

Quotations Associated with Scripps Institution of Oceanography

Compiled by Scripps Institution of Oceanography Archives

ON SCRIPPS AQUARIUM

“In reply to his query as to how much we want, we tell [E.W. Scripps] \$5000 to run on. He assures us that if we can locate at La Jolla and do something for the scheme that interests him, viz. A popular public aquarium, he will help us.” Diary of William E. Ritter, July 28, 1903

As to out of door aquarium. All of the aquariums here, save one, are under cover within the building and thrive well indeed. There is one, similar in other particulars to those in the building, but differing in the fact that the whole tank – save the glass front is out of doors. It has a ribbed glass roof about two feet above it for shelter. This aquarium is the one bad one in the whole lot. ... [page 5] All of this seems to have a very definite relation to your project to make the aquarium at San Diego an out of door affair. He [Racovitze] advises as a result of his many years experience here, very strongly against attempting out of door aquaria. Charles Kofoid to William E. Ritter, Banyuls-sur-Mer, May 15, 1909, page 4. Kofoid Papers 82-71, Box 1, folder 7

“We ought, I believe, to always think of the aquarium and museum not merely in the light of public resorts for entertainment and amusement, but as essential and integral elements in our plans for public education.” William E. Ritter to Ellen Browning Scripps, February 19, 1914. William E. Ritter Papers, SIO Archives, Box 1, folder 26.

ON ATMOSPHERIC CO₂/GLOBAL CHANGE

“Thus human beings are now carrying out a large scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future. Within a few centuries we are returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years. This experiment, if adequately documented, may yield a far-reaching insight into the processes determining weather and climate. It therefore becomes of prime importance to attempt to determine the way in which carbon dioxide is partitioned between the atmosphere, the oceans, the biosphere and the lithosphere.” Roger Revelle and Hans E. Suess, “Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO₂ during the Past Decades,” Tellus IX (1957) pp. 19-20.

The recent extreme temperatures and drought in the Middle West are not necessarily due to the greenhouse effect. Most scientists familiar with the subject are not yet willing to bet that the climate this year is the result of

"greenhouse warming." As you very well know, climate is highly variable from year to year, and the causes of these variations are not at all well understood. My own personal belief is that we should wait for another ten or twenty years to really be convinced that the green house is going to be important for human beings, in both positive and negative ways. From this belief I conclude that we should take whatever actions would be desirable whether or not the green house effect materializes. A transition to nuclear power and development of publicly acceptable means for water and energy conservation are actions of this type. Roger Revelle Papers, Manuscript Collection MC6A, Box 19, folder 3, Revelle to Honorable Jim Bates, July 14, 1988, page 3.

"Probably no single contribution to the Earth sciences in the last 30 years has changed the focus of research more than the record of CO₂ concentration in the atmosphere... This was, and still is, the decisive evidence of human influence on the fundamentals of our global environment, and the implications have gradually been dawning not only on an ever widening group of scientists, but also on citizens and governments throughout the world." Ralph Cicerone quoting a scientist, "Keeling Receives 1991 Ewing Medal," EOS 73, no. 11. (1992), 121.

"Science for me has always been a fascinating pursuit in which I was able to study pretty much whatever I wished to. Thus, it is appropriate to use this opportunity to express my advocacy for a retention of small science in the United States; science carried out by single investigators who can apply their energies to pursuing leads as they appear in their computations and data without at every turn having to justify their work and future plans to managers and committees." Charles David Keeling, "Response," EOS 73, no. 11 (1992), 121.

"We at Scripps believe it is possible and correct to utilize basic scientific research to address major world concerns. We see no reason why research designed to elucidate basic processes cannot be applied to questions of immediate, practical concern, if the limitations of new research discoveries are made known to decision makers. Thus, a major part of Scripps' strategic plan for the future is to emphasize the dynamics of the ocean/atmosphere linkage relative to global change processes. These two high priority global change research areas are within the purview of Scripps' research, and we expect to make major progress in these areas in the future." Edward A. Frieman, "Scripps Institution of Oceanography, Present and Future." In: New Directions of Oceanographic Research and Development, JAMSTEC International Symposium, edited by N. Nasu and S. Honjo. Tokyo: Springer Verlag, 1993.

"When I began my professional career, the pursuit of science was in a transition from a pursuit by individuals motivated by personal curiosity to a worldwide enterprise with powerful strategic and materialistic purposes. The studies of the earth's environment that I have engaged in for over forty years...could not have been realized by the old kind of science. Associated with the new kind of science, however, was a loss of ease to pursue, unfettered, one's personal approaches to scientific discovery. Human society, embracing science for its tangible benefits, inevitably has grown dependent on scientific discoveries.

It now seeks direct deliverable results, often on a timetable, as compensation for public sponsorship.” Charles David Keeling, “Rewards and Penalties of Monitoring the Earth,” Annual Review of Energy Environment 23 (1998), 25.

ON EDUCATION

“A graduate school is a place where professors make colleagues of their students.” Roger Revelle Papers MC6, Box 29, f 22" The Multiple Functions of a Graduate School,” Princeton University, December 1958, p. 5.

“One characteristic of a research-oriented graduate school should be that it does not have too rigid a program -- too well thought out a plan. The essence of research is that it can't be programmed or planned. It differs in an essential way from the business of teaching the kind of systematic and well organized people who can start in September 1958 and guarantee that by June 1961 they are going to have a Ph.D. Instead of tidying up our graduate schools and our graduate programs...what we need if we're going to emphasize research, is to make them messier and more chaotic.” Roger Revelle Papers MC6, Box 29, f 22" The Multiple Functions of a Graduate School,” Princeton University, December 1958, p. 6.

