

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

HEARINGS BEFORE THE SUBCOMMITTEE ON OCEANOGRAPHY OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES HOUSE OF REPRESENTATIVES EIGHTY-NINTH CONGRESS

FIRST SESSION

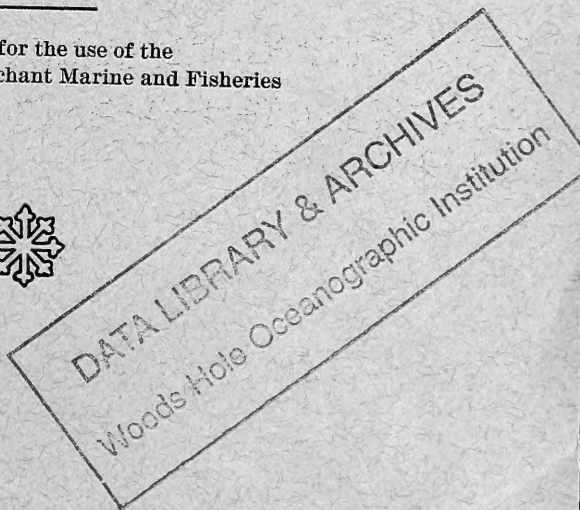
ON

H.R. 921, H.R. 2218, H.R. 3310, H.R. 3352, H.R. 5175,
H.R. 5654, H.R. 5884, H.R. 6009, H.R. 6457, H.R. 6512,
H.R. 7301, H.R. 7798, H.R. 7849, H.R. 9064, H.R. 9483,
H.R. 9617, H.R. 9667, H.R. 10432, and S. 944

AUGUST 3, 4, 5, 10, 11, 12, 13, 17, 18, 19, 1965

Serial No. 89-13

Printed for the use of the
Committee on Merchant Marine and Fisheries





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COMMITTEE ON MERCHANT MARINE AND FISHERIES
OF THE
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HOUSE OF REPRESENTATIVES
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NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

TUESDAY, AUGUST 3, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to call, in the caucus room, Cannon House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. Ladies and gentlemen, this is not a church so you won't have to sit in the back seats. We would appreciate it if you who are attending these hearings would come to the seats in the first five or six rows. Thank you very much.

The meeting will please come to order. Today we are beginning hearings on a number of bills designed to strengthen the Nation's efforts in its study of the exploitation of the ocean resources of the world. I think these hearings and the results they achieve will rank high in importance among the legislative activities of this Congress.

There are 16 bills before us this morning, dealing with some 7 approaches designed to state our national objectives in the field of oceanography and to establish the best organizational mechanism to implement those objectives.

(The bills and agency reports follow:)

[H.R. 921, 89th Cong., 1st sess.]

A BILL To establish the National Oceanographic Agency

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby established an independent agency which shall be known as the "National Oceanographic Agency" (hereinafter referred to as the "Agency").

SEC. 2. There shall be at the head of the Agency an officer to be known as the Administrator. The Administrator shall be appointed by the President, with the advice and consent of the Senate.

SEC. 3. The Agency shall establish a coordinated national program for oceanography and related sciences including meteorology. In order to implement that program the Agency shall have authority to carry out research projects and programs of the United States in this broad area.

SEC. 4. There is hereby transferred to the Agency all functions relating to oceanography and related sciences which are vested on the date of enactment of this Act in any officer, employee, department, agency, and instrumentality of the United States. There are hereby transferred to the Agency so much of the personnel, property, records, and unexpended balances of appropriations, allocations, and other funds, of any department, agency, or instrumentality of the United States with respect to which any function is transferred under this section, as the Director of the Bureau of the Budget determines necessary in connection with the exercise by the Agency of the functions so transferred.

SEC. 5. All orders, regulations, directives, and other official acts of any officer or employee of the United States with respect to functions relating to oceanog-

raphy and related sciences which are transferred by this Act and which are in force on the date of enactment of this Act shall continue in force until modified, amended, superseded, or revoked by the Administrator.

SEC. 6. In the performance of his functions the Administrator is authorized—

(1) to make, promulgate, issue, and rescind rules and regulations governing the manner of the operation of the Agency and the exercise of its powers;

(2) subject to the civil service laws and the Classification Act of 1940, as amended, to appoint and fix the compensation of such officers and employees as may be necessary to carry out its functions;

(3) to accept unconditional gifts or donations of services, moneys, or property, real, personal, or mixed, tangible or intangible;

(4) without regard to section 3648 of the Revised Statutes, as amended (31 U.S.C. 529), to enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of its work and on such terms as it may deem appropriate, with any agency or instrumentality of the United States, or with any State, territory, or possession, or with any political subdivision thereof, or with any person, firm, association, corporation, or educational institution;

(5) to use, with their consent, the services, equipment, personnel, and facilities of Federal and other agencies with or without reimbursement, and on a similar basis to cooperate with other public and private agencies and instrumentalities in the use of services, equipment, and facilities, and each department, agency, and instrumentality of the Federal Government shall cooperate fully with the Agency in making its services, equipment, personnel, and facilities available to the Agency, and any such department, agency, or instrumentality is authorized, notwithstanding any other provision of law, to transfer to or receive from the Agency, without reimbursement, supplies and equipment other than the administrative supplies and equipment.

(6) to establish within the Agency such offices and procedures as may be appropriate to provide for the greatest possible coordination of its activities under this Act with related activities being carried out by other public and private agencies and organizations; and

(7) with the approval of the President, to enter into cooperative agreements under which officers and employees (including members of the Armed Forces) of any department, agency, or instrumentality in the executive branch of the Government may be detailed by the head of such department, agency, or instrumentality for services in the performance of functions under this Act to the same extent as that to which they might lawfully be assigned in such department, agency, or instrumentality.

SEC. 7. Notwithstanding any other provision of this Act, no function shall be transferred under this Act which the President determines should not be transferred in the interests of national security.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., March 5, 1965.

Hon. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on H.R. 921, a bill to establish the National Oceanographic Agency.

As you know, the Atomic Energy Commission was one of the four Federal agencies that first suggested and participated in efforts to coordinate a national program in oceanography. However, the Commission feels that on balance H.R. 921, which transfers to a newly created National Oceanographic Agency all functions relating to oceanography and related sciences presently performed by other Government agencies, is undesirable.

In connection with the bill's general purpose of establishing a coordinated national program for oceanography and related sciences,

it should be noted that the Federal Council for Science and Technology, created by Executive Order No. 10807 on March 13, 1959, established a permanent Interagency Committee on Oceanography by letter dated March 3, 1960, from Dr. George Kistiakowsky, Chairman of the FCST, to the Honorable James H. Wakelin, Jr., Assistant Secretary of the Navy for Research and Development. The primary function of the ICO is to coordinate the activities of various agencies having an interest in oceanography in order to eliminate duplication of effort and to provide a total program with appropriate objectives. It is our understanding not only that the ICO's advisory functions would be taken over by the National Oceanographic Agency but that the proposed bill would interpose an independent agency between the President and the executive agencies in the direct chain of line authority. Oceanography is of prime programmatic interest to the Commission. We believe that staff assistance rendered by the Interagency Committee on Oceanography has been valuable in coordinating efforts by the various agencies in the oceanography field. By the same token, however, the Commission believes that it would be detrimental to its mission if overall directive authority for oceanographic activities was invested in one agency.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

R. E. HOLLINGSWORTH,
General Manager.

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., March 11, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your letter of January 22, 1965, requesting the views of the Bureau of the Budget on H.R. 921, a bill to establish the National Oceanographic Agency.

The bill would establish an agency to which would be transferred all functions relating to oceanography and related sciences that are now vested in various Federal agencies, except those excluded by the President for reasons of national security. The agency would be headed by an Administrator appointed by the President, with the advice and consent of the Senate. The new agency would establish a coordinated national program for oceanography and related sciences.

Under current organizational arrangements, oceanographic activities are being conducted by a number of agencies in support of their basic missions. For example, the Department of the Interior supports oceanographic activities related to its fisheries programs. The Department of Commerce conducts oceanographic activities supporting the navigation and charting responsibilities of the Coast and Geodetic Survey. The Department of the Navy conducts oceanographic activities related to antisubmarine warfare and other defense missions. This is the traditional way in which science has been or-

ganized in the Government, with research activities being conducted by agencies whose specialized operational requirements require new knowledge. In our view the proposed transfer would adversely affect the accomplishment of operating missions by divorcing oceanographic activities from programs which they are designed to support.

A further difficulty is that the proposed agency would be authorized to coordinate activities in those fields of science related to oceanography, including meteorology. Such a step would upset existing arrangements for coordination. For example, a Bureau of the Budget circular assigns responsibility to the Department of Commerce for facilitating coordination of Federal meteorological activities. This assignment is consistent with the central role of the Weather Bureau in providing meteorological services to the general public and to many special users. The Department of Commerce has developed the first annual plan for Federal meteorological activities and copies have recently been provided to appropriations committees of the Congress.

Your committee is aware of the significant steps that have been taken in recent years to strengthen overall coordination of oceanographic activities at the Presidential level. A committee of the Federal Council for Science and Technology has been developing annual plans for the Government's oceanographic program for the past several years. These plans, that are provided to agencies and to committees of the Congress, have served to facilitate orderly growth of this important field. The Office of Science and Technology, created as a Presidential staff agency in 1962, has played a major part in obtaining information and advice from foremost authorities in oceanography, drawn from within and outside Government. Oceanography is one of the fields of science subjected to special review by the Bureau of the Budget, with the advice and assistance of the Office of Science and Technology.

The continuing top level attention being given the field of oceanography demonstrates the advantages of the existing policy machinery. While programs need to be conducted by agencies whose missions require special knowledge of the ocean environment, overall planning and coordination is best exercised at the Presidential level. These arrangements for policy planning and coordination must be flexible in order to adjust readily to the changing requirements of a dynamic technology.

The present organization has fostered the growth of the Federal oceanographic program from \$35 million in fiscal year 1958 to an estimated \$135 million for fiscal year 1965. However, arrangements at the Presidential level for overseeing this large program would be further strengthened through the passage of H.R. 2218, a bill that the Bureau of the Budget recommends for enactment in a separate letter to your committee.

Because the Bureau of the Budget regards the existing organization of oceanographic activities as basically sound it is recommended that H.R. 921 not be enacted.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in reply to your request for the views of this Department with respect to H.R. 921, a bill to establish the National Oceanographic Agency.

This bill would establish an independent agency to be known as the National Oceanographic Agency. The Agency would be charged with establishing a coordinated program for oceanography and related sciences including meteorology. All functions relating to oceanography and related sciences vested in other Government offices would be transferred to the Agency unless the President determined that in the interest of national security a function should not be transferred.

The Department of Commerce is opposed to the enactment of H.R. 921.

An independent agency having jurisdiction over the total national program in oceanography would not serve the best interest of the Nation's scientific missions or of other missions which operationally utilize oceanography for support. Oceanography as a science is an interdisciplinary science drawing expertise from geology, marine biology, marine zoology, chemistry, and physics. While it is conceivable that an agency could have a narrow mission related to oceanography, the Agency contemplated by the bill would have very broad jurisdiction based on a restricted scientific discipline.

Sections 3 and 4 of the bill would "establish a coordinated national program for oceanography and related sciences." It is difficult to know what such a program is intended to accomplish. Putting the "related sciences" under the proposed agency would be most impractical, as the related sciences involved are more basic and of greater scientific significance than oceanography. It appears that the intent is indeed to bring such other scientific endeavors under the jurisdiction of the proposed oceanographic agency. Section 3 enumerates meteorology as one of the "related sciences." Meteorology is in no way subordinate to oceanography. The science of meteorology is, in fact, much broader in scope than oceanography. The two are related only under the broad classification of "atmospheric sciences."

Meteorology is the core scientific discipline utilized by the Weather Bureau, which is now part of the Environmental Science Services Administration (ESSA), in the performance of its weather mission. This mission includes the issuance of storm warnings, display of weather and flood signals, distribution of meteorology information and forecasts in the interest of agriculture, commerce, aviation and the general public. Is it a purpose of this bill to place all of meteorology under an agency ostensibly devoted to the study of the oceans? The weather mission of ESSA is obviously too unique and important to subordinate it in an agency devoted to such a narrow interest. Meteorology as an independent area of scientific endeavor was deemed to be of sufficient importance that the Bureau of the Budget in its Circular No. A-62, November 13, 1963, created a meteorological coordinating authority within the Department of Commerce.

In addition, oceanography serves the missions of a number of Government agencies. These missions could be affected detrimentally if their oceanography supporting functions were transferred to another agency.

The Coast and Geodetic Survey functions of ESSA are also related to oceanography but of much greater independent significance. The nautical charting program of ESSA makes an indirect contribution to oceanography but the prime function of the program is based on the policy to provide nautical charts for the mariner. The contribution to scientific knowledge is an incidental byproduct of this function. To remove the nautical charting program from the bureau would be to separate it from the necessary supporting functions, such as geodesy, coastal mapping and magnetics. On the other hand, to place the Coast and Geodetic Survey functions of ESSA under the proposed oceanographic agency would place it under the jurisdiction of an agency whose program appears to be more narrowly oriented than its own.

Oceanography should remain a useful tool for achieving specific public policies and missions. However, the national interest also recognizes that it should be pursued as a science to extend our knowledge of the oceans. We believe the first properly should remain within the province of the operating agencies. The second falls more within the scope of the National Science Foundation and coordinated by the Federal Council for Science and Technology.

The Interagency Committee on Oceanography and the Interdepartmental Committee for Atmospheric Sciences established by the Federal Council for Science and Technology afford sufficient coordination at present to assure a strong national program for research and investigation in oceanography.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely,

BURT W. ROPER
(For Robert E. Giles).

DEPARTMENT OF THE NAVY,
OFFICE OF THE SECRETARY,
OFFICE OF LEGISLATIVE AFFAIRS,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries, House of
Representatives, Washington, D.C.*

MY DEAR MR. CHAIRMAN: Your request for comment on H.R. 921, a bill to establish the National Oceanographic Agency, has been assigned to this Department by the Secretary of Defense for the preparation of a report thereon expressing the views of the Department of Defense.

H.R. 921, in brief, would establish the National Oceanographic Agency, including therein meteorology and other close-allied sciences. It would be initially established by the transferral to it of all functions in oceanography and related sciences from other agencies of the U.S.

Government, including personnel, property and funds. In addition to the personnel initially transferred to it, other Government employees and members of the Armed Forces may be detailed for services in the National Oceanographic Agency. There is a stipulation that the President may determine that certain functions should not be transferred under this act in the interests of national security.

Oceanography, as with many other sciences, provides maximum benefits to the Federal agencies when its results are applicable to specific problems within the Government. Many Federal agencies require varied kinds of oceanographic information in order to do their jobs.

In fact, this link to the missions of the agencies makes the oceanographic program productive and viable. Most information is highly specialized and obtained to assist in meeting existing or foreseeable problems. Examples are the kind of information needed by the Navy Department to hunt submarines, to be prepared to launch Polaris missiles, conduct amphibious and submarine operations. Similarly, in the Commerce Department, oceanographic information is required for chart making and assisting maritime trade, in the Department of the Interior for exploiting the mineral and food resources of the ocean and increasing U.S. efficiency in fishing both commercially and as a recreational asset through sport fisheries. The Public Health Service needs oceanographic information as it affects offshore pollution and the Atomic Energy Commission as it affects disposal of atomic waste and radioactivity in the oceans. If each of these users must go to a different agency to obtain oceanographic support, he will be less likely to make the effort. It is believed that no central single oceanographic office could ever adequately fill all these specialized requirements.

There is a continuing need for national coordination and collaboration on projects of mutual interest. Different agencies often need the same information, and only one agency then need obtain it. The information collected by a single agency has to be available to all agencies. For example, the broad array of oceanographic activities of the Navy is related to the mission of the Navy, but it should be, and is, available to the civilian agencies. This coordination and collaboration is achieved through the general supervision of the Interagency Committee on Oceanography. Chaired by the Assistant Secretary of the Navy for Research and Development and including members from all major Federal agencies involved in marine sciences, this Committee accomplishes a tremendous amount of good without direct administrative control. It is considered that a National Oceanographic Agency, which would substitute centralized authority for voluntary cooperation, would remove oceanography from the laboratories of the users and reduce its utilization.

It is noted that section 7 of the proposed bill could be readily interpreted to exclude Navy oceanographic programs from the provisions of the bill, although there is no assurance that this would in fact be done. In spite of this, the Department of the Navy, on behalf of the Department of Defense, is opposed to H.R. 921 for the above stated reasons.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that, from the standpoint of the administration's program, there is no objection to the presentation of this report for the consideration of the committee.

Sincerely yours,

M. K. DISNEY,
Captain, U.S. Navy,
Director, Legislative Division
(For the Secretary of the Navy).

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
Washington, D.C., August 2, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This letter is in response to your request of January 22, 1965, for a report on H.R. 921, a bill to establish the National Oceanographic Agency.

The bill would establish an independent agency to coordinate a national program for oceanography and related sciences; establish an Administrator for the National Oceanographic Agency; transfer to this Agency all functions relating to oceanography and related sciences which are now vested in any officer, employee, department, agency, and instrumentality of the United States; transfer existing regulations to this Agency until such time as they are modified, amended, superseded, or revoked by the Administrator; establish within the Agency offices and procedures to provide coordination of activities with other private and public organizations; and authorize with the approval of the President, entrance into cooperative agreements with other agencies for services in the performance of functions under the act.

H.R. 921 would transfer to the proposed new Agency all functions relating to oceanography and related sciences now vested in any department or agency of the United States. We believe this would be unwise. Our activities in oceanography, like those of other agencies, are not an end in themselves but are related to the missions of Department programs which carry on those activities. The transfer of our oceanographic activities would work to the detriment of those programs. The Interagency Committee on Oceanography, on which this Department is represented, provides a workable mechanism for the coordination of our activities in the field with those of other agencies. The Committee prepares each year a coordinated, comprehensive plan for the achievement of national goals in oceanography. Through the budgetary process, the appropriate roles and responsibilities of the participating agencies are specifically defined.

With respect to the organizational setting of the oceanographic program, we refer the provisions of H.R. 2218. That bill would vest in the President the responsibility for issuing a statement of national goals with respect to oceanography, for developing a comprehensive program of oceanographic activities for fixing the responsibility for the direction of such activities, for reporting annually to the Congress on stated aspects of the program, and for appointing

an Advisory Committee for Oceanography. This bill would provide a specific statutory basis for interagency cooperation in programs in oceanography and could serve to focus wider attention on oceanography.

We would therefore recommend that H.R. 921, providing for the establishment of the National Oceanographic Agency, not be enacted.

We are advised by the Bureau of the Budget that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely,

WILBUR J. COHEN,
Under Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Your committee has requested our views and recommendations on seven specific bills concerned with the problem of planning, coordinating, and financing the national oceanographic program. This Department through the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife, the Bureau of Mines, and the Geological Survey, is greatly interested in, and directly concerned with, the science of oceanography. We are primarily concerned with the development of the natural resources of the oceans. Consequently, we desire that this form of research and development proceed efficiently and effectively in the national interest.

Described briefly, the bills before the committee are:

H.R. 921 provides for the establishment of a new and independent agency which would be headed by an Administrator to establish a coordinated national program for oceanography and related sciences, including meteorology. It provides for the transfer of all the functions now carried out by approximately eight governmental agencies involving the subjects of physical oceanography, biological oceanography, marine geology, meteorology, and others. Also to be transferred are personnel, property records, and unexpended appropriations related to these functions.

* * * * *

All of these bills deal in various ways with the problem of planning, coordinating, and financing the national oceanographic program. This is a larger program of research and development which involves several Federal Government departments and specialized agencies. It is largely based on the recommendation of a committee of the National Academy of Sciences, which in 1959 proposed that the Federal Government embark on a 10-year program of expanded research on the oceans. The program involves studies of the physics, chemistry, geology, and biology of the ocean and its contiguous waters; the relationships and interactions between ocean and atmosphere; and the living, mineral, and fossil resources of the ocean waters and seabed, and methods of conserving and harvesting these natural

resources. Since 1960 the program has been coordinated and its budgets planned by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Funds are appropriated through the budgets of the individual cooperating agencies. The large number of bills which have been introduced in the Congress in recent sessions proposing to alter this coordinating machinery or to begin new studies of the ocean and its resources reflects the concern of the legislative branch of the Government that the present mechanism for planning and review may not be adequate. The varying nature of the individual solutions to the problem represented by these bills is a fair indication of the complexity of the problem.

We believe that there is a growing need for a perspective in which the oceanographic programs of the Federal Government can be more clearly seen in relation to each other and in relation to the national goals which they support. All of these bills contain some features which could be helpful in carrying out a national oceanographic program. The position of the executive branch, however, is that H.R. 2218 should be enacted, but that the enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised governmental organization to administer the national oceanographic program should be enacted.

The recommendation that legislative action should be deferred is not intended to cast any doubt on the importance of the subject. President Johnson has recently stated his intention that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: Over the last 3 months you have been kind enough to refer to us for our information, and such comment as we might wish to make, several bills having to do with the Federal Government's arrangements for developing, coordination, and funding the national oceanographic program.

Our Committee on Oceanography has welcomed the opportunity to review these bills. The Committee has long recognized the need for

a more unified approach to the oceanography program among the Federal agencies. The Committee considers such an approach to be especially desirable with reference to those elements of the program that involve the missions of several different agencies, for example, the study of air-sea interactions, the development and use of deep-diving vehicles and other means of deep-sea investigation, and the study of ocean resources.

While the Committee does not have an adequate basis for recommending a particular mechanism for achieving the desired unity of approach, its members feel that efforts at the appropriate level of the executive branch, for example, the Office of Science and Technology, in consultation with the congressional committees concerned, can undoubtedly result in an effective solution of the problem.

Yours sincerely,

FREDERICK SEITZ, *President.*

NATIONAL SCIENCE FOUNDATION,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request of January 22, 1965, for the views of the National Science Foundation on H.R. 921, a bill to establish the National Oceanographic Agency.

H.R. 921 would establish a national oceanographic agency and transfer to it all functions relating to oceanography and related sciences being carried on by other Federal agencies. The proposed agency would be directed to establish a coordinated Federal oceanographic program and to carry out research efforts in this area.

As you know, a number of Government agencies are engaged in the support of oceanographic activities. Such activities are generally directly related to the primary responsibilities of the agencies concerned. Thus, for example, fisheries aspects of oceanography are undertaken by the Department of the Interior, marine geophysical surveys are conducted by the U.S. Coast and Geodetic Survey, and the Department of Defense conducts its oceanographic activities with a view to their defense implications. We do not think it would be feasible, therefore, to attempt to centralize responsibility for the entire Federal oceanographic effort in one agency. At present coordination of the Federal effort is undertaken through the Inter-agency Committee on Oceanography of the Federal Council for Science and Technology. We believe that this responsibility is being carried out in a satisfactory manner. In view of the above considerations, we recommend against enactment of H.R. 921.

The Bureau of the Budget has advised us it has no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

LELAND J. HAWORTH, *Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, D.C., February 17, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Thank you for sending me with your letters of January 22 and 26, copies of H.R. 921, to establish the National Oceanographic Agency, and H.R. 2218, to provide for a comprehensive long-range, and coordinated national program in oceanography.

My testimony of June 23, 1964, before the Subcommittee on Oceanography of the House Merchant Marine and Fisheries Committee (two copies enclosed) continues to represent what seems to me to be the essential considerations to be taken into account in organizing the executive branch for an effective oceanographic program. H.R. 912 and H.R. 2218 represent quite different approaches to this question. I do not believe that H.R. 912 provides a satisfactory solution because it would centralize in a single agency many aspects of oceanography which must be carried on by many parts of the Federal Government if they are to discharge their statutory obligations. On the other hand, H.R. 2218 provides a policy and actions which would strengthen oceanographic activities without centralizing them. This I consider the preferable general approach, and I would be glad to discuss these matters, as well as more recent developments in the Federal oceanographic programs, in greater detail at the appropriate time.

Thank you for the opportunity to comment on these measures.

Sincerely yours,

DONALD F. HORNIG, *Director.*

SMITHSONIAN INSTITUTION,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: This report is in further reference to your letter of January 22, 1965, requesting the views of the Smithsonian Institution on H.R. 921, a bill to establish the National Oceanographic Agency.

This legislation would establish an independent agency which would be directed to establish a coordinated national program for oceanography and related sciences including meteorology. Under section 4 of H.R. 921, all functions, personnel, property, and unexpended funds relating to oceanography and related sciences vested in any Federal agency would be transferred to the National Oceanographic Agency.

On February 3, 1965, you were advised that the Board of Regents would be asked for its views on H.R. 921 at its next meeting and that subsequently you would be advised of its views.

The Interagency Committee on Oceanography has been operating as an effective means of exchanging information and coordinating activities of the various Federal agencies active in this field. It has

obtained support from the various agencies for the undertaking of new programs and has been effective in the development of oceanographic policy in the United States.

An integral part of the normal programs of numerous Federal agencies relates to oceanographic activities. The Smithsonian Institution would be greatly weakened in its operation of the Museum of Natural History if its competence in biological oceanography were removed to some other agency. The Board of Regents of the Smithsonian Institution, therefore, recommends against the enactment of H. R. 921.

The Bureau of the Budget advises that there is no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

S. DILLON RIPLEY, *Secretary.*

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your request for the views and recommendations of this Department on H. R. 921, to establish the National Oceanographic Agency.

The bill would establish an independent National Oceanographic Agency headed by an Administrator. The Agency would have the responsibility for establishing a coordinated national program for oceanography and related sciences including meteorology. The bill would transfer to the Agency all functions relating to oceanography and related sciences which are vested, on the date of enactment, in any officer, employee, department, agency, or instrumentality of the United States. Further, the bill would transfer to the Agency so much of the personnel, property, records, and unexpended balances of appropriations, allocation, and other funds of any department, agency, or instrumentality of the United States with respect to which any function is transferred as the Director of the Bureau of the Budget determines necessary in connection with the exercises by the Agency of the functions so transferred.

The Coast Guard's mission in oceanography constitutes an important but collateral part of its activities. Normally, oceanographic tasks are accomplished in conjunction with or as a part of the accomplishment of other Coast Guard activities. There is only one vessel of the Coast Guard whose functions are primarily oceanographic and this is a vessel used in connection with the International Ice Patrol. Most of the other major vessels of the Coast Guard, although engaged in work involving oceanography, carry out these tasks in connection with the performance of other statutory functions. Such methods have resulted in the accumulation of significant data with a minimum expenditure of funds.

As proposed, H. R. 921 presents difficulties of application. One difficulty relates to the role of the proposed Agency and a second to that Agency's scope of operations.

If the bill contemplates the role of the Agency as chiefly operational, it would introduce a division of responsibility and action of an imprecise and artificial ground. Where does the "oceanography" aspect of, for example, ocean-station vessels begin and end? Clearly, under 14 U.S.C. 90, the maintenance of an ocean station is not primarily an oceanographic task. The personnel directly engaged in taking bathythermograph readings are obviously engaged in oceanographic work. The personnel who maintain the position of the vessel at an ocean station for this purpose as well as others assigned to the vessel as an ocean-station vessel are just as obviously not engaged directly in oceanographic work. Yet, the latter personnel are essential both to oceanographic and nonoceanographic functions of the vessel. The joint accomplishment of separate tasks to which the organization of the Coast Guard so readily lends itself seems to suggest that a working system exists which would be jeopardized if the proposed will were enacted.

If the bill contemplates the role of the Agency as chiefly coordinating, the result will be dual and competing channels of authority; one in the new Agency and others in the agencies having facilities used to carry out the work. Such a duplication would lead to confusion and unnecessary expense. At the present time, coordination is achieved by the Interagency Committee on Oceanography, formed by the Federal Council for Science and Technology. It has been suggested that this present cooperation be put on a more formal basis. H.R. 2218, a bill to provide for, among other things, a coordinated national program in oceanography offers a workable program without involving the transfer of personnel, equipment, and funds and without duplicating unnecessarily the organization which would be required to translate the program of the new Agency into execution by the various cooperating agencies. This Department supports the enactment of H.R. 2218.

The second difficulty in interpretation of H.R. 921 relates to the vagueness and uncertainty surrounding the scope of operation of the proposed Agency. The Department suggests that an agency limited only by the generic term "oceanography" can cause chaos in the field. The very real difficulty is the lack of a precise definition of "oceanography." Oceanography cannot be defined in clear-cut terms of reference. It covers basic disciplines of science and engineering. The broad spectrum of the basic sciences (i.e., marine biology, geology, physics, and chemistry) as well as their practical application (i.e., charts, harbor improvements, aids to navigation, fisheries, ocean forecasting) makes most difficult the resolution of the term "oceanography" into workable and practical guidelines, both for the transfer of personnel, equipment, funds, and functions to the new Agency and for the determination of the powers and authority to be exercised by the new Agency.

The Department has stated its support of H.R. 2218 as a constructive measure for assuring coordination of the efforts of the various Government agencies in the area of oceanography. For the reasons given above, the Department believes that the establishment of a new agency, as outlined in the proposed bill, will not achieve that result in as desirable a manner.

Accordingly, the Treasury Department opposes the enactment of H.R. 921.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRED B. SMITH,
Acting General Counsel.

[H.R. 2218, H.R. 3310, H.R. 3352, 89th Cong., 1st sess.]

BILLS To provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Oceanographic Act of 1965".

SEC. 2. (a) It is hereby declared to be the policy of the United States to develop, encourage, and maintain a coordinated, comprehensive, and long-range national program in oceanography for the benefit of mankind, defense against attack from the oceans, and operation of our own surface and subsurface naval forces with maximum efficiency, rehabilitation of our commercial fisheries, and increased utilization of these and other resources. Furtherance of this policy requires that adequate provision be made for continuing systematic research, studies, and surveys of the ocean and its resources, and of the total marine environment, the development of new and improved techniques, instruments, or equipment for oceanographic research and surveys, the education and training of scientists and technicians through a sustained and effective program, and encouragement of international cooperation in marine research and surveys in the national interest.

It is further declared to be the policy of the United States to implement the national program through the balanced participation and cooperation of all qualified persons, organizations, institutions, agencies, or corporate entities whether governmental, educational, nonprofit, or industrial.

(b) It is the purpose of this Act to carry out and effectuate the policies declared in subsection (a) of this section.

SEC. 3. (a) In conformity with the provisions of section 2 of this Act, it shall be the duty of the President to—

(1) issue a statement of national goals with respect to oceanography;

(2) survey all significant oceanographic activities, including the policies, plans, programs, and accomplishments of all Federal agencies engaged in such activities;

(3) develop a comprehensive program of oceanographic activities to be conducted or supported by Federal agencies;

(4) designate and fix responsibility for the direction of oceanographic activities; and

(5) resolve differences arising among Federal agencies with respect to oceanographic activities.

(b) In the planning and conduct of a coordinated Federal program the President shall utilize such advisory arrangements, including the Office of Science and Technology, as he may find necessary and appropriate. Departments and agencies concerned with oceanographic problems or having capabilities in the field shall be consulted in planning a Federal program. The views of non-Federal organizations and individuals with capabilities in oceanography shall also be solicited.

SEC. 4. (a) The President is authorized to appoint an Advisory Committee for Oceanography to consist of not less than seven members. The Committee shall contain adequate representation of scientists selected on the basis of competence from universities and other non-Federal institutions and agencies, and from industry.

(b) The Advisory Committee shall meet at the call of the President. The Advisory Committee shall review the national program of oceanography and revisions thereof and may make recommendations with respect thereto.

SEC. 5. The President shall report annually during the month of February to the Congress. Such report shall contain the following:

- (1) the general status of oceanography;
- (2) the status of research, development, studies, and surveys conducted (directly or indirectly) by the United States in furtherance of oceanography, together with application of such research, development, studies, and surveys;
- (3) a financial analysis on a horizontal basis showing the totality of the amounts proposed for appropriation by Congress for marine sciences, by functions;
- (4) a detailed analysis of the amounts proposed for appropriation by Congress for the ensuing fiscal year for each of the departments, agencies, and instrumentalities of the Government to carry out the purposes of this Act;
- (5) current and future plans and policies of the United States with respect to oceanography; and
- (6) requests for such legislation as may be necessary to carry out as rapidly as possible the purposes of this Act.

SEC. 6. As used in this Act the term "oceanography" includes, but is not limited to, the acquisition, assembling, processing, and dissemination of all scientific and technological oceanographic and related environmental data, including, but not limited to, physical, geological, biological, fisheries, hydrographic and coastal survey, meteorological, climatological, and geophysical data.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., March 4, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on H.R. 2218, a bill "[t]o provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes."

As you are aware, the AEC was one of the four Federal agencies that first suggested and participated in efforts to coordinate an effective national program in oceanography.

We believe that H.R. 2218, which directs the President to establish a comprehensive Federal program in oceanography and to fix responsibility for its conduct, could effectively achieve this important objective. Accordingly, the Commission recommends the enactment of H.R. 2218.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN V. VINCIGUERRA,
General Manager.

