Occidental College, who worked at La Jolla during the summer months. Mr. Michael died in 1919, Dr. Esterly in 1928. Mr. W. C. Crandall was business agent of the Institution from its inception until 1924. He was also master of the research vessel, the Alexander Agassiz. These brief statements hardly suggest, however, the importance of his services to the Institution during its earlier history.

Aside from administrative duties, Dr. Ritter's time was divided between his biological observations and his philosophical writings. Under the former head, he gave considerable attention at first to the marine group of tunicates, but later his interests largely shifted to behavioristic studies, particularly of the California woodpecker.

Dr. McEwen, then as now, was concerned with studies of the physics of the ocean, particularly with the dynamical basis for ocean currents. His search for possible correlations between water temperature and rainfall, of a sort to form a basis for seasonal forecasts, was at first only an incidental development from his oceanographic studies. Though by far the most widely publicized of his activities, I am sure that Dr. McEwen would be the first to deny that it is his most important one. To our biologists, Dr. McEwen is, among other things, a ready source of valuable information relative to those questions of mathematical probability which cannot be overlooked in interpreting experimental results.

Mr. Michael was primarily concerned with the classification, distribution and migrations of the marine group of chaetognaths or arrow-worms. His method of attack was the statistical analysis of collections, rather than observation and description. In his later years, Michael largely abandoned the objective study of nature in favor of statistical technique,

and his excessive concentration upon abstruse matters of methodology was doubtless responsible in part for the tragic breakdown of his mental and physical health.

Dr. Esterly was devoting his attention to the description and classification of several groups of small marine crustaceans, notably the copepods; but more especially to seasonal and diurnal variations in the occurrence of these animals.

The present speaker joined the staff of the institution at the end of 1913, with a strictly non-marine project in view, a study, namely of geographic variation, heredity and other phenomena, chiefly as exemplified by various species of the wild mouse, Peromyscus. The Peromyscus studies were continued for seventeen years, when they were finally abandoned as unsuited to an environment which had long ceased to be hospitable. Mice were replaced by fishes. The problems dealt with in our present division of fish biology have comprised osmotic regulation, color change and acclimatization to changes of temperature.

In 1914, Mr. P. S. Barnhart became curator of our museum and aquarium, and assumed charge of the biological supply department which the Institution for a time maintained. Mr. Barnhart's wide knowledge of California marine fishes bore fruit a few years ago in the publication of an illustrated checklist and key to the fishes of our coast.

Professor W. E. Allen was appointed in 1919 to undertake the investigation of phytoplankton, the minute floating plants of the sea. For more than twenty years, he has kept regular inventories of the diatoms and dinoflagellates from two stations on the southern California coast, as well as studying numerous collections from more distant points.



With the advent of Dr. Vaughan as director, the staff was considerably enlarged and strengthened. Dr. Vaughan himself was concerned, both as geologist and biologist, with the deposits which cover the ocean-bottom, and the part played by marine organisms in the formation of these. To this was due his special interest in the protozoan group of Foraminifera, in the study of which he has long been an outstanding leader.

Dr. Moberg was the next to be added to our permanent staff in 1924, after holding a fellowship here for a number of years. From that time on, Dr. Moberg has had charge of investigations of the chemistry of sea-water. In the same year, Mr. Chambers became associate in dynamic oceanography.

Dr. Fox joined us in 1931, as bio-chemist and physiologist, Dr. ZoBell in 1932, as bacteriologist. Dr. Fox has among other things, been making extensive studies of the physiology of the sea-mussel, and of the carotenoid pigments of this and of various other marine organisms. Dr. ZoBell has been busy identifying and rearing the bacteria of the ocean water and the sea-bottom, and throwing light upon the part which they play in the food cycle of marine life. Of particular recent interest is his discovery of living or at least viable, bacteria at considerable depths beneath the surface of deep-sea muds, which seems to indicate that these organisms may have remained dormant for many thousands of years.

Dr. Martin Johnson arrived in 1934, to take charge of investigations of the zooplankton or floating animal life of the ocean. He is giving special attention to the life history and distribution of the minute crustaceans known as copepods, a group of great importance as food for fishes.

Dr. R. H. Fleming and Dr. Roger Revelle joined our permanent staff only a year or two later, after being awarded doctor's degrees for work largely accomplished at the Institution. Their studies are concerned respec-

tively with physical and chemical oceanography and with the geology of the ocean floor.

The latest addition to our staff is Dr. M. C. Sargent, whose chief past training has been in the field of plant physiology, but whose present work is concerned with both plants and animals.