ON ELLEN BROWNING SCRIPPS

“Mr. Wood of Chamber of Commerce called to solicit contribution to our getting biological station here. Promised \$100. E.W. gave him \$500.” Diary of Ellen Browning Scripps, March 19, 1903.

“Prof. Ritter and Mr. Wood here to dinner. Had talk about permanent biological station and aquarium in this part of the country – possibly at La Jolla. After free discussion asked the gentlemen. Ed and myself [drew up] a paper of preliminary plans, etc.” Diary of Ellen Browning Scripps, August 2, 1903.

“Before the Park Site is definitely settled on for building [the marine biological station] I should like to have a little more general considering and discussion. You know how strongly my brother E.W. urged the larger site [on La Jolla Shores]. I am so accustomed in almost all matters of discussion between us to his larger view, deeper insight and surer foresight that I generally become a covert to his views despite my own opinions or prejudices.” Ellen Browning Scripps to Fred Baker, May 1, 1907.

“I should like to add how greatly I appreciate the introduction of the State as a factor in the development of this Institution as putting it on a footing of public esteem and giving it the promise of a future power and influence that mere private contributions could not have accomplished.” Ellen Browning Scripps to UC President Benjamin Wheeler, December 8, 1912, on the station becoming part of the University of California, SIO Biographical Files, SIO Archives, folder 292.

“I have freely admitted to you and others that Ellen was a good deal better giver than I was. But then it is possible that you never considered the fact that in those years in the past when she was giving so wisely and I was refraining from giving, that I had the job, not only of making the money that Ellen gave you, but also the job of making the money that I kept.” E.W. Scripps to William E. Ritter, November 18, 1921, E.W. Scripps Papers, Ohio University Archives.

A good gift, given in good faith, speaks for itself. It needs no herald or interpreter. And I should count it a small thing... were it not built...on the foundation stones of Faith, Hope, and charity—the greatest of which, let it be remembered, is charity. ...” Ellen Browning Scripps at the dedication of the La Jolla Women’s Club, cFebruary 1915, newspaper clipping in letter, MBR to CPWK, February 3, 1915.

“Miss Scripps always lived simply. Throughout her life she followed habits formed on the farm. She rose early; ...publicity concerning herself was distasteful.” Jacob Chandler Harper, *Ellen Browning Scripps, 1836-1936*. La Jolla, CA: Privately printed, 1936

“People who suffered for their opinions found a friend in Miss Scripps. ... She encouraged freedom of thought, public assemblage, and the untrammelled discussion of all matters.” Jacob Chandler Harper, *Ellen Browning Scripps, 1836-1936*. La Jolla, CA: Privately printed, 1936

“I hate the role of ‘philanthropist.’ What I do I do as an ‘investment.’ It is yours to accept the present situation as ordered by the Powers that be. It is mine to furnish the opportunity.” -- Ellen Browning Scripps, 1926

“Never shall I forget my first glimpse of Ellen Browning Scripps. ...On the little rattling train I noticed a small, inconspicuous, plainly-dressed woman who attracted my attention because she was so different from other passengers. I studied her as she sat diagonally across the car and a little in front of our seat. I decided she had the plainest face I had ever seen, yet it was attractive. ... The plain features were illuminated by a spirit of such grandeur that they were transformed.” Mary Bennett Ritter, “Memoirs of Ellen Browning Scripps, Personal Reminiscences, April 5, 1937. Ellen Browning Scripps Papers, Scripps College.

ON E.W. SCRIPPS

“Scripps is certainly an interesting man. A man of force which quality he has used well to his own advantage.” Diary of William E. Ritter, July 27, 1903.

“I have given at least ten times as much of my time to association meetings of the Biological Station as I have to similar meetings of the several million dollar corporations on which I am interested.” E.W. Scripps, 1909

“You know that it was our general idea from the beginning that the Station could be properly and permanently founded with a capital of \$250,000.” E.W. Scripps to William E. Ritter, February 25, 1909.

Whether the Scripps Institution shall or shall not turn out to be useful to mankind, the foundational motive upon which it rests is a faith in the value of science, especially biological science, far more concrete and deep and broad than that which seems to be held by most men of science; and this is in large measure due to E.W. Scripps.” William E. Ritter, “A Business Man’s Appraisal of Biology,” *Science* 44, no. 1145 (1916), 820.

“Ritter, I want you to get my sister Ellen so deeply interested in this project that she will forget her age. She is seventy-one and our family drop off at seventy-one or seventy-two, and I know Ellen is thinking about it. I want her to become so absorbed in something that the next two or three years will pass before she realizes it. So I am going to urge her to build this laboratory in memory of our brother George.” E.W. Scripps in 1906 as quoted by Mary Bennett Ritter, “Memoirs of Ellen Browning Scripps, Personal Reminiscences,” April 5, 1937, Ellen Browning Scripps Papers, Scripps College.

“At the very outset, I am sure it was the novelty...that appealed to him. Here was a small group of earnest university men trying to start an enterprise for making scientific investigations on the life of the Pacific Ocean... This was the sort of thing that he had never come in contact with before and that...was calculated to appeal to his curiosity.” William E. Ritter to J.H. Sorrels, October 31, 1941, Ritter Papers, SIO Archives.

“Well, it will kill those damn fleas.” E.W. Scripps upon learning of the 1906 wreck of his yacht LOMA, which he had donated to the institution. Quoted in Helen Raitt, “Give Us Room: First Installment of the History of Scripps Institution of Oceanography,” December 17, 1961. SIO Subject Files, Box 10, folder 50.