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., March 11, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This will acknowledge your letter of January 26, 1965, inviting the Bureau of the Budget to comment on H.R. 2218, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

The proposed legislation contains three principal provisions: (a) The President is directed to establish a comprehensive Federal program of oceanographic activities and to fix responsibility for its conduct; (b) the President is authorized to appoint an Advisory Committee for Oceanography; (c) The President is directed to report annually on specific aspects of the program to the Congress.

The Bureau of the Budget commented on a predecessor bill, H.R. 13, in a letter to your committee on May 6, 1963. Subsequently, we made suggestions for improvement of the bill which have been reflected in the drafting of H.R. 2218.

The provision in the bill for development of a coordinated national program in oceanography conforms with the objectives of this administration. Similarly, the Office of Science and Technology, the Federal Council for Science and Technology, and the Bureau of the Budget have been seeking to improve the process of reporting to the Congress on the status and future plans for the field. Consequently, the reporting procedures in the bill are welcomed as useful guidelines in keeping the Congress informed of developments in the fast moving field of oceanography.

The Bureau of the Budget recommends enactment of H.R. 2218.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C.; April 15, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of this Department with respect to H.R. 2218, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

This bill would require the President to issue a statement of national goals with respect to oceanography, to survey the oceanographic activities of all Federal agencies, to develop a comprehensive Federal program in oceanography, to fix responsibility for the direction of oceanographic activities, and to resolve differences among the Federal agencies with regard to these activities. The President would also be authorized to appoint an advisory committee and would be required to furnish the Congress with a detailed annual report. This Department recommends enactment of this legislation, if amended as set forth below.

The national interest requires effective planning and coordination of the oceanographic effort, and this bill will establish the mechanism whereby this can be accomplished. It should be noted that with the exception of the required annual report to the Congress, the provisions of this bill are now being carried out in effect by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. The bill would provide for the continuation of the executive responsibilities which that committee was established to meet and would ensure that oceanography, an important aspect of

the national scientific program, continues to receive the coordinated attention it deserves. In addition, it provides that the Congress annually be apprised of the general status of oceanography, of the planned financial support, and of the present and future plans and policies in this field.

The cost of oceanographic operations of this Department should not be affected by this legislation, although some economy may result in the national program.

We recommend that page 5, lines 2 and 3, be amended to read "hydrographic and coastal survey, and geophysical data, and those aspects of marine meteorology directly related to oceanography." It is felt that climatology and most meteorology do not pertain to oceanography.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely,

ROBERT E. GILES.

DEPARTMENT OF THE NAVY,
OFFICE OF THE SECRETARY,
OFFICE OF LEGISLATIVE AFFAIRS,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

MY DEAR MR. CHAIRMAN: Your request for comment on H.R. 2218, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes, has been assigned to this Department by the Secretary of Defense for the preparation of a report thereon expressing the views of the Department of Defense.

The proposed legislation, in assigning the responsibility for establishing a coordinated national program in oceanography to the President, is consistent with the objectives of the administration. Further, it is consistent with the actions which have been taken during the past few years by the executive branch to improve the state of our marine sciences. Of major importance are the features of the bill which provide a statutory foundation for executive responsibilities as well as for an annual review of the field by the Congress.

The objections previously transmitted by this Department on predecessor bills have been effectively overcome in H.R. 2213. Therefore, the Department of the Navy, on behalf of the Department of Defense, supports and recommends enactment of H.R. 2218.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that, from the standpoint of the administration's program, there is no objection to the presentation of this report for the consideration of the committee.

Sincerely yours,

M. K. DISNEY,
*Captain, U.S. Navy,
Director, Legislative Division
(For the Secretary of the Navy).*

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., February 4, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your letter of January 26, 1965, requesting our comments on H.R. 2218, 89th Congress, 1st session, entitled "A bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes."

We have no special information or knowledge concerning the proposed legislation and, therefore, we make no recommendation with respect to its enactment.

Sincerely yours,

JOSEPH CAMPBELL,
Comptroller General of the United States.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
Washington, D.C., August 2, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your request of January 26, 1965, for a report on H.R. 2218, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

The bill would vest in the President responsibility for issuance of a statement of national goals with respect to oceanography, development of a comprehensive program of oceanographic activities, and designation and fixing of responsibility for the direction of such activities. Further, the bill would direct the President to report annually to the Congress on stated aspects of the program and would authorize him to appoint an Advisory Committee for Oceanography.

This Department is represented on the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Through the work of the Committee, many of the objectives of H.R. 2218 are presently being achieved. The Committee prepares each year a coordinated, comprehensive plan for the achievement of national goals in the field of oceanography. The national oceanographic program for fiscal year 1966 was recently transmitted to the Congress by the President.

H.R. 2218 would provide specific statutory basis for interagency coordination of programs in oceanography. It could serve to focus wider attention on this broad area in inquiry in its many aspects. We would, therefore, have no objection to enactment of the bill.

We are advised by the Bureau of the Budget that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely,

WILBUR J. COHEN,
Under Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Your committee has requested our views and recommendations on seven specific bills concerned with the problem of planning, coordinating, and financing the national oceanographic program. This Department, through the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife, the Bureau of Mines, and the Geological Survey, is greatly interested in, and directly concerned with, the science of oceanography. We are primarily concerned with the development of the natural resources of the oceans. Consequently, we desire that this form of research and development proceed efficiently and effectively in the national interest.

Described briefly, the bills before the committee are:

* * * * *

H.R. 2218 provides a declaration of policy concerning a long-range national program in oceanography and lists specific duties of the President in conformity with such policy. He is directed to utilize such advisory arrangements as he deems necessary, including the Office of Science and Technology. Departments and agencies having problems or capabilities in oceanography are to be consulted in planning a Federal program and non-Federal organizations having such capability are to be consulted. The President is authorized to appoint a seven-member Advisory Committee for Oceanography from universities, non-Federal institutions, and industry to review the national program of oceanography and make recommendations. H.R. 2218 is identical to H.R. 6997, 88th Congress, which passed the House but was not acted upon by the Senate. It is identical to H.R. 3310 and H.R. 3352, introduced in the 89th Congress.

* * * * *

All of these bills deal in various ways with the problem of planning, coordinating and financing the national oceanographic program. This is a large program of research and development which involves several Federal Government departments and specialized agencies. It is largely based on the recommendation of a committee of the National Academy of Sciences, which in 1959 proposed that the Federal Government embark on a 10-year program of expanded research on the oceans. The program involves studies of the physics, chemistry, geology, and biology of the ocean and its contiguous waters; the relationships and interactions between ocean and atmosphere; and the living mineral, and fossil resources of the ocean waters and seabed, and methods of conserving and harvesting these natural resources. Since 1960 the program has been coordinated and its budgets planned by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Funds are appropriated through the budgets of the individual cooperating agencies. The large number of bills which have been introduced in the Congress in recent sessions proposing to alter this coordinating machinery or to begin new studies of the ocean and its resources reflects the concern

of the legislative branch of the Government that the present mechanism for planning and review may not be adequate. The varying nature of the individual solutions to the problem represented by these bills is a fair indication of the complexity of the problem.

We believe that there is a growing need for a perspective in which the oceanographic programs of the Federal Government can be more clearly seen in relation to each other and in relation to the national goals which they support. All of these bills contain some features which could be helpful in carrying out a national oceanographic program. The position of the executive branch, however, is that H.R. 2218 should be enacted, but that the enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the Panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised governmental organization to administer the national oceanographic program should be enacted.

The recommendation that legislative action should be deferred is not intended to cast any doubt on the importance of the subject. President Johnson has recently stated his intention that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: Over the last 3 months you have been kind enough to refer to us for our information, and such comment as we might wish to make, several bills having to do with the Federal Government's arrangements for developing, coordination, and funding the national oceanographic program.

Our Committee on Oceanography has welcomed the opportunity to review these bills. The Committee has long recognized the need for a more unified approach to the oceanography program among the Federal agencies. The Committee considers such an approach to be especially desirable with reference to those elements of the program that involve the missions of several different agencies, for example, the study of air-sea interactions, the development and use of deep-diving vehicles and other means of deep-sea investigation, and the study of ocean resources.

While the Committee does not have an adequate basis for recommending a particular mechanism for achieving the desired unity of

approach, its members feel that efforts at the appropriate level of the executive branch, for example, the Office of science and Technology, in consultation with the congressional committees concerned, can undoubtedly result in an effective solution of the problem.

Yours sincerely,

FREDERICK SEITZ, *President.*

NATIONAL SCIENCE FOUNDATION,
OFFICE OF THE DIRECTOR,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request of January 25, 1965, for the views of the National Science Foundation on H.R. 2218, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

Under the terms of the bill, the President is directed to establish a national oceanographic program and to assign responsibility for carrying out the program. In addition, the bill authorizes the President to appoint an advisory committee for oceanography and directs him to report annually to the Congress on the status of the program.

We believe that legislation such as that proposed in H.R. 2218 would be useful in helping to establish guidelines for carrying out the national oceanographic program and recommend that the bill be enacted.

The Bureau of the Budget has advised us it has no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

LELAND J. HAWORTH, *Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, D.C., February 17, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Thank you for sending me with your letters of January 22 and January 26, copies of H.R. 921, a bill to establish the National Oceanographic Agency, and H.R. 2218, a bill to provide for a comprehensive long-range, and coordinated national program in oceanography.

My testimony of June 23, 1964, before the Subcommittee on Oceanography of the House Merchant Marine and Fisheries Committee (two copies enclosed) continues to represent what seems to me to be the essential considerations to be taken into account in organizing the executive branch for an effective oceanographic program. H.R. 912 and H.R. 2218 represent quite different approaches to this

question. I do not believe that H.R. 912 provides a satisfactory solution because it would centralize in a single agency many aspects of oceanography which must be carried on by many parts of the Federal Government if they are to discharge their statutory obligations. On the other hand, H.R. 2218 provides a policy and actions which would strengthen oceanographic activities without centralizing them. This I consider the preferable general approach, and I would be glad to discuss these matters, as well as more recent developments in the Federal oceanographic programs, in greater detail at the appropriate time.

Thank you for the opportunity to comment on these measures.

Sincerely yours,

DONALD F. HORNIG, *Director.*

SMITHSONIAN INSTITUTION,
Washington, D.C., March 19, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Thank you for your letter of January 26, 1965, requesting the views of the Smithsonian Institution on H.R. 2218, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

This legislation would (1) set forth as national policy the development of a national oceanographic program; (2) place the responsibility for the development of the national program with the President; (3) authorize the President to appoint an advisory committee on oceanography; and (4) require the President to make an annual oceanographic report.

The Smithsonian Institution favors enactment of this legislation. We have a deep interest in the science of oceanography, are included in the membership of the Interagency Committee on Oceanography, and welcome further participation in the biological and geological portions of the sustained national oceanographic effort. From this effort significant advances of knowledge will occur that will result in economic benefits and the increased utilization of food and other resources of the sea.

That portion of H.R. 2218 providing for the utilization of advice from non-Federal sources is significant. Such advice is essential to the intelligent operation of a program as broad in scope as the national oceanographic program.

The Bureau of the Budget advises that there is no objection to the presentation of this report from the standpoint of the administration's program.

We appreciate this opportunity to indicate our support of H.R. 2218.

Sincerely yours,

S. DILLON RIPLEY, *Secretary.*

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your request for the views and recommendations of this Department on H.R. 2218, to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

In addition to declaring a national policy on oceanography, the bill would delineate the duties of the President in that field, authorize him to utilize such advisory arrangements as he finds desirable, and authorize him to appoint an Advisory Committee for Oceanography. This Committee would review the national program in oceanography and make recommendations concerning it. The bill would provide for a report by the President to Congress which would contain, among other items, a financial analysis of the amounts proposed for appropriations for oceanography for each department and agency of the Government.

The bill is clearly intended to advance the national program in oceanography. The Department is in full sympathy with this objective. The bill would appear to be a constructive step toward the advancement and improvement of this program without derogating from the authority of the President or the heads of the agencies supporting oceanographic activities. The Department, therefore, supports its enactment.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRED B. SMITH,
Acting General Counsel.

[H.R. 5654, H.R. 6512, H.R. 7301, H.R. 7798, 89th Cong., 1st sess.]

BILLS To provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SEC. 101. This Act may be cited as the National Oceanographic Act of 1965.

DECLARATION OF POLICY AND PURPOSE

SEC. 201. The oceanographic and marine activities of the United States should be conducted so as to contribute to the following objectives:

(1) The expansion of human knowledge of phenomena in and related to the oceans, the marine environment, and the Great Lakes, their boundaries and contents.

(2) The preservation of the role of the United States as a leader in oceanographic and marine science and technology.

(3) The enhancement of the general welfare and security of the United States.

(4) The advancement of education and training in marine science and technology.

(5) The development and improvement of the capabilities, performance, and efficiency of vehicles, equipment, and instruments for use in exploration, research, surveys, the recovery of resources, and the transmission of energy in the marine environment.

(6) The coordination of activities of the various agencies concerned with the marine sciences, and the collection, storing, and distribution of significant data acquired as a result of these activities.

(7) The establishment of long-range studies of the potential benefits to the United States economy, security, health, and welfare to be gained from the opportunities for, and the problems involved in, utilization of scientific marine and Great Lakes research and surveys.

(8) The effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States, in order to avoid unnecessary duplication of effort, facilities and equipment, or waste.

(9) The making available to agencies directly concerned or affected by oceanographic or Great Lakes phenomena of knowledge obtained through U.S. scientific marine research and surveys which is of value or significance to the agency.

(10) The cooperation by the United States with other nations and groups of nations in oceanographic and marine research and surveys when such cooperation is in the national interest.

THE NATIONAL OCEANOGRAPHIC COUNCIL

SEC. 301. (a) There is hereby established, in the Executive Office of the President, the National Oceanographic Council (hereinafter called the "Council") which shall be composed of—

- (1) The Vice President, who shall be Chairman of the Council.
- (2) The Secretary of State.
- (3) The Secretary of the Treasury.
- (4) The Secretary of Defense.
- (5) The Secretary of the Interior.
- (6) The Secretary of Commerce.
- (7) The Secretary of Health, Education, and Welfare.
- (8) The Director of the Office of Science and Technology.
- (9) The Chairman of the Atomic Energy Commission.
- (10) The Director of the National Science Foundation.
- (11) The Secretary of the Smithsonian Institution.

(b) The President shall from time to time designate one of the members of the Council to preside over meetings of the Council during the absence, disability, or unavailability of the Chairman.

(c) Each member of the Council may designate another officer of his department or agency to serve on the Council as his alternate in his unavoidable absence.

(d) Each alternate member designated under subsection (c) of this section shall be designated to serve as such by and with the advice and consent of the Senate unless at the time of his designation he holds an office in the Federal Government to which he was appointed with the advice and consent of the Senate.

(e) It shall be the function of the Council to advise and assist the President, as he may request, with respect to the performance of functions in the field of oceanography and the marine sciences, including but not limited to the following functions:

(1) survey all significant oceanographic and marine science activities, including the policies, plans, programs, and accomplishments of all departments and agencies of the United States engaged in such activities;

(2) develop a comprehensive program of oceanographic and marine science activities, including, but not limited to, exploration, exploitation and conservation of marine resources, oceanographic engineering, studies of air-sea interaction, transmission of energy, and communications, to be conducted by departments and agencies of the United States;

(3) designate and fix responsibility for the direction of major oceanographic and marine science activities, including, but not limited to, exploration, exploitation and conservation of marine resources, oceanographic engineering, studies of air-sea interaction, transmission of energy, and communications;

(4) provide for effective cooperation among all departments and agencies of the United States engaged in oceanographic and marine science activities, and specify, in any case in which primary responsibility for any category of the oceanographic and marine science activities has been assigned to any department or agency, which of those activities may be carried on concurrently by other departments or agencies;

(5) resolve differences arising among departments and agencies of the United States with respect to oceanographic and marine science activities under this Act, including differences as to whether a particular project is an oceanographic and marine science activity; and

(6) review annually all existing oceanographic and marine sciences activities conducted by departments and agencies of the United States in light of the policies, plans, programs, and priorities developed pursuant to this Act.

(f) The Council may employ a staff to be headed by a civilian executive secretary who shall be appointed by the President, by and with the advice and consent of the Senate, and shall receive compensation at a rate established by the President at not to exceed that of level II of the Federal Executive Salary Schedule. The executive secretary, subject to the direction of the Council, is authorized to appoint and fix the compensation of such personnel, including not more than seven persons who may be appointed without regard to civil service laws of the Classification Act of 1949 and compensated at not to exceed the highest rate of grade 18 of the General Schedule of the Classification Act of 1949, as amended, as may be necessary to perform such duties as may be prescribed by the Council in connection with the performance of its functions.

(g) The Council shall submit to Congress within one year from the date of enactment of this Act, a comprehensive program of proposed legislation in furtherance of oceanography and the marine sciences.

SEC. 401. (a) The Council, under the foreign policy guidance of the President, may engage in a program of international cooperation in work done pursuant to this Act, pursuant to agreements made by the President with the advice and consent of the Senate.

(b) The President shall transmit to the Congress in January of each year a report, which shall include (1) a comprehensive description of the programed activities and the accomplishments of all agencies and departments of the United States in the field of oceanography and marine science activities during the preceding year, and (2) an evaluation of such activities and accomplishments in terms of the attainment of, or the failure to attain, the objectives developed pursuant to this Act.

(c) Any report made under this section shall contain such recommendations for additional legislation as the Chairman or the President may consider necessary or desirable for the attainment of the objectives developed pursuant to this Act, and shall contain an estimate of funding requirements of each agency and department of the United States in the field of oceanography and the marine science activities for its projected program activities during the succeeding fiscal year.

(d) No information which has been classified for reasons of national security shall be included in any report made under this section, unless such information has been declassified by, or pursuant to authorization given by, the President.

SEC. 501. (a) The Council shall arrange with the Federal Bureau of Investigation for the conduct of such security or other personnel investigation of the Council's officers, employees, and consultants, as it deems appropriate, and if any such investigation develops any data reflecting that the individual who is the subject thereof is of questionable loyalty there shall be a full field investigation of the matter, the results of which shall be furnished to the Council.

(b) The Atomic Energy Commission may authorize any of its employees, or employees of any contractor, prospective contractor, licensee, or prospective licensee of the Atomic Energy Commission under subsection 145(b) of the Atomic Energy Act of 1954 (42 U.S.C. 2165(b)), to permit any member, officer, or employee of the Council to have access to restricted data relating to oceanography and the marine sciences which is required in the performance of his duties and so certified by the Council but only if (1) the Council or designee thereof has determined, in accordance with the established personnel security procedures and standards of the Council, that permitting such individual to have access to such restricted data will not endanger the common defense and security, and (2) the Council or designee thereof finds that the established personnel and other security procedures and standards of the Council are adequate and in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165). Any individual granted access to such restricted data pursuant to this subsection may exchange such data with any individual who (A) is an officer or employee of the Department of Defense, or any department or agency thereof, or a member of the Armed

Forces, or a contractor or subcontractor of any such department, agency, or armed force, or an officer or employee of any such contractor or subcontractor, and (B) has been authorized to have access to restricted data under the provisions of section 143 of the Atomic Energy Act of 1954 (42 U.S.C. 2163).

SEC. 601. Information obtained or developed by the Chairman in the performance of his functions under this Act shall be made available for public inspection except (a) information authorized or required by Federal statute to be withheld, and (b) information classified to protect the national security: *Provided*, That nothing in this Act shall authorize the withholding of information by the Chairman from the duly authorized committees of Congress.

SEC. 701. (a) For the purposes of this Act the term "marine sciences" shall be deemed to apply also to scientific endeavors in and with relation to the Great Lakes.

(b) There is hereby authorized to be appropriated such sums as may be necessary to carry out this Act, but sums appropriated for any one fiscal year shall not exceed \$500,000.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on H.R. 5654, a bill to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

As you know, the Atomic Energy Commission was one of the four Federal agencies that first suggested and participated in efforts to coordinate the national program in oceanography. The Federal Council for Science and Technology (FCST) created by Executive Order No. 10807 on March 13, 1959, established the permanent Interagency Committee on Oceanography (ICO) by letter dated March 3, 1960, from George Kistiakowsky, Chairman of the FCST, to the Honorable James H. Wakelin, Jr., Assistant Secretary of the Navy for Research and Development. A primary function of the ICO has been to coordinate the activities of various agencies having an interest in oceanography and related marine sciences. There is also an FCST Committee on Water Resources Research which is concerned with coordinating research activities of the various agencies on fresh water resources, including research pertaining to the Great Lakes.

It is the AEC's understanding that the proposed bill would in effect substitute a National Oceanographic Council for the ICO as the primary coordinator of agency activities in the field of oceanography, and for the FCST Committee on Water Resources Research as the primary coordinator of agency research activities in the field of fresh water resources to the extent that those activities concern the Great Lakes. While the Commission is in accord with the substantive purpose and intent of the proposed legislation, it is our belief that such a substitution is not necessary or appropriate at this time in view of the effective coordination of agency efforts in this field by the ICO and the FCST Committee on Water Resources Research.

Should the bill be considered for passage, however, the Commission suggests that changes as set forth below be made.

The Commission urges the deletion from the bill of subsection 501 (b). This subsection would authorize "any member, officer, or employee of the Council to have access to restricted data relating to

oceanography and the marine sciences which is required in the performance of his duties * * * as certified by the Council, provided the Council determines that its established "security procedures * * * are * * * in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165)," and provided the Council has determined in accordance with such procedures "that permitting such individual to have access to such restricted data will not endanger the common defense and security."

In our view subsection 501(b) would have the effect of diluting the Commission's control over restricted data without adequate demonstrated need. Such a certification procedure for access to restricted data, as proposed by subsection 501(b), has been accorded to only two agencies, the Department of Defense and the National Aeronautics and Space Administration because the nature of the duties and functions of these agencies have so required. However, we believe that such a statutory provision for the National Oceanographic Council is not necessary. There does not appear to be extensive restricted data pertaining to oceanography and related marine sciences, and we believe that need for access to such restricted data, which the Council's members and officers as well as its relatively small staff may have, can be effectively handled through the Commission's usual security procedures. In this connection, it should be noted that Public Law 87-206 (75 Stat. 475) amended the Atomic Energy Act of 1954, as amended, on September 6, 1961, by adding a new subsection 145(c) in order to expedite clearances in such cases as this. In order to allow the Council to make full use of the clearance procedure contained in section 145(c) of the Atomic Energy Act, it is also recommended that section 501(a) of the proposed bill be revised to read as follows:

"SEC. 501. (a) The Council shall arrange with the Federal Bureau of Investigation for the conduct of investigations, including full field investigations, of the character, associations, and loyalty of the Council's officers, employees, and consultants, as it deems appropriate. The results of such investigations shall be furnished to the Council."

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN V. VINCIGUERRA
(For General Manager.)

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C., July 26, 1965.

Hon. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of this Department concerning H.R. 5654, a bill to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

H.R. 5654 would set forth national objectives for oceanographic and marine activities and would establish a National Oceanographic Council composed principally of Cabinet-level officers. The Council would advise and assist the President by surveying present oceanographic activities, developing an oceanographic program, coordinating the agencies' oceanographic activities and annually comparing Federal oceanographic accomplishments against the Council's oceanographic program. The Council would be authorized to employ an executive secretary and staff. H.R. 5654 would also require the President to report annually to Congress on his oceanographic program and on present accomplishments.

The Department strongly supports improvement in and greater emphasis for the national oceanographic program. However, we doubt that H.R. 5654 would have enough beneficial effect upon oceanographic activities to offset the detrimental effect it would have upon the administration of oceanography as a whole.

The Interagency Committee on Oceanography has had considerable success in coordinating and stimulating Federal oceanographic activities, and we are therefore not aware of overriding reasons for replacing it. The proposed National Oceanographic Council would not change the realities involved in setting priorities and apportioning limited funds among less limited demands within the agencies. There is no reason to believe that Council review of the national oceanographic program before its submission to the agencies would keep any agency from balancing its oceanographic program needs against the needs of its other programs. On the other hand, creation of the proposed Council would place additional demands directly upon Cabinet officers and agency heads who already have heavy burdens of responsibility.

If the Council supplants the Interagency Committee on Oceanography, the limited amount of personal time which the Council members could devote to Council activities might result in less consideration of oceanography within the executive branch than presently exists. If the Council and the Interagency Committee on Oceanography both exist there will be substantial duplication of efforts and possible conflict of proposed programs. We think it is better to leave oceanographic planning and coordination in the hands of the policy and operating officials who work with the oceanographic program, serve on the Interagency Committee on Oceanography and who are thus most qualified to advise the President on its needs.

For these reasons, the Department strongly favors the objectives of the bill but is opposed to the establishment of a Council to accomplish these objectives. If the bill were amended to permit the President to establish such mechanisms as he believes necessary to accomplish these objectives, we would favor the bill.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely,

BURT W. ROPER
(For Robert E. Giles).

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
Washington, D.C., August 2, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in response to your requests of March 4, 1965, and March 24, 1965, for a report on H.R. 5654, a bill to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes, and H.R. 6457, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

These bills would provide for the establishment in the Office of Science and Technology in the Executive Office of the President a National Oceanographic Council, composed of the heads of the departments and agencies having an interest in oceanography. The bills would also set out objectives to be sought in oceanography.

H.R. 5654 and H.R. 6457 would extend to the Great Lakes the scientific endeavors being conducted in and with relation to the oceans. This Department carries on widespread activities in the Great Lakes region. There are respects in which the behavior of the Great Lakes is the same as that of the oceans. The inclusion of the Great Lakes in the national oceanographic program would, in our judgment, be appropriate.

With respect to the organizational setting of the oceanographic program, we prefer the provisions of H.R. 2218. That bill would vest in the President the responsibility for issuing a statement of national goals with respect to oceanography, for developing a comprehensive program of oceanographic activities, for fixing the responsibility for the direction of such activities, for reporting annually to the Congress on stated aspects of the program, and for appointing an Advisory Committee for Oceanography. This bill would provide a specific statutory basis for interagency cooperation in programs in oceanography and could serve to focus wider attention on oceanography.

We would therefore recommend that H.R. 5654 or H.R. 6457 not be enacted.

We are advised by the Bureau of the Budget that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely,

WILBUR J. COHEN,
Under Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Your committee has requested our views and recommendations on seven specific bills concerned with the problem of planning, coordinating, and financing the national oceanographic program. This Department, through the Bureau of Commercial

Fisheries, the Bureau of Sport Fisheries and Wildlife, the Bureau of Mines, and the Geological Survey, is greatly interested in, and directly concerned with the science of oceanography. We are primarily concerned with the development of the natural resources of the oceans. Consequently, we desire that this form of research and development proceed efficiently and effectively in the national interest.

Described briefly, the bills before the committee are:

* * * * *

H.R. 5654 provides for the establishment of a National Oceanographic Council composed of the Vice President, certain Cabinet members, including the Secretary of the Interior, and certain other heads of agencies, including the Director of the Office of Science and Technology. The function of this Council is to advise the President on oceanography and the marine sciences. H.R. 6512, H.R. 7301, and H.R. 7798 are identical bills.

* * * * *

All of these bills deal in various ways with the problem of planning, coordinating and financing the national oceanographic program. This is a large program of research and development which involves several Federal Government departments and specialized agencies. It is largely based on the recommendation of a committee of the National Academy of Sciences, which in 1959 proposed that the Federal Government embark on a 10-year program of expanded research on the oceans. The program involves studies of the physics, chemistry, geology, and biology of the ocean and its contiguous waters; the relationships and interactions between ocean and atmosphere; and the living, mineral, and fossil resources of the ocean waters and seabed, and methods of conserving and harvesting these natural resources. Since 1960 the program has been coordinated and its budgets planned by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Funds are appropriated through the budgets of the individual cooperating agencies. The large number of bills which have been introduced in the Congress in recent sessions proposing to alter this coordinating machinery or to begin new studies of the ocean and its resources reflects the concern of the legislative branch of the Government that the present mechanism for planning and review may not be adequate. The varying nature of the individual solutions to the problem represented by these bills is a fair indication of the complexity of the problem.

We believe that there is a growing need for a perspective in which the oceanographic programs of the Federal Government can be more clearly seen in relation to each other and in relation to the national goals which they support. All of these bills contain some features which could be helpful in carrying out a national oceanographic program. The position of the executive branch, however, is that H.R. 2218 should be enacted, but that the enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the Panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised governmental organization to administer the national oceanographic program should be enacted.

The recommendation that legislative action should be deferred is not intended to cast any doubt on the importance of the subject. President Johnson has recently stated his intention that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: Over the last 3 months you have been kind enough to refer to us for our information, and such comment as we might wish to make, several bills having to do with the Federal Government's arrangements for developing, coordinating, and funding the national oceanographic program.

Our Committee on Oceanography has welcomed the opportunity to review these bills. The Committee has long recognized the need for a more unified approach to the oceanography program among the Federal agencies. The Committee considers such an approach to be especially desirable with reference to those elements of the program that involve the missions of several different agencies, for example, the study of air-sea interactions, the development and use of deep-diving vehicles and other means of deep-sea investigation, and the study of ocean resources.

While the Committee does not have an adequate basis for recommending a particular mechanism for achieving the desired unity of approach, its members feel that efforts at the appropriate level of the executive branch, for example, the Office of Science and Technology, in consultation with the congressional committees concerned, can undoubtedly result in an effective solution of the problem.

Yours sincerely,

FREDERICK SEITZ, *President.*

NATIONAL SCIENCE FOUNDATION,
OFFICE OF THE DIRECTOR,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of the National Science Foundation on H.R. 5654, a bill to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

The primary purpose of H.R. 5654 would be the establishment of a national oceanographic council consisting of the heads of 10 Federal departments and agencies with the Vice President of the United States as chairman. The function of the council would be to advise and assist the President in connection with matters involving oceanography and the marine sciences. The council would have a staff headed by a civilian executive secretary appointed by the President, by and with the advice and consent of the Senate.

H.R. 5654 is aimed at insuring that the United States has a strong oceanographic program. We fully concur with this objective. As you know, the national program in this area is being coordinated through the Interagency Committee on Oceanography of the Federal Council for Science and Technology. We believe that this organizational arrangement is proving satisfactory for carrying on the Nation's oceanographic effort, and that such problems as have arisen do not warrant establishment of the high level council envisaged by H.R. 5654.

In view of the above considerations, we recommend against enactment of H.R. 5654.

The Bureau of the Budget has advised us it has no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

LELAND J. HAWORTH, *Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, D.C., May 6, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Thank you for the opportunity to comment on H.R. 5654, a bill to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

We are in full accord with the objective of the bill, and concur with the proposal that the Great Lakes should be a part of a full oceanographic effort.

With respect to the functions to be performed by the proposed Council, the President has had available to him since 1959, through the Federal Council for Science and Technology, a means of coordinating and planning Federal activities relating to oceanography. The Interagency Committee on Oceanography, a group established under the Federal Council, is this instrumentality. The ICO is a working group composed of senior officials with both technical and policy responsibilities. The members of the group can work directly on matters involving oceanography with the members of the Federal Council for Science and Technology. The Council is composed of the top officials responsible for research and development policy in each of the major departments and agencies. Through the Special Assistant for Science and Technology, who is the Chairman of the Federal Council, important policy questions relating to oceanography are considered by the Executive Office of the President and by the President himself. Scientific ques-

tions arising from oceanography and related fields are considered by the President's Science Advisory Committee and discussed with the Chairman of ICO. These links between oceanography and the points of decision in the executive branch give considerable strength and flexibility to the existing system.

The ICO has to its credit a number of significant accomplishments. ICO has: (1) surveyed all significant oceanographic and marine science activities, including the programs of all Federal departments and agencies; (2) developed a comprehensive, long-range program of oceanographic and marine science activities of Federal agencies, and has transmitted this program to Congress; (3) served as the means of fixing responsibility for major oceanographic activities of Federal agencies; (4) provided for effective cooperation among Federal agencies; (5) resolved differences among agencies; and (6) reviewed annually all oceanographic activities of Federal agencies, and transmitted to Congress annually a report on Federal oceanographic activities. These are the functions that would be assigned to the proposed National Oceanographic Council. Whether they would be performed more effectively by the proposed Council is open to question.

The bill raises a general question relating to the structure of the executive branch for dealing with questions of science policy. The Office of Science and Technology was established with the concurrence of the Congress to advise the President on all matters relating to science and technology and to coordinate the activities of the Federal agencies. The bill raises in principle the desirability of establishing a series of national councils, for areas of high importance to science and technology, which report directly to the President. This way of organizing to deal with problems of science and technology would raise complicated problems, both for the President and for the major departments.

It seems to me that at this time, questions of scientific and technological substance relating to oceanography should take precedence over questions of organization. A prerequisite to decisions relating to the future development of oceanography is a thorough analysis of the state of the field, identification of points of priority in terms of science, technology, and resources, and the potential contributions of all parties (industry, government, universities, foundations, and private laboratories) to the field. A study group composed of outstanding scientists is being established under the auspices of the President's Science Advisory Committee to review these questions. They are also under study by the National Academy of Sciences Committee on Oceanography. It would seem prudent to withhold judgments on organizational matters until the results of these studies, plus the results of any inquiries that may stem from congressional action, are available.

The net effect of the considerations noted above is to leave me unconvinced of the advantages of the National Council approach to the organization of the Federal Government's activities in oceanography. At this time, it seems to me that concentration upon means of making the essential elements of the existing system more effective is the wiser course. This would be done under H.R. 2218, and it is for this reason that my favorable comment on that bill was sent to you on February 17, 1965.