Our director, Dr. Sverdrup is by training and personal inclination a physical oceanographer. Fortunately for me and for you, he follows me immediately upon this program, and will discuss those phases of work in which he is most directly concerned. He may forget to say, however, what I know to be true, that he regards the ocean, with its currents and its temperatures and its chemical components, as of interest primarily as the environment of its various living inhabitants, including man.

The limits of space have made it necessary that I should exclude from the foregoing list all except those who have become permanent members of the scientific staff. To this limitation I must, however, make two exceptions. The work of Dr. F. P. Shepard of the University of Illinois, is at present an intergral part of the present program of the Institution, even though this work has been financed from other sources. His discoveries and theoretical discussions of submarine topography, particularly as they relate to submerged canyons, are probably known to most of you. Less well known to the public, for ~~obvious~~ <sup>which will be obvious</sup> reasons, are the investigations of Mr. W. Forest Whedon, who is studying, under the auspices of the Navy, the problem of controlling the so-called "fouling organisms" which impede the navigation of vessels.

abridge ( Since the founding of this Institution, we have had numerous research assistants most of whom were also graduate students. Ten of these have taken the degree of doctor of philosophy, awarded primarily on the basis of work done at La Jolla. And we have had many guests, some of them men of real eminence, who have spent weeks or months with us and have contributed very

substantially to the total scientific output of the station. Professors Jennings, Parker and Child may be mentioned as examples.

And lastly, there have always been men and women without faculty rank who have been nearly or quite as essential to the efficient functioning of our establishment as are any of those whose names appear in the list of officers of the University.

If I may be allowed, in conclusion, to play the role of prophet, I will venture to predict a continued successful future for the Scripps Institution of Oceanography. But this only on certain conditions. The necessity of adequate financial support is too obvious to mention. What I chiefly have in mind is something else. Our institution should maintain itself primarily as a research organization, and turn a deaf ear to the siren voice of the "booster" who offers convincing reasons why it should become either a big public exhibition place or a busy information bureau, run in the interest of the fishing industries. It is fairly easy to obtain money for industrial research: the country is full of such laboratories. Support for fundamental researches is far more difficult to obtain. I should be equally fearful of any move to divert the funds and energies of the Scripps Institution primarily in the direction of elementary scientific education.

We who have the immense good fortune to be free of either of these entanglements should prize this heritage beyond measure. Happily there is little present need to sound this warning. But we cannot overlook the possibility of forces which may at some future time endeavor to drive us in one or another of these directions.

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From the standpoint of the University of California, the Scripps Institution rates as one of the University's many departments, and "Oceanography" finds its place in the catalog as one of the subjects of instruction and research. It is obvious, however, that oceanography is no single science, having a rank coordinate with that of the other major divisions of human knowledge. Under the term oceanography is included a rather arbitrary combination of physics, chemistry, geology and various branches of biology subjects which would ordinarily be dealt with by at least half<sup>a</sup> dozen university departments. And so it is inevitable that our scientific labors are apportioned among a considerable number of "divisions" -- nine of these at present, to be exact. These divisions are administrative units, whose

number and character have been determined in part by considerations of practical expediency rather than of logical fitness. Two of our divisions are concerned with physical problems of the ocean, one <sup>with</sup> ~~to~~ the chemistry of sea-water, one <sup>with</sup> ~~to~~ the origin and nature of oceanic bottom deposits. In the biological sciences, we have divisions concerned respectively with bacteriology, phytoplankton, zooplankton, the physiology and biochemistry of marine invertebrates, and "fish biology", as we designate our studies (really no less physiological) of fishes.

Among these various lines of investigation, there is one bond of union. We are all concerned with the phenomena of the ocean or of its inhabitants. The physical and chemical researches relate to a medium which forms the environment of marine plants and animals, and determines their distribution, life-history, functions, etc. The biological researches, on the other hand, relate to organisms which have been evolved in a marine environment, and whose functions are adapted to life in this environment. While our interests are diverse and we talk, at times, in wholly different languages, there are frequent examples of interdependence among our various lines of effort, and most of us profit greatly from this association.

If I may be allowed, in conclusion, to play the role of prophet, I will venture to predict a great future for the Scripps Institution of Oceanography. But this only on certain conditions. The necessity of adequate financial support is too obvious to mention. What I chiefly have in mind is something else. Our institution should maintain itself primarily as a research organization, and turn a deaf ear to the siren voice of the "booster" who offers convincing reasons why it should become a

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