ON FACULTY WIVES

[Ida Sproul, wife of UC President Robert Gordon Sproul] "started out by telling us that her most serious worry, when she heard her husband was going to become president, had been that she herself might sometime have to give speeches. She had admitted this worry to the wife of the retiring President whose sensible advice was, "My dear, just don't ever get started! Your husband will be talking all the time, and one loudspeaker in the family is enough." Ida, so she said, had stuck firmly to a no-speeches policy throughout the 27 years of her husband's presidency."

Ellen Revelle, *A Quiet Adventurous Life*. Speech, Scripps College Founder's Day Convocation, October 20, 1966.

ON HARALD SVERDRUP

"Occasionally one can get very discouraged and there are times when one needs a great deal of faith and optimism in order to keep on plodding with Ritter's program in mind. It is so very tempting to follow the road of least resistance, to let the station deteriorate into a marine biological shore station, the work of which can be based on collections above the lowest low tide and on studies in the laboratory.

During the year just before the war, we made a conscious effort to push the work out to sea, but since we were cut off from undertaking any work at sea during the many years of war, we have now to develop that program again nearly from scratch, and we have again to make a large part of the activity at this Institution truly oceanographic." Harald U. Sverdrup, "Brief Address in Connection with Charter day Celebration, 1947" page 5.

ON THE INTERACTION OF SCIENCE AND POLITICS

"Endowed research in pure science is absolutely essential to continued progress in civilization. In a democratic country like ours, there must be provision for investigation and also definite measures to disseminate the fruits of investigation as widely as possible among the people." William E. Ritter, *San Diego Union*, February 22, 1915.

"What, then, is the role of the scientist as a scientist in the realm of politics? It seems to me that the scientist can do five things:

First, he can emphasize the uncertainties that surround political action. This does not mean a negative iconoclasm but rather a healthy skepticism, an emphasis on the need for flexibility in not being too thoroughly committed to any set of so-called political principles.

Second, he can defend and promote his own political interest. He must jealously guard the freedom of research against political regulation. He must attempt to lower the barriers of secrecy and insist on the maximum of free communication between scientists. He must do all he can to insure free international interchange between scientists of different countries. He must insist on the need for sufficient effort and money for the education of young scientists. He must use all the political wiles of which he is capable to gain financial and material support for basic research.

Third, scientists should advise the politicians concerning technical change and its possible social implications. In the modern world the task of the politician is largely that of helping society adjust to the overwhelming impact of technical change....

Fourth, the scientific community should devote part of its research effort to the long-range problems of society, such problems as the proper conservation and use of natural resources and the problems of human population control....

Fifth, scientific work on the problems of human motives, emotions and mental processes should be encouraged. ..."--Revelle, "The Scientist and the Politician," 1957 UC Charter Day Address, UC Riverside 22 March 1957, p. 4-6. Roger Revelle Papers MC6, Box 29, f1.

“Whether the scientists like it or not, the mark of science is the determinate of the world to come and scientists therefore have a special responsibility for the political consequences of their work. Whether the politicians like it or not, their decisions and actions will be far worse than futile if they do not take account of technological change, and this can only be done through understanding of the nature of scientific discovery and its applications.”

Roger Revelle, “The Scientist and the Politician,” 1957 Charter Day Address, UC Riverside, 22 March 1957, p. 10.

“The [scientific] community is being criticized for not being more responsive to society’s needs. A recent Op Ed piece by Congressman George Brown, who is usually on our side in these matters, was called The Last Blank Check. Essentially it said that resources devoted to following one’s nose are at an end. ... My point is that the community must change in order to be a significant player in this new world. I am afraid that our old comfortable ways are no longer acceptable to society. To say that there is a paradigm shift underway sounds like a cliché, but it is in fact true.” Edward A. Frieman to James Hansen, April 5, 1993, Frieman Papers, SIO Archives, NASA 1992-1993

ON MARINE BIOLOGY

"I am of course bending every effort to getting the work into such shape during that period [3 years] that it may be expanded and made more permanent, for I am convinced that this sort of organized, systematic, continuous and long continued effort will yield large returns." William E. Ritter to Alexander Agassiz April 11, 1904 (William E. Ritter Papers Accession 82-26 SIO Archives UCSD, Box 1, folder 6, page 2).

“By contrast, marine biological knowledge has not kept pace with the progress of physical oceanography, nor has it taken full advantage of the experimental approach, which has brought about sweeping advances in other fields of biology. Marine organisms have provided tools for important advances in experimental biology, but marine biology as a whole, with few exceptions, has remained at a descriptive level. ... At present thanks to the greater familiarity with the sea, to the development of new tools and theoretical approaches, and to the deeper insight into general biological problems obtained by biophysicists, biochemists, geneticists and microbiologists the time is ripe for a planned, broad, frontal attack on the problems of marine biology.”

UC. SIO. “Proposal Development of Marine Biology at the Scripps Institution of Oceanography, 15 August 1953.” Proposal to the Rockefeller Foundation. SIO Archives, UCSD. Carl Leavitt Hubbs Papers, Box 31, f50

ON OCEANOGRAPHY

“Much as I respect the theoretical and laboratory physicists and chemists it has frequently struck me that these have a tendency to identify conditions in nature with such which can be reproduced in the laboratory. They often lack an appreciation of the complexity of the atmosphere and the ocean and the physics of the earth – and many of those I have met

have little knowledge of how far we have advanced in our understanding of the phenomena encountered. I have repeatedly seen physicists embark on programs of observation without knowledge of what has been accomplished.” Harald Ulrik Sverdrup letter to T. Wayland Vaughan, April 20, 1945. Smithsonian Archives, T. Wayland Vaughan Papers, Box 109.

...the scientific study of the earth as a whole is becoming evermore dependent on increased understanding of that part of the earth which is covered by sea water. Our definition of oceanography is thus gradually broadening to be simply: The science that is done at sea.”