Sincerely yours,

DONALD F. HORNIG, *Director.*

SMITHSONIAN INSTITUTION,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Thank you for your letter of March 4, 1965, for the views of the Smithsonian Institution on H.R. 5654, a bill to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

This legislation, designated as the National Oceanographic Act of 1965 and identical to S. 944 introduced by Senator Magnuson on February 2, 1965, would (1) set forth the objectives of the oceanographic and marine activities of the United States; (2) establish a National Oceanographic Council on which the Vice President would serve as Chairman and whose membership would include the heads of Federal departments and agencies concerned with oceanography and marine science activities; (3) set forth the mission of the Council as the advisory body to the President concerning the performance of specified functions in the fields of oceanography and marine sciences; (4) authorize the Council to employ the necessary staff; (5) direct the Council to present to Congress within 1 year from the date of enactment of H.R. 5654 a comprehensive legislative program in furtherance of oceanography and marine sciences; (6) authorize the Council, under the foreign policy guidance of the President, to engage in a program of international cooperation in these fields; (7) provide for the issuance of an annual report by the President describing and evaluating the activities of the United States in these fields and containing such legislative recommendations as the President may deem necessary; (8) prescribe certain security provisions relating to the Council's employees and activities; (9) provide that information developed by the Chairman of the Council under this legislation will be made available to the public, unless authorized or required by statute to be withheld for security reasons; and (10) authorize appropriations not to exceed \$500,000 to carry out the purposes of the bill.

It is noted that the Secretary of the Smithsonian Institution is included in the membership of the proposed National Oceanographic Council.

The Board of Regents of the Smithsonian Institution will be asked to consider this legislation at its next meeting. I shall be pleased to advise you of its views at that time.

Sincerely yours.

FRANK A. TAYLOR,
Acting Secretary.

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your request for the views of this Department on H.R. 5654, to establish a National Oceanographic Council.

The bill would establish a National Oceanographic Council in the Executive Office of the President. The Council would be chaired by

the Vice President and composed of the heads of certain executive departments and agencies. The Council would employ a staff headed by an Executive Director. The chief responsibility of the Council would be to coordinate the work in oceanography being carried out by the various departments and agencies of the Federal Government.

The bill is clearly intended to advance the national program in oceanography. The Department is in full sympathy with that objective; however, it questions whether the proposed bill offers the most effective method of achieving the desired purpose. At the present time, coordination is achieved by the Interagency Committee on Oceanography formed by the Federal Council for Science and Technology. The Department believes this basic approach should be continued and is opposed to the creation of another office or agency with independent authority and responsibility in the field. The latter would result in duplication of effort and organization in oceanography as well as derogate from the authority and responsibility of existing agencies in this field.

The Department has stated its support of H.R. 2218 as a constructive measure for assuring coordination of the efforts of the various Government agencies in the area of oceanography. For the reasons given above, the Department believes that the establishment of a new administrative organization, as outlined in the proposed bill, will not achieve that result in as desirable a manner.

Accordingly, the Treasury Department is opposed to the enactment of H.R. 5654.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRED B. SMITH,
Acting General Counsel.

[H.R. 5884, H.R. 6009, 89th Cong., 1st sess.]

BILLS To provide a program of marine exploration and development of the resources of the Continental Shelf

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the "Marine Exploration and Development Act".

DECLARATION OF POLICY

SEC. 2. The Congress finds and declares that —

The United States acquired under international law on June 10, 1964, sovereign rights to the exploration and development of resources of the Continental Shelf under the Convention on the Continental Shelf adopted at the United Nations Conference on the Law of the Sea. Pursuant to the internationally recognized and exclusive rights so secured, the United States assumes the responsibility of executing an accelerated program of exploration and development of the physical, chemical, geological, and biological resources of the Continental Shelf.

It is the policy of the United States to encourage private investment in the economic utilization of the marine resources of the Continental Shelf; to determine the benefits from use of these marine resources for increased investment and economic growth; to make available discoveries and information which may

have value to United States industries and to Federal and State agencies concerned with missions on the Continental Shelf; to develop an engineering capability for operating on the Continental Shelf and to fashion and operate vehicles and equipment for use in the waters above the Continental Shelf.

DEFINITIONS

SEC. 3. As used in this Act—

(1) The term "Continental Shelf" means the seabed and subsoil of the submarine areas adjacent to (a) the coast of continental United States to a depth of two hundred meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of such areas; or (b) the seabed and subsoil of similar submarine areas adjacent to the coasts of islands which comprise United States territory.

(2) The term "Commission" means the Marine Exploration and Development Commission established under section 4.

COMMISSION ESTABLISHED

SEC. 4. (a) There is hereby established a Marine Exploration and Development Commission to be composed of five members as follows—

(1) two members to be appointed from private life by the President, by and with the advice and consent of the Senate;

(2) the Secretary of Defense;

(3) the Secretary of the Interior; and

(4) the Secretary of Commerce.

One of the members appointed under clause (1) shall be designated by the President at the time of appointment as Chairman of the Commission. Each member specified in clause (2), (3), or (4) may designate another officer of his department to serve on the Commission in his absence.

(b) Members of the Commission appointed under subsection (a) (1) shall receive compensation at the rate of \$100 per diem while engaged in the business of the Commission, and while away from their homes or regular places of business they may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons in the service of the Federal Government who are employed intermittently. Members specified in subsection (a) (2), (3), and (4), including persons designated to serve in their absence, shall not receive compensation in addition to that to which they are otherwise entitled as officers or employees of the Government but shall be reimbursed for travel or other expenses incurred in carrying out the business of the Commission.

(c) The Commission shall have an Executive Director, who shall be appointed by the President, by and with the advice and consent of the Senate. The Executive Director shall serve at the pleasure of the President and shall receive compensation at the rate prescribed for level IV of the Federal Executive Salary Schedule established by the Federal Executive Salary Act of 1964. Subject to the general supervision of the Commission, the Executive Director shall perform such of the functions conferred upon the Commission under this Act as the Commission shall prescribe.

(d) The Commission shall appoint and fix the compensation of such other officers and employees as may be necessary to enable it to carry out its functions. However, the Commission shall utilize the capacity of existing governmental agencies to the maximum extent consistent with the purposes of this Act. The Commission may also procure, without regard to the civil service laws and the Classification Act of 1949, temporary and intermittent services to the same extent as is authorized for the departments by section 15 of the Act of August 2, 1946, but at rates not exceeding \$75 per diem for the individuals.

FUNCTIONS OF THE COMMISSION

SEC. 5. It shall be the function of the Commission to formulate and carry out programs for purposes of exploration and development of the marine resources of the Continental Shelf and waters above the Continental Shelf. Such programs shall include but shall not be limited to the following:

(1) Marine exploration, expeditions, and surveys necessary to describe the topography and to identify, locate, and economically develop physical, chemical, geological, and biological resources of the Continental Shelf;

(2) Cooperative expeditions for these purposes with other Federal agencies having missions on the Continental Shelf;

(3) Development of an engineering capability that will permit exploration and development of the Continental Shelf and superjacent waters;

(4) Fostering participation in marine exploration and economic development by scientific institutions and industry, through grants, loans, and cost-sharing arrangements; and

(5) Providing for the widest practicable and appropriate dissemination of information concerning marine discoveries, development of instrumentation, equipment, and facilities, and other information as the Commission may deem appropriate.

POWERS OF COMMISSION

SEC. 6. In carrying out its functions under section 5, the Commission is authorized—

(1) to enter into agreements with other Government agencies for the carrying out by such agencies of any activities authorized by this Act, and for the reimbursement from appropriations made pursuant to section 8(a) of expenses incurred by such agencies in carrying out such activities;

(2) to enter into agreements with public or private scientific institutions, or with private enterprises or individuals, for the carrying out of any activities authorized by this Act, and for the payment from appropriations made pursuant to section 8(a) of all or any portion of the expenses incurred by such institutions, enterprises, or individuals in carrying out such activities; and

(3) to make loans, grants, or other cost-sharing arrangements from the fund established under section 7 to public or private scientific institutions, or to business enterprises or individuals, for the purpose of enabling them to carry out activities to further the programs of the Commission.

MARINE EXPLORATION AND DEVELOPMENT FUND

SEC. 7. There is hereby established on the books of the Treasury a Marine Exploration and Development Fund which shall be available to the Commission for making loans, grants, or other cost-sharing arrangements authorized by section 6(3). The fund shall consist of amounts appropriated thereto pursuant to section 8 together with amounts received as repayments of principal and payments of interest on such loans. In establishing terms for loans, grants, or other cost-sharing arrangements made from such fund, the Commission shall give due weight to the benefits inuring to the Government from the activities carried out with the proceeds of such loans.

FINANCING

SEC. 8. (a) There are hereby authorized to be appropriated such sums, not to exceed \$50,000,000 for any fiscal year, as may be necessary to enable the Commission to carry out its functions under this Act.

(b) In addition to appropriations authorized by subsection (a), there is hereby authorized to be appropriated to the fund established by section 7 of the sum of \$100,000,000 to remain available until expended.

DISSEMINATION OF INFORMATION

SEC. 9. The Commission shall make available to other interested Government agencies and, to the extent consistent with national security, to public and private institutions, business enterprises, and individuals any information obtained by the Commission in carrying out its functions under this Act.

REPORTS TO CONGRESS

SEC. 10. The Commission shall transmit to the Congress, at the beginning of each regular session of the Congress, an annual report of its activities under this Act, together with such legislative recommendations as it may deem desirable.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., July 28, 1965.

Hon. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on H.R. 5884 and H.R. 6009, identical bills to provide a program of marine exploration and development of the resources of the Continental Shelf.

H.R. 5884 and H.R. 6009 (hereinafter referred to as "the bill") would establish a Marine Exploration and Development Commission composed of two members appointed from private life by the President, as well as the Secretaries of the Departments of Defense, Interior, and Commerce. The function of this Commission would be to formulate and carry out programs for purposes of exploration and development of the marine resources of the Continental Shelf and the waters above the Continental Shelf. Among the specifically described programs are those for marine exploration necessary to describe the topography and to identify, locate and economically develop physical, chemical, geological, and biological resources of the Continental Shelf and for fostering participation in marine exploration and economic development by scientific institutions and industry.

Marine exploration of the Continental Shelf is one segment of the study of oceanography. As you know, the Atomic Energy Commission was one of the four Federal agencies that first suggested and participated in efforts to coordinate the national program in oceanography. The Federal Council for Science and Technology (FCST) created by Executive Order No. 10807 on March 13, 1959, established the permanent Interagency Committee on Oceanography (ICO) by letter dated March 3, 1960, from George Kistiakowsky, Chairman of the FCST, to the Honorable James H. Wakelin, Jr., Assistant Secretary of the Navy for Research and Development. A primary function of the ICO has been to coordinate the activities of various agencies having an interest in oceanography and related marine sciences. These activities include exploration of the Continental Shelf as well as research involving the physical, chemical, geological, and biological processes of the marine environment.

The Commission considers that appropriate efforts for the accumulation of knowledge respecting the Continental Shelf are currently being exerted by those Federal agencies carrying out activities of exploration and research with respect to the Continental Shelf under the coordination of the ICO, and that the institution of a program of economic development of the resources of the Continental Shelf, which would be a primary function of the Marine Exploration and Development Commission under the bill, would be premature at this time. For example, agencies participating in the ICO are currently conducting a program to develop a comprehensive understanding of the distribution, ecology, physiology, behavior, response to environmental changes and interrelationships of marine organisms in order to permit proper planning for the greater use of the sea, including the waters of the Continental Shelf, as a source of food. Intensive commercial development at the present time could adversely affect the satisfactory conduct of this program. In addition, exploration of the Continental Shelf has been under way for a considerable period of

time; the results of such efforts will be invaluable when our knowledge is sufficiently developed to permit extensive economic exploitation. At the present time, however, the creation of a new commission to carry out such activities is likely to result in an unnecessary duplication of effort between the Marine Exploration and Development Commission and the ICO and its member agencies; moreover, it could result in a premature commercial exploitation of vital resources and the loss of the opportunity to study and develop such resources systematically to the best advantage of the Nation.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN V. VINCIGUERRA
(For General Manager).

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., July 27, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your letter of March 19, 1965, requesting the views of the Bureau of the Budget on H.R. 5884 and H.R. 6009, identical bills to provide a program of marine exploration and development of the resources of the Continental Shelf.

The bills would establish a new agency to carry out programs for exploring and developing the marine resources of the Continental Shelf and its overlying waters. The agency would be headed by a Marine Exploration and Development Commission, composed of five members: the Secretaries of Defense, Commerce, and the Interior, and two members appointed from private life. The agency would carry out programs with its own staff, cooperatively with other agencies, and through grants, loans, and cost-sharing arrangements with private organizations.

As explained in our letter to your committee of March 11, 1965, on H.R. 921, Federal oceanographic activities are being conducted by a number of agencies in support of their respective basic missions. This is the traditional way in which science has been organized in the Government, with operational requirements guiding the direction and pace of scientific programs. Additionally, there is close inter-agency coordination through the Federal Council for Science and Technology to assure that an integrated program is developed to meet broad national objectives in oceanography.

Establishment of the proposed commission would deviate from this organizational pattern. With the creation of the commission, the Department of the Interior would have to look to another agency to develop certain resources for which that Department is now responsible. Such resources would often be the same as those existing in areas other than the Continental Shelf, thereby dividing program responsibility between two agencies on a geographic basis. Creation of the commission would make even more difficult than at present the achievement of balance programs for developing the scarce resources of our country. In addition, establishment of a new agency would

complicate the coordination of related scientific and technical activities.

Moreover, the proposed commission would deviate from sound principles of organization. Agencies established to carry out operating functions are generally headed by a single individual in order to provide unity of direction and clearly fix responsibility. Placing a plural body at the head of the proposed agency would not be consonant with its operating functions. The fixing of responsibilities would be additionally complicated because the ex officio members of the commission would have dual, and sometimes conflicting, responsibilities with respect to similar programs in their parent departments.

In our view significant progress is being made in developing and conducting a sound oceanographic program under existing arrangements. It is noteworthy that the Department of the Navy and the Atomic Energy Commission are jointly developing a nuclear powered deep submergence research and ocean engineering vehicle and the Department of the Interior is participating in the design and engineering of the vehicle. The technology developed through this project is to be used for investigating ocean resources as well as for defense purposes.

The President's Science Advisory Committee is currently undertaking a broad-gaged review of the Nation's oceanographic activities, drawing upon experts from related fields. The findings of this study will help to illuminate the opportunities in oceanography and the best way for their realization.

In view of the progress being made in developing and conducting Federal programs in the field of oceanography and the cited difficulties that would be created in establishing a new agency for exploring the Continental Shelf, the Bureau of the Budget recommends against enactment of H.R. 5884 and H.R. 6009.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in further reply to your request for the views of this Department with respect to H. R. 5884, a bill to provide a program of marine exploration and development of the resources of the Continental Shelf.

This bill would encourage utilization of the resources of the Continental Shelf; establish a Marine Exploration and Development Commission composed of Cabinet officers and private appointees to formulate and carry out programs for exploration and development of the continental shelf; create a marine exploration and development fund for loans, grants, or cost-sharing arrangements; and authorize an annual appropriation of \$50 million to the Commission and an initial appropriation of \$100 million to establish the fund.

The Department favors an increase in exploration and development of the Continental Shelf; but opposes enactment of H.R. 5884 because, among other reasons, the establishment of a commission to manage the Federal Continental Shelf program and to fund private Continental Shelf activities is unnecessary and undesirable. The Federal program, including any funding of private Continental Shelf activities, should properly be managed by the agencies having missions concerning the shelf under supervision of the President.

Under the Convention on the Continental Shelf, which entered into force for the United States on June 10, 1964, the United States and other signatory states have jurisdiction over their continental shelves to a depth of 200 meters or, beyond that limit, to such depths as admit of exploitation of the natural resources of the seabed and subsoil. In view of the importance of these resources, it has become imperative that the United States intensify its efforts to explore, survey, and map its Continental Shelf to locate potential exploitable resources, and to encourage industry to develop the technology to recover these resources so that the country as a whole will be able to take full advantage of them. Present activities of the Department are directed toward accomplishment of these objectives.

The Secretary of Commerce presently has the authority, which he has delegated to the Environmental Science Services Administration (ESSA), to survey and map the Continental Shelf. ESSA has the competency through its Coast and Geodetic Survey for these activities. From its surveying activities, ESSA obtains knowledge about the Continental Shelf including the locations of its mineral resources. Furthermore, ESSA cooperates with the Department of the Interior and other agencies while surveying the Continental Shelf so that mineral, biological, and other resources can be located in the same operation. Accordingly, we do not think that creation of a new agency, such as the Marine Exploration and Development Commission, will increase the efficiency of Federal exploration of the Continental Shelf. Rather, creation of such a commission is likely to result in duplication of activities and facilities and waste of experienced manpower.

Admittedly, section 4(d) of H.R. 5884 requires the Commission to "utilize the capacity of existing governmental agencies to the maximum extent consistent with the purposes of this Act." However, the Commission can avoid the limiting sentence of section 4(d) by determining that its staff, or a private organization under a loan, grant or cost-sharing arrangement, is better able to carry out the "purposes of this Act" than the staff of another Federal agency. Such determinations would result in considerable duplication of the activities and facilities present in Federal agencies. In this connection, it appears that (except for administration of the proposed fund) H.R. 5884 creates no new authority in the executive branch of the Government, or sets no priorities, but merely duplicates existing authority.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely yours,

BURT W. ROPER
(For Robert E. Giles).

DEPARTMENT OF THE NAVY,
OFFICE OF LEGISLATIVE AFFAIRS,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

MY DEAR MR. CHAIRMAN: Your request for comment on H.R. 5884 and H.R. 6009, identical bills to provide a program of marine exploration and development of the resources of the Continental Shelf, has been assigned to this Department by the Secretary of Defense for the preparation of a report thereon expressing the views of the Department of Defense.

H.R. 5884 and H.R. 6009 would encourage private exploitation of the resources of the U.S. Continental Shelf by establishing a Marine Exploration and Development Commission and a Marine Exploration and Development Fund. The Commission working closely with other agencies, would administer the fund to carry out programs of engineering and exploration as required to exploit the Continental Shelf for the benefit of the United States.

Numerous Federal agencies are already engaged in the exploration and survey of these submerged areas. Some of these agencies, such as the Bureau of Commercial Fisheries, Geological Survey, and Bureau of Mines are specifically concerned with the exploitation of the resources contained therein. The Department of Defense has many programs of marine research, surveys, and engineering directed toward the solution of Department of Defense problems which, at the same time, provide information directly applicable to the purposes of the bills. These multiagency efforts are presently coordinated by the Interagency Committee on Oceanography.

It is considered that the purposes of the bills would be better accomplished by strengthening the existing capabilities and organization in this area to achieve maximum utilization of these efforts before any attempt is made to set up a special commission to do the job. For example, the Navy's deep submergence program might take on additional responsibilities in marine engineering development and thus provide an effective mechanism for exploiting the shelf while at the same time satisfying the mission requirements of the Navy.

In view of the foregoing, the Department of the Navy, on behalf of the Department of Defense, is opposed to the enactment of H.R. 5884 and H.R. 6009.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense. The Bureau of the Budget advises that, from the standpoint of the administration's program, there is no objection to the presentation of this report on H.R. 5884 and H.R. 6009 for the consideration of the committee.

Sincerely yours,

M. K. DISNEY,
*Captain, U.S. Navy,
Director, Legislative Division
(For the Secretary of the Navy).*

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Your committee has requested our views and recommendations on seven specific bills concerned with the problem of planning, coordinating, and financing the national oceanographic program. This Department, through the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife, the Bureau of Mines, and the Geological Survey, is greatly interested in, and directly concerned with, the science of oceanography. We are primarily concerned with the development of the natural resources of the oceans. Consequently, we desire that this form of research and development proceed efficiently and effectively in the national interest.

Described briefly, the bills before the committee are:

* * * * *

H.R. 5884 establishes a commission for the exploration and development of the resources of the Continental Shelf. The commission is composed of five members, including the Secretary of the Interior. The commission will have its own staff and will have specific functions, including authority to make loans and grants. It has the authority to utilize the capabilities of other Federal agencies in carrying out its functions. It may also carry out these functions directly. H.R. 6009 is an identical bill.

* * * * *

All of these bills deal in various ways with the problem of planning, coordinating and financing the national oceanographic program. This is a large program of research and development which involves several Federal Government departments and specialized agencies. It is largely based on the recommendation of a committee of the National Academy of Sciences, which in 1959 proposed that the Federal Government embark on a 10-year program of expanded research on the oceans. The program involves studies of the physics, chemistry, geology, and biology of the ocean and is contiguous waters; the relationships and interactions between ocean and atmosphere; and the living, mineral, and fossil resources of the ocean waters and seabed, and methods of conserving and harvesting these natural resources. Since 1960 the program has been coordinated and its budgets planned by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Funds are appropriated through the budgets of the individual cooperating agencies. The large number of bills which have been introduced in the Congress in recent sessions proposing to alter this coordinating machinery or to begin new studies of the ocean and its resources reflects the concern of the legislative branch of the Government that the present mechanism for planning and review may not be adequate. The varying nature of the individual solutions to the problems represented by these bills is a fair indication of the complexity of the problem.

We believe that there is a growing need for a perspective in which the oceanographic programs of the Federal Government can be more clearly seen in relation to each other and in relation to the national

goals which they support. All of these bills contain some features which could be helpful in carrying out a national oceanographic program. The position of the executive branch, however, is that H.R. 2218 should be enacted, but that the enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the Panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised governmental organization to administer the national oceanographic program should be enacted.

The recommendation that legislative action should be deferred is not intended to cast any doubt on the importance of the subject. President Johnson has recently stated his intention that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: Over the last 3 months you have been kind enough to refer to us for our information, and such comment as we might wish to make, several bills having to do with the Federal Government's arrangements for developing, coordination, and funding the national oceanographic program.

Our Committee on Oceanography has welcomed the opportunity to review these bills. The committee has long recognized the need for a more unified approach to the oceanography program among the Federal agencies. The committee considers such an approach to be especially desirable with reference to those elements of the program that involve the missions of several different agencies, for example, the study of air-sea interactions, the development and use of deep-diving vehicles and other means of deep-sea investigation, and the study of ocean resources.

While the committee does not have an adequate basis for recommending a particular mechanism for achieving the desired unity of approach, its members feel that efforts at the appropriate level of the executive branch, for example, the Office of Science and Technology, in consultation with the congressional committees concerned, can undoubtedly result in an effective solution of the problem.

Yours sincerely,

FREDERICK SEITZ, *President.*

NATIONAL SCIENCE FOUNDATION,
OFFICE OF THE DIRECTOR,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your letter of March 19, 1965, requesting the comments of the National Science Foundation on H.R. 5884 and an identical bill, H.R. 6009, to provide a program of marine exploration and development of the resources of the Continental Shelf.

The bills in question would establish a Marine Exploration and Development Commission, consisting of two members appointed from private life, one of whom would be Chairman, the Secretary of Defense, the Secretary of the Interior, and the Secretary of Commerce. It would be the responsibility of the Commission to formulate and carry out programs for exploration and development of the marine resources of the Continental Shelf and waters above the Continental Shelf. Such programs would include, among others, marine exploration, expeditions and surveys, and the making of grants, loans, or cost-sharing arrangements for marine exploration, and economic development activities by scientific institutions and industry.

We consider the aims of these bills highly worthwhile. In our view, however, the problems involved in the exploration and development of the Continental Shelf are still largely undefined. Information is not yet available regarding the kinds of programs that should be undertaken or the amounts of money which might be necessary to carry out such activities. We believe that the administrative mechanism for carrying out such activities should be considered in the light of the programs to be conducted. In this connection, the President's Science Advisory Committee has established a Panel on Oceanography, which will be considering recommendations regarding national policies with respect to oceanography, including matters such as those with which these bills are concerned.

In view of the above considerations, we recommend against enactment of H.R. 5884 and H.R. 6009.

The Bureau of the Budget has advised us it has no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

BOWEN C. DEES, *Acting Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, June 1, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: This is in response to your request for comments on H.R. 5884 and H.R. 6009, identical bills to provide a program of marine exploration and development of the Continental Shelf.

The recent acquisition by the United States of sovereign rights to the natural resources of the Continental Shelf offers economic oppor-

tunities which may add substantially to the wealth of this country. As the bills point out, efforts to exploit this source of wealth are called for.

Nevertheless, in my opinion, it would be premature for several reasons to enact H.R. 5884 or H.R. 6009. At this time, the extent to which industry is prepared to invest private funds in the extraction of wealth from the Continental Shelf is not clear. For this reason, it is not clear that the provision of funds to industry, as provided by the bills, is the necessary or proper direction of Federal activity. The primary need may well be for guidance and consultation at this stage and further clarification of the legal status of resource exploitation.

Furthermore, I have some reservations with respect to the proposed administrative provisions. The addition of councils, commissions, boards, committees, and similar groups reporting directly to the President is generating a situation which tends to make an existing difficult situation almost impossible. For this reason, if any of the functions proposed in the bills are established in law, serious consideration should be given to placing them under the general jurisdiction of an existing major agency or department.

My reservations with respect to the bills relate not to the significance of the subject with which they deal, but rather with the wisdom of enacting a law which would establish functions and allocate responsibilities and funds when it is not clear that the approach taken in the bills is the one which would be adopted if all of the alternatives had been thoroughly explored.

At this time, I think that a thorough and detailed review of the enormous potentialities of the Continental Shelf, and of priorities among surveys, research, and development of tools and instruments in the context of the entire set of problems, needs, and opportunities should take precedence over the enactment at this time of a statute of the kind proposed in H.R. 5884 and H.R. 6009.

Sincerely yours,

DONALD F. HORNIG, *Director.*

DEPARTMENT OF STATE,
Washington, July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. CHAIRMAN: Your letter of March 19, 1965, requested the Department's comments on H.R. 5884 and H.R. 6009, bills to provide a program of marine exploration and development of the resources of the Continental Shelf. The following comments and suggestions are made for your consideration.

The Department would interpose no objection to the enactment of the bills from the standpoint of foreign relations. In fact, the Department believes that the bills might prove most useful in the development of oceanic capability and use which would not only provide a source of raw material for our economy, as the bills contemplate, but forestall domination of the ocean by forces inimical to our welfare.

The following specific comments would apply if the Congress decides to take action on the bills.

The Department questions the relationship between the proposed Commission and the rest of the American oceanographic community, particularly that within the U.S. Government. The functions of the Commission, as given in section 5, overlap to a greater or lesser extent with several existing agencies. While the Department is not in a position to question whether it might be worthwhile having these functions, as they apply to the Continental Shelf, performed by a single body, the Department does believe that coordination of the oceanic activities of the various agencies is important. The Department notes that several other bills are now pending before the Congress on this subject, such as H.R. 6457, H.R. 5654, and S. 944 to establish a National Oceanographic Council to coordinate U.S. activities in oceanography. It might be useful in H.R. 5884 and H.R. 6009 to establish the relationship between the proposed Commission and the proposed Council if it should be created. Better yet, it might be useful to combine the two proposals, and especially to combine the proposed Commission and the proposed Council.

It is suggested that the first paragraph of section 2 of the bill be redrafted to read somewhat as follows:

“SEC. 2. The Congress finds and declares that—

“The Convention on the Continental Shelf adopted at the United Nations Conference on the Law of the Sea at Geneva in 1958 provides that the coastal State exercises over the Continental Shelf sovereign rights for the purpose of exploring it and exploiting its natural resources. This Convention which has been ratified by the United States entered into force on June 10, 1964. Pursuant to the rights of the United States under the Convention the responsibility is assumed for providing an accelerated program of exploration and development of the physical, chemical, geographical and biological resources of the Continental Shelf.”

Section 3 of the bill defines the term “Continental Shelf” in a way different from the way the term is defined in the Convention on the Continental Shelf referred to above. Since the rights of the United States derive from the convention, it is our view that any implementing or supporting legislation should conform substantially to the convention. As defined in the convention the term “Continental Shelf” includes only areas “outside the area of the territorial sea” where the specified depth or exploitability criteria exist. The term as defined in the bill does not exclude the area of the territorial sea but, on the contrary, would include the territorial sea at least where the depth and exploitability factors are present. The territorial sea including its seabed and subsoil, as well as the superjacent airspace, is a part of the sovereign territory of the coastal State and rests on different principles of law than those applicable to the Continental Shelf. In the case of the shelf the sovereign rights of the coastal State are confined to the subsoil and seabed, the superjacent waters remaining high seas in which the customary freedom of the seas exists. The superjacent airspace also remains free. Finally, not only is the definition of “Continental Shelf” in the bill inconsistent with the definition in the Convention on the Continental Shelf but also with existing U.S. legislation, i.e., the Outer Continental Shelf Lands Act (Public Law 212, 83d Cong.; 67 Stat. 462).

If, as the Department believes, the provisions of the bill should be extended to the territorial sea, it is suggested that this be done by

specific mention of the territorial sea and that the definition of the term "Continental Shelf" conform to the definition in article 1 of the Convention on the Continental Shelf. However, in this connection, it is suggested that consideration be given to the question whether the inclusion of the territorial sea in the coverage of the proposed legislation would be consistent with the rights of the States under the Submerged Lands Act (Public Law 31, 83d Cong.; 67 Stat. 29), and maybe other laws also.

Section 5(3) of the bill provides as one of the functions of the Commission to be set up by the proposed legislation the development of an engineering capability that will permit exploitation and development of the Continental Shelf "and superjacent waters." As pointed out above, the waters superjacent to the Continental Shelf are high seas and while the provision in question is not necessarily inconsistent with that situation, nevertheless, it should be clear that the rights of the coastal State in such waters are not exclusive.

The Bureau of the Budget advises that from the standpoint of the administration's program there is no objection to the submission of this report.

Sincerely yours,

DOUGLAS MACARTHUR II,
Assistant Secretary for Congressional Relations.

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your request for the views of this Department on H.R. 5884 and H.R. 6009, identical bills, to provide a program of marine exploration and development of the resources of the Continental Shelf.

This bill would create a Marine Exploration and Development Commission composed of five members, two members from private life appointed by the President, the Secretary of Defense, the Secretary of the Interior, and the Secretary of Commerce. This Commission would be charged with the function of formulating and carrying out programs for the purpose of exploration and development of the marine resources of the Continental Shelf. These programs would include, but not be limited to, such matters as marine explorations, expeditions and surveys; the identification, location and economical development of physical, chemical, geological, and biological resources of the Continental Shelf; and cooperative expeditions for these purposes with other Federal agencies.

The Department is in favor of the purpose of the bill which is to advance the national interest in the exploration and development of the resources of the Continental Shelf. However, it is believed that the functions of the proposed Commission would overlap the duties and responsibilities currently vested in other offices and agencies with respect to oceanography. The field of oceanography cannot be defined in clear-cut terms of reference. It covers basic disciplines of science and engineering and contains within its spectrum such

things as marine biology, geology, physics, chemistry, fisheries, and ocean forecasting. From this partial listing, it can be seen that functions of the proposed Commission would include many of the phases of oceanography currently within the scope of the Interagency Committee on Oceanography formed by the Federal Council for Science and Technology.

The Department has stated its support of H.R. 2218 as a constructive measure for assuring coordination of the efforts of the various Government agencies in the area of oceanography. For the reasons given above, the Department believes that the establishment of a new agency, as outlined in the proposed bill, will not achieve that result in as desirable a manner.

Accordingly, the Treasury Department opposes the enactment of H.R. 5884 and H.R. 6009.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRED B. SMITH,
Acting General Counsel.

[H.R. 6457, 89th Cong., 1st sess.]

A BILL To provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the "National Oceanographic Act of 1965".

SEC. 2. The oceanographic and marine activities of the United States should be conducted so as to contribute to the following objectives:

(1) The exploitation of the oceans, in terms of recovery of living and mineral resources, safer waste disposal, improved recreation, expanded commerce, and extended weather prediction.

(2) The expansion of human knowledge of phenomena in and related to the oceans, the marine environment, and the Great Lakes, their boundaries and contents.

(3) The preservation of the role of the United States as a leader in oceanographic and marine science and technology.

(4) The enhancement of the culture, general welfare, and security of the United States.

(5) The advancement of education and training in marine science and technology.

(6) The development and improvement of the capabilities, performance, and efficiency of vehicles, equipment, and instruments for use in exploration, research, surveys, the recovery of resources, and the transmission of energy in the marine environment.

(7) The coordination of activities of the various agencies concerned with the marine sciences, and the collection, storing, and distribution of significant data acquired as a result of these activities.

(8) The establishment of long-range studies of the potential benefits to the United States economy, security, culture, health, and welfare to be gained from the opportunities for, and the problems involved in, utilization of scientific marine and Great Lakes research and surveys.

(9) The effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States, in order to avoid unnecessary duplication of effort, facilities and equipment, or waste.

(10) The making available to agencies directly concerned or affected by oceanographic or Great Lakes phenomena of knowledge obtained through domestic or foreign scientific marine research and surveys which is of value or significance to the agency.

(11) The cooperation by the United States with other nations and groups of nations in oceanographic and marine research and surveys when such cooperation is in the national interest.

SEC. 3. (a) There is hereby established in the Office of Science and Technology in the Executive Office of the President, the National Oceanographic Council (hereinafter called the "Council") which shall be composed of one representative each from:

- (1) The Department of State.
- (2) The Department of the Treasury.
- (3) The Department of Defense.
- (4) The Department of the Interior.
- (5) The Department of Commerce.
- (6) The Department of Health, Education, and Welfare.
- (7) The Office of Science and Technology.
- (8) The Atomic Energy Commission.
- (9) The National Science Foundation.
- (10) The Smithsonian Institution.

(b) The head of each department, agency, and instrumentality to be represented on the Council shall designate from among those officers of his department, agency, or instrumentality who were appointed to their offices by the President with the advice and consent of the Senate, an officer to serve as representative on the Council.

(c) The President shall from time to time designate a representative on the Council to serve as Chairman of the Council.

(d) It shall be the function of the Council to advise and assist the President, as he may request, with respect to the performance of functions in the field of oceanography and the marine sciences, including but not limited to the following functions:

(1) surveying all significant oceanographic and marine sciences activities, including the policies, plans, programs, and accomplishments of all departments and agencies of the United States engaged in such activities;

(2) developing a comprehensive program of oceanographic and marine science activities, including, but not limited to, exploration, exploitation and conservation of marine resources, ocean engineering, studies of air-sea interaction, expanded recreational facilities and waterfront development, transmission of energy, and communications, to be conducted by departments and agencies of the United States;

(3) designating and fixing the direction of major oceanographic and marine science activities, including, but not limited to, exploration, exploitation and conservation of marine resources, ocean engineering, studies of air-sea interaction, expanded recreational facilities, and waterfront development, transmission of energy, and communications;

(4) providing for effective cooperation among all departments and agencies of the United States engaged in oceanographic and marine science activities, and specify, in any case in which primary responsibility for any category of the oceanographic and marine science activities has been assigned to any department or agency, which of those activities may be carried on concurrently by other departments or agencies;

(5) coordinating all Federal activities in combating natural and manmade phenomena adversely affecting public welfare, including storms, floods, seismic activity, pollution and radioactive fallout;

(6) resolving differences arising among departments and agencies of the United States with respect to oceanographic and marine science activities under this Act, including differences as to whether a particular project is an oceanographic and marine science activity; and

(7) reviewing annually all existing oceanographic and marine sciences activities conducted by departments and agencies of the United States in light of the policies, plans, programs, and priorities developed pursuant to this Act.

(e) The Council may employ a staff to be headed by a civilian executive secretary who shall be appointed by the President by and with the advice and consent of the Senate, and shall receive compensation at a rate established by the President at not to exceed that of level IV of the Federal Executive Salary Schedule

of the Federal Executive Salary Act of 1964. The executive secretary, subject to the direction of the Council, is authorized to appoint and fix the compensation of such personnel, including not more than seven persons who may be appointed without regard to civil service laws or the Classification Act of 1949 and compensated at not to exceed the highest rate of grade 18 of the General Schedule of the Classification Act of 1949, as amended, as may be necessary to perform such duties as may be prescribed by the Council in connection with the performance of its functions.

SEC. 4. (a) The Council, under the foreign policy guidance of the President, may engage in a program of international cooperation in work done pursuant to this Act, pursuant to agreements made by the President with the advice and consent of the Senate.

(b) The President shall report annually during the month of February to the Congress. Such report shall contain the following:

(1) The general status of oceanography.

(2) The status of research, development, studies, and surveys conducted (directly or indirectly) by the United States in furtherance of oceanography, together with application of such research, development, studies, and surveys.

(3) A financial analysis on a horizontal basis showing the totality of the amounts proposed for appropriation by Congress for marine sciences, by functions.

(4) A detailed analysis of the amounts proposed for appropriation by Congress for the ensuing fiscal year for each of the departments, agencies, and instrumentalities of the Government to carry out the purposes of this Act.

(5) Current and future plans and policies of the United States with respect of oceanography.

(6) Requests for such legislation as may be necessary to carry out as rapidly as possible the purposes of this Act.

(c) No information which has been classified for reasons of national security shall be included in any report made under this section, unless such information has been declassified by, or pursuant to authorization given by, the President.

SEC. 5. (a) The Council shall arrange with the Federal Bureau of Investigation for the conduct of such security or other personnel investigation of the Council's officers, employees, and consultants, as it deems appropriate, and if any such investigation develops any data reflecting that the individual who is the subject thereof is of questionable loyalty there shall be a full field investigation of the matter, the results of which shall be furnished to the Council.

(b) The Atomic Energy Commission may authorize any of its employees or employees of any contractor, prospective contractor, licensee, or prospective licensee of the Atomic Energy Commission under subsection 145(b) of the Atomic Energy Act of 1954 (42 U.S.C. 2165(b)), to permit any member, officer, or employee of the Council to have access to restricted data relating to oceanography and the marine sciences which is required in the performance of his duties and so certified by the Council but only if (1) the Council or designee thereof has determined, in accordance with the established personnel security procedures and standards of the Council, that permitting such individual to have access to such restricted data will not endanger the common defense and security, and (2) the Council or designee thereof finds that the established personnel and other security procedures and standards of the Council are adequate and in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165). Any individual granted access to such restricted data pursuant to this subsection may exchange such data with any individual who (A) is an officer or employee of the Department of Defense, or any department or agency thereof, or a member of the Armed Forces, or a contractor or subcontractor of any such department, agency, or armed force, or an officer or employee of any such contractor or subcontractor, and (B) has been authorized to have access to restricted data under the provisions of section 143 of the Atomic Energy Act of 1954 (42 U.S.C. 2163).

SEC. 6. Information obtained or developed by the Council in the performance of its functions under this Act shall be made available for public inspection except (A) information authorized or required by Federal statute to be withheld, and (B) information classified to protect the national security. Nothing in this Act shall authorize the withholding of information by the Council from the duly authorized committees of Congress.

SEC. 7. (a) For the purposes of this Act the term—

(1) "marine sciences" shall be deemed to apply also to scientific endeavors in and with relation to the Great Lakes.

(2) "oceanography" includes, but is not limited to, the acquisition, assembling, processing, and dissemination of all scientific and technological oceanographic and related environmental data, including, but not limited to, physical, geological, biological, fisheries, hydrographic and coastal survey, meteorological, climatological, and geophysical data.

(b) There is hereby authorized to be appropriated not to exceed \$800,000 per fiscal year to carry out this Act.

ATOMIC ENERGY COMMISSION,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on H.R. 6457, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

As you know, the Atomic Energy Commission was one of the four Federal agencies that first suggested and participated in efforts to coordinate the national program in oceanography. The Federal Council for Science and Technology (FCST) created by Executive Order No. 10807 on March 13, 1959, established the permanent Interagency Committee on Oceanography (ICO) by letter dated March 3, 1960, from George Kistiakowsky, Chairman of the FCST, to the Honorable James H. Wakelin, Jr., Assistant Secretary of the Navy for Research and Development. A primary function of the ICO has been to coordinate the activities of various agencies having an interest in oceanography and related marine sciences. There is also an FCST Committee on Water Resources Research which is concerned with coordinating research activities of the various agencies on fresh water resources, including research pertaining to the Great Lakes.

It is the AEC's understanding that the proposed bill would in effect substitute a National Oceanographic Council for the ICO as the primary coordinator of agency activities in the field of oceanography, and for the FCST Committee on Water Resources Research as the primary coordinator of agency research activities in the field of fresh water resources to the extent that those activities concern the Great Lakes. While the Commission is in accord with the substantive purpose and intent of the proposed legislation, it is our belief that such a substitution is not necessary or appropriate at this time in view of the effective coordination of agency efforts in this field by the ICO and the FCST Committee on Water Resources Research.

Should the bill be considered for passage, however, the Commission suggests that changes as set forth below be made.

Subsection 3(b) of the bill would require the head of each agency represented on the Council to designate from among those officers of his agency " * * * who were appointed to their offices by the President with the advice and consent of the Senate, an officer to serve as representative on the Council." The Commission suggests that a provision be added authorizing each representative on the Council to designate another officer of his agency to serve on the Council as

his alternate in his absence. The choice of an alternate should not be limited by a requirement that he be appointed to his office by the President with the advice and consent of the Senate.

The Commission urges the deletion from the bill of subsection 5(b). This subsection would authorize "any member, officer, or employee of the Council to have access to restricted data relating to oceanography and the marine sciences which is required in the performance of his duties * * *" as certified by the Council, provided the Council determines that its established "security procedures * * * are * * * in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165)," and provided the Council has determined in accordance with such procedures "that permitting such individual to have access to such restricted data will not endanger the common defense and security."

In our view subsection 5(b) would have the effect of diluting the Commission's control over restricted data without adequate demonstrated need. Such a certification procedure for access to restricted data, as proposed by subsection 5(b), has been accorded to only two agencies, the Department of Defense and the National Aeronautics and Space Administration because the nature of the duties and functions of these agencies have so required. However, we believe that such a statutory provision for the National Oceanographic Council is not necessary. There does not appear to be extensive restricted data pertaining to oceanography and related marine sciences, and we believe that need for access to such restricted data, which the Council's members and officers as well as its relatively small staff may have, can be effectively handled through the Commission's usual security procedures. In this connection, it should be noted that Public Law 87-206 (75 Stat. 475) amended the Atomic Energy Act of 1954, as amended, on September 6, 1961, by adding a new subsection 145(c) in order to expedite clearances in such cases as this. In order to allow the Council to make full use of the clearance procedure contained in section 145(c) of the Atomic Energy Act, it is also recommended that section 5(a) of the proposed bill be revised to read as follows:

"SEC. 5. (a) The Council shall arrange with the Federal Bureau of Investigation for the conduct of investigations, including full field investigations, of the character, associations, and loyalty of the Council's officers, employees, and consultants, as it deems appropriate. The results of such investigations shall be furnished to the Council."

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN V. VINCIGUERRA
(For General Manager).

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C., July 26, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This letter is in reply to your request for the views of this Department with respect to H.R. 6457, a bill to provide

for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

H. R. 6457 would set forth national objectives for oceanographic and marine activities and would establish a National Oceanographic Council composed principally of Cabinet department representatives. The Council would advise and assist the President by surveying present oceanographic activities, developing an oceanographic program, coordinating the agencies' oceanographic activities and annually comparing Federal oceanographic accomplishments against the Council's oceanographic program. The Council would be authorized to employ an executive secretary and staff. H. R. 6457 also includes detailed requirements for an annual report from the President to Congress on his oceanographic program and on present accomplishments.

The Department strongly supports improvement in and greater emphasis for the national oceanographic program. However, we doubt that H. R. 6457 would have enough beneficial effect upon oceanographic activities to offset the limiting effect it would have upon the administration of Federal activities in oceanography as a whole.

The Interagency Committee on Oceanography has had considerable success in coordinating and stimulating Federal oceanographic activities, and we are therefore not aware of overriding reasons for replacing it. The proposed National Oceanographic Council would not change the realities involved in setting priorities and apportioning limited funds among less limited demands within the agencies. There is no reason to believe that Council review of the national oceanographic program before its submission to the agencies would keep any agency from balancing its oceanographic program needs against the needs of its other programs. On the other hand, creation of the proposed Council would add to the proliferation of councils and committees which the President is now seeking to reduce.

If the intent of H. R. 6457 is to replace the Interagency Committee on Oceanography with the proposed Council, then little practical change from the present arrangement for coordination would occur. However, we believe it is undesirable to establish the Council by statute as the means for coordination of Federal programs. We think it is better to leave flexibility in the executive for coordinating programs, which, like the program in oceanography, are still developing. Moreover, if the Council and the Interagency Committee on Oceanography are both to exist, enactment of H. R. 6457 would cause substantial duplication of effort and possibly conflict of proposed programs.

For these reasons, while the Department favors the objectives of the bill, we oppose the establishment of a statutory Council to accomplish these objectives. We would have no objection to the bill if it were amended to permit the President to establish such mechanisms as he believes necessary to accomplish these objectives.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely yours,

BURT W. ROPER
(For Robert E. Giles).

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Your committee has requested our views and recommendations on seven specific bills concerned with the problem of planning, coordinating, and financing the national oceanographic program. This Department, through the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife, the Bureau of Mines, and the Geological Survey, is greatly interested in, and directly concerned with, the science of oceanography. We are primarily concerned with the development of the natural resources of the oceans. Consequently, we desire that this form of research and development proceed efficiently and effectively in the national interest.

Described briefly, the bills before the committee are:

* * * * *

H.R. 6457 is similar to H.R. 5654. The major difference is that the new Council established by the bill would not be a Cabinet-level council, but would be composed of representatives from member agencies and would be established in the Office of Science and Technology in the Executive Office of the President.

* * * * *

All of these bills deal in various ways with the problem of planning, coordinating and financing the national oceanographic program. This is a large program of research and development which involves several Federal Government departments and specialized agencies. It is largely based on the recommendation of a committee of the National Academy of Sciences, which in 1959 proposed that the Federal Government embark on a 10-year program of expanded research on the oceans. The program involves studies of the physics, chemistry, geology, and biology of the ocean and its contiguous waters; the relationships and interactions between ocean and atmosphere; and the living, mineral, and fossil resources of the ocean waters and seabed, and methods of conserving and harvesting these natural resources. Since 1960 the program has been coordinated and its budgets planned by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Funds are appropriated through the budgets of the individual cooperating agencies. The large number of bills which have been introduced in the Congress in recent sessions proposing to alter this coordinating machinery or to begin new studies of the ocean and its resources reflects the concern of the legislative branch of the Government that the present mechanism for planning and review may not be adequate. The varying nature of the individual solutions to the problem represented by these bills is a fair indication of the complexity of the problem.

We believe that there is a growing need for a perspective in which the oceanographic programs of the Federal Government can be more clearly seen in relation to each other and in relation to the national goals which they support. All of these bills contain some features which could be helpful in carrying out a national oceanographic program. The position of the executive branch, however, is that

H.R. 2218 should be enacted, but that the enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the Panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised governmental organization to administer the national oceanographic program should be enacted.

The recommendation that legislative action should be deferred is not intended to cast any doubt on the importance of the subject. President Johnson has recently stated his intention that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

U.S. DEPARTMENT OF JUSTICE,
OFFICE OF THE DEPUTY ATTORNEY GENERAL,
Washington, D.C., August 3, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives,
Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your request for the views of the Department of Justice on H.R. 6457, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

The bill would establish in the Office of Science and Technology in the Executive Office of the President, the National Oceanographic Council to be composed of one representative each from the Departments of State, Treasury, Defense, Interior, Commerce, Health, Education, and Welfare, the Office of Science and Technology, the Atomic Energy Commission, the National Science Foundation, and the Smithsonian Institution. It would be the responsibility of the Council to advise and assist the President with respect to the performance of functions in the field of oceanography and the marine sciences.

The bill provides that the Council shall arrange with the Federal Bureau of Investigation for the conduct of such security or other personnel investigation of the Council's officers, employees, and consultants as it deems appropriate.

Other than with respect to the conduct of security investigations by the Federal Bureau of Investigation, to which we have no objection, the subject of the bill concerns primarily the operations of the executive agencies represented on the Council. It is assumed that the committee will consult those agencies with respect to legislation in this field. In these circumstances, the Department of Justice makes no recommendation as to the enactment of this legislation.

The Bureau of the Budget has advised that there is no objection to the submission of this report from the standpoint of the administration's program.

Sincerely,

RAMSEY CLARK,
Deputy Attorney General.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: Over the last 3 months you have been kind enough to refer to us for our information, and such comment as we might wish to make, several bills having to do with the Federal Government's arrangements for developing, coordination, and funding the national oceanographic program.

Our Committee on Oceanography has welcomed the opportunity to review these bills. The Committee has long recognized the need for a more unified approach to the oceanography program among the Federal agencies. The Committee considers such an approach to be especially desirable with reference to those elements of the program that involve the missions of several different agencies, for example, the study of air-sea interactions, the development and use of deep-diving vehicles and other means of deep-sea investigation, and the study of ocean resources.

While the Committee does not have an adequate basis for recommending a particular mechanism for achieving the desired unity of approach, its members feel that efforts at the appropriate level of the executive branch, for example, the Office of Science and Technology, in consultation with the congressional committees concerned, can undoubtedly result in an effective solution of the problem.

Yours sincerely,

FREDERICK SEITZ, *President.*

NATIONAL SCIENCE FOUNDATION,
OFFICE OF THE DIRECTOR,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of the National Science Foundation on H.R. 6457, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

The primary objective of H.R. 6457 would be the establishment, in the Office of Science and Technology, of a National Oceanographic Council, consisting of representatives from 10 Federal organizations. The function of the Council would be to advise and assist the President with respect to matters in the field of oceanography and the marine sciences. The Council would have a staff headed by a civilian execu-

tive secretary appointed by the President, by and with the advice and consent of the Senate.

H.R. 6457 is aimed at insuring that the United States has a strong oceanographic program. We fully concur with this objective. As you know, the national program in this area is being coordinated through the Interagency Committee on Oceanography of the Federal Council for Science and Technology. We believe that this organizational arrangement is proving satisfactory for carrying on the Nation's oceanographic effort, and that such problems as have arisen do not warrant establishment of the Council envisaged by H.R. 6457.

The Bureau of the Budget has advised us it has no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

LELAND J. HAWORTH, *Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, D.C., May 8, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Thank you for the opportunity to comment on H.R. 6457, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography and for other purposes.

We are in full accord with the objective of the bill, and concur with the proposal that the Great Lakes should be a part of a full oceanographic effect.

With respect to the functions to be performed by the proposed Council, the President has had available to him since 1959, through the Federal Council for Science and Technology, a means of coordinating and planning Federal activities relating to oceanography. The Interagency Committee on Oceanography, a group established under the Federal Council, is this instrumentality. The ICO is a working group composed of senior officials with both technical and policy responsibilities. The members of the group can work directly on matters involving oceanography with the members of the Federal Council for Science and Technology. The Council is composed of the top officials responsible for research and development policy in each of the major departments and agencies. Through the Special Assistant for Science and Technology, who is the Chairman of the Federal Council, important policy questions relating to oceanography are considered by the Executive Office of the President and by the President himself. Scientific questions arising from oceanography and related fields are considered by the President's Science Advisory Committee. These links between oceanography and the points of decision in the executive branch give considerable strength and flexibility to the existing system.

The ICO has to its credit a number of significant accomplishments. ICO has: (1) surveyed all significant oceanographic and marine science activities, including the programs of all Federal departments

and agencies; (2) developed a comprehensive, long-range program of oceanographic and marine science activities of Federal agencies, and has transmitted this program to Congress; (3) assisted in fixing responsibility for major oceanographic activities of Federal agencies; (4) provided for effective cooperation among Federal agencies; (5) facilitated the resolution of differences among agencies; and (6) reviewed annually all oceanographic activities of Federal agencies, and transmitted to Congress annually a report on Federal oceanographic activities. These are the functions that would be assigned to the proposed National Oceanographic Council.

The bill raises general questions relating to the structure of the executive branch for dealing with questions of science policy. The Office of Science and Technology was established with the concurrence of the Congress to advise the President on all matters relating to science and technology and to coordinate the activities of the Federal agencies. The bill raises in principle the desirability of establishing a series of national councils in the Office of Science and Technology for areas of high importance to science and technology. This way of organizing to deal with problems of science and technology would raise complicated problems, both for the President and for the major departments. In my judgment it would be anomalous and unwise to establish within the Office of Science and Technology a statutory national council of any kind. The Federal Council for Science and Technology already has the responsibility to advise and assist the President with respect to oceanography. The establishment of a Council reporting to the President within an Office which also reports to the President would create confusion and conflicts. The establishment of the staff for the Council as proposed in the bill, including an executive secretary appointed by the President by and with the advice and consent of the Senate, would create a staff within a staff in the Office of Science and Technology. It would be difficult if not impossible to set forth clearly the respective duties, authorities, and responsibilities under such an arrangement.

In addition to the deficiencies of the bill which are rooted in its basic concepts, the bill has a number of questionable provisions. First, it would not be proper for a representative of the Office of Science and Technology, which has general responsibilities, to serve as a member of a national council which may advise the President as an official advocate of a specialized area of science. Second, the functions assigned to the Council include some already assigned by law to other agencies, or already dealt with by other interagency machinery.

It seems to me that, at this time, questions of scientific and technological substance relating to oceanography should take precedence over questions of organization. A prerequisite to decisions relating to the future development of oceanography is a thorough analysis of the state of the field, identification of points of priority in terms of science, technology, and resources, and the potential contributions of all parties (industry, government, universities, foundations, and private laboratories) to the field. A study group composed of outstanding scientists is being established under the auspices of the President's Science Advisory Committee to review these questions. They are also under study by the National Academy of Sciences Committee on Oceanography. It would seem prudent to withhold

judgments on organizational matters until the results of these studies, plus the results of any inquiries that may stem from congressional action, are available.

The net effect of the considerations noted above is to leave me strongly opposed to the national council approach to the organization of the Federal Government's activities in oceanography as outlined in this bill. At this time, it seems to me that concentration upon means of making the essential elements of the existing system more effective is the wiser course. This would be done under H.R. 2218, and it is for this reason that my favorable comment on that bill was sent to you on February 17, 1965.

Sincerely yours,

DONALD F. HORNIG, *Director.*

SMITHSONIAN INSTITUTION,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.,

DEAR MR. BONNER: Thank you for your letter of March 22, 1965, requesting the views of the Smithsonian Institution on H.R. 6457, a bill to provide for a comprehensive, long-range, and coordinated national program in oceanography, and for other purposes.

This legislation, designated as the "National Oceanographic Act of 1965," is essentially similar to H.R. 5654, of which the Smithsonian's views were requested by your committee on March 4, 1965. H.R. 6457 would (1) set forth the objectives of the oceanographic and marine activities of the United States; (2) establish a National Oceanographic Council composed of representatives of Federal departments and agencies engaged in oceanographic and marine science activities; (3) provide that the Council shall serve as the advisory body to the President on the performance of designated functions in the fields of oceanography and marine sciences; (4) authorize the Council to employ the necessary staff; (5) authorize the Council, under the foreign policy guidance of the President, to engage in a program of international cooperation in these fields; (6) provide for the issuance of an annual oceanographic report by the President, containing such recommendations for legislation as the President may deem necessary; (7) set forth certain security provisions relating to the Council's employees and activities; (8) provide that information developed by the Council pursuant to provisions of H.R. 6457 would be available to the public, unless authorized or required by statute to be withheld for security purposes; and (9) authorize appropriations not to exceed \$800,000 to carry out the purposes of this bill.

It is noted that a representative of the Smithsonian Institution is to be included in the membership of the National Oceanographic Council.

The Board of Regents of the Smithsonian Institution will be asked to consider this legislation at its next meeting. I shall be pleased to advise you of its views at that time.

Sincerely yours,

FRANK A. TAYLOR, *Acting Secretary.*

DEPARTMENT OF STATE,
Washington, July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. CHAIRMAN: In your letter to the Secretary of March 22, 1965, you asked for comments concerning H.R. 6457, 89th Congress, 1st session, introduced by Mr. Ashley.

The Department of State is in full agreement with the necessity for joint planning and coordination of the multiple oceanographic activities sponsored by the various governmental agencies. Only in this way can an effective, integrated, truly national program be developed. It was for this purpose that the Interagency Committee on Oceanography was established in 1960 by the Federal Council for Science and Technology. Its membership represents each of the departments and agencies proposed for the National Oceanographic Council except the Office of Science and Technology. From the standpoint of foreign relations, the Department believes the existing structure has effectively protected and furthered its interests. It defers to the judgment of the various operational agencies whether the proposed Council will more adequately promote their domestic missions and whether, if approved, the Council should be in the Office of Science and Technology.

If the bill is considered favorably, the following modifications are suggested:

It is noted that Section 3 (b) contains no provision for alternate members. Since it may be expected that departmental representatives will not be able to attend all meetings of the Council, it is suggested that the section be amended to provide that a representative on the Council may designate alternates.

Section 3 (c) provides that the President designate a representative of the Council to serve as Chairman. It is suggested, instead, that a full-time Chairman might be designated by the President with the advice and consent of the Senate. The scope and magnitude of the national oceanographic effort demands the full attention of a high level policy officer. It is not believed an Executive Secretary can serve this purpose since his functions are primarily administrative rather than decisionmaking.

Section 3 (d) (5) provides that the Council will be responsible for coordinating all Federal activities in combating natural and manmade phenomena adversely affecting public welfare and including storms, floods, seismic activities, pollution, and radioactive fallout. This section considerably exceeds the responsibility of the present Interagency Committee on Oceanography. It encompasses many areas presently outside the national oceanographic program and includes many activities directly related to the primary missions of several agencies, some of which have only a limited connection with oceanography. It is suggested that this section be eliminated or the stated activities be restricted.

Section 3(e) provides for an Executive Secretary. If the suggestion for a full-time Chairman is accepted, an amendment of this section would be necessary providing for the Chairman to head the staff.

Section 4(a) provides that the Council may engage in international cooperative activities. The Department believes this section is

unnecessarily restrictive since it appears to confine international cooperation in oceanography to formal treaties ratified by the United States after advice and consent of the Senate. U.S. agencies and institutions are now cooperating with other countries in many valuable oceanographic studies and are contemplating additional programs. All these programs fall within the normal activities of the responsible agencies and are carefully reviewed for foreign policy implications before approval. Ample authority now exists for most international ventures in oceanography. Should this prove inadequate, further authority would be sought through treaty or legislation. Since the present procedure has worked very satisfactorily, no change is believed necessary. More formal agreements can be made, of course, for any aspect of the international programs requiring such action. It is suggested, therefore, that section 4(a) be deleted.

The Bureau of the Budget advises that, from the standpoint of the administration program, there is no objection to the presentation of this report for the consideration of the committee.

Sincerely yours,

DOUGLAS MACARTHUR II,
Assistant Secretary for Congressional Relations
(For the Secretary of State).

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., July 30, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your request for the views of this Department on H.R. 6457, to provide for a comprehensive, long range, and coordinated national program in oceanography, and for other purposes.

The bill would establish a National Oceanographic Council in the Office of Science and Technology in the Executive Office of the President. The Council would be composed of representatives of certain executive departments and agencies and the Chairman of the Council would be designated from among its members by the President. The chief responsibility of the Council would be to coordinate the work in oceanography being carried out by the various departments and agencies of the Federal Government.

Like H.R. 5654, a similar bill introduced previously in this Congress, the bill is clearly intended to advance the national program in oceanography. As we indicated in our comments on H.R. 5654, the Department is in full sympathy with that objective; however, it questions whether the proposed bill offers the most effective method of achieving the desired purpose. At the present time, coordination is achieved by the Interagency Committee on Oceanography formed by the Federal Council for Science and Technology. The Department believes this basic approach should be continued and is opposed to the creation of another office or agency with independent authority and responsibility in the field. The latter would result in duplication of effort and organization in oceanography as well as derogate from the authority and responsibility of existing agencies in this field.

The Department has stated its support of H.R. 2218 as a constructive measure for assuring coordination of the efforts of the various Government agencies in the area of oceanography. For the reasons given above, the Department believes that the establishment of a new administrative organization, as outlined in the proposed bill, will not achieve that result in as desirable a manner.

Accordingly, the Treasury Department is opposed to the enactment of H.R. 6457.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRED B. SMITH,
Acting General Counsel.

[H.R. 7849, 89th Cong., 1st sess.]

A BILL To provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Ocean Resources Development Act of 1965".

TITLE I

SEC. 101. The oceanographic and marine activities of the United States should be conducted so as to contribute to the following objectives:

(1) The achievement of a capability to perform and carry on operations within the marine environment for the purposes of developing, managing, and conserving the resources within and underlying the oceans for beneficial uses.

(2) The exploration and development of the resources of the Continental Shelf as recognized by the Convention on the Continental Shelf adopted at the United Nations Conference on the Law of the Sea.

(3) The expansion of human knowledge of phenomena in and related to the oceans, the marine environment, and the Great Lakes, their boundaries and contents.

(4) The development and improvement of the capabilities, performance, and efficiency of vehicles, equipment, and instruments for use in exploration, research, surveys, recovery of resources, and the transmission of energy in the marine environment.

(5) The establishment of long-range studies of the potential benefits to the United States economy, security, health, and welfare to be gained from the opportunities for, and the problems involved in, utilization of scientific marine and Great Lakes research and surveys.

(6) The enhancement of the general welfare and security of the United States and the preservation of the role of the United States as a leader in oceanographic and marine science and technology.

(7) The encouragement of private investment in the economic utilization of the marine resources of the Continental Shelf.

(8) The advancement of education and training in marine science and technology and the dissemination of discoveries and information which may have value to United States industries, and to Federal and State agencies concerned with ocean resource development missions.

(9) The cooperation by the United States with other nations and groups of nations in oceanographic and marine research and surveys, and in developmental projects when such cooperation is in the national interest.

SEC. 102. As used in this Act—

(1) The term "Council" means the National Oceanographic Council established in section 201 of this Act.

(2) The term "Commission" means the Marine and Exploration and Development Commission established in section 301 of this Act.

(3) The term "Continental Shelf" means the seabed and subsoil of the submarine areas adjacent to (A) the coast of continental United States to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of such areas, or (B) the seabed and subsoil of similar submarine areas adjacent to the coasts of islands which comprise United States territory.

(4) The term "oceans" is deemed to include the Great Lakes.

TITLE II

SEC. 201. (a) There is hereby established, in the Executive Office of the President, the National Oceanographic Council (hereinafter called the "Council") which shall be composed of—

- (1) the Vice President, who shall be Chairman of the Council;
- (2) the Secretary of State;
- (3) the Secretary of the Treasury;
- (4) the Secretary of Defense;
- (5) the Secretary of the Interior;
- (6) the Secretary of Commerce;
- (7) the Secretary of Health, Education, and Welfare;
- (8) the Director of the Office of Science and Technology;
- (9) the Chairman of the Atomic Energy Commission;
- (10) the Director of the National Science Foundation; and
- (11) the Secretary of the Smithsonian Institution.

(b) The President shall from time to time designate one of the members of the Council to preside over meetings of the Council during the absence, disability, or unavailability of the Chairman.

(c) Each member of the Council may designate another officer of his department or agency to serve on the Council as his alternate in his unavoidable absence.

(d) Each alternate member designated under subsection (c) of this section shall be designated to serve as such by and with the advice and consent of the Senate unless at the time of his designation he holds an office in the Federal Government to which he was appointed with the advice and consent of the Senate.

(e) It shall be the function of the Council to advise and assist the President, as he may request, with respect to the performance of functions in the field of oceanography and the marine sciences, including but not limited to the following functions:

(1) Survey all significant oceanographic and marine science activities, including the policies, plans, programs, and accomplishments of all departments and agencies of the United States engaged in such activities;

(2) Develop a comprehensive program of oceanographic and marine science activities, including, but not limited to, exploration, exploitation and conservation of marine resources, oceanographic engineering, studies of air-sea interaction, transmission of energy, and communications, to be conducted by departments and agencies of the United States;

(3) Designate and fix responsibility for the direction of major oceanographic and marine science activities, including, but not limited to, exploration, exploitation and conservation of marine resources, oceanographic engineering, studies of air-sea interaction, transmission of energy, and communications;

(4) Provide for effective cooperation among all departments and agencies of the United States engaged in oceanographic and marine science activities, and specify, in any case, in which primary responsibility for any category of the oceanographic and marine science activities has been assigned to any department or agency, which of those activities may be carried on concurrently by other departments or agencies;

(5) Resolve differences arising among departments and agencies of the United States with respect to oceanographic and marine science activities under this title, including differences as to whether a particular project is an oceanographic and marine science activity; and

(6) Review annually all existing oceanographic and marine sciences activities conducted by departments and agencies of the United States in light of the policies, plans, programs, and priorities developed pursuant to this title, and agencies of the United States in light of the policies, plans, programs, and priorities developed pursuant to this title.

(f) The Council may employ a staff to be headed by a civilian executive secretary who shall be appointed by the President, by and with the advice and consent of the Senate, and shall receive compensation at a rate established by the President at not to exceed that of level II of the Federal Executive Salary Schedule. The executive secretary, subject to the direction of the Council, is authorized to appoint and fix the compensation of such personnel, including not more than seven persons who may be appointed without regard to civil service laws or the Classification Act of 1949 and compensated at not to exceed the highest rate of grade 18 of the General Schedule of the Classification Act of 1949, as amended, as may be necessary to perform such duties as may be prescribed by the Council in connection with the performance of its functions.

(g) The Council shall submit to Congress within one year from the date of enactment of this title, a comprehensive program of proposed legislation in furtherance of oceanography and the marine sciences.

SEC. 202. (a) The Council, under the foreign policy guidance of the President, may engage in a program of international cooperation in work done pursuant to this title, pursuant to agreements made by the President with the advice and consent of the Senate.

(b) The President shall transmit to the Congress in January of each year a report, which shall include (1) a comprehensive description of the programed activities and the accomplishments of all agencies and departments of the United States in the field of oceanography and marine science activities during the preceding year, and (2) an evaluation of such activities and accomplishments in terms of the attainment of, or the failure to attain, the objectives developed pursuant to this Act.