Roger Revelle, In: Symposium on Oceanographic Instrumentation, Rancho Sante Fe, California, June 21-23, 1952. Washington: 1952, p. 10.

“...we know more about the surface of the moon than about the topography of the seafloor.”

Roger Revelle, In: Symposium on Oceanographic Instrumentation, Rancho Sante Fe, California, June 21-23, 1952. Washington: 1952, p. 10.

“The fact is that we know less in detail about the shape of nearly three-quarters of the earth’s surface than we do about the surface of the moon. I am speaking, of course, of the part of the Earth’s surface which lies beneath the sea.” Roger Revelle, “In these Days of Space Travel, n.d.

“The earth is full of wonders. We may not be able to imagine these until we see them, but by careful observation and clear-headed reasoning, it should be possible for us to understand them.” Roger Revelle, “The Past and Future of Ocean Drilling,” 1981.

Frankly, the ocean is little more than a nuisance to a marine geologist. It provides a convenient medium for transporting equipment, although it is regrettably unstable. Otherwise it seems to be an unnecessary filter which obscures every bit of information that one manages to collect. H. William Menard, *Marine Geology of the Pacific*, 1964, page x.

“An oceanographer totally familiar with his field in 1950, but with no further experience, would flunk a freshman examination in 1998.” Walter Munk, “Achievements in Physical Oceanography,” Speech, National Science Foundation Symposium, Fifty Years of Ocean Discovery, October 18, 1998.

ON THE PACIFIC OCEAN

“Frankly, the ocean is little more than a nuisance to a marine geologist. It provides a convenient medium for transporting equipment, although it is regrettably unstable. Otherwise it seems to be an unnecessary filter which obscures every bit of information that one manages to collect.” H. William Menard, *Marine Geology of the Pacific*, New York: McGraw Hill, 1964, x.

ON THE NAVY

“My reasons for applying for such a commission [i.e. commission in the Naval Reserve] were the result of the Bushnell experience; I felt that in any future oceanographic work on board a naval vessel it would be best to be able to give and take orders, rather than being in the anomalous position of a paying guest. This rather slight liaison with the Navy may also be of some future value to Scripps Institution; and in any case is good fun.”

--Letter from Revelle to Harald Sverdrup, October 26, 1936, p. 2; in Roger Revelle Papers MC 6, Box 1, f54, SIO Archives UCSD.

ON PHILANTHROPY

“Continually, Wangenheim, I am being asked to contribute money to some association or some committee or some institution whose alleged reason for existence is public service. There seems to be a universal idea that the mere fact that I have money proves that I have no mental capacities to make good use of it.” EWS to Julius Wangenheim, March 22, 1916, page 5. The original of this letter is owned by Wangenheim’s grandson, Robert Heyneman. A photocopy of it is in SIO Archives blue files, Richard Heyneman.

“In the past I have experimented in spending my own money and turning it over to other people to spend and I have discovered that, as a rule, I can accomplish more public service with a dime, the disbursement of which I supervise myself, than I can with a dollar turned over to other men whose principle activities consist in getting their names in the papers, my own paper amongst the rest.” EWS to Julius Wangenheim, March 22, 1916, page 5. The original of this letter is owned by Wangenheim’s grandson, Robert Heyneman. A photocopy of it is in SIO Archives blue files, Richard Heyneman.

ON SCRIPPS INSTITUTION OF OCEANOGRAPHY

“The general purpose of the institution shall be to carry on a biological and hydrographic survey of the waters of the Pacific Ocean adjacent to the coast of Southern California; to build and maintain a public aquarium and museum; and to prosecute such other kindred undertakings as the Board of Trustees may from time to time deem it wise to enter upon.”
By Laws of the San Diego Marine Biological Association, 1903

“The particular satisfaction in having a physical laboratory operating in conjunction with the biological work lies in the fact that whenever a special biological question comes along requiring information from the physical side, the physicist can be appealed to then and there.” William E Ritter, “The Scientific Work of the San Diego Marine Biological Station during the year 1908,” *Science* 28, no. 715 (1908), 332.

“I wish to gather together at this institution a number of men of strong minds and force who are eager for research work.” E.W. Scripps Disquisition, “The Scripps Institute for Biological Research,” September 15, 1916, Ritter Papers, SIO Archives Box 2, folder 95.

“The work of the Biological Station is only very insignificantly beneficial to the city. The aims and objects of such an institution are to be of service to the universality of men and women. I am greatly interested in the institution and I am glad to help in its development...” E.W. Scripps to Julius Wangenheim, April 8, 1916, page 3. Original letter in the hands of Wangenheim’s grandson, Robert Heyneman. Copy in SIO Archives blue Heyneman file.

“Until after World War II, the Scripps Institution was very remote from the rest of the university. It was almost never visited by the president or his staff, let alone those unimaginably grand creatures, The Regents. Their contact with Scripps can only be described as slight. They almost never thought about the Institution except at budget time. One of them is said to have remarked, ‘So far as I can see, The Scripps Institution consists of only two things, a pier and a seawall, both in need of repair.’”

--Revelle, “The Adolescence of the Elephant,” a talk given at the 75th anniversary banquet, SIO 1978, p. 10

“It seems to be a requirement that to be director of the Scripps Institution one has to be a visionary with grandiose ideas and implausible plans.” Roger Revelle, “Why is it called the Scripps Institution of Oceanography?” March 26, 1987.