(c) Any report made under this section shall contain such recommendations for additional legislation as the Chairman or the President may consider necessary or desirable for the attainment of the objectives developed pursuant to this Act, and shall contain an estimate of funding requirements of each agency and department of the United States in the field of oceanography and the marine science activities for its projected program activities during the succeeding fiscal year.

(d) No information which has been classified for reasons of national security shall be included in any report made under this section, unless such information has been declassified by, or pursuant to authorization given by, the President.

SEC. 203. (a) The Council shall arrange with the Federal Bureau of Investigation for the conduct of such security or other personnel investigation of the Council's officers, employees, and consultants, as it deems appropriate, and if any such investigation develops any data reflecting that the individual who is the subject thereof is of questionable loyalty there shall be a full field investigation of the matter, the results of which shall be furnished to the Council.

(b) The Atomic Energy Commission may authorize any of its employees, or employees of any contractor, prospective contractor, licensee, or prospective licensee of the Atomic Energy Commission under subsection 145(b) of the Atomic Energy Act of 1954 (42 U.S.C. 2165(b)), to permit any member, officer, or employee of the Council to have access to restricted data relating to oceanography and the marine sciences which is required in the performance of his duties and so certified by the Council but only if (1) the Council or designee thereof has determined, in accordance with the established personnel security procedures and standards of the Council, that permitting such individual to have access to such restricted data will not endanger the common defense and security, and (2) the Council or designee thereof finds that the established personnel and other security procedures and standards of the Council are adequate and in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165). Any individual granted access to such restricted data pursuant to this subsection may exchange such data with any individual who (A) is an officer or employee of the Department of Defense, or any department or agency thereof, or a member of the Armed Forces, or a contractor or subcontractor of any such department, agency, or armed force, or an officer or employee of any such contractor or subcontractor, and (B) has been authorized to have access to restricted data under the provisions of section 143 of the Atomic Energy Act of 1954 (42 U.S.C. 2163).

SEC. 204. Information obtained or developed by the Chairman in the performance of his functions under this title shall be made available for public inspection except (A) information authorized or required by Federal statute to be withheld, and (B) information classified to protect the national security. Nothing

in this title shall authorize the withholding of information by the Chairman from the duly authorized committees of Congress.

SEC. 205. There is hereby authorized to be appropriated such sums as may be necessary to carry out this title, but sums appropriated for any one fiscal year shall not exceed \$500,000.

TITLE III

SEC. 301. (a) There is hereby established a Marine Exploration and Development Commission to be composed of five members as follows—

- (1) two members to be appointed from private life by the President, by and with the advice and consent of the Senate;
- (2) the Secretary of Defense;
- (3) the Secretary of the Interior; and
- (4) the Secretary of Commerce.

One of the members appointed under clause (1) shall be designated by the President at the time of appointment as Chairman of the Commission. Each member specified in clause (2), (3), or (4) may designate another officer of his department to serve on the Commission in his absence.

(b) Members of the Commission appointed under subsection (a) (1) shall receive compensation at the rate of \$100 per diem while engaged in the business of the Commission, and while away from their homes or regular places of business they may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons in the service of the Federal Government who are employed intermittently. Members specified in subsection (a) (2), (3), and (4), including persons designated to serve in their absence, shall not receive compensation in addition to that to which they are otherwise entitled as officers or employees of the Government but shall be reimbursed for travel or other expenses incurred in carrying out the business of the Commission.

(c) The Commission shall have an Executive Director, who shall be appointed by the President, by and with the advice and consent of the Senate. The Executive Director shall serve at the pleasure of the President and shall receive compensation at the rate prescribed for level IV of the Federal Executive Salary Schedule established by the Federal Executive Salary Act of 1964. Subject to the general supervision of the Commission, the Executive Director shall perform such of the functions conferred upon the Commission under this Act as the Commission shall prescribe.

(d) The Commission shall appoint and fix the compensation of such other officers and employees as may be necessary to enable it to carry out its functions. However, the Commission shall utilize the capacity of existing governmental agencies to the maximum extent consistent with the purposes of this Act. The Commission may also procure, without regard to the civil service laws and the Classification Act of 1949, temporary and intermittent services to the same extent as is authorized for the departments by section 15 of the Act of August 2, 1946, but at rates not exceeding \$75 per diem for individuals.

SEC. 302. It shall be the function of the Commission to formulate and carry out programs for purposes of exploration and development of the marine resources of the Continental Shelf and waters above the Continental Shelf. Such programs shall include but shall not be limited to the following:

(1) Marine exploration, expeditions, and surveys necessary to describe the topography and to identify, locate, and economically develop physical, chemical, geological, and biological resources of the Continental Shelf;

(2) Cooperative expeditions for these purposes with other Federal agencies having missions on the Continental Shelf;

(3) Development of an engineering capability that will permit exploration and development of the Continental Shelf and superjacent waters;

(4) Fostering participation in marine exploration and economic development by scientific institutions and industry, through grants, loans and cost-sharing arrangements; and

(5) Providing for the widest practicable and appropriate dissemination of information concerning marine discoveries, development of instrumentation, equipment, and facilities, and other information as the Commission may deem appropriate.

SEC. 303. In carrying out its functions under section 302, the Commission is authorized—

- (1) to enter into agreements with other Government agencies for the carrying out by such agencies of any activities authorized by this title, and

for the reimbursement from appropriations made pursuant to section 305(a) of expenses incurred by such agencies in carrying out such activities;

(2) to enter into agreements with public or private scientific institutions, or with private enterprises or individuals, for the carrying out of any activities authorized by this title, and for the payment from appropriations made pursuant to section 305(a) of all or any portion of the expenses incurred by such institutions, enterprises, or individuals in carrying out such activities; and

(3) to make loans, grants, or other cost-sharing arrangements from the fund established under section 304 to public or private scientific institutions, or to business enterprises or individuals for the purpose of enabling them to carry out activities to further the programs of the Commission.

SEC. 304. There is hereby established on the books of the Treasury a marine exploration and development fund which shall be available to the Commission for making loans, grants or other cost-sharing arrangements authorized by section 303(3). The fund shall consist of amounts appropriated thereto pursuant to section 305 together with amounts received as repayments of principal and payments of interest on such loans. In establishing terms for loans, grants or other cost-sharing arrangements made from such fund, the Commission shall give due weight to the benefits inuring to the Government from the activities carried out with the proceeds of such loans.

SEC. 305. (a) There are hereby authorized to be appropriated such sums, not to exceed \$50,000,000 for any fiscal year, as may be necessary to enable the Commission to carry out its functions under this title.

(b) In addition to appropriations authorized by subsection (a), there is hereby authorized to be appropriated to the fund established by section 304 the sum of \$100,000,000 to remain available until expended.

SEC. 306. The Commission shall make available to other interested Government agencies and, to the extent consistent with national security, to public and private institutions, business enterprises, and individuals any information obtained by the Commission in carrying out its functions under this title.

SEC. 307. The Commission shall transmit to the Congress, at the beginning of each regular session of the Congress, an annual report of its activities under this title, together with such legislative recommendations as it may deem desirable.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on H.R. 7849, a bill to provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

As you know, the Atomic Energy Commission was one of the four Federal agencies that first suggested and participated in efforts to coordinate the national program in oceanography. The Federal Council for Science and Technology (FCST) created by Executive Order No. 10807 on March 13, 1959, established the permanent Interagency Committee on Oceanography (ICO) by letter dated March 3, 1960, from George Kistiakowsky, Chairman of the FCST, to the Honorable James H. Wakelin, Jr., Assistant Secretary of the Navy for Research and Development. A primary function of the ICO has been to coordinate the activities of various agencies having an interest in oceanography and related marine sciences. These activities include exploration of the Continental Shelf as well as research involving the physical, chemical, geological, and biological

processes of the marine environment. There is also an FCST Committee on Water Resources Research which is concerned with coordinating research activities of the various agencies on fresh water resources, including research pertaining to the Great Lakes.

It is the AEC's understanding that title II of the proposed bill would in effect substitute a National Oceanographic Council for the ICO as the primary coordinator of agency activities in the field of oceanography, and for the FCST Committee on Water Resources Research as the primary coordinator of agency research activities in the field of fresh water resources to the extent that those activities concern the Great Lakes. While the Commission is in accord with the substantive purpose and intent of title II of the proposed legislation, it is our belief that such a substitution is not necessary or appropriate at this time in view of the effective coordination of agency efforts in this field by the ICO and the FCST Committee on Water Resources Research.

Should the bill be considered for passage, however, the Commission suggests that changes in title II as set forth below be made:

The Commission urges the deletion from the bill of subsection 203(b). This subsection would authorize "any member, officer, or employee of the Council to have access to restricted data relating to oceanography and the marine sciences which is required in the performance of his duties * * *" as certified by the Council, provided the Council determines that its established "security procedures * * * are * * * in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165)", and provided the Council has determined in accordance with such procedures "that permitting such individual to have access to such restricted data will not endanger the common defense and security."

In our view subsection 203(b) would have the effect of diluting the Commission's control over restricted data without adequate demonstrated need. Such a certification procedure for access to restricted data, as proposed by subsection 203(b), has been accorded to only two agencies, the Department of Defense and the National Aeronautics and Space Administration because the nature of the duties and functions of these agencies have so required. However, we believe that such a statutory provision for the National Oceanographic Council is not necessary. There does not appear to be extensive restricted data pertaining to oceanography and related marine sciences, and we believe that need for access to such restricted data, which the Council's members and officers as well as its relatively small staff may have, can be effectively handled through the Commission's usual security procedures. In this connection, it should be noted that Public Law 87-206 (75 Stat. 475) amended the Atomic Energy Act of 1954, as amended, on September 6, 1961, by adding a new subsection 145(c) in order to expedite clearances in such cases as this. In order to allow the Council to make full use of the clearance procedure contained in section 145(c) of the Atomic Energy Act, it is also recommended that section 203(a) of the proposed bill be revised to read as follows:

"Sec. 203(a). The Council shall arrange with the Federal Bureau of Investigation for the conduct of investigations, including full field

investigations, of the character, associations, and loyalty of the Council's officers, employees, and consultants, as it deems appropriate. The results of such investigations shall be furnished to the Council."

Title III of the proposed bill would establish a Marine Exploration and Development Commission composed of two members appointed from private life by the President, as well as the Secretaries of the Departments of Defense, Interior, and Commerce. The function of this Commission would be to formulate and carry out programs for purposes of exploration and development of the marine resources of the Continental Shelf and the waters above the Continental Shelf. Among the specifically described programs are those for marine exploration necessary to describe the topography and to identify, locate, and economically develop physical, chemical, geological, and biological resources of the Continental Shelf and for fostering participation in marine exploration and economic development by scientific institutions and industry.

The Commission considers that appropriate efforts for the accumulation of knowledge respecting the Continental Shelf are currently being exerted by those Federal agencies carrying out activities of exploration and research with respect to the Continental Shelf under the coordination of the ICO, and that the institution of a program of economic development of the resources of the Continental Shelf, which would be a primary function of the Marine Exploration and Development Commission under the bill, would be premature at this time. For example, agencies participating in the ICO are currently conducting a program to develop a comprehensive understanding of the distribution, ecology, physiology, behavior, response to environmental changes and interrelationships of marine organisms in order to permit proper planning for the greater use of the sea, including the waters of the Continental Shelf, as a source of food. Intensive commercial development at the present time could adversely affect the satisfactory conduct of this program. In addition, exploration of the Continental Shelf has been under way for a considerable period of time; the results of such efforts will be invaluable when our knowledge is sufficiently developed to permit extensive economic exploitation. At the present time, however, the creation of a new Commission to carry out such activities is likely to result in an unnecessary duplication of effort between the Marine Exploration and Development Commission and the ICO and its member agencies; moreover, it could result in a premature commercial exploitation of vital resources and the loss of the opportunity to study and develop such resources systematically to the best advantage of the Nation.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN V. VINCIGUERRA
(For the General Manager).

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in further reply to your request for the views of this Department with respect to H.R. 7849, a bill to provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

This bill combines the features of H.R. 5654 and H.R. 5884 and would set forth national objectives for oceanographic and marine activities and would establish a National Oceanographic Council composed principally of Cabinet-level officers. The Council would advise and assist the President by surveying present oceanographic activities, developing an oceanographic program, coordinating the agencies' oceanographic activities, and annually comparing Federal oceanographic accomplishments against the Council's oceanographic program. The Council would be authorized to employ an Executive Secretary and staff. H.R. 7849 would also require the President to report annually to Congress on his oceanographic program and on present accomplishments.

In addition this bill would encourage utilization of the resources of the Continental Shelf; establish a Marine Exploration and Development Commission composed of Cabinet officers and private appointees to formulate and carry out programs for exploration and development of the Continental Shelf; create a marine exploration and development fund for loans, grants, or cost-sharing arrangements; and authorize an annual appropriation of \$50 million to the Commission and an initial appropriation of \$100 million to establish the fund.

The Department strongly supports improvement in and greater emphasis for the national oceanographic program. However, we doubt that H.R. 7849 would have enough beneficial effect upon oceanographic activities to offset the detrimental effect it would have upon the administration of oceanography as a whole.

The Interagency Committee on Oceanography has had considerable success in coordinating and stimulating Federal oceanographic activities, and we are therefore not aware of overriding reasons for replacing it. The proposed National Oceanographic Council would not change the realities involved in setting priorities and apportioning limited funds among less limited demands within the agencies. There is no reason to believe that Council review of the national oceanographic program before its submission to the agencies would keep any agency from balancing its oceanographic program needs against the needs of its other programs. On the other hand, creation of the proposed Council would place additional demands directly upon Cabinet officers and agency heads who already have heavy burdens of responsibility.

If the Council supplants the Interagency Committee on Oceanography, the limited amount of personal time which the Counn-

members could devote to Council activities might result in less consideration of oceanography within the executive branch than presently exists. If the Council and the Interagency Committee on Oceanography both exist, there will be substantial duplication of efforts and possible conflict of proposed programs. We think it is better to leave oceanographic planning and coordination in the hands of the policy and operating officials who work with the oceanographic program, serve on the Interagency Committee on Oceanography, and who are thus most qualified to advise the President on its needs.

For these reasons, the Department strongly favors the objectives of titles I and II of the bill but is opposed to the establishment of a council to accomplish these objectives. If the bill were amended to permit the President to establish such mechanisms as he believes necessary to accomplish these objectives, we would favor those titles of the bill.

The Department also favors an increase in exploration and development of the Continental Shelf; but opposes enactment of H.R. 7849 because, among other reasons, the establishment of a commission to manage the Federal Continental Shelf program and to fund private Continental Shelf activities is unnecessary and undesirable. The Federal program, including any funding of private Continental Shelf activities, should properly be managed by the agencies having missions concerning the shelf under supervision of the President.

Under the Convention on the Continental Shelf, which entered into force for the United States on June 10, 1964, the United States and other signatory states have jurisdiction over their continental shelves to a depth of 200 meters or, beyond that limit, to such depths as admit of exploitation of the natural resources of the seabed and subsoil. In view of the importance of these resources, it has become imperative that the United States intensify its efforts to explore, survey, and map its Continental Shelf to locate potential exploitable resources, and to encourage industry to develop the technology to recover these resources so that the country as a whole will be able to take full advantage of them. Present activities of the Department are directed toward accomplishment of these objectives.

The Secretary of Commerce presently has the authority, which he has delegated to the Environmental Science Services Administration (ESSA), to survey and map the Continental Shelf. ESSA has the competency, through its Coast and Geodetic Survey, for these activities. From its surveying activities, ESSA obtains knowledge about the Continental Shelf including the locations of its mineral resources. Furthermore, ESSA cooperates with the Department of the Interior and other agencies while surveying the Continental Shelf so that mineral, biological, and other resources can be located in the same operation. Accordingly, we do not think that creation of a new agency, such as the Marine Exploration and Development Commission, will increase the efficiency of Federal exploration of the Continental Shelf. Rather, creation of such a commission is likely to result in duplication of activities and facilities, and waste of experienced manpower.

Admittedly, section 301(d) of H.R. 7849 requires the Commission to "utilize the capacity of existing governmental agencies to the maximum extent consistent with the purposes of this Act." However, the Commission can avoid the limiting sentence of section 301(d) by determining that its staff, or a private organization under a loan,

grant, or cost-sharing arrangement, is better able to carry out the "purposes of this Act" than the staff of another Federal agency. Such determinations would result in considerable duplication of the activities and facilities present in Federal agencies. In this connection, it appears that (except for administration of the proposed fund) title III of H.R. 7849 creates no new authority in the executive branch of the Government, or sets no priorities, but merely duplicates existing authority.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely yours,

BURT W. ROPER,
Acting General Counsel.

DEPARTMENT OF THE NAVY,
OFFICE OF THE SECRETARY,
OFFICE OF LEGISLATIVE AFFAIRS,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

MY DEAR MR. CHAIRMAN: Your request for comment on H.R. 7849, a bill to provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes, has been assigned to this Department by the Secretary of Defense for the preparation of a report thereon expressing the views of the Department of Defense.

This bill would establish a National Oceanographic Council to advise and assist the President in the field of oceanography and would also establish a Marine Exploration and Development Commission to formulate and carry out programs for purposes of exploration and development of the marine resources of the Continental Shelf.

While the objectives of this bill are unquestionably worthwhile, the methods envisioned would duplicate in large part the missions already assigned to a variety of Government agencies. The Marine Exploration and Development Commission which would be established would be not only a managing and funding agency but also would be charged with "carrying out programs." As an operating agency, it would thus be in competition with the Navy, the Coast and Geodetic Survey, the Bureau of Mines, and the U.S. Geological Survey all of which already have certain responsibilities similar to those mentioned in the bill. In the coordination of cooperative expeditions it would be in competition with the Interagency Committee on Oceanography. Its powers to make grants, contracts, and loans to encourage such programs would be in competition with the National Science Foundation and the Office of Naval Research, which support related efforts. Of particular concern is the authorization for the Commission to enter into agreements with other Government agencies, to pay them for doing work for the Commission. This would put the Commission in the powerful position of controlling the work of other agencies. Fifty

million dollars per year is authorized for the Commission, and it is improbable that such a large sum (almost 40 percent of the current national oceanographic program funding) will be provided without equivalent reductions in the budgets of agencies now active in ocean exploration and development.

The Department of the Navy, on behalf of the Department of Defense, is opposed to the enactment of H.R. 7849 as it would in large part duplicate what existing agencies are already doing. Its objectives could be achieved more efficiently by strengthening existing agency programs, and assigning individual agencies further statutory responsibility, as may be considered appropriate.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that, from the standpoint of the administration's program, there is no objection to the presentation of this report on H.R. 7849 for the consideration of the committee.

Sincerely yours,

M. K. DISNEY,
Captain, U.S. Navy,
Director, Legislative Division
 (For the Secretary of the Navy).

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE.

Washington, D.C., August 2, 1965.

HON. HERBERT C. BONNER,

Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This letter is in response to your request of May 11, 1965, for a report on H.R. 7849, a bill to provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

Title I of the bill would set forth objectives to be sought in oceanography and title II would provide for the establishment in the Executive Office of the President of a National Oceanographic Council, composed of the heads of the departments and agencies having an interest in oceanography. We believe that the purposes for which the National Oceanographic Council would be established are now being pursued through the Interagency Committee on Oceanography. With respect to the organizational setting of the oceanographic program, we prefer the provisions of H.R. 2218.

Title III of H.R. 7849 provides for the establishment of a five-member Marine Exploration and Development Commission composed of two private citizens appointed by the President and confirmed by the Senate, and the Secretaries of Defense, the Interior, and Commerce. One of the citizen members would be designated as chairman by the President. An Executive Director appointed by the President and confirmed by the Senate would perform under the general supervision of the Commission such functions authorized by the act as the Commission prescribes. The capacity of existing governmental agencies would be used to the maximum extent consistent with the act's purposes.

The Commission's function would be the formulation and conduct of programs for exploration and development of the marine resources of the Continental Shelf and waters above it, including but not limited to the following: exploration to describe the topography and to identify, locate, and economically develop the physical, chemical, geological, and biological resources of the Continental Shelf; cooperative expeditions for these purposes with other concerned Federal agencies; development of an engineering capability for exploration and development of the Continental Shelf and superjacent waters; promotion of participation in marine exploration and economic development by scientific institutions and industry, through grants, loans, and cost-sharing arrangements; and dissemination of information on marine discoveries, development of instrumentation, equipment, and facilities, and other appropriate information.

The Commission would be authorized to make agreements with other Government agencies, public or private scientific institutions, private enterprises, or individuals, and to make loans, grants, or other cost-sharing arrangements with such institutions, private enterprises, or individuals from a marine exploration and development fund, for which a \$100 million appropriation would be authorized. Annual appropriations not to exceed \$50 million would be authorized for the work of the Commission. The Commission would be directed to make its findings available to other Government agencies, and, consistent with national security, to others, and to make an annual report to Congress with any legislative recommendations.

The purpose of title III, the exploitation of the resources of the Continental Shelf, touches on certain program interests of this Department. These interests include the use of the shelf for the disposal of municipal, industrial, and radioactive wastes, the presence of naturally occurring toxins, and the effect of these contaminants on the suitability for human consumption of the marine food resources of the waters above the shelf. Although we have no specific recommendation regarding title III, we do hope that, if such a Commission is established, it will be so constituted and its functions so defined as to give appropriate consideration to the program interests of this Department.

Since we object to certain sections of this bill, we recommend that H.R. 7849 not be enacted.

We are advised by the Bureau of the Budget that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely,

WILBUR J. COHEN,
Under Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 29, 1965.

Hon. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. BONNER: Your committee has requested our views and recommendations on seven specific bills concerned with the problem

of planning, coordinating, and financing the national oceanographic program. This Department, through the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife, the Bureau of Mines, and the Geological Survey, is greatly interested in, and directly concerned with, the science of oceanography. We are primarily concerned with the development of the natural resources of the oceans. Consequently, we desire that this form of research and development proceed efficiently and effectively in the national interest.

Described briefly, the bills before the committee are:

* * * * *

H.R. 7849 combines the principal provisions of H.R. 5654 and H.R. 5884. There are no provisions of substance added in this combination of the two bills.

* * * * *

All of these bills deal in various ways with the problem of planning, coordinating and financing the national oceanographic program. This is a large program of research and development which involves several Federal Government departments and specialized agencies. It is largely based on the recommendation of a committee of the National Academy of Sciences, which in 1959 proposed that the Federal Government embark on a 10-year program of expanded research on the oceans. The program involves studies of the physics, chemistry, geology, and biology of the ocean and its contiguous waters; the relationships and interactions between ocean and atmosphere; and the living, mineral, and fossil resources of the ocean waters and seabed, and methods of conserving and harvesting these natural resources. Since 1960 the program has been coordinated and its budgets planned by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Funds are appropriated through the budgets of the individual cooperation agencies. The large number of bills which have been introduced in the Congress in recent sessions proposing to alter this coordinating machinery or to begin new studies of the ocean and its resources reflects the concern of the legislative branch of the Government that the present mechanism for planning and review may not be adequate. The varying nature of the individual solutions to the problem represented by these bills is a fair indication of the complexity of the problem.

We believe that there is a growing need for a perspective in which the oceanographic programs of the Federal Government can be more clearly seen in relation to each other and in relation to the national goals which they support. All of these bills contain some features which could be helpful in carrying out a national oceanographic program. The position of the executive branch, however, is that H.R. 2218 should be enacted, but that the enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the Panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised governmental organization to administer the national oceanographic program should be enacted.

The recommendation that legislative action should be deferred is not intended to cast any doubt on the importance of the subject. President Johnson has recently stated his intention that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: Over the last 3 months you have been kind enough to refer to us for our information, and such comment as we might wish to make, several bills having to do with the Federal Government's arrangements for developing, coordination, and funding the national oceanographic program.

Our Committee on Oceanography has welcomed the opportunity to review these bills. The Committee has long recognized the need for a more unified approach to the oceanography program among the Federal agencies. The Committee considers such an approach to be especially desirable with reference to those elements of the program that involve the missions of several different agencies, for example, the study of air-sea interactions, the development and use of deep-diving vehicles and other means of deep-sea investigation, and the study of ocean resources.

While the Committee does not have an adequate basis for recommending a particular mechanism for achieving the desired unity of approach, its members feel that effects at the appropriate level of the executive branch, for example, the Office of Science and Technology, in consultation with the congressional committees concerned, can undoubtedly result in an effective solution of the problem.

Yours sincerely,

F. Seitz,
FREDERICK SEITZ,
President.

NATIONAL SCIENCE FOUNDATION,
OFFICE OF THE DIRECTOR,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request of May 11, 1965, for the views of the National Science Foundation on H.R. 7849, a bill to provide for the development of ocean resources,

to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

H. R. 7849 would establish in the Executive Office of the President a National Oceanographic Council, consisting of the heads of 10 Federal departments and agencies with the Vice President of the United States as Chairman. The function of the Council would be to advise and assist the President in connection with matters involving oceanography and the marine sciences. The Council would have a staff headed by a civilian Executive Secretary appointed by the President, by and with the advice and consent of the Senate.

The bill would also establish a Marine Exploration and Development Commission, consisting of two members appointed from private life, one of whom would be Chairman of the Commission, the Secretary of Defense, the Secretary of the Interior, and the Secretary of Commerce. It would be the responsibility of the Commission to formulate and carry out programs for exploration and development of the marine resources of the Continental Shelf and waters above the Continental Shelf. Such programs would include, among others, marine exploration, expeditions and surveys, and the making of grants, loans or cost-sharing arrangements for marine exploration, and economic development activities by scientific institutions and industry.

As you know, the national program in oceanography is being coordinated through the Interagency Committee on Oceanography of the Federal Council for Science and Technology. We believe that this organizational arrangement is proving satisfactory for carrying on the Nation's oceanographic effort and that such problems as have arisen do not warrant establishment of the high level council envisaged by H. R. 7849.

With regard to the proposed Marine Exploration and Development Commission, it is our view that the problems involved in the exploration and development of the Continental Shelf are still largely undefined. Information is not yet available regarding the kinds of programs that should be undertaken or the amounts of money which might be necessary to carry out such activities. We believe that the administrative mechanism for carrying out such activities should be considered in the light of the programs to be conducted. In this connection, the President's Science Advisory Committee has established a Panel on Oceanography, which will be considering recommendations regarding national policies with respect to oceanography, including matters such as those contemplated by this portion of H. R. 7849.

While we consider the aims of H. R. 7849 highly important ones, in view of the above considerations, we recommend against its enactment.

The Bureau of the Budget has advised us it has no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

BOWEN C. DEES, *Acting Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, June 24, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: I am pleased to have the opportunity to comment on H.R. 7849, a bill to provide for economic development of the Continental Shelf and for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

Though fully concurring with the stated objectives of the bill, to sustain leadership for the United States in marine science and technology and their economic, military, and social applications, I regret that I cannot recommend enactment of H.R. 7849. Because my reasons differ for the two central provisions of the bill, they will be discussed separately.

In regard to the provisions relating to the Continental Shelf, the extent to which industry is prepared to invest private funds in the extraction of wealth from the Continental Shelf is not clear at this time. For this reason, it is not clear that the provision of funds to industry, as provided by the bill, is the necessary or proper direction of Federal activity. The primary need may well be for guidance and consultation at this stage and further clarification of the legal status of resource exploitation.

Furthermore, the addition of commissions, counsels, boards, committees, and similar groups reporting directly to the President is generating a situation which tends to make an existing difficult situation nearly impossible. For this reason, if any of the functions proposed in the bill are established in law, serious consideration should be given to placing them under the general jurisdiction of an existing major agency or department.

In sum, my reservations with respect to this portion of the bill relate not to the eventual economic significance of the Continental Shelf but, rather, to the wisdom of enacting a law which would establish functions and allocate responsibilities and funds, when it is not clear that the approach taken in the bill is the one which would be adopted if all of the alternatives had been thoroughly explored.

In regard to the functions to be performed by the proposed National Oceanographic Council, these essentially duplicate those now being performed by the Interagency Committee on Oceanography (ICO), a committee consisting of senior officials with technical and policy responsibilities established under the Federal Council for Science and Technology to plan and coordinate Federal programs relating to oceanography. The ICO, through the Federal Council for Science and Technology and its Chairman, the Special Assistant to the President, has been a highly effective link between the President and the Federal departments and agencies in matters relating to marine science and technology. Whether this link would be strengthened by the proposed Council and substantially greater effectiveness

achieved in planning and coordination is doubtful, owing to the efficacy of the existing ICO system, now in its sixth year of operation.

Moreover, the bill raises a general question relating to the structure of the executive branch for dealing with questions of science policy. The Office of Science and Technology was established with the concurrence of the Congress to advise and assist the President on matters relating to science and technology and to coordinate the activities of the Federal agencies. The bill raises in principle the desirability of establishing a series of national councils, for areas of high importance to science and technology, which report directly to the President. This way of organizing to deal with problems of science and technology would raise complicated problems, both for the President and for the major departments.

A prerequisite to decisions relating to the future development of oceanography is a thorough analysis of the state of the field, identification of points of priority in terms of science, technology, and resources, and the potential contributions of all parties (industry, government, universities, foundations, and private laboratories) to the field. A study group composed of outstanding scientists is being established under the auspices of the President's Science Advisory Committee to review these questions. They are also under study by the National Academy of Science's Committee on Oceanography. It would seem prudent to withhold judgments on organizational matters until the results of these studies are available.

Sincerely yours,

DONALD F. HORNIG, *Director.*

SMITHSONIAN INSTITUTION,
Washington, D.C., June 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Thank you for your request of May 11, 1965, for the views of the Smithsonian Institution on H.R. 7849, a bill to provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

This legislation, consisting of three titles, is designated the "Ocean Resources Development Act of 1965."

Title I of H.R. 7849 sets forth the objectives of the oceanographic and marine science activities of the United States.

Title II of this legislation would (1) establish in the Executive Office of the President a National Oceanographic Council composed of representatives of Federal departments and agencies engaged in oceanographic and marine science activities; (2) provide that the Council shall serve as the advisory body of the President concerning the performance of functions in the fields of oceanography and the marine sciences, including certain designated functions; (3) authorize the Council to employ a staff; (4) direct the Council to submit to Congress within 1 year from the enactment of H.R. 7849 a comprehensive legislative program to further oceanography and the marine

sciences; (5) authorize the Council, under the foreign policy guidance of the President, to engage in an international cooperative program in these fields; (6) provide for the issuance of an annual report by the President describing and evaluating the activities of the United States in the fields of oceanography and the marine sciences, containing such legislative recommendations as the President may deem necessary; (7) prescribe certain security provisions relating to the Council's employees and activities; and (8) authorize annual appropriations, not exceeding \$500,000, to carry out the purposes of H. R. 7849.

Title III of H. R. 7849 would (1) establish a Marine Exploration and Development Commission, composed of two private citizens appointed by the President and the Secretaries of Defense, Commerce, and the Interior, to formulate and carry out programs of exploration and development of the marine resources of the Continental Shelf and the water above it, including certain designated programs; (2) grant the Commission authority to employ a staff, to enter into certain cooperative agreements with public and private scientific institutions or with private individuals or enterprises, and to make loans, grants, or other cost-sharing arrangements; (3) establish a marine exploration and development fund to be available to the Commission for making loans, grants, or other cost-sharing arrangements; (4) authorize an annual appropriation not exceeding \$50 million to the Commission to carry out its functions, and a \$100 million appropriation into the marine exploration and development fund, to remain available until expended; (5) direct the Commission to the extent found consistent with the national security requirements to make available to the public information obtained in carrying out its functions; and (6) direct the Commission to make an annual report of its activities, including such legislative recommendations as are deemed desirable.

It is noted that the Secretary of the Smithsonian Institution is included in the membership of the proposed National Oceanographic Council to be established under title II of H. R. 7849.

The Board of Regents of the Smithsonian Institution will be asked to consider this legislation as soon as practicable. I shall be pleased to advise you of its views at that time.

Sincerely yours,

S. DILLON RIPLEY, *Secretary.*

DEPARTMENT OF STATE,
Washington, D. C., July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. CHAIRMAN: Your letter of May 11, 1965, acknowledged on May 14, requested the Department's comments on H. R. 7849, a bill to provide for the development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes. Essentially, the bill combines the features of H. R. 5654 and H. R. 5884 (and companion bills).

The Department of State is in full agreement with the necessity for joint planning and coordination of the multiple oceanographic activ-

ities sponsored by the various governmental agencies. Only in this way can an effective, integrated, truly national program be developed. It was for this purpose that the Interagency Committee on Oceanography was established in 1960 by the Federal Council for Science and Technology. Its membership represents the Departments of State, Treasury, Defense, Interior, Commerce, Health, Education, and Welfare, and the Smithsonian Institution, Atomic Energy Commission, and National Science Foundation. This Committee has achieved considerable success in furthering national goals while supporting the missions of the individual agencies. There would be no effect on the conduct of our foreign relations if the proposed Council were substituted for the Interagency Committee, and, therefore, the Department would interpose no objection to the creation of such a Council. However, creation of such a Council would more directly affect the domestic operation oceanographic agencies, and due consideration should be accorded their views on the matter.