“The whole enterprise was a field station of the University of California at Berkeley, one of whose regents had described it as consisting ‘mainly of a pier and a sea wall, both in need of repair.’” Roger Revelle, “Scripps Institution of Oceanography - Its Evolution and Present State,” August 1989

“In those heady days of the 1950's one could hardly go to sea without making an important, unanticipated discovery.” Roger Revelle, Scripps Institution of Oceanography - Its Evolution and Present State, August 1989.

ON THE FUTURE OF OCEANOGRAPHY

“The fundamental doctrine of American geology in the late 1940s was that the continents and ocean basins had been permanent features of the earth’s surface, almost since the beginning of geologic time. The crust of the earth beneath the sea was unimaginably old, and the continents had always been about where they are today, though they had probably grown in size over several billion years. ... These doctrines received an abrupt shock in 1950 when shallow-water reef corals only about a hundred million years old were found on the flat-topped sea mounts of the Mid-Pacific Mountains at a depth of two kilometers, and when Russell Raitt’s seismic refraction studies indicated that the deep sea sediments over vast areas are only one or two hundred meters thick. ... Now fifteen years later, we know that none of these doctrines even resemble the truth.” Revelle, “The Past and Future of Ocean Drilling,” 1975 speech, p. 1-2. Roger Revelle Papers, MC 6A, Box 159, f3.

“The large computers, with their ability to do something with literally millions of numbers, are revolutionizing physical oceanography. But they will be really valuable

only to the extent that they can communicate with human beings, and the capacity of human beings to comprehend much at any one time is extremely limited. We need to make sure that our computers don't simply talk to each other, and this means we must be able not only to talk to them but to understand what they are saying. We are faced here with the basic dilemma of scientific description, whether we are studying a single tree or the entire ocean. A complete description of our object of study would fill so many rolls of magnetic tape that it would be larger than the object itself, and hence useless for human comprehension. The dilemma is constantly changing. An understandable description of the ocean must always be an abstract model of some kind. But this requires more than description; it requires simplification. Some simplifications come from understanding relationships; to summarize many data in a way we can understand, we can employ a set of generalizations or so-called scientific laws, the purpose of these laws being simply to state those underlying relationships between phenomena that make it possible to describe a great mass of data in relatively few words." Revelle, Presidential Address to the International Association for the Physical Sciences of the Oceans (IAPSO), XIV General Assembly at Berne, Sept-Oct. 1967. In IAPSO, IUGG Process-Verbaux No. 10, p. 6.

"..a disturbing problem: the centrifugal tendencies in oceanography. Our science is, in some sense, flying apart, exploding in terms of needs and demand and fragmenting in terms of people. There are many causes...: First is the growth in the numbers of oceanographers, and the sheer physical impossibility of their all meeting together at the same time and place...It is difficult to engage in a real exchange of ideas and knowledge in such a large group." Revelle, Presidential Address to the International Association for the Physical Sciences of the Oceans (IAPSO), XIV General Assembly at Berne, Sept-Oct. 1967. In IAPSO, IUGG Process-Verbaux No. 10, p. 8.

"The second centrifugal tendency is the requirement for increased specialization. Our science is becoming so complex and far-reaching that one can't know ... more than a part of it." Revelle, Presidential Address to the International Association for the Physical Sciences of the Oceans (IAPSO), XIV General Assembly at Berne, Sept-Oct. 1967. In IAPSO, IUGG Process-Verbaux No. 10, p. 6.

"Third is the development of local interests." [reference to growth of site specific studies] Revelle, Presidential Address to the International Association for the Physical Sciences of the Oceans (IAPSO), XIV General Assembly at Berne, Sept-Oct. 1967. In IAPSO, IUGG Process-Verbaux No. 10, p. 9

"Fourth is the growing tendency to relate aspects of marine research to particular basic sciences. The increasingly close relationship between applied mathematicians and theoretical fluid dynamicists, physicists and marine physicists, chemists and marine chemists, biologists and marine biologists are all occurring to some extent at the expense of the relationships among different kinds of marine scientists. ..." Revelle, Presidential Address to the International Association for the Physical Sciences of the Oceans (IAPSO), XIV General Assembly at Berne, Sept-Oct. 1967. In IAPSO, IUGG Process-Verbaux No. 10, p. 9.

“Fifth is the increased tendency to relate marine research to application.” Revelle, Presidential Address to the International Association for the Physical Sciences of the Oceans (IAPSO), XIV General Assembly at Berne, Sept-Oct. 1967. In IAPSO, IUGG Process-Verbaux No. 10, p. 9.

“There are some centripetal tendencies which work in the opposite direction to bring different kinds of marine scientists together, and to join those from different countries. Among these are the growth in the last twenty years, of marine science laboratories and institutions, and of international marine science organizations. But the most important centripetal tendencies are still intellectual ones, the two overriding realities that the oceans are indivisible -- events in any part of the sea eventually have profound effects at great distances -- and that they belong to no man and no nation, yet are used by many men and many nations.” Revelle, Presidential Address to the International Association for the Physical Sciences of the Oceans (IAPSO), XIV General Assembly at Berne, Sept-Oct. 1967. In IAPSO, IUGG Process-Verbaux No. 10, p. 9.

ON THE MARINE PHYSICAL LABORATORY

The Bureau of Ships is convinced that a continuation of this fundamental research [i.e. research in underwater acoustics by UCDWR] forma an indispensable part of a farsighted naval defense program. The impenetrability of the sea to electromagnetic radiation and the relative difficulty of detecting underwater objects by means of sound indicate that the submarine will continue to occupy an important position in naval warfare. It is believed that a detailed quantitative knowledge of the fundamental factors affecting the performance of underwater sound gear is a powerful guarantee that anti-submarine and pro-submarine techniques used by the U.S. Navy can be made most effective. In addition knowledge of underwater sound is of great practical importance in air-sea rescue and suboceanic surveying as well as in navigation and fisheries... It is therefore the intention of the Bureau to promote basic research on the physics and acoustics of underwater sound on a long-range basis.