If the Congress should decide to create the Council, the legislation might create a position of full-time Chairman of the Council to coordinate policy and action and to direct the staff. The Vice President could still be given the responsibility for overseeing and coordinating oceanographic activities within the executive branch in such legislation, but would not, of course, be Chairman of the Council since the Chairman would report to the Federal Council for Science and Technology. This change could be accomplished through minor changes in the bill.

The Department does not believe that the proposed Marine Exploration and Development Commission would have any adverse effect on the conduct of our foreign relations, and therefore would interpose no objection to its creation. In fact, the Department believes that the Commission might prove most helpful in the development of oceanic capability and use which would not only provide a source of raw materials for our economy, as contemplated by the bill, but also forestall domination of the ocean by forces inimical to our welfare.

The Department is disturbed, however, that the bill is silent on the relationship between the Council and the Commission, should it be decided to create both, or the relationship between the Commission and the existing Government oceanic community should it be decided to create only the Commission. It is suggested that, in the first instance, the Chairman of the Commission should be made a member of the Council. If the suggestion made above regarding a full-time Chairman for the Council is adopted, he might also be the Chairman of the Commission. It should also be made clear that the provisions of section 201(e) apply to the Commission. If the Council is not established, provisions should be inserted in the sections dealing with the Commission requiring cooperation with other Government agencies engaged in oceanic endeavors.

The following comments are directed to specific provisions or sections of the bill, should the Congress determine that it should be enacted.

1. Section 102(3): This section defines the term "Continental Shelf" in a somewhat different way from the way the term is defined in the Convention on the Continental Shelf, 1958. Since the rights of the United States derive from the convention, it is our view that any implementing or supporting legislation should conform substantially to the convention. As defined in the convention, the term

"Continental Shelf" includes only areas "outside the area of the territorial sea" where the specified depth or exploitability criteria exists. The term as defined in the bill does not exclude the area of the territorial sea but, on the contrary, would include the territorial sea at least where the depth or exploitability factors are present. The territorial sea, including its seabed and subsoil, is a part of the sovereign territory of the coastal State and rests on different principles of law than those applicable to the Continental Shelf. In the case of the shelf the sovereign rights of the coastal State are confined to the subsoil and seabed, the superjacent waters remaining high seas in which the customary freedom of the seas exists. Finally, not only is the definition of "Continental Shelf" in the bill inconsistent with the definition in the Convention on the Continental Shelf but also with existing U.S. legislation; i.e., the Outer Continental Shelf Lands Act (Public Law 212, 83d Cong.; 67 Stat 462).

However, the Department recognizes the necessity of including in the functions of the proposed Commission responsibility to carry out activities in the area of the submerged lands of the territorial sea similar to those carried out in the area of the Continental Shelf. The Department further recognizes that the functions envisaged for the Commission cannot be carried out completely if limited to the Continental Shelf. The rights of the states under the Submerged Lands Act (Public Law 31, 83d Congress; 67 Stat. 29) must be taken into account, of course.

If, as the Department believes, the provisions of the bill should be extended to the territorial sea, it is suggested that this be done by specific mention of the territorial sea and that the definition of the term "Continental Shelf" conform to the definition in article 1 of the Convention on the Continental Shelf. However, in this connection, it is suggested that consideration be given to the question whether the inclusion of the territorial sea in the coverage of the proposed legislation would be consistent with the rights of the States under the Submerged Lands Act (Public Law 31, 83d Congress; 67 Stat. 29), and maybe other laws also.

2. Section 201(f) and section 301(c): Section 201(f) provides that the Executive Secretary of the Council shall receive a rate of compensation not to exceed that of level II of the Federal executive salary schedule, while section 301(c) provides that the Executive Director of the Commission shall receive compensation at the rate of level IV of the Federal executive salary schedule. The Department calls this difference to the attention of the Congress, which may wish to consider whether an appropriate change should be made in either section 201(f) or section 301(c) or both.

3. Section 202(a): The Department believes that section 202(a) is unnecessarily restrictive since it appears to confine international cooperation in oceanography to that formalized by treaties ratified by the President after advice and consent of the Senate. U.S. agencies and institutions are now cooperating with other countries in many valuable oceanographic studies and are contemplating additional programs in the future. All these programs fall within the normal activities of the responsible agencies and are carefully reviewed for foreign policy implications before approval. Ample authority already exists for a large measure of cooperation in international ventures in oceanography. Should this prove inadequate, further authority would be

sought through treaty or legislation. Since the present procedure has worked very satisfactorily, no change is believed necessary at present. More formal agreements can be made, of course, for any aspect of the international programs requiring such action. Therefore, if the proposed legislation is enacted, it is suggested that a period be placed after the word "title" in line 25, page 7, of section 202(a) or that the section be deleted.

4. Section 202(c): We suggest, also, the deletion of the words "the Chairman or" from section 202(c). This section implies that the President is required to include in his report to the Congress proposals for additional legislation considered necessary by the Chairman of the Council (whether the Vice President or an independent Chairman) whether or not the President agreed with the proposal.

5. Section 201(c), section 201(d), and section 301(a): The Department notes that the authority in section 201(d) for members of the Council to designate alternates is with the advice and consent of the Senate, unless at the time of the designation the officer was appointed with the advice and consent of the Senate. Section 301(a), however, permits Government members of the Commission to designate any officer of his department as alternate, without any restriction. The Department suggests that a member of the Council or of the Commission may wish to designate more than one alternate. First, there may be times when both the member and a single alternate would be unable to attend a meeting of the Council or of the Commission. Second, in departments where more than one oceanographic specialty is encountered, it may be desired to have more than one alternate in order that the most appropriate officer may serve as alternate at a particular meeting. Therefore, the Department suggests that the Congress may wish to consider substituting the words "not more than two officers" for the words "another officer" in sections 201(c) and 301(a). Further, the Department does not believe it essential that such alternates be designated with the advice and consent of the Senate. Such a provision is designed to insure that an alternate would be a policy level officer; the Department believes that it is unlikely that members would designate other than policy level officers as alternates.

6. Section 203(a): The Department believes that the word "consulted" in line 3, page 9, should be "consultants."

7. Section 302(3): This section provides, as one of the functions of the proposed Commission, the development of an engineering capability that will permit exploitation and development of the Continental Shelf "and superjacent waters." The waters superjacent to the Continental Shelf, as defined by the convention, are high seas, and while the provision in question is not necessarily inconsistent with that situation, nevertheless, it should be clear that the rights of the coastal state in such waters are not exclusive.

The Bureau of the Budget advises that from the standpoint of the administration's program there is no objection to the submission of this report.

Sincerely yours,

DOUGLAS MACARTHUR II,
Assistant Secretary for Congressional Relations.

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., July 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Reference is made to your request for the views of this Department on H.R. 7849, to provide for the development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

This bill combines the provisions of other bills introduced in the 89th Congress of which H.R. 5654 and H.R. 6009 are representative. One title of the bill provides for the establishment of a National Oceanographic Council in the Executive Office of the President. The Council would be chaired by the Vice President and would be composed of the heads of certain executive departments and agencies. It would employ a staff headed by an Executive Director. The chief responsibility of the Council would be to coordinate work in oceanography being carried out by the various departments and agencies of the Federal Government. A second title of the bill would establish a Marine Exploration and Development Commission composed of five members—two from private life appointed by the President and the Secretaries of Defense, Interior, and Commerce. This Commission would be charged with the formulation and carrying out of programs for the purpose of exploration and development of the marine resources of the Continental Shelf.

The Department is in favor of the purposes of the bill which are to advance the national program on oceanography and to advance the national interest in exploration and development of the resources of the Continental Shelf. It questions, however, whether the proposed bill offers the most effective method of achieving these purposes. With respect to oceanography, coordination at the present time is achieved through the use of the Interagency Committee on Oceanography formed by the Federal Council for Science and Technology. The Department believes that this basic approach should be continued and is opposed to the creation of another office or agency with independent authority and responsibility in the field.

With respect to the proposed Commission, it is believed that the function and programs of that Commission would overlap the duties and responsibilities currently vested in other offices and agencies with respect to oceanography. The latter covers basic disciplines of science and engineering and contains within its spectrum such categories as marine biology, geology, physics, chemistry, fisheries, and ocean forecasting. From this partial listing, it is apparent that some functions of the proposed Commission would include many of the phases of oceanography currently within the scope of the existing national program on oceanography.

The Department has stated its support of H.R. 2218 as a constructive measure for assuring coordination of the efforts of the various Government agencies in the area of oceanography. For the reasons given above, the Department believes that the establishment of a

new agency, as outlined in the proposed bill, will not achieve that result in as desirable a manner.

Accordingly, the Treasury Department opposes the enactment of H.R. 7849.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRED B. SMITH,
Acting General Counsel.

[H.R. 9064, H.R. 9483, H.R. 9617, H.R. 9667, 89th Cong., 1st sess.]

BILLS To establish a National Commission on Oceanography

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby established a National Commission on Oceanography, hereinafter referred to as the "Commission".

SEC. 2. The Commission shall be composed of fifteen members appointed by the President from among persons with a competency in the areas to be dealt with by the Commission. It shall include five representatives from Government; five representatives from industry; and five representatives from universities or laboratories engaged in oceanographic pursuits.

SEC. 3. The Commission shall elect a chairman and a vice chairman from among its members. Eight members of the Commission shall constitute a quorum. Any vacancy in the Commission shall not affect its power but shall be filled in the same manner in which the appointment was made.

SEC. 4. The Commission shall make a comprehensive investigation and study of all aspects of oceanography in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs. The investigation and study shall include, but not be limited to, the following:

(a) Review the known and contemplated needs for natural resources from the oceans to maintain our expanding national economy.

(b) Review the surveys, applied research programs, and ocean engineering projects required to obtain the needed resources from the ocean.

(c) Review the existing national research programs to insure realistic and adequate support for basic oceanographic research that will enhance human welfare and scientific knowledge.

(d) Review the existing Government and industrial oceanographic and ocean engineering programs, including education and technical training to determine which programs are required to advance our national oceanographic competence and stature and which are not now adequately supported by existing agencies.

(e) Analyze the findings of the above reviews and recommend an overall plan for an adequate national oceanographic and ocean engineering program that will meet the present and future national needs without unnecessary duplication of effort among the participating agencies.

(f) Recommend an organizational plan and budget to accomplish the recommendations above.

SEC. 5. Members of the Commission appointed from outside the Government shall each receive \$100 per diem when engaged in the actual performance of duties of the Commission. Members of the Commission appointed from within the Government shall serve without compensation in addition to that received for their services to the Government.

SEC. 6. The Commission shall have power to appoint and fix the compensation of such personnel as it deems advisable, without regard to the civil service laws and the Classification Act of 1949, as amended. In addition, the Commission may secure temporary and immediate services to the same extent as is authorized the departments and agencies of the Government by section 15 of the Administrative Expenses Act of 1946, but at rates not to exceed \$100 per diem for individuals.

SEC. 7. All members and other personnel of the Commission shall be reimbursed for travel, subsistence, and other necessary expenses incurred in carrying out this Act.

SEC. 8. (a) The Commission or, on the authorization of the Commission, any subcommittee or member thereof, may, for the purpose of carrying out the provisions of this Act, hold such hearings and sit and act at such times and places, administer such oaths, and require, by subpoena or otherwise, the attendance and testimony of such witnesses and the production of such books, records, correspondence, memorandums, papers, and documents as the Commission or such subcommittee or member may deem advisable. Subpenas may be issued under the signature of the chairman of the Commission, of such committee, or any duly designated member, and may be served by any person designated by such chairman or member. The provisions of sections 102 to 104, inclusive, of the Revised Statutes of the United States (2 U.S.C., secs. 192-194), shall apply in the case of any failure of any witness to comply with any subpoena or to testify when summoned under authority of this section.

(b) The Commission is authorized to secure directly from any executive department, bureau, agency, board, commission, office, independent establishment, or instrumentality information, suggestions, estimates, and statistics for the purpose of this Act; and each such department, bureau, agency, board, commission, office, establishment, or instrumentality is authorized and directed to furnish such information, suggestions, estimates, and statistics directly to the Commission, upon request made by the chairman or vice chairman.

SEC. 9. The Commission shall submit an interim report within one year from the date of enactment of this Act and submit a final report of its findings and recommendations to the President and Congress no later than the end of two years after the date of enactment of this Act. The Commission shall cease to exist thirty days after it has submitted its final report.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on H.R. 9064, a bill to establish a National Commission on Oceanography.

The bill would establish a National Commission on Oceanography composed of members, appointed by the President, who would be representatives from Government, from industry, and from universities or laboratories engaged in oceanographic pursuits. The Commission would be directed to make a comprehensive investigation and study of all aspects of oceanography in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs. The Commission would be directed to submit a final report of its findings and recommendations to the President and Congress within 2 years.

As you know, the Atomic Energy Commission was one of the four Federal agencies that first suggested and participated in efforts to coordinate the national program in oceanography. The Federal Council for Science and Technology (FCST) established the permanent Interagency Committee on Oceanography (ICO) in 1960; a primary function of ICO has been to coordinate the activities of various agencies having an interest in oceanography and related marine sciences. The AEC is a member of the ICO and participates in the annual preparation of the Government's national oceanographic program, which is reviewed and approved by the FCST.

The ICO has also formulated a long range national oceanographic plan (1963-72). The National Academy of Sciences (NAS) participated in the review of this plan, and the NAS Committee on

Oceanography engages in a continuing examination of long range oceanographic planning.

The recently established NAS National Academy of Engineering plans to set up a Committee on Ocean Engineering to work closely with the NAS Committee on Oceanography in the future development of long range oceanographic matters of interest to industry. The National Security Industrial Association is also active in making recommendations regarding a national oceanographic program.

In view of the comprehensive short and long range planning being carried on by the Federal Government and by organizations, composed of representatives of industry, universities and laboratories, whose recommendations are given careful consideration in the formulation of the Government's program in oceanography, it is not clear that the establishment of a National Commission on Oceanography as proposed by the bill would be of substantial benefit to the national oceanographic program. It is the Commission's view that the Nation's interests in oceanography can best be served by adequate support of the present efforts.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN V. VINCIGUERRA
(For the General Manager).

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in reply to your letter of June 21, 1965, requesting the views of the Bureau of the Budget on H.R. 9064, a bill to establish a National Commission on Oceanography. The bill would create a temporary commission to "make a comprehensive investigation and study of all aspects of oceanography in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs." It would submit a final report of its findings and recommendations within 2 years.

In its report to you of July 6, 1965, the Office of Science and Technology has pointed out that a study like that proposed to be made by the Commission is already being carried out by the special Panel on Oceanography of the President's Science Advisory Committee. A principal advantage of conducting a study of programs in one field of science through the machinery of the President's Science Advisory Committee is that the objectives and opportunities in that field can be weighed against the competing claims of other fields of science. A statutory Commission concerned with a single scientific field would necessarily lack the breadth of perspective which would be desirable. Its mission would not permit it to assess the relative priorities of oceanography in relation to those of other scientific

fields and, thus, its recommendations might lead to serious imbalance among scientific programs.

In our previous letters we have reported our views to your committee concerning H.R. 921 (March 11, 1965), H.R. 2218 (March 11, 1965) and H.R. 5884 and 6009 (July 27, 1965). In those letters we stated that significant steps have been taken in recent years to strengthen overall coordination of oceanographic activities at the Presidential level; that substantial progress is being made in developing and conducting a sound oceanographic program under existing arrangements; and that the executive branch has been seeking to improve the process of reporting to the Congress on the status and future plans for this field. We believe that the study currently in process by the Panel on Oceanography will help to illuminate further opportunities and needs in this field.

In light of the factors cited above, the Bureau of the Budget recommends against enactment of H.R. 9064. We favor, instead, enactment of H.R. 2218 which would provide for the establishment of a comprehensive Federal oceanographic program. Under this program the President and the Congress would be informed not once—but annually—of recommended plans and programs to meet the present and future national needs in oceanography.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in further reply to your request for the views of this Department with respect to H.R. 9064, a bill to establish a National Commission on Oceanography. H.R. 9064 would establish a temporary investigatory commission on oceanography of 15 members appointed by the President, five from Government, five from industry, and five from universities and laboratories. The Commission would investigate and study all aspects of oceanography and recommend a plan for a national oceanographic program. It would submit an interim report within 1 year, a final report within 2 years, and would cease to exist 30 days after submission of its final report.

The existing Federal program in oceanography is continuously evaluated and coordinated by the Interagency Committee on Oceanography. The National Academy of Sciences Committee on Oceanography is preparing a review and reevaluation of its 1960-70 program for Federal oceanographic activity. The President's Science Advisory Committee has been directed to review and recommend improvements of the Federal program in oceanography, and its Panel on Oceanography recently held a meeting at Woods Hole, Mass., for that purpose. Thus, Federal oceanographic activities are presently under significant review by qualified persons both within and outside

the Government, and we do not see any need for legislation establishing an investigatory commission at this time.

However, we recognize that it may become desirable in the future to have an intensive general review of national oceanographic activity conducted by a commission of highly qualified persons. If your committee now desires to recommend legislation directed toward possible future review of oceanography, we suggest that it include the following amendments in its recommendation.

In order to allow such a commission to take advantage of the studies and reviews presently underway, we believe that the bills should be amended to give the President discretionary authority to establish the Commission. Thus, if it does become desirable to have such a commission, the President could select the best time for its establishment. We also feel that the constitution of the Commission is not sufficiently flexible and recommend amendment of the bill to remove its formula for apportionment of Commission membership. The amendment should authorize the President to appoint to the Commission no more than 15 qualified persons from Government and from the public at large and to name its chairman. Finally, section 8(b) of H.R. 9064 would direct Federal agencies to supply information directly to the Commission. We think that provision should be amended to restate the President's existing authority to direct Federal agencies to furnish information to the Commission.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely,

BURT W. ROPER,
Acting General Counsel.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
Washington, D.C., August 2, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington D.C.*

DEAR MR. CHAIRMAN: This letter is in response to your request of June 21, 1965, for a report on H.R. 9064, a bill to establish a National Commission on Oceanography.

This bill would establish a 15-member National Commission on Oceanography, appointed by the President from among competent persons: 5 from Government, 5 from industry, and 5 from universities or laboratories engaged in oceanographic pursuits. By election of the Commission, one member would be Chairman and one Vice Chairman.

The Commission would be directed to make a comprehensive investigation of and study all aspects of oceanography in order to recommend an overall plan for an adequate national program to meet present and future national needs, such investigation and study to include, but not be limited to, a review of known and contemplated needs for national resources from the oceans; a review of the activities required to obtain needed ocean resources; a review of present research programs to insure realistic and adequate support for basic oceanography research; a review of present Government and industrial programs,

including education and technical training; to determine requirements; an analysis of the findings of these reviews and recommendations for an adequate program to meet present and future national needs without unnecessary duplication among participating agencies; and recommendation of an organizational plan and budget to accomplish the recommendations.

The bill would confer the usual authorities to hold hearings, administer oaths, and subpoena witnesses and records, and would require other Federal agencies to furnish information, suggestions, estimates, and statistics directly to the Commission on request of its Chairman or Vice Chairman. The Commission would be directed to submit to the President and Congress an interim report within a year, and a final report of its findings and recommendations within 2 years of enactment, and would cease to exist 30 days thereafter.

A study of this field is now in progress by a Panel on Oceanography of the President's Science Advisory Committee. In the circumstances, we believe that creation of the statutory commission proposed by H.R. 9064 would be premature. We would, however, favor the enactment of H.R. 2218, the proposed "Oceanographic Act of 1965," which would require the President to issue a statement of national goals in this field, survey all significant oceanographic activities (including the relevant policies, plans, programs, and accomplishments of Federal agencies), develop a comprehensive oceanographic program to be conducted or supported by Federal agencies, fix responsibility for the direction of activities in this field, and resolve differences among Federal agencies. H.R. 2218 provides that in the conduct of a coordinated Federal program the President shall utilize such advisory arrangements (including the Office of Science and Technology) as he may find necessary and appropriate, and shall, in addition to consulting Federal agencies, solicit the views of non-Federal agencies and individuals with capabilities in oceanography; the President would be specifically authorized to appoint an Advisory Committee for Oceanography of not less than seven members, including adequate representation of scientists selected on the basis of competence from universities and other non-Federal institutions and agencies and from industry.

We are advised by the Bureau of the Budget that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely,

WILBUR J. COHEN,
Under Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Your committee has requested our views and recommendations on seven specific bills concerned with the problem of planning, coordinating, and financing the national oceanographic program. This Department, through the Bureau of Commercial

Fisheries, the Bureau of Sport Fisheries and Wildlife, the Bureau of Mines, and the Geological Survey, is greatly interested in, and directly concerned with, the science of oceanography. We are primarily concerned with the development of the natural resources of the oceans. Consequently, we desire that this form of research and development proceed efficiently and effectively in the national interest.

Described briefly, the bills before the committee are:

* * * * *

H.R. 9064 provides for a national commission composed of 15 members appointed by the President. This would include five representatives from Government, five from industry, and five from universities or laboratories engaged in oceanographic pursuits.

The Commission would make a comprehensive investigation and study of all aspects of oceanography with the objective of devising a plan for an adequate national program to meet present and future national needs. It would review known and contemplated requirements for natural resources from the oceans, determine what programs are needed to obtain these resources, review existing national research programs to insure adequate support, review existing Government and industrial oceanographic and ocean engineering programs, including education and technical training, to determine what is required and what now is not adequately supported, analyze these findings and recommend an overall plan to meet present and future national needs, including an organizational plan and budget.

The Commission would have the power to appoint and fix the compensation of such personnel as it deems advisable, and obtain temporary and immediate services to the same extent as is authorized for the departments and agencies of the Government. The Commissioner would submit a report within 2 years after its creation and would cease to exist 30 days after it submitted the report. Identical bills are H.R. 9483, H.R. 9617, and H.R. 9667.

All of these bills deal in various ways with the problem of planning, coordinating and financing the national oceanographic program. This is a large program of research and development which involves several Federal Government departments and specialized agencies. It is largely based on the recommendation of a committee of the National Academy of Sciences, which in 1959 proposed that the Federal Government embark on a 10-year program of expanded research on the oceans. The program involves studies of the physics, chemistry, geology, and biology of the ocean and its contiguous waters; the relationships and interactions between ocean and atmosphere; and the living, mineral, and fossil resources of the ocean waters and seabed, and methods of conserving and harvesting these natural resources. Since 1960 the program has been coordinated and its budgets planned by the Interagency Committee on Oceanography of the Federal Council for Science and Technology. Funds are appropriated through the budgets of the individual cooperating agencies. The large number of bills which have been introduced in the Congress in recent sessions proposing to alter this coordinating machinery or to begin new studies of the ocean and its resources reflects the concern of the legislative branch of the Government that the present mechanism for planning and review may not be adequate. The varying nature of the individual solutions to the problem represented by these bills is a fair indication of the complexity of the problem.

We believe that there is a growing need for a perspective in which the oceanographic programs of the Federal Government can be more clearly seen in relation to each other and in relation to the national goals which they support. All of these bills contain some features which could be helpful in carrying out a national oceanographic program. The position of the executive branch, however, is that H.R. 2218 should be enacted, but that the enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the Panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised governmental organization to administer the national oceanographic program should be enacted.

The recommendation that legislative action should be deferred is not intended to cast any doubt on the importance of the subject. President Johnson has recently stated his intention that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: Over the last 3 months you have been kind enough to refer to us for our information, and such comment as we might wish to make, several bills having to do with the Federal Government's arrangements for developing, coordination, and funding the national oceanographic program.

Our Committee on Oceanography has welcomed the opportunity to review these bills. The Committee has long recognized the need for a more unified approach to the oceanography program among the Federal agencies. The Committee considers such an approach to be especially desirable with reference to those elements of the program that involve the missions of several different agencies, for example, the study of air-sea interactions, the development and use of deep-diving vehicles and other means of deep-sea investigation, and the study of ocean resources.

While the Committee does not have an adequate basis for recommending a particular mechanism for achieving the desired unity of approach, its members feel that efforts at the appropriate level of the executive branch, for example, the Office of Science and Technology, in consultation with the congressional committees concerned, can undoubtedly result in an effective solution of the problem.

Yours sincerely,

FREDERICK SEITZ, *President.*

NATIONAL SCIENCE FOUNDATION,
OFFICE OF THE DIRECTOR,
Washington, D.C., July 29, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the comments of the National Science Foundation on H.R. 9064, which would establish a National Commission on Oceanography.

The Commission proposed in H.R. 9064 would be composed of 15 members appointed by the President. Its membership would include five representatives from Government, five from industry, and five from universities or laboratories engaged in oceanographic activities. The Commission's function would be to make a comprehensive study of oceanography in order to recommend an overall plan for an adequate national oceanographic program.

In this connection, the President's Science Advisory Committee has established a Panel on Oceanography, which will be considering recommendations regarding national policies in this area. It may be that the Panel, after its deliberations have concluded, will recommend creation of a group similar to that proposed in H.R. 9064. Whether such a recommendation will be made, however, is contingent upon the conclusions of the Panel.

In view of the above considerations, we recommend against enactment of H.R. 9064.

The Bureau of the Budget has advised us it has no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

BOWEN C. DEES, *Acting Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, July 6, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: I am pleased to have the opportunity to comment on H.R. 9064, a bill to establish a National Commission on Oceanography. Although fully concurring with the purposes of the bill, to conduct a comprehensive investigation and study of all aspects of oceanography in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs, I do not believe the Commission established by H.R. 9064 would be desirable.

The functions of the proposed Commission, to review—the known and contemplated needs for natural resources from the oceans; the surveys, applied research programs, and ocean engineering projects; the existing national research programs; and the existing Government and industrial oceanographic and ocean engineering programs, including education and technical training, are essentially the same as those of the President's Science Advisory Committee's Panel on Oceanog-

raphy, that has been charged with recommending an improved oceanographic program in terms of scientific merit, effectiveness in technological application, and scientific and engineering leadership.

In commenting upon the current status of oceanography to the President of the National Security Industrial Association, President Johnson recently stated his intent that the United States shall maintain leadership in ocean science and technology and their economic, military, and social applications, and noted that the oceanographic program is currently being reviewed in terms of national goals, opportunities, priorities, and means whereby industrial, academic, and Federal resources can be jointly and effectively employed in this program.

I recognize the possibility that there might be a need for a commission on oceanography at a later time, to supplement and extend the current review. I have asked the Panel to report to the President's Science Advisory Committee on the results of their study, at which time a more informed and reliable judgment can be made on this point and on the composition and mission of any commission which might be established.

Sincerely yours,

DONALD F. HORNIG, *Director.*

SMITHSONIAN INSTITUTION,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Thank you for your request of June 21, 1965, for the views of the Smithsonian Institution on H.R. 9064, a bill to establish a National Commission on Oceanography.

This legislation would establish a National Oceanography Commission composed of 15 persons appointed by the President. Five representatives on this Commission shall be from the Government, five from industry, and five from universities and laboratories engaged in oceanographic pursuits.

In order to recommend an adequate national oceanographic program, the Commission would be directed to make a comprehensive study of all aspects of oceanography, including certain specified aspects found in section 4 of H.R. 9064. Provisions is made for the submission by the Commission of an interim report within one year of approval of H.R. 9064 and a final report of its activities within 2 years of approval of this legislation. It is also provided that the Commission shall cease to exist 30 days after submission of its final report.

The Board of Regents of the Smithsonian Institution will be asked to consider this legislation at its next meeting. I shall be pleased to advise you of its views at that time.

Sincerely yours,

FRANK A. TAYLOR,
Acting Secretary.

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., August 10, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
 House of Representatives,
 Washington, D.C.*

DEAR MR. CHAIRMAN: Reference is made to your request for the comments of this Department on H.R. 9064, to establish a National Commission on Oceanography.

The bill would establish a National Commission on Oceanography composed of 15 members from Government, from industry, and from universities or laboratories engaged in oceanographic pursuits. The function of the Commission would be to study all aspects of oceanography in order to recommend an overall plan for a national oceanographic program that will meet present and future national needs. In addition, the Commission would be authorized to recommend an organizational plan and a budget for the purpose of accomplishing its recommendations. Finally, the Commission would be required to submit an interim report within a year from the date of enactment of the bill and a final report within 2 years. The Commission would cease to exist 30 days after submission of its final report.

The review of existing national efforts in the oceanographic field and the development of a plan for their continuation would provide an excellent planning basis for the Federal agencies engaged in oceanographic research. However, the Department does not consider it necessary or desirable that a new body be created to form a national oceanographic plan and make recommendations to implement it.

At the present time, coordination is achieved through the use of the Interagency Committee on Oceanography formed by the Federal Council for Science and Technology. This Committee continues to mature and exert a strong influence over individual agency plans and is capable of influencing the Federal effort to meet any reasonable national plan. It is the Department's opinion that the determination of the resource levels required to meet established national goals needs to be weighed by each agency head in planning his agency's program. In this manner, expected technological advances which would affect resource planning in the oceanographic field can be considered in determining the best method of meeting national goals.

The Treasury Department has previously stated its support of H.R. 2218 as a constructive measure for assuring coordination of the efforts of the various Government agencies in this field. The Department adheres to that view and opposes the enactment of H.R. 9064.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRED B. SMITH,
Acting General Counsel.

[H.R. 5175, 89th Cong., 1st sess.]

A BILL Providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the United States Coast Guard is au-

thorized and directed to conduct, by contract or otherwise, a study of the legal problems arising out of the management, use, and control of the natural resources of the oceans and ocean beds.

SEC. 2. There is authorized to be appropriated \$50,000 for the purposes of this Act.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., May 4, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. BONNER: This is in reply to your request for the views of the Atomic Energy Commission on H.R. 5175, a bill providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

The Atomic Energy Commission has been long interested in the management, use, and control of the marine resources of the United States. If it is decided that a study of the legal problems connected with our marine resources would be useful, the Commission would be pleased to cooperate with whatever agency makes the study to the maximum extent consistent with the Commission's responsibilities under the Atomic Energy Act of 1954, as amended.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN V. VINCIGUERRA
(For General Manager).

GENERAL COUNSEL OF THE
DEPARTMENT OF COMMERCE,
Washington, D.C., May 4, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in further reply to your request for the views of this Department with respect to H.R. 5175, a bill providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

The bill would authorize and direct the U.S. Coast Guard to conduct a study, by contract or otherwise, of the legal problems arising out of the management, use and control of the natural resources of the oceans and ocean beds, and would authorize the appropriation of \$50,000 for the study. We oppose the bill in its present form.

We do not believe that the Coast Guard is the appropriate agency for conducting the study contemplated by H.R. 5175. The legal problems that arise from management, use and control of ocean and ocean bed resources will generally fall within the missions of the Departments of State and Interior. The Department of the Interior is the agency charged with managing the resources of our outer Continental Shelf (Outer Continental Shelf Lands Act of 1953). International law problems arising from our use of the ocean and ocean beds should be treated by the Department of State.

Legal problems in the use of ocean and ocean bed resources may become more complex as activities in the field of oceanography increase. However, we defer to the views of the Departments of State and Interior on the extent to which these problems require special attention.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely,

DEAN B. LEWIS
(For Robert E. Giles).

DEPARTMENT OF THE NAVY,
OFFICE OF THE SECRETARY,
Washington, D.C., June 3, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

MY DEAR MR. CHAIRMAN: Your request for comment on H.R. 5175, a bill "Providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds," has been assigned to this Department by the Secretary of Defense for the preparation of a report thereon expressing the views of the Department of Defense.

This bill would authorize the United States Coast Guard to conduct a study of the legal problems arising out of the management, use, and control of the natural resources of the ocean beds, by contract or otherwise, and would appropriate \$50,000 for this purpose.

H.R. 5175 is identical to H.R. 11419, 88th Congress. It is similar to H.R. 11232, 88th Congress, which would have authorized the same study and appropriation, but would have empowered the National Science Foundation to conduct the study. The Department of the Navy, on behalf of the Department of Defense, supports the purposes of H.R. 5175, but defers as to which agency is best qualified to conduct the study.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that, from the standpoint of the Administration's program, there is no objection to the presentation of this report for the consideration of the committee.

Sincerely yours,

C. R. KEAR, Jr.,
Captain, U.S. Navy, Deputy Chief
(For the Secretary of the Navy).

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
April 6, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in response to your request of February 23, 1965, for a report on H.R. 5175, a bill providing for

a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

This legislation does not appear to affect the programs of this Department, and we defer to the views of those agencies concerned with this matter.

Sincerely,

WILBUR J. COHEN,
Assistant Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., April 30, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. BONNER: Your committee has requested our views and recommendations on H.R. 5175, a bill providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

The bill directs the U.S. Coast Guard to conduct a study of the legal problems relating to the management, use, and control of the natural resources of the oceans and ocean beds.

A study of this kind would directly involve the interests of this Department because of its responsibilities with respect to petroleum, fisheries, and the resources of the outer Continental Shelf (43 U.S.C. sec. 1331 et seq.) (the act of May 20, 1964, 78 Stat. 194). Under these and other authorities the Department has substantial resource management functions.