It is desirable not only to carry out this research on a fundamental basis, but also to attract a sufficient number of promising young men into the field so that a considerable number of scientists can be trained in the problem of underwater sound. Experience in the present war has shown that even the most capable men cannot contribute most effectively to underwater sound research without several years of experience in the many and complicated problems involved. It is therefore most important that if another emergency should arise, a trained reserve of scientists be at hand to permit immediate expansion of research and development.

Both of these objectives can best be achieved if part of this basic research is carried out by one of the nation's leading universities.

...

It is therefore proposed that the University of California enter into a contract with the Navy Department to carry on for the Bureau of Ships, as part of its academic research program, the fundamental studies of the physics and acoustics of underwater sound started by the University of California, Division of War Research.

--Letter from E. L. Cochrane, Vice Admiral, U.S.N. to UC President Robert Gordon Sproul, 31 January 1946, copy in SIO Archives, Marine Physical Laboratory Records (81-141), Box 9, f "MPL, Establishment of.

ON ROGER REVELLE

"In a second way, the U.S.A. has done very well. This fellow Revelle from La Jolla, has turned out to be the find of the century. He is extremely well trained, especially in chemistry and geology. He knows enough about the circulation to be able to make a dull sounding paper into something of broad application. He speaks extremely well, not even using notes. He is by far the star performer of the oceanography section. Vaughan has made a real find and it is nice to know that the Pacific coast has at last turned out a well rounded oceanographer who is able and enthusiastic." Columbus Iselin to Henry Bryant Bigelow, September 22, 1936. Iselin Papers, WHOI Archives.

"...in the long run I would be happier if I had more to do with the actual conduct of scientific research rather than with it over-all planning and coordination at the rather remote level of Washington." Revelle to Sverdrup, January 6, 1948 explaining his reasons for wanting to leave ONR and return to SIO. Records of the SIO Office of the Director, 81-23, Box 1.

"The ocean holds me in an enduring spell. Part of the spell comes from mystery -- the fourfold mystery of the shoreline, the surface, the horizon and the timeless motion of the sea." Roger Revelle, *Scientific American*, September 1969

"The low funding [for beach studies] at least required us to develop some ingenuity in devising simple, inexpensive instrumentation. For example, we used the 2-meter-long Roger Revelle, later director of Scripps Institution of Oceanography, as a wave staff by having him stand at various distances from shore in the buffeting surf." R.S. Dietz and K.O. Emery, "Early Days of Marine Geology," *Oceanus* 19, no. 4 (1976), 19.

"Being at the same time a sailor and a scientist just seemed too good to be true. Of course this meant that I would have to spend my life at an oceanographic institution...for a California boy, Scripps was the obvious choice, although Dr. Vaughan and the faculty didn't realize it, and I never actually told them, I just stayed." Roger Revelle, "How I Became an Oceanographer and other Sea Stories," *Annual Review of Earth and Planetary Science*, 1987.

ON MARY BENNETT RITTER

“Expected to go to San Diego with Miss Scripps and Dr. Charlotte [Baker] to interview Governor Stephens about ratification of Suffrage Amendment, but he left in [the] night.” Mary Bennett Ritter Diary, September 30, 1919.

“The University of California today presented to the United States the only married couple to receive honorary degrees from the same institution. Two years ago Dr. William E. Ritter...”father” of the Scripps Institution of Oceanography at La Jolla was honored by the university... Today...his wife, Mary Bennett Ritter, one of the State’s first women medicos...received a similar honor...” Berkeley newspaper, May 18, 1935.

“First dean of women at the University of California, in fact if not in title; teacher, physician, and friend to the women students of three generations. Always in the forefront of those who seek the general welfare, you have counted as achievement only that which inspired achievement in others. A daughter of the argonauts, you have found and shared more than gold in California.” UC President Robert Gordon Sproul tribute to Dr. Mary Bennett Ritter upon conferring upon her the honorary degree of Doctor of Laws, May 18, 1935.

ON WILLIAM E. RITTER

"All men should be naturalists."

Ritter, William E. and Bailey, Edna 1928. The organismal conception... University of California Publications in Zoology 31 (14): 355.

“It’s not altogether agreeable for one to be compelled to realize that with the usual measure of opportunity, in years and all, given to one, he can’t leave a scratch on the face of civilization so deep as not to be rubbed out wholly by the first winter’s storms. In fact such a realization would be so distasteful to me that I’m making a mighty effort to scratch a little deeper than the average mortal scratches.” William Ritter to Nelson Ritter, May 4, 1904, Ritter Family Papers, MC 15.

“Out of this relation, however, there grew up from the very first a close and ever enlarging intellectual attachment and personal friendship between Dr. Ritter and [E.W. Scripps]. The attachment between the men rested upon mutual understanding of certain rather deep seated motives which guided these two men, who otherwise differed greatly... One was a masterful, dominating man of affairs, with a largely assumed indifference to culture and refinement, but withal with the keenest of intellectual grasp of the world’s thought and life, and, under the mast of realism, a great idealist. The other came from the academic shades with the aspirations of the idealist and a program devoid of all immediate practical implications. The two had this in common, both were inquirers, both were earnestly seeking the truth, and both were believers that the truth, science, would set men free, if men could only come to know the truth.” Charles Atwood Kofoid, quoted in Frank E.A. Thone and Edna Watson Bailey, “William Emerson Ritter: Builder,” Scientific Monthly 24 (1927), p. 259.

“The professor...proved to be a tall man with a shock of pale sandy hair, wrinkled features, pleasant eyes, and an engaging smile. ... He was somewhat slow and hesitant of

speech at times, particularly when he was searching for the words needed to give exact expression to an idea, but the force of his arguments carried conviction and their delivery was frequently emphasized by pointing with the index finger of one of his large hands.” Tracy I. Storer, “William Emerson Ritter, X Club speech,” Sacramento, February 2, 1943. SIO Archives.

“Scripps’ own support of the institution was primarily on behalf of Ritter. He more than once said that what he and his sister were really doing was ‘endowing Ritter,’ but this was probably a bit of Scrippsian hyperbole.” Francis B. Sumner, “William Emerson Ritter: Naturalist and Philosopher,” *Science* 99, no. 2574 (1944), p. 337.

ON THE SCRIPPS FAMILY

“Afternoon our company of benefactors invited early in the week came in considerable numbers. E.W. Scripps, Fred Scripps, Mrs. Scripps, and Ellen and Virginia Scripps... The people all seemed much interested. Mr. E.W. Scripps whose interest ought to count for most, invited me to visit him at Miramar and assures me of his interest in the enterprise.” *Diary of William E. Ritter*, July 18, 1903.

ON FRANCIS SHEPARD

“We have hesitated in referring to Shepard as the ‘father of marine geology.’ However, the venerable Madame Klenova of the USSR Institute of Oceanology did so upon the occasion of the International Geological Congress in Mexico City in 1956, when the cold war first had thawed sufficiently for Russian scientists to attend such functions. As they met for the first time, Mme. Klenova warmly remarked, ‘You are the father of marine geology and I am the mother of marine geology.’ To this, Elizabeth Shepard replied, ‘and that, in turn, must make me the concubine.’” Robert S. Dietz and K.O. Emery, “Portrait of a Scientist: Francis Shepard,” *Atlantic Oceanographic Meteorological Laboratory Collected Reprints* 2 (1971), A15.

“This attachment for the sea cost Shepard the first draft of his textbook on submarine geology and nearly his life, as well. In 1946 while writing the manuscript, he was living in a small cottage on the north coast of Hawaii. When the April 1 tsunami, triggered by an earthquake in the Aleutian trench, struck, his wife, Elizabeth, quickly retreated to high ground. Shepard himself incautiously remained behind to observe and photograph this rare natural phenomenon. The cottage was completely demolished, the manuscript was washed away, and only by climbing a tree was he able to avoid being washed away by the inundating eighth wave. With characteristic energy and enthusiasm, Shepard (with D.C. Cox and G.A. MacDonald) immediately initiated a now-classic investigation of the coastal effects of that tsunami...” Robert S. Dietz and K.O. Emery, “Portrait of a Scientist: Francis Shepard,” *Atlantic Oceanographic Meteorological Laboratory Collected Reprints* 2 (1971), A14.

ON UCSD

“During the seven years from 1955 and 1961 I experienced the fierce joys of helping to found a new university. As with most things one does for the first time -- making love, becoming a father, getting a Ph.D. -- this task was approached with more enthusiasm than knowledge.”

--Roger Revelle, “On Starting a University,” 1974

“It is proposed to expand the present La Jolla Campus of the University of California by increasing the facilities and staff for graduate research and teaching in the sciences and by adding an undergraduate teaching program. The undergraduate teaching would emphasize the natural sciences and technology, but would include sufficient courses in the humanities and social sciences to insure that the students would receive a well-rounded educational experience. This proposed “scientific campus” of the University of California would have four main objectives: 1. To increase the facilities for graduate work in the sciences within the State of California; 2. To provide opportunities for promising studies in the San Diego area to obtain undergraduate training at the highest level; 3. To provide a center of research and increased understanding for the third largest population center of the state; 4. To stimulate and foster the teaching of science at all levels in the educational system of California.” – Roger Revelle, “The La Jolla Campus of the University of California.” Memorandum, January 30, 1956, page 11, AC 16, Box 4, f 81.

“The proposed expanded campus might be something like a publicly-supported Cal Tech. The emphasis in research would be on the sciences that deal with the world as it is rather than those that make their own world by controlled experiments in the laboratory. The emphasis in teaching would be on the new profession of scientific research rather than on the older more orthodox professions. An attempt would be made to bring out the creative potentialities of undergraduate as well as graduate students. The liberal arts would certainly form an important component of the undergraduate curriculum.” Memorandum, January 30, 1956, page 15, AC 16, Box 4, f 81.

“The Committees on Educational Policy consisted almost entirely of professors from Berkeley and UCLA. They were experts at seeing clouds no bigger than a man’s hand. It was clear to them that a new graduate school would draw money away from their own campuses; it might even attract outstanding scientists who could better serve mankind in Berkeley or Los Angeles. They thought it would be nice to have an undergraduate school at La Jolla, managed by a farm team of dedicated teachers, which could provide well-trained new graduate students for their own laboratories. It was suggested that San Diego’s problems could be handled by locating an extension division of the UCLA College of Engineering in the city.”

-- Revelle, “On Starting a University,” 1974, p. 3. Manuscript prepared for but not published by Daedalus. In Roger Revelle Papers, MC6A, Box 158, f19, SIO Archives UCSD.

“...in our American society basic research is carried out almost entirely in universities. One can nearly count on the fingers of two hands the industrial and government

laboratories that conduct basic research. People sometimes comfort themselves by thinking that research can be done in non-profit, non-governmental laboratories apart from the universities, but I believe it can be demonstrated that such laboratories have little viability past one generation. The reasons are partly financial, partly the problems of staff selection and tenure, but most important of all is the absence of the iconoclasm, the originality, the eagerness and the devotion of graduate students. Basic research and graduate teaching are inseparable activities, perhaps in many ways almost the same activity.” -- Roger Revelle, “The Multiple Functions of a Graduate School,” Princeton University Address, December 28, 1958, page 3. RR Papers, MC 6, Box 29, f22.