The matters to which this legislation is addressed were the subject of intensive study, extending over a period of several years, by the International Law Commission, a group formed under the sponsorship of the General Assembly of the United Nations. As a result of the findings and recommendations of the Commission, a United Nations Conference on the Law of the Sea was held at Geneva from February 24 to April 27, 1958.

The 1958 Geneva Conference on the Law of the Sea led to the formulation of five international agreements which are set forth and described in summary in Senate Executives J to N, inclusive, 86th Congress, 1st session. These international agreements are identified as follows:

- (1) Convention on the Territorial Sea and the Contiguous Zone.
- (2) Convention on the High Seas. (Entered into force on September 30, 1962.)
- (3) Convention on Fishing and Conservation of the Living Resources of the High Seas.
- (4) Convention on the Continental Shelf. (Entered into force on June 10, 1964.)
- (5) Optional Protocol of Signature Concerning the Compulsory Settlement of Disputes. (Entered into force on September 30, 1962; not in force for the United States.)

These agreements and the work of the International Law Commission which preceded their formulation indicate the depth to which the

legal problems related to the oceans and ocean beds have already been probed. We feel that a new study by the United States is not needed at this time. If such a study is undertaken however, we would not object, provided that it is conducted by the Secretary of the Interior, in consultation with the Secretary of State and other interested Federal agencies. Since any study would involve questions of rights and jurisdictions of other nations and the responsibilities of this Department, we believe it would be more appropriate for these two Departments, rather than the U.S. Coast Guard, to conduct the study.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

JOHN A. CARVER, JR.,
Under Secretary of the Interior.

DEPARTMENT OF JUSTICE,
Washington, D.C., May 7, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your request for the views of the Department of Justice on H.R. 5175, a bill providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

The bill would authorize the U.S. Coast Guard to conduct, by contract or otherwise, a study of the legal problems arising out of the management, use, and control of the natural resources of the oceans and ocean beds, and to that end would authorize the appropriation of \$50,000.

The subject of the bill concerns natural resources and in some aspects also may affect foreign relations, matters which are of primary concern to the Department of the Interior and the Department of State, respectively. Accordingly, it is suggested that the committee may wish to consult those Departments on the measure.

The Bureau of the Budget has advised that there is no objection to the submission of this report from the standpoint of the administration's program.

Sincerely,

RAMSEY CLARK,
Deputy Attorney General.

NATIONAL ACADEMY OF SCIENCES,
Washington, D.C., April 6, 1965.

HON. HERBERT C. BONNER,
*House of Representatives,
Washington, D.C.*

DEAR CONGRESSMAN BONNER: The Committee on Oceanography heartily endorses H.R. 5175, a bill providing for a study of the legal problems arising out of the management, use, and control of the natural resources of the oceans and ocean beds. Such a study should

be done by contract with a competent, disinterested, non-Government organization experienced in matters pertaining to the law of the sea. Supporting a detailed research investigation on this complex problem is very important.

Sincerely yours,

FREDERICK SEITZ, *President.*

NATIONAL SCIENCE FOUNDATION,
Washington, D.C., July 28, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in further reply to your request for the views of the National Science Foundation on H.R. 5175, providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

H.R. 5175 would require that the legal study referred to be undertaken by the U.S. Coast Guard. In our view the matters with which the study would be concerned are not sufficiently within the responsibilities of the Coast Guard so as to make it appropriate for that organization to conduct the proposed study. We suggest that if a study is to be made, it be accomplished by an agency more closely identified with such areas of activity.

The Bureau of the Budget has advised us it has no objection to submission of this report from the standpoint of the administration's program.

Sincerely yours,

LELAND J. HAWORTH, *Director.*

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, May 20, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Thank you for the opportunity to comment on H.R. 5175, a bill to provide for study of legal problems relating to the management, use, and control of natural resources of the oceans and ocean beds.

As knowledge and technology is acquired through the national oceanographic program which enables us to manage, use, and control the valuable resources of the sea, it is essential that such activities proceed within an appropriate framework of Federal and international law. Legal problems inevitably follow new human activities and our emerging capabilities to exploit the oceans create the need for full understanding of the relevant legal considerations and international implications. In this regard, the International Convention on the Continental Shelf is a major accomplishment.

Although I am not acquainted with the specific legal problems in connection with the management, use, and control of oceanic resources, it is evident that many unresolved questions relating to such matters

as rights to these resources exist. Further legal studies could well serve to consolidate the applicable existing Federal and international statutes and may highlight unsuspected legal problems arising from new activities of the national oceanographic program. In view of the mission of the Department of the Interior in the field of resource management, I believe any such studies can and should be sponsored by that Department.

Sincerely yours,

DONALD F. HORNIG, *Director.*

DEPARTMENT OF STATE,
Washington, May 3, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.*

DEAR MR. CHAIRMAN: Your letter of February 23, 1965, previously acknowledged, requested the views of the Department of State on H.R. 5175, a bill providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

While the Department is unaware of the need for any such legal study from the standpoint of international law or of our relations with foreign countries it sees no objection thereto if such a study is considered necessary from a domestic law standpoint. In such eventuality some agency of the Government having responsibilities in the field of our natural resources, such as the Department of the Interior, might be more appropriate for this function than the U.S. Coast Guard.

The Bureau of the Budget advises that from the standpoint of the administration's program there is no objection to the submission of this report.

Sincerely yours,

DOUGLAS MACARTHUR II,
*Assistant Secretary for Congressional Relations
(For the Secretary of State).*

THE GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., May 3, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN: Reference is made to your request for the views of this Department on H.R. 5175, providing for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.

The bill would authorize and direct the U.S. Coast Guard to conduct by contract or otherwise, a study of the legal problems arising out of the management, use, and control of the natural resources of the oceans and ocean beds. The bill further authorizes the appropriation of \$50,000 for the accomplishment of its aims.

The Department has no independent knowledge as to the necessity for, or desirability of, the proposed legislation. However, since the study would relate to legal problems involving the natural resources of the ocean and ocean beds, it is our opinion that the study would be of more direct concern to the Department of the Interior rather than the Coast Guard. Consequently, while the Department would be ready to cooperate in any way in which its facilities or personnel could be used, the Department does not believe that the primary responsibility for the study should be lodged in the Coast Guard.

Subject to the foregoing comments, this Department has no objection to the enactment of H.R. 5175.

The Department has been advised by the Bureau of the Budget that there is no objection from the standpoint of the administration's program to the submission of this report to your committee.

Sincerely yours,

FRANK B. SMITH,
Acting General Counsel.

[COMMITTEE NOTE.—S. 944 and H.R. 10432, which are identical, were referred to the committee after the hearings had commenced. The two bills and related agency reports follow:]

[S. 944, H.R. 10432, 89th Cong., 1st sess.]

AN ACT and A BILL To provide for expanded research and development in the marine environment of the United States, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering and Resources, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SHORT TITLE

SECTION 1. This Act may be cited as the Marine Resources and Engineering Development Act of 1965.

DECLARATION OF POLICY AND PURPOSE

SEC. 2. The marine science activities of the United States should be conducted so as to contribute to the following objectives:

(1) The accelerated development of the physical, chemical, geological, and biological resources of the marine environment.

(2) The expansion of human knowledge of the marine environment.

(3) The encouragement of private investment enterprise in exploration, technological development, marine commerce, and economic utilization of the resources of the marine environment.

(4) The preservation of the role of the United States as a leader in marine science and resource development.

(5) The advancement of education and training in marine science.

(6) The development and improvement of the capabilities, performance, use, and efficiency of vehicles, equipment, and instruments for use in exploration, research, surveys, the recovery of resources, and the transmission of energy in the marine environment.

(7) The effective utilization of the scientific and engineering resources of the Nation, with close cooperation among all interested agencies, public and private, in order to avoid unnecessary duplication of effort, facilities, and equipment, or waste.

(8) The cooperation by the United States with other nations and groups of nations and international organizations in marine science activities when such cooperation is in the national interest.

THE NATIONAL COUNCIL ON MARINE RESOURCES AND ENGINEERING DEVELOPMENT

SEC. 3. (a) There is hereby established, in the Executive Office of the President, the National Council on Marine Resources and Engineering Development (hereinafter called the "Council") which shall be composed of—

- (1) The Vice President, who shall be Chairman of the Council.
- (2) The Secretary of State.
- (3) The Secretary of the Navy.
- (4) The Secretary of the Interior.
- (5) The Secretary of Commerce.
- (6) The Chairman of the Atomic Energy Commission.
- (7) The Director of the National Science Foundation.
- (8) The Secretary of Health, Education, and Welfare.

(b) The President may name to the Council such other officers and officials as he deems advisable.

(c) The President shall from time to time designate one of the members of the Council to preside over meetings of the Council during the absence, disability, or unavailability of the Chairman.

(d) Each member of the Council, except those designated pursuant to subsection (b), may designate another officer of his department or agency to serve on the Council as his alternate in his unavoidable absence.

(e) Each alternate member designated under subsection (d) of this section shall be designated to serve as such by and with the advice and consent of the Senate unless at the time of his designation he holds an office in the Federal Government to which he was appointed with the advice and consent of the Senate.

(f) The Council shall advise and assist the President, as he may request, with respect to the performance of Federal functions in the field of marine science and engineering, including but not limited to the following functions:

(1) survey all significant marine science activities, including the policies, plans, programs, and accomplishments of all departments and agencies of the United States engaged in such activities;

(2) develop a comprehensive program of marine science activities, including, but not limited to, exploration, exploitation, and conservation of the resources of the marine environment, marine engineering, studies of air-sea interaction, transmission of energy, and communications, to be conducted by departments and agencies of the United States;

(3) designate and fix responsibility for the conduct of marine science activities, by departments and agencies of the United States, including, but not limited to, exploration, exploitation, and conservation of the resources of the marine environment, marine engineering, studies of air-sea interaction, transmission of energy, and communications;

(4) provide for effective cooperation among all departments and agencies of the United States engaged in marine science activities, and specify, in any case in which primary responsibility for any category of the marine science activities has been assigned to any department or agency, which of those activities may be carried on concurrently by other departments or agencies;

(5) resolve differences arising among departments and agencies of the United States with respect to marine science activities under this Act, including differences as to whether a particular project is a marine science activity;

(6) review annually all marine science activities conducted by departments and agencies of the United States in light of the policies, plans, programs, and priorities developed pursuant to this Act;

(7) undertake a comprehensive study of the legal problems arising out of the management, use, development, recovery, and control of the resources of the marine environment; and

(8) establish long-range studies of the potential benefits to the United States economy, security, health, and welfare to be gained from marine resources, engineering, and science.

(g) The Council may employ a staff to be headed by a civilian executive secretary who shall be appointed by the President, by and with the advice and consent of the Senate, and shall receive compensation at a rate established by the President at not to exceed that of level II of the Federal Executive Salary Schedule. The executive secretary, subject to the direction of the Council, is

authorized to appoint and fix the compensation of such personnel, including not more than seven persons who may be appointed without regard to civil service laws or the Classification Act of 1949 and compensated at not to exceed the highest rate of grade 18 of the General Schedule of the Classification Act of 1949, as amended, as may be necessary to perform such duties as may be prescribed by the President.

COMMISSION ON MARINE SCIENCE, ENGINEERING AND RESOURCES

SEC. 4. (a) To assist the President and the Council in carrying out the functions stated in sections 3(f) (1), (2), (7), and (8) of this Act, there is authorized to be established, at the discretion of the President, a Commission on Marine Science, Engineering and Resources composed of fifteen members appointed by the President from among persons with a competency in the areas designated in this Act. The Commission may include five representatives from Government, five representatives from industry, and five representatives from universities, institutions, or laboratories engaged in marine science pursuits, and, upon establishment of such Commission, the President shall designate from among its members a Chairman and a Vice Chairman.

(b) Members of the Commission appointed from outside the Government shall each receive \$100 per diem when engaged in the actual performance of duties of the commission appointed from within the Government shall serve without compensation in addition to that received for their services to the Government.

(c) The Commission, its Chairman and Vice Chairman, shall at all times cooperate effectively with the Council in carrying out the responsibilities and functions delegated to it under this Act by the President through the Council, and shall report at such intervals as may be determined by the Council, its findings and recommendations for the consideration of the Council.

(d) In addition to the duties set forth in subsection (a) of this section and such other duties as may be assigned to it, the Commission shall survey the marine science activities of the United States, make recommendations for the most effective organizational structure for conduct of Federal activities in this area, and make recommendations for the encouragement of private investment in marine science and resource development.

(e) Subject to determinations of the Council, the Commission shall appoint and fix the compensation of such personnel as it deems advisable, without regard to the civil service laws and the Classification Act of 1949, as amended. In addition, subject to determination of the Council, the Commission may secure temporary and immediate services to the same extent as is authorized the departments and agencies of the Government by section 15 of the Administrative Expenses Act of 1946, but at rates not to exceed \$100 per diem for individuals.

(f) All members and other personnel of the Commission shall be reimbursed for travel, subsistence, and other necessary expenses incurred in carrying out this act.

(g) The Commission, whatever may be the requirements of the Council under paragraph (c) of this section, shall submit to the Council not later than eighteen months after the establishment of the Commission as provided in subsection (a) of this section, a final report of its findings and recommendations. The Commission shall cease to exist thirty days after it has submitted its final report.

SEC. 5. (a) The Council, under the foreign policy guidance of the President and as he may request, may coordinate a program of international cooperation in work done pursuant to this Act, pursuant to agreements made by the President with the advice and consent of the Senate.

(b) The President shall transmit to the Congress in January of each year a report, which shall include (1) a comprehensive description of the activities and the accomplishments of all agencies and departments of the United States in the field of marine science activities during the preceding year, and (2) an evaluation of such activities and accomplishments in terms of the attainment of, or the failure to attain, the objectives set forth in pursuant to this Act.

(c) Reports made under this section shall contain such recommendations for legislation as the Chairman of the Council or the President may consider necessary or desirable for the attainment of the objectives of this Act, and shall contain an estimate of funding requirements of each agency and department of the United States for marine science activities during the succeeding fiscal year.

(d) No information which has been classified for reasons of national security shall be included in any report made under this section, except pursuant to authorization given by the President.

Sec. 6. (a) The Council shall arrange with the Federal Bureau of Investigation for the conduct of such security or other personnel investigation of the Council's officers, employees, and consultants, as it deems appropriate, and if any such investigation develops any data reflecting that the individual who is the subject thereof is of questionable loyalty there shall be a full field investigation of the matter, the results of which shall be furnished to the Council.

(b) The Atomic Energy Commission may authorize any of its employees, or employees of any contractor, prospective contractor, licensee, or prospective licensee of the Atomic Energy Commission under subsection 145(b) of the Atomic Energy Act of 1954 (42 U.S.C. 2165(b)), to permit any member, officer, or employee of the Council to have access to restricted data relating to oceanography and the marine sciences which is required in the performance of his duties and so certified by the Council but only if (1) the Council or designee thereof has determined, in accordance with the established personnel security procedures and standards of the Council, that permitting such individual to have access to such restricted data will not endanger the common defense and security, and (2) the Council or designee thereof finds that the established personnel and other security procedures and standards of the Council are adequate and in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165). Any individual granted access to such restricted data pursuant to this subsection may exchange such data with any individual who (A) is an officer or employee of the Department of Defense, or any department or agency thereof, or a member of the Armed Forces, or a contractor or subcontractor of any such department, agency, or armed force, or an officer or employee of any such contractor or subcontractor, and (B) has been authorized to have access to restricted data under the provisions of section 143 of the Atomic Energy Act of 1954 (42 U.S.C. 2163).

Sec. 7. Information obtained or developed under this Act shall be made available for public inspection except (a) information authorized or required by Federal statute to be withheld, and (b) information classified to protect the national security: *Provided*, That nothing in this Act shall authorize the withholding of information from the duly authorized committees of Congress.

Sec. 8. (a) For the purposes of this Act the term "marine science" shall be deemed to apply to oceanographic and scientific endeavors and disciplines, engineering and technology in and with relation to the marine environment; and the term "marine environment" shall be deemed to include (1) the oceans, (2) the Continental Shelf of the United States, (3) the Great Lakes, (4) seabed and subsoil of the submarine areas adjacent to the coasts of the United States to the depth of two hundred meters, or beyond that limit, to where the depths of the superjacent waters admit of the exploitation of the natural resources of such areas, (5) the seabed and subsoil of similar submarine areas adjacent to the coasts of islands which comprise United States territory, and (6) the resources thereof.

(b) There is hereby authorized to be appropriated such sums as may be necessary to carry out this Act, but sums appropriated for any one fiscal year shall not exceed \$1,000,000.

SEC. 9. The provisions of this Act shall expire at the termination of June 30, 1970.

Passed the Senate August 5, 1965.

Attest:

FELTON M. JOHNSTON, *Secretary*.

U.S. ATOMIC ENERGY COMMISSION,
Washington, D.C., August 18, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives.

DEAR MR. BONNER: The Atomic Energy Commission is pleased to comment on S. 944, a bill "[t]o provide for expanded research and development in the marine environment of the United States, to establish a National Council on Marine Resources and Engineering De-

velopment, and a Commission on Marine Science, Engineering and Resources, and for other purposes.”

As you know, the Atomic Energy Commission was one of the four Federal agencies that first suggested and participated in efforts to coordinate the national program in oceanography. The Federal Council for Science and Technology (FCST) established the permanent Interagency Committee on Oceanography (ICO) in 1960; a primary function of the ICO has been to coordinate the activities of various agencies having an interest in oceanography and related marine sciences. The AEC is a member of the ICO and participates in the annual preparation of the Government's national oceanography program, which is reviewed and approved by the FCST. There is also an FCST Committee on Water Resources Research which is concerned with coordinating research activities of the various agencies on fresh water resources, including research pertaining to the Great Lakes.

It is the AEC's understanding that the proposed bill would in effect substitute a National Council on Marine Resources and Engineering Development for the ICO as the primary coordinator of agency activities in the field of oceanography, including the Continental Shelf, and for the FCST Committee on Water Resources Research as the primary coordinator of agency research activities in the field of fresh water resources to the extent that those activities concern the Great Lakes. The bill would also establish, at the discretion of the President, a Commission on Marine Science, Engineering, and Resources to assist the President and the Council in carrying out certain of the functions stated in the bill, and such other duties as may be assigned to it. While the Commission is in accord with the substantive purpose and intent of the proposed legislation, it is our belief that the substitution of the National Council for the ICO and the FCST Committee on Water Resources Research is not necessary or appropriate at this time in view of the effective coordination of agency efforts in this field by these two committees.

Should the bill be considered for passage, however, the Commission suggests that changes as set forth below be made.

Subsection 5(d) should be amended to read as follows:

“(d) No information which has been classified for reasons of national security shall be included in any report made under this section, unless such information has been declassified by, or pursuant to authorization given by, the President.”

This change would make it clear that information which has been previously declassified may be included in a report without further action.

The Commission urges the deletion from the bill of subsection 6(b). This subsection would authorize “any member, officer, or employee of the Council to have access to restricted data relating to oceanography and the marine sciences which is required in the performance of his duties * * *” as certified by the National Council, provided the National Council determines that its established “security procedures * * * are * * * in reasonable conformity to the standards established by the Atomic Energy Commission under section 145 of the Atomic Energy Act of 1954 (42 U.S.C. 2165)”, and provided the National Council has determined in accordance with such procedures

“that permitting such individual to have access to such restricted data will not endanger the common defense and security.”

In our view subsection 6(b) would have the effect of diluting the Commission's control over restricted data without adequate demonstrated need. Such a certification procedure for access to restricted data, as proposed by subsection 6(b), has been accorded to only two agencies, the Department of Defense and the National Aeronautics and Space Administration because the nature of the duties and functions of these agencies have so required. In addition, as Dr. George M. Kavanaugh mentioned during his testimony before your subcommittee on August 13, 1965, section 6(b) is technically defective in that (a) the words “or any other person authorized access to restricted data by the Commission” should follow the word “Commission” in line 14, and (b) the subsection does not provide a means under which persons certified under S. 944 for access to restricted data may exchange restricted data with persons certified for similar access under the National Aeronautics and Space Act.

However, we believe that a statutory provision such as subsection 6(b) for the National Council on Marine Resources and Engineering Development is not necessary. There does not appear to be extensive restricted data pertaining to oceanography and related marine sciences, and we believe that need for access to such restricted data, which the National Council's members and officers as well as its relatively small staff may have, can be effectively handled through the Commission's usual security procedures. In this connection, it should be noted that Public Law 87-206 (75 Stat. 475) amended the Atomic Energy Act of 1954, as amended, on September 6, 1961, by adding a new subsection 145(c) in order to expedite clearances in such cases as this. In order to allow the National Council to make full use of the clearance procedure contained in section 145(c) of the Atomic Energy Act, it is also recommended that section 6(a) of the proposed bill be revised to read as follows:

“SEC. 6(a). The Council shall arrange with the Federal Bureau of Investigation for the conduct of investigations, including full field investigations, of the character, associations, and loyalty of the Council's officers, employees, and consultants, as it deems appropriate. The results of such investigations shall be furnished to the Council.”

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

E. J. BLOCH,
Deputy General Manager.

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., August 18, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This will acknowledge your letter of August 10, 1965, inviting the Bureau of the Budget to comment on S. 944, a bill to establish a National Council on Marine Resources and Engi-

neering Development, a Commission on Marine Science, Engineering, and Resources, and for other purposes.

The proposed Council would be composed of the Vice President, who would be chairman, the heads of a number of specified agencies, and such additional officials as the President might designate. The bill provides that the Council assist the President in carrying out a number of specified functions in planning and conducting a national oceanographic program.

The Office of Science and Technology was established in 1962, with the concurrence of the Congress, to advise the President on all scientific and technical matters and to coordinate Federal activities in this area. The Office provides a means whereby the problems and opportunities of competitive scientific areas can be weighed against each other in making program decisions. Establishment of a statutory council would derogate from the functions of the Office in the field of oceanography and would constitute a precedent for further incursions in other fields. Further, the existing Interagency Committee on Oceanography has proven to be an effective mechanism for planning a coordinated national program and is sufficiently flexible to accommodate to developments in this rapidly moving scientific area. The need for flexibility in establishing coordinating arrangements was stressed by the President in his message transmitting Reorganization Plan No. 4 of 1965 to the Congress, which action led to the abolition of nine statutory boards, councils, and interagency committees. The President emphasized that we must have "the capacity for fast flexible response to changing needs imposed by changing circumstances."

The views of the Bureau of the Budget on the establishment of a study commission for oceanography were provided your committee in our letter of July 29, 1965, on H.R. 9064. We noted that a special Panel on Oceanography of the President's Science Advisory Committee is now conducting a broad gage study of the field and that this study will help illuminate further opportunities and needs in oceanography. Dr. Hornig's letter of July 6, 1965, on H.R. 9064 pointed out that until this panel has completed its review the establishment of any study commission would be premature.

In the light of the factors cited above, the Bureau of the Budget recommends against enactment of S. 944 and favors, instead, enactment of H.R. 2218, which would provide for the establishment of a comprehensive Federal oceanographic program under the leadership of the President.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

GENERAL COUNSEL OF THE DEPARTMENT OF COMMERCE,
Washington, D.C., August 20, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.*

DEAR MR. CHAIRMAN. This letter is in reply to your request for the views of this Department with respect to S. 944, an act to provide for expanded research and development in the marine environment of

the United States, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering, and Resources, and for other purposes.

S. 944 would set forth national objectives for marine science activities and would establish a National Council on Marine Resources and Engineering Development composed principally of Cabinet level officers. The Council would advise and assist the President by surveying present marine science activities, developing a marine science program, coordinating the agencies' marine science activities, studying the legal problems arising out of use of marine resources and annually comparing Federal marine science accomplishments against the Council's marine science program. The Council would be authorized to employ an executive secretary and staff. S. 944 would also authorize the President to establish an investigatory commission to assist the Council and the President, and require the President to report annually to Congress on his marine science program and on present accomplishments.

The Department strongly supports improvements in and greater emphasis for the national oceanographic or marine sciences program. However, we doubt that S. 944 would have enough beneficial effect upon oceanographic activities to offset the detrimental effect it would have upon the administration of oceanography as a whole.

The Interagency Committee on Oceanography has had considerable success in coordinating and stimulating Federal oceanographic activities, and we are therefore not aware of overriding reasons for replacing it. The proposed National Council on Marine Resources and Engineering Development would not change the realities involved in setting priorities and apportioning limited funds among less limited demands within the agencies. There is no reason to believe that Council review of the national oceanographic or marine sciences program before its submission to the agencies would keep any agency from balancing its oceanographic program needs against the needs of its other programs. On the other hand, creation of the proposed Council would place additional demands directly upon Cabinet officers and agency heads who already have heavy burdens of responsibility.

If the Council supplants the Interagency Committee on Oceanography, the limited amount of personal time which the Council members could devote to Council activities might result in less consideration of oceanography within the executive branch than presently exists. If the Council and the Interagency Committee on Oceanography both exist there will be substantial duplication of efforts and possible conflict of proposed programs. We think it is better to leave oceanographic planning and coordination in the hands of the policy and operating officials who work with the oceanographic program, serve on the Interagency Committee on Oceanography and who are thus most qualified to advise the President on its needs.

For these reasons, the Department strongly favors the objectives of the act but is opposed to the establishment of a Council to accomplish these objectives. Subject to our additional comments referred to below, we would favor the act if it were amended to permit the President to establish such mechanisms as he believes necessary to accomplish these objectives.

Section 4 of S. 944 would establish an investigatory commission comparable to the commission which would be established by H.R. 9064. We do not see any need for an investigatory commission at this time. We refer you to our letter to you of July 29, 1965, commenting on H.R. 9064, for the remainder of our views on investigatory commissions.

Section 3(f) (7) would require a study of legal problems arising from use of marine resources. Our views on that subject are contained in our letter to you of May 4, 1965, commenting on H.R. 5175.

We have been advised by the Bureau of the Budget that there would be no objection to the submission of our report from the standpoint of the administration's program.

Sincerely,

ROBERT E. GILES.

DEPARTMENT OF THE NAVY,
OFFICE OF THE SECRETARY,
OFFICE OF LEGISLATIVE AFFAIRS,
Washington, D.C., September 14, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
House of Representatives,
Washington, D.C.*

MY DEAR MR. CHAIRMAN: Your request for comment on S. 944, an act to provide for expanded research and development in the marine environment of the United States, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering and Resources, and for other purposes, as passed by the Senate on August 5, 1965, has been assigned to this Department by the Secretary of Defense for the preparation of a report thereon expressing the views of the Department of Defense.

S. 944 would establish a National Council on Marine Resources and Engineering Development consisting of members at the Cabinet level and the Vice President as Chairman. The Council's prerogatives would extend into the areas of both marine sciences and engineering. Further, the President is authorized to establish a 15-member Commission that would report to the President through the Council. The Commission would consist of five members from the Government, five from industry, and five from universities, institutions, or laboratories. The Commission would be dissolved upon submission of its final report due no later than 18 months after the establishment of the Commission.

The objectives of this bill are unquestionably worthwhile; however, the mechanism proposed would put the marine sciences and engineering in an awkward position vis-a-vis the rest of science supported by the Federal Government. The Council on Marine Resources and Engineering Development as proposed in S. 944 would be on the same level, or perhaps even above, that of the Federal Council for Science and Technology to whose work it is closely related. It is difficult to envisage how the administrative complications in such an arrangement could be resolved. Further, establishment of the proposed

Council and Commission could lead to the proliferation of similar Councils in other scientific areas.

The Department of the Navy, on behalf of the Department of Defense, opposes enactment of S. 944.

This report has been coordinated within the Department of Defense in accordance with procedures prescribed by the Secretary of Defense.

The Bureau of the Budget advises that, from the standpoint of the Administration's program, there is no objection to the presentation of this report on S. 944 for the consideration of the Committee.

For the Secretary of the Navy.

Sincerely yours,

M. K. DISNEY,
Captain, U.S. Navy,
Director, Legislative Division.

U.S. DEPARTMENT OF THE INTERIOR,
 OFFICE OF THE SECRETARY,
Washington, D.C., August 16, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. BONNER: Your committee has requested our views on S. 944, a bill to provide for expanded research and development in the marine environment of the United States, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering, and Resources, and for other purposes, which passed the Senate on August 5, 1965.

S. 944 has two main features. First, it provides for the establishment of a National Oceanographic Council composed of the Vice President, certain Cabinet members, including the Secretary of the Interior, and certain other heads of agencies. The function of the Council is to advise the President on the performance of Federal functions in the field of marine science and engineering. This provision of S. 944 is similar to the provision in H.R. 5654 upon which the Department commented adversely in its letter of July 29, 1965, to your committee. Second, it authorizes the President, at his discretion, to establish a 15-member Commission on Marine Science, Engineering, and Resources. The members may include five people from Government, five from industry, and five from universities. One of the functions of the Commission will be to survey the marine science activities of this Nation, and make recommendations regarding the organizational structure of Federal activities in this area. This provision of the bill is similar to H.R. 9064.

In our July 29 letter to your committee, this Department supported the enactment of H.R. 2218. We said that the enactment of the other bills, such as H.R. 5654 and H.R. 9064, is premature.

"This position is based on the premise that the President's Science Advisory Committee's Panel on Oceanography is at the present time making the kind of investigation and study that is contemplated by H.R. 9064. When the Panel completes its study and submits its report Congress can more appropriately decide whether additional legislation dealing either with a further study or with a revised govern-

mental organization to administer the national oceanographic program should be enacted."

Our views have not changed with the passage by the Senate of S. 944. We understand, however, that during the present hearings before your committee a proposal has been made to provide standby authority for the establishment, in the discretion of the President, of a self-liquidating commission, such as proposed in S. 944. We think that this proposal merits serious consideration. If your committee adopts this approach, we would like the opportunity to offer suggestions on the provisions of the legislation.

The Bureau of the Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

STANLEY A. CAIN,
Assistant Secretary of the Interior.

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF SCIENCE AND TECHNOLOGY,
Washington, D.C., August 26, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is further reply to your letter of August 10, 1965, requesting comments on S. 944, to establish a National Council on Marine Resources and Engineering Development and a Commission on Marine Science, Engineering, and Resources, and for other purposes.

Although I am in accord with the purpose of the bill, I do not recognize the need for a National Council and believe it would be unwise to create one. Most of the functions of the Council are being performed by the Federal Council for Science and Technology. The creation of another Council to foster a particular major field of science raises in principle the desirability of a series of national councils in successive major areas of science. It seems unlikely that the Cabinet officers designated to serve on such a Council would, in fact, be able to devote much attention to its work since they already have major responsibility. For these reasons I cannot recommend the enactment of S. 944.

It seems to me that what is needed at this time is a bill that would blend the best features of S. 944 with those of H.R. 2218, which has won administration support. We are now preparing such a bill which I would be pleased to discuss with you in the near future.

Sincerely yours,

DONALD F. HORNIG, *Director.*

Mr. LENNON. The authors of these bills have all sincerely sought effective answers to the numerous problems involved in our well established need for an oceanographic program to overcome our past neglect in the understanding and conquering of the oceanographic environment, which are so essential to the development of our civiliza-

tion. It is gratifying to all of us to have the benefit of such a broad spectrum of ideas to work with as we consider the legislation before us.

In addition to the bills pending before our committee, the Senate Committee on Commerce has recently ordered reported S. 944, which contains features similar to those embodied in some of our bills. Also in the Senate, there was recently introduced by Senator Muskie for himself and 17 cosponsors a bill which would create a new executive Department of Marine and Atmospheric Affairs.

Just the other day, Mr. Hathaway, of Maine, introduced an identical bill in the House, H.R. 10106. In both Houses these bills were referred to the Government Operations Committees. Though not before us, the Chair mentions these latter two bills because of their close and important relationship to the objectives we have under study.

I might say that in the interest of compiling a complete and comprehensive record the Chair would have no objection whatever to comments by any of the witnesses concerning the subject matter of these bills.

Finally, we have again scheduled consideration of H.R. 5175, which would provide for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds. Although this bill is only collaterally related to the others we have scheduled, the Chair thought it desirable to take this opportunity to receive testimony on this subject during this session.

In order to be as helpful as possible to the membership of the committee in the consideration of the rather involved concepts we have before us, the staff has heretofore prepared and distributed a list of the bills on which these hearings are being held, as well as copies of the bills themselves as they were introduced.

Each member of the committee has also received a memorandum, dated July 26, setting forth the background of these hearings and an abstract of the provisions of each of the several types of bills.

As an aid to understanding of the background of legislative activity in the field of oceanography, there has also been distributed a committee print entitled "Abridged Chronology of Events Related to Federal Legislation for Oceanography 1956-65," which was prepared with great care by the excellent staff of the Library of Congress Legislative Reference Service under the direction of Dr. Edward Wenk, Chief of the Science Policy Research Division.

Finally, as a convenience to members, the staff has prepared a committee print which is a compilation of the pending bills on oceanography and departmental reports related thereto.

In preparation for these hearings, we have set aside the mornings of Tuesday, Wednesday, and Thursday of this week and the same days next week. If more time is needed, we will continue into the third week of this month.

In line with the usual custom, those congressional witnesses who wish to do so will be heard first at this opening session. It is our general plan that they will be followed by witnesses from the executive departments and agencies, and they in turn followed by institutional, industry, and other public witnesses.

I am sure all are aware that it is impossible to schedule times of appearance in major legislative hearings with precision. Adjustments

will inevitably have to be made for one reason or another, but we will do the best we can to accommodate to the convenience of the busy persons who may wish to appear and present their views.

I might say that it is almost impossible to have a committee meeting convened of the Congress and expect to have even all the members of this subcommittee present. The Coast Guard Subcommittee, of which several members of this subcommittee are members, is in session. The Interstate and Foreign Commerce Committee is in executive session, with several of the members who are to appear before this subcommittee, and on this committee, there, some on the Armed Services Committee, and here, there, and yonder.

However, before we hear our first witness today, I want to make an announcement.

For the past 6 years we have been privileged to have attached to our staff a man of very unusual talents, ability, and creative energy, Capt. Paul Sherman Bauer, of the U.S. Naval Reserve, retired. I regret this morning to announce that Paul will be leaving us on September 1. I hope these hearings will be concluded and positive legislation passed through the Congress before we have to lose him—and in honor of his splendid achievements and service to this committee.

Captain Bauer first came with our committee in 1959, at the very beginning of the concept of a national oceanographic program. We have been fortunate indeed in having his services as a consultant on oceanographic, fisheries, and other technical matters since that time.

A successful businessman in his native Massachusetts, he has in recent years devoted almost full time to the cause of science. Oceanography and the other earth sciences have been his specialties.

In addition to his valuable contributions to this subcommittee and to the full Committee on Merchant Marine and Fisheries, he has also served as professor of earth sciences at the American University here in Washington; participated in numerous technical meetings of value to the work of this committee, and published, as some of you know, several very important papers.

He brought to the committee a long background of technical and scientific achievement. He is wise in the ways of Government—which has been invaluable to us as we have tried to unravel the mysteries of what has been going on in oceanography and to determine the course we should take for the future.

While I can fully appreciate Paul's desire to devote more time to his personal business, I want to express my personal regret and the regret of the full committee at losing him.

It has been a very fruitful period in the development of a true oceanographic program since he came with us.

Again I say, Paul, in behalf of the committee, I wish you well in your new activities, and hope that we may call upon you from time to time for your most wise and able counsel.

We are delighted to have today as the first witness the distinguished Senator from the State of Alaska, a former Member of the House, Senator Bob Bartlett.

Do members of the committee have copies of the Senator's statement?

Senator, we welcome you back to from whence you came. We are delighted to have you back.

STATEMENT OF HON. BOB BARTLETT, A U.S. SENATOR FROM THE STATE OF ALASKA

Senator BARTLETT. Thank you, Mr. Chairman. Do you all have copies of the statement?

Mr. LENNON. Yes, we do. You may proceed.

Senator BARTLETT. Thank you, Mr. Chairman. I must say that, after having served on this committee for 14 years about half the time, yet when I set out for the Senate Commerce Committee, of which I am a member, instinct almost diverts me to this building. I enjoyed my service on this committee very much indeed.

Mr. Chairman, your committee is to be congratulated for undertaking a comprehensive review of the U.S. oceanographic and marine resources program. This is a significant and enormous task.

The committee is considering numerous legislative measures relating to oceanography and ocean resource development. The diversity of purposes and approaches reflected in these bills demonstrates clearly that there are many in Congress who feel that the present ocean program is seriously inadequate.

Indeed, one might well ask whether we have anything that might properly be termed an oceanographic program. A serious and concerted program in this area will certainly require something better than our present uncoordinated efforts—represented by a scattering of some 22 separate agency requests for funds.

Several bills before this committee are concerned with improving the coordination of present oceanographic activity. Others are directed toward a broad reorganization of all of the Federal Government's ocean-related activities.

One bill, Mr. Chairman, focuses on the legal problems of ocean resource development. Several proposals similar to S. 1091, which I introduced in the Senate, would create a new agency with a broad mission of marine exploration development.

Now, Mr. Chairman, we may properly ask what is the reason for the flood of oceanographic legislation introduced this session? What is the basis of this obvious congressional discontent with our present effort? I will suggest an answer.

It is, in my opinion, a failure of this administration and preceding administrations to respond effectively either to the recent advances in the field of marine technology and ocean resource development or to recent changes in the international law of the sea.

Other nations have not been as hesitant. The Soviet Government, for example, supports extensive oceanographic expeditions for the exploration of mineral resources; recent reports tell of their discovering manganese nodules on the floor of the Mediterranean Sea. The British have recently organized a Commercial Oceanology Study Group which will investigate the prospect of developing the minerals resources of the sea.

The U.S. oceanographic activity has thus far been directed primarily toward learning more about the oceanic environment. In many respects we have been successful in this scientific effort. It is because of this success, among other reasons, that the focus of our effort in the future will shift to the utilization of the ocean and ocean resources.

The oceans are being recognized more and more as a source of wealth and as a profitable field for industrial enterprise.

Yesterday we were interested in oceanography primarily as a science and our activity was centered in the several universities and private institutions interested in studying the oceans. But today we are thinking more about man's working and living on the ocean floor, about the engineering and technological problems related to harvesting the resources of the seas.

I will make no elaborate attempt here to outline for the committee the many and varied ocean resources that are today within our reach.

In its natural state, acre per acre, the sea is producing about as much as the land, yet man is only taking about 1 percent of his present food requirements from the salt water environment. When we begin to farm the oceans we can expect them to produce much greater quantities of desirable food substances—just as farming on land has greatly increased its productivity.

However, at the present, the United States does not have a program dedicated to the farming of the sea.

With regard to efficient hunting and capturing of the living resources of the sea, new types of vessels are being developed far more rapidly than they are being used. World fishery production is doubling every 12 years, but world production could be further increased if intelligent management of these resources were practiced.

But this committee knows well that the United States is not engaged in this exciting development.

Looking beyond the resources to be found in the sea water itself, we find in the Continental Shelf and ocean floor the ultimate repository of minerals eroded from the continent. The ocean does a remarkable job of segregating and concentrating many of the minerals which are of substantial commercial value, including phosphorus, manganese, nickel, iron, copper, and cobalt.

In recent years vast discoveries of these minerals have been made on the Continental Shelf and ocean floor. Although several American industries have expressed interest in the development of these resources, the United States today has no program to assist in this effort.

One of the earliest and today certainly the most significant industry operating on the Continental Shelf is the petroleum industry. This industry, with but limited encouragement from our Government, has made vast expenditures of money for the exploitation of oil and gas reserves on the Continental Shelf.

Approximately 5,000 wells have been drilled on the Outer Continental Shelf, primarily in the Gulf of Mexico. Some wells have been drilled at a depth of almost 600 feet, and are located over 75 miles offshore. This development has been particularly significant because the Federal Government has directly benefited substantially from oil leases, bonuses, and royalties.

During the past 10 years the United States has received over \$1.2 billion from Outer Continental Shelf mineral bonuses, \$14 million in rentals, and royalties estimated at \$16 million a year.

There appears to be complete agreement that further development of the petroleum resources of the Continental Shelf could be substantially expedited if the U.S. Government would undertake an accelerated program to study the Continental Shelf and ocean environment.

In addition to recent technological advances affecting ocean resource development, there have occurred in the past few years significant changes in the law of the sea. These changes resulted from the United Nations Conference on the Law of Sea, held in Geneva in 1958.

The committee is familiar with the four conventions adopted in Geneva, all of which have been ratified by the United States and all of which except the Convention on Fishing and Conservation of the Living Resources of the High Seas are in effect. It is anticipated that this remaining Convention on Fishing will become effective the latter part of this year or early in 1966.

The two conventions of primary interest in regard to ocean resource development are the Convention on the Continental Shelf and the Convention on Fishing and Conservation of the Living Resources of the High Seas. The Continental Shelf Convention gives to each coastal nation exclusive rights over the exploitation of the resources of its Continental Shelf.

This means that as of last year, when the convention went into effect, the United States increased by one-third the territory over which it held sovereign rights under international law. The area of this shelf acquisition—approximately 1 million square miles—surpasses that of any of our previous territorial acquisitions, including Jefferson's Louisiana Purchase.

The 1958 Fishery Convention acknowledges that each coastal nation has a dominant interest in the fishery resources of its waters and provides that such nations shall have the right to provide for the conservation of these resources.

Approximately 90 percent of the world fishery catch is taken from inland waters or waters immediately over or adjacent to the Continental Shelf of nations within the Temperate or Tropic Zones.

The measurement of the U.S. coastline within these zones exceeds 10,000 miles. Only Indonesia, Australia, and Russia have comparable or more extensive coastlines. The other 111 nations of the world either have substantially shorter coastlines or none at all.

It is estimated that the U.S. coastal fishery resources are such as to permit an annual sustainable yield of approximately 20 billion pounds. The estimated value of our potential yearly catch is between \$1 and \$1.5 billion.

Last year, however, the U.S. coastal catch was below 5 billion pounds and the foreign catch off the U.S. coast was approximately 3 billion pounds.

The evidence is quite clear that the U.S. coastal fishery resource is one of the most extensive and richest in the world. It is also clear that this resource is being underutilized by the United States and is becoming increasingly attractive to foreign fishing fleets. Five years ago there were fewer than 100 foreign vessels fishing off the U.S. coasts.

This past summer we witnessed more than 1,500 large, modern, efficient foreign-flag fishing vessels ranging between 3 and 50 miles from our coast. About one-half of this foreign fleet has been operating off the coast of Alaska.

Although the U.S. coastal fishery resource is perhaps the greatest in the world, although certain stocks are being seriously damaged by foreign fishing, and although the United States will soon, for the first

time under international law, have the right and obligation to conserve these coastal fishery resources, the fact is that we have no active program designed to protect these stocks.

Under the Fishery Convention, the United States will have the right to promulgate fishing conservation regulations on the high seas to conserve these coastal fishery resources. This will be possible only if the United States has the necessary information about the resource to support the conservation measures undertaken.

However, we know little about our own coastal fishery resources. I fear foreign fishermen know more about certain coastal fishery resources in Alaska than we do. Further, the administration has advanced no program to implement the 1958 Fishery Convention.

In summary, for over 350 years the nations of the world have generally agreed that the resources of the sea and the ocean floor were held in common and that no single nation had an exclusive or even preferential right to exploit or conserve these resources. The 1958 Fishery and Continental Shelf Conventions were dramatic departures from these traditionally held tenets.

The final ratification of the Continental Shelf Convention last fall and the anticipated final ratification of the Fishery Convention this year signal international acceptance of a new order and a new approach to the use of ocean resources. I am absolutely convinced that the administration has missed entirely the significance of these recent and important changes in international law.

The seas are mankind's last frontier on this planet. For ages we have treated the ocean waters as little more than hunting grounds for fishermen and highways for ships. Now we are awakening to see that beneath the surface of the waters lies a vast territory every bit as challenging as outer space and infinitely more promising with regard to economic reward.

Man at last has the scientific capability and technical mastery to meet the challenge, and his growing need for food, water, minerals, power, and weather control gives him solid reasons for doing so.

I suggest we begin to occupy and use our recently acquired 1 million square miles of Continental Shelf and that the U.S. Government assess our extensive coastal fishery resources. We today know so little about this territory and this environment that our initial efforts will be somewhat akin to the rewards and failures of the Lewis and Clark Expedition. But the adventure beneath the surface of the sea must begin.

What is needed in my opinion is a new agency with a broad mission and with a chief executive who can speak effectively in Congress and elsewhere for the administration regarding our civilian program on the oceans.

This is not a Navy responsibility nor is it any longer strictly a matter of science. The legislation I introduced would establish an independent civilian agency. In my opinion, this is still the most desirable approach.

I recognize, however, that the job could be accomplished by an expansion of the responsibilities of some division or agency within either the Department of the Interior or the Department of Commerce. There could be an Ocean Resources Service in the Department of the Interior, or ESSA in the Department of Commerce could be expanded to accomplish the job.

I do not feel strongly about the structure and I want to emphasize that, but I do feel strongly that the mission of the new agency must be sufficiently broad to unify the program and centralize responsibility. It is my conviction that until this is done we will continue to fail in our program on the oceans.

Mr. Chairman, in an effort to save some time of the committee I did not read the entire text of my statement and I should like permission to have it placed in the record in full.

Mr. LENNON. Without objection the full text of the Senator's statement will be placed in the record at this point.

(The statement referred to follows:)

STATEMENT BY HON. E. L. BARTLETT, A U.S. SENATOR FROM THE STATE OF ALASKA

Mr. Chairman, your committee is to be congratulated for undertaking a comprehensive review of the U.S. oceanographic and marine resources program. This is a significant and enormous task.

The committee is considering numerous legislative measures relating to oceanography and ocean resources development. The diversity of purposes and approaches reflected in these bills demonstrates clearly that there are many in Congress who feel that the present ocean program is seriously inadequate. Indeed, one might well ask whether we have anything that might properly be termed an oceanographic program. A serious and concerted program in this area will certainly require something better than our present uncoordinated efforts—represented by a scattering of some 22 separate agency requests for funds.

Several bills before this committee are concerned with improving the coordination of present oceanographic activity. Others are directed toward a broad reorganization of all of the Federal Government's ocean-related activities. One bill focuses on the legal problems of ocean resource development. Several proposals similar to S. 1091, which I introduced in the Senate, would create a new agency with a broad mission of marine exploration and development.

What is the reason for the flood of oceanographic legislation introduced this session? What is the basis of this obvious congressional discontent with our present effort? I will suggest an answer. It is, in my opinion, a failure of this administration to respond effectively either to the recent advances in the field of marine technology and ocean resource development or to recent changes in the international law of the sea. Other nations have not been as hesitant. The Soviet Government supports extensive oceanographic expeditions for the explorations of mineral resources; recent reports tell of their discovering manganese nodules on the floor of the Mediterranean Sea. The British have recently organized a commercial oceanology study group which will investigate the prospect of developing the mineral resources of the sea.

MARINE TECHNOLOGY AND RESOURCE DEVELOPMENT

The U.S. oceanographic activity has thus far been directed primarily toward learning more about the oceanic environment. In many respects we have been successful in this scientific effort. It is because of this success, among other reasons, that the focus of our effort in the future will shift to the utilization of the ocean and ocean resources. The oceans are being recognized more and more as a source of wealth and as a profitable field for industrial enterprise. Yesterday we were interested in oceanography primarily as a science and our activity was centered in the several universities and private institutions interested in studying the oceans. But today we are thinking more about man's working and living on the ocean floor, about the engineering and technological problems related to harvesting the resources of the seas.

I will make no elaborate attempt here to outline for the committee the many and varied ocean resources that are today within our reach. I would point out that fresh water from the sea itself is of enormous potential value. The United States has recently undertaken an accelerated saline water conversion program, important to the thirsty residents of New York, as well as to drought-stricken farmers and ranchers in southern California. This program should be strengthened and accelerated.

Sea water is also a rich source of minerals. The United States has a lead in this field because of the pioneering work that has been accomplished by Dow Chemical Co., in extracting valuable minerals, particularly bromine and magnesium, from sea water. But the U.S. Government has no program to evaluate the mineral extraction potential of the oceans.

In its natural state, acre per acre, the sea is producing about as much as the land, yet man is only taking about 1 percent of his present food requirements from the salt-water environment. When we begin to farm the oceans we can expect them to produce much greater quantities of desirable food substances—just as farming on land has greatly increased in productivity. However, at the present, the United States does not have a program dedicated to the farming of the sea.

With regard to efficient hunting and capturing of the living resources of the sea, new types of vessels and gear are being developed far more rapidly than they are being used. World fishery production is doubling every 12 years, but world production could be further increased if intelligent management of these resources were practiced. But this committee knows well that the United States is not engaged in this exciting development. U.S. production in 1964 was approximately the same as 30 years ago. The Fishing Vessel Improvement Act, passed by Congress last year, was far too modest. The fact is that the United States would have to build fishing vessels to the maximum extent allowed under the Fishing Vessel Improvement Act through the close of this century before we would be able to place in our own coastal waters a fleet of U.S. fishing vessels comparable in tonnage to the foreign-flag fishing vessels operating in our coastal waters at the present time.

Looking beyond the resources to be found in the sea water itself, we find in the Continental Shelf and ocean floor the ultimate repository of minerals eroded from the continent. The ocean does a remarkable job of segregating and concentrating many of the minerals which are of substantial commercial value, including phosphorus, manganese, nickel, iron, copper, and cobalt. In recent years vast discoveries of these minerals have been made on the Continental Shelf and ocean floor. Although several American industries have expressed interest in the development of these resources, the United States today has no program to assist in this effort.

One of the earliest and today certainly the most significant industry operating on the Continental Shelf is the petroleum industry. This industry, with limited encouragement from our Government, has made vast expenditures of money for the exploitation of oil and gas reserves on the Continental Shelf. Approximately 5,000 wells have been drilled on the Outer Continental Shelf, primarily in the Gulf of Mexico. Some wells have been drilled at a depth of almost 600 feet, and are located over 75 miles offshore. This development has been particularly significant because the Federal Government has directly benefited substantially from oil leases, bonuses, and royalties. During the past 10 years the United States has received over \$1.2 billion from Outer Continental Shelf mineral bonuses, \$14 million in rentals, and royalties estimated at \$16 million a year. These figures do not include the receipts by State governments for oil leases, bonuses, and royalties on that portion of the Continental Shelf within their jurisdiction. However, strong evidence suggests that substantial returns have also been received by States from this source.

There appears to be complete agreement that further development of the petroleum resources of the Continental Shelf could be substantially expedited if the U.S. Government would undertake an accelerated program to study the Continental Shelf and ocean environment. The U.S. Government makes available to all industries information about the land environment to encourage economic development. It is high time that we do the same regarding the Continental Shelf environment.

One of the most encouraging recent actions by the Government was President Johnson's decision to construct an atomic-powered vehicle for commercial ocean resource work. This will for the first time give us the power needed to work on the ocean floor without the usual restrictions of time. The significance of this is not to be minimized.

I would like again to stress that these recent technological developments encouraging the economic use of ocean resources represent a shift in our interests from the collecting of scientific information to the solving of problems relating to the harvesting and utilization of ocean resources. There are obvious and extensive economic benefits to be gained by a U.S. program of resource development

of the Continental Shelf. Compare this to the situation in space exploration. No one has suggested that there is any economic benefit to be gained from exploring the surface of the Moon or Mars. In addition, there are many defense purposes to be served by additional activity in the oceans, but there is limited defense interest in any space effort beyond the Moon. The space program has no economic or substantial military justification. The only justification today is scientific. We must as a matter of national policy reevaluate our allocation of scientific effort to assure a proper balance between space and the oceans, and we must recognize the fact that an increased knowledge of the oceans, more than knowledge of space, can have defense and economic significance.

INTERNATIONAL LAW

In addition to recent technological advances affecting ocean resource development, there have occurred in the past few years significant changes in the law of the sea. These changes resulted from the United Nations Conference on the Law of the Sea, held in Geneva in 1958. The committee is familiar with the four conventions adopted in Geneva, all of which have been ratified by the United States and all of which except the Convention on Fishing and Conservation of the Living Resources of the High Seas are in effect. It is anticipated that this remaining Convention on Fishing will become effective the latter part of this year or early next year.

The two conventions of primary interest in regard to ocean resource development are the Convention on the Continental Shelf and the Convention on Fishing and Conservation of the Living Resources of the High Seas. The Continental Shelf Convention gives to each coastal nation exclusive rights over the exploitation of the resources of its continental shelf. This means that as of last year, when the convention went into effect, the United States increased by one-third the territory over which it held sovereign rights under international law. The area of this shelf acquisition—approximately 1 million square miles—surpasses that of any of our previous territorial acquisitions, including Jefferson's Louisiana Purchase.

The convention defines the shelf as the seabed and subsoil of the submarine area adjacent to the coast to a depth of 200 meters or beyond to a depth which admits of the exploitation of the natural resources of the area. The sovereign right of the United States over territory is therefore related directly to our technological capability to exploit the resources of the Continental Shelf. These exclusive rights relate to mineral and other resources of the seabed (magnesium nodules) and subsoil (oil and gas) and certain living resources dependent on the shelf (clams, oysters, certain crabs).

The 1958 Fishery Convention acknowledges that each coastal nation has a dominant interest in the fishery resources of its waters and provides that such nations shall have the right to provide for the conservation of these resources. Approximately 90 percent of the world fishery catch is taken from inland waters or waters immediately over or adjacent to the continental shelf of nations within the temperate or tropic zones. The measurement of the U.S. coastline within these zones exceeds 10,000 miles. Only Indonesia, Australia, and Russia have comparable or more extensive coastlines. The other 111 nations of the world either have substantially shorter coastlines or none at all. It is estimated that U.S. coastal fishery resources are such as to permit an annual sustainable yield of approximately 20 billion pounds. The estimated value of our potential yearly catch is between \$1 and \$1.5 billion. Last year, however, the U.S. coastal catch was below 5 billion pounds and the foreign catch off the U.S. coast was approximately 3 billion pounds.

The evidence is quite clear that the U.S. coastal fishery resource is one of the most extensive and richest in the world. It is also clear that this resource is being underutilized by the United States and is becoming increasingly attractive to foreign fishing fleets. Five years ago there were fewer than 100 foreign vessels fishing off the U.S. coast. This past summer we witnessed more than 1,500 large, modern, efficient foreign-flag fishing vessels ranging between 3 and 50 miles from our coast. About one-half of this foreign fleet has been operating off the coast of Alaska. Since I am more familiar with that area, I would like to focus attention on the North Pacific.

In recent years, the Russians and Japanese have taken substantial quantities of shrimp, flounder, ocean perch, sablefish, cod, and pollack in the water above the Alaska Continental Shelf. It is reliably and conservatively estimated that these six fishery resources alone have a potential annual catch value in excess

of \$200 million or over half the value of the present total U.S. catch. In 1963 the U.S. catch from the same six North Pacific fishery resources was about 100 million pounds valued at about \$8 million. It is estimated that the potential annual shrimp catch off Alaska exceeds 1 billion pounds (approximately five times the present gulf coast shrimp catch); the potential annual flounder catch is 1.5 billion pounds; ocean perch, 300 million pounds; cod and pollack, 140 million pounds; and sablefish, 100 million pounds. In addition to these six stocks of fish which the Japanese and Russians are now taking, there are estimated annual potential catches of 1.2 billion pounds of herring, 700 million pounds for hake, and 500 million pounds each for anchovy and sardines.

Although these fishery stocks appear abundant when one looks at the total resource from California to the Bering Sea, there is evidence that certain species, particularly in the Bering Sea, may be already threatened by excessive foreign fishing. The eastern Bering Sea catch of flounder by Japan 10 years ago was 18 million pounds. The combined Japanese and Russian catch in the same areas was about 1.2 billion pounds in 1961. The comparable catch figure for 1963 indicated a dramatic reduction. This sharp drop in catch was undoubtedly due to a heavy depletion of the resource. It is clear that there has recently occurred off the Alaska coast in the eastern Bering Sea one of the most rapid expansions of ground fisheries in the world.

Although the U.S. coastal fishery resource is perhaps the greatest in the world, although certain stocks are being seriously damaged by foreign fishing, and although the United States will soon, for the first time under international law, have the right and obligation to conserve these coastal fishery resources, the fact is that we have no active program to accomplish this. Under the Fishery Convention, the United States will have the right to promulgate fishing conservation regulations on the high seas to conserve these coastal fishery resources, but this will be possible only if the United States has the necessary information about the resource to support the conservation measures undertaken. However, we know little about our own coastal fishery resources. I fear foreign fishermen known more about certain coastal fishery resources in Alaska than we do. Further, the administration has advanced no program to implement the 1958 Fishery Convention.

In summary, for over 350 years the nations of the world have generally agreed that the resources of the sea and the ocean floor were held in common and that no single nation had an exclusive or even preferential right to exploit or conserve these resources. The 1958 Fishery and Continental Shelf Conventions were dramatic departures from these traditionally held tenets. The final ratification of the Continental Shelf Convention last fall and the anticipated final ratification of the Fishery Convention this year signal international acceptance of a new order and a new approach to the use of ocean resources. I am absolutely convinced that the administration has missed entirely the significance of these recent and important changes in international law.

The seas are mankind's last frontier on this planet. For ages we have treated the ocean waters as little more than hunting grounds for fishermen, and highways for ships. Now we are awakening to see that beneath the surface of the waters lies a vast territory every bit as challenging as outer space and infinitely more promising with regard to economic reward. Man at last has the scientific capability and technical mastery to meet the challenge, and his growing need for food, water, minerals, power, and weather control gives him solid reasons for doing so. I suggest we begin to occupy and use our recently acquired 1 million square miles of Continental Shelf and that the U.S. Government assess our extensive coastal fishery resources. We today know so little about this territory and this environment that our initial efforts will be somewhat akin to the rewards and failures of the Lewis and Clark Expedition. But the adventure beneath the surface of the sea must begin.

I mentioned earlier that the reason for the present discontent in Congress and rash of legislative proposals is a failure on the part of the administration to meet these problems and respond to these possibilities. The administration insists on floundering in a "sea" of indecision with no national program for ocean development. No less than 22 different agencies are involved in what is referred to as the "oceanographic program." Each agency is required to appear before a subcommittee of the House and Senate Appropriations Committees to explain its needs. In effect this means that everyone in the executive branch is to some extent involved but no one really cares. The same is true with Congress, as far as appropriations are concerned. The senior Government officials responsible

for the Government program on the oceans consider their effort a part-time job. Every Friday afternoon, time is given to oceanography and the various ocean resources. I am saying that theirs is a full-time job. It requires full-time attention and needs full-time staff personnel.

What is needed in my opinion is a new agency with a broad mission and with a chief executive who can speak effectively in Congress and elsewhere for the administration regarding our civilian program on the oceans. This is not a Navy responsibility nor is it any longer strictly a matter of science. The legislation I introduced would establish an independent civilian agency. In my opinion, this is still the most desirable approach. I recognize, however, that the job could be accomplished by an expansion of the responsibilities of some division or agency within either the Department of the Interior or the Department of Commerce. There could be an Ocean Resources Service in the Department of the Interior, or ESSA in the Department of Commerce could be expanded to accomplish the job. I do not feel strongly about the structure, but I do feel strongly that the mission of the new agency must be sufficiently broad to unify the program and centralize responsibility. It is my conviction that until this is done we will continue to fail in our program on the oceans.

Mr. LENNON. Senator, let me commend and compliment you for a most interesting and informative statement. Mr. Mosher, any questions?

Mr. MOSHER. I don't think I have any questions, Mr. Chairman, but I also want to echo your compliment to the Senator. I think it is a very challenging statement. We are fortunate to have this as the kickoff of these hearings.

I am a little curious, Senator. You several times have suggested that the administration has failed to live up to some of its opportunities in this field recently.

Do you want to be more specific? Do you want to suggest what you think the administration might have done in the last few years?

Senator BARTLETT. Surely. I added some words of my own to the prepared text. I said past administrations too. I think there has been a failure on the part of recent administrations to recognize the importance of this broad subject. I think there is an understandable reluctance on the part of these 22 agencies that are now concerned in the effort, in whatever manner it may be, to endorse a unification program, because of a natural bureaucratic fear that to do so would rob them of some of their authority. But I can't see for the life of me how we can do what we need to do, so urgently need to do, unless there is a unification of this effort.

It has proliferated now to an unnecessary and inefficient extent and I would hope, out of the hearings you are holding now, and out of similar, comparable hearings, that I hope will be held on the Senate side, that we may focus attention on this very important problem to the point where someone in the administration will say, "What goes on here? We haven't paid enough attention to this. We are glad that the congressional committees called this to our attention and brought it into focus." And then get busy and try to do the job which is required to be done.

Mr. MOSHER. You are really suggesting that the initiative is going to have to come from the Congress, that we can stimulate the administration by some action here, is that right?

Senator BARTLETT. Precisely. As you and I know, often the stimulation has to come from Congress in other areas as well.

Mr. MOSHER. That is all, Mr. Chairman.

Mr. LENNON. Mr. Casey.

Mr. CASEY. Senator, it is a real pleasure to have you here today and I certainly enjoyed your statement. I know that you follow this very closely and attended the Conferences in Geneva, where I had the occasion to be at one, myself, during my freshman term here.

This was the Conference in 1959 and I was completely enlightened by the fact that the other nations were focusing more attention on this, knew more about it than we did, and the lack of our interest.

I think our problem is, and I think you probably agree with me—as you pointed out the space program is being well financed—and I will repeat what I have said many times, we have to glamorize and publicize the importance of the oceanography program.

More interesting, on just the Mohole project there were lots of screams because it was going to cost around \$80 million. I happen to serve on the Science and Astronautics Committee of the House, and we spend three times that for one launching pad and no one complains, not that it isn't important, because I think it is, and I think it is important not only from a scientific point, but also from a defense point, but I think oceanography is important from not only a scientific but from a defense point of view.

I know that the Senator is familiar with the fact that we have tried to impress on past administrations the importance of bringing about a cohesion of the oceanographic effort and I think the Senator was in the forefront of one of the bills that we passed before, which happened to be vetoed.

I don't know what it is going to take to awaken not only the administration, but the public support for all-out oceanographic program. One thing that disturbs me, and what you touched on, is the amount of food that is taken out of our oceans, and right off of your coast particularly, and off the coast of Florida, and off the coast of Texas, where we have no program as to the regulations that we will have to promulgate to conserve the food.

In addition to that I would like the Senator's comment, which I think is related in that regard, as to how we could stimulate the fishing industry, say in your own State. Has this program of vessel loans and so forth that came out of this committee been any help in that regard?

Senator BARTLETT. Yes, decidedly it has been of help. But the fact remains, as you stated it, that our fishery in the Pacific Northwest, and elsewhere along all our coasts, is an in-shore fishery. We haven't gone out for ground fish, for example, along the west coast.

The Russians have mother ships lying directly off our coast as large in tonnage as our heavy cruisers during World War II. We have nothing comparable to this.

On the other hand, and corrections are being made on account of this loan program to which you referred, we have an outmoded, out-dated fleet. I think the oldest fishing vessel in the entire fleet is one that operates from a port in Mr. Rogers' State. It was built during the Civil War and is still fishing.

West Germany is replacing fishing ships built as recently as 1954. I don't know, Congressman Casey, how we are going to do this, but I do say that you are exactly right when you say that we have to attach to this something of the glamor that accompanies the space program.

This doesn't denigrate the space program at all. We desire to take

nothing away from that of course, but I think we who have studied this to a certain extent at least see the importance of early action on the part of the Government. I suspect that it won't take too much help from Government to bring private industry right in behind.

I have talked with many people who are with companies that aren't doing a thing now on the oceans, but who have a great desire to do so, who see a chance to make a profit by those operations. Of course to the best of our ability we want to foster that desire.

Mr. CASEY. One thing the Senator touched on which I am somewhat familiar with is the amount of scientific data and information available from private industry, say in the oil business. My own hometown of Houston has some very excellent exploration companies that are in that field all the time, as well as Dow Chemical, which is just outside of Houston and has done a fine job in extracting minerals from sea water.

Senator BARTLETT. Dow has done a tremendous job.

Mr. CASEY. They have done a terrific job and without any substantial, that I can think of, Government help. Their interest has been purely a profit motive, and if that one company can flourish as well as it has on its own, no telling what we could accomplish with a little stimulus from governmental interests.

Senator, do you have a companion bill introduced by a House Member that is before us?

Senator BARTLETT. Yes. Congressman Rivers of Alaska has one and Congressman Keith.

Mr. CASEY. I thought that might be the bill and I have been glancing through it. I notice that you have approached it like we have approached it in the past, that you would establish a commission. When we tried to write one according to the desires or according to what we were told by the executive departments and scientific advisers, they didn't want anything compulsory. They wanted us to turn all the "shalls" to "may" and wanted to leave it all at their broad discretion.

I am inclined to agree with you that the bills that have been introduced this session indicate that some of the Members of the Congress, myself included, are getting a little impatient and we better stick these "shalls" back in and definitely create an organization and insist that some type of organization bring this together, and I am with you.

I appreciate the attitude you are taking. You are not interested in any particular pride of authorship, just so you get somebody—

Senator BARTLETT. Get going.

Mr. CASEY. Or some organization to bring it together and get going, and I commend the Senator for his attitude and you can rest assured that you have my wholehearted support in your endeavor.

Senator BARTLETT. I thank you.

Mr. LENNON. Mr. Pelly?

Mr. PELLY. Senator, I think I greet you maybe more warmly than anyone else of this committee because you and I have such a community of interest out in the Pacific Northwest. I have admired your contribution to oceanography and fisheries and certainly, while occasionally you and I might have a difference, we are just like members of the same family; we quarrel—

Senator BARTLETT. I can't remember when one last occurred.

Mr. PELLY. Once in a while people in Alaska think that some of us down in Seattle are a little selfish, but I can assure you that basically our policy is what is good for Alaska is good for Seattle, and you know how the business interests of Seattle have felt toward their No. 1 customer in Alaska.

I notice that your particular bill, S. 1091, calls for a new agency. Did you have hearings in the other body?

Senator BARTLETT. No; we haven't had hearings yet. We haven't been as timely as this committee has in approaching this whole broad subject.

Mr. PELLY. I would say this: That you have been very busy over there turning out legislation in your subcommittee and I commend you for it because I know that you have had hearings