“A graduate school is a place where professors make colleagues of their students.” -- Roger Revelle, *ibid.* p. 5.

“As some of you may know, in my own town of San Diego we are trying to establish a new university and it may be of interest to you to hear of some of our thoughts about this problem. In the first place, we have felt that to be distinguished a new university must be distinctive; it must be distinguishable from other universities in particular from the other campuses of the University of California. In establishing a new university, it is a good idea to start with a graduate school. Building a university, it seems to us, is just the opposite from building a house. It must be done from the top down and not the bottom up – from the inside out, not from the outside in. There is a Gressham’s law of faculties; mediocre faculties drive out good. Greatness in a faculty is easy to lose and hard to build. To build strength from weakness may, in fact, take several faculty generations because mediocre departments tend to reproduce themselves.” Roger Revelle, *ibid.* p. 7

“To me a university is a cathedral of our modern society, the center to which all men turn to find the meaning of their lives and from which emanates a wondrous light, the light of understanding. During the Middle Ages the center of each city was the cathedral. In some sense it gave an eternal meaning to the transitory lives of the people, and the university lay in its shadow. Today no one builds cathedrals out of stone and mortar except as pallid imitations of the past, but the university has come into its own as the cathedral of the mind. The comparison has many aspects. Like a Gothic cathedral, the modern university is a living thing, ever building yet never finished, irregular in plan and indeed almost planless. Like the cathedral, the university is incredibly complex in detail. The great cathedral contained many small and perfect chapels; the great modern university contains many segments, each almost complete in itself and famous and wonderful in itself. The cathedrals were built by many men. No one remembers the names of the architects, the master builders, the inspired artists and the skilled craftsmen who built them, but their works still rise in majesty for all men to see what great things men can do. Just so a modern university. It can be built only through the hard work, the inspired skill, the free imagination of many men. The names of these men will soon be forgotten but their work will last as long as our civilization lasts.” Roger Revelle, *ibid.* page 10.

“In 1951 Revelle was appointed director of Scripps and subsequently dean of research for the entire University of California, of which Scripps is part. Revelle sold the Regents of

the university the idea of establishing at Scripps an Institute of Science and Technology – a kind of Western MIT. Later, the Regents and the university administration became convinced that, rather than a scientific institute, a first-class general university was needed to serve California's third-largest population center. Revelle was again in the forefront, arguing, explaining, bulldozing, pleading, and finally winning approval for his concept of a university made up of twelve independent colleges, modeled much more after the ancient Oxbridge pattern than after Yale's residential colleges or Harvard's houses." Kenneth LaMott, "La Jolla's New University: Olympus on a Mesa." Harper's Magazine, August 1966, p. 84.

ON PLATE TECTONICS

"We were not courageous enough, or perhaps not smart enough, to conclude what is now widely believed that the rocks of the Pacific ocean floor are carried along by convective motion and the force of gravity from the ridges (where they originate as lava) to the trenches (where they are subducted as relatively cool lithospheric crust)." Roger Revelle, "How I became an Oceanographer," Annual Review of Earth and Planetary Sciences 15 (1987), page 18.

"Well, in retrospect, what was discovered in 1950 might have told us we were in need of a revolution in our thinking. However... A separate solution was proposed for each problem when it was discovered. No one realized that we were all looking at different parts of the same camel." H.W. Menard, "Very like a spear," In: Two hundred years of geology in America: Proceedings of the New Hampshire Bicentennial Conference on the History of Geology, Cecil J. Schneer, editor. Hanover, N.H.: University Press of New England, 1979, page 25.

"Looking backward, you may wonder why no one at Scripps, where the data were long unpublished, noticed what is now obvious... Why was the great opportunity left waiting the vision of Vine and Wilson? Well, maybe we just lacked vision." H.W. Menard, *Ibid.*, page 26.

"...many of us later had time to kick ourselves when earlier we had not had time to think." H.W. Menard, *The Ocean of Truth*, 1986, page 298.

ON WALTER MUNK

"I do not spend much time in polishing lectures. The excuse is that, in a small class, students learn more if they participate in halting derivations and have the joy of pointing out blunders, than if they are handed the subject on a silver platter." Walter Munk, in *A celebration in Geophysics and Oceanography* 1982, page 6.

"I do not like to read. The outcome has been that I have entered fields with little or no modern literature; in a number of cases I left the field some ten years later in a state of lively activity..." Walter Munk, *ibid.*

“Thank God we’re finally talking about something besides space.” Walter Munk quoting I.I. Rabi at the first Mohole discussions. *Ibid.*, p. 8.

“The 1951 nuclear test IVY0MIKE almost brought my scientific career to an end.” *Ibid.* p. 19.

“...definitive papers are usually written when a subject is no longer interesting.” Walter Munk as quoted by Carl Wunch, *Ibid.* p. 47.

“Down to the wine-dark sea stride Munk,
And slapped the water with a mighty thunk.” Poem by Stanley Flatte in honor of Walter Munk, *Ibid.*, p. 104.

“You have to get rid of that corporal right away.” Roger Revelle quoting Walter’s battalion commander observing Munk in field operations, *Ibid.*, p. 113.

“If Walter Munk had never done any great scientific work, his life as a husband, a father, and a friend would still be an inspiration for the rest of us.” Roger Revelle, *Ibid.*, p. 115.

“Sverdrup imbued Walter with the belief that knowledge grows from a deep study of data...” Henry Stommel, *Ibid.*, 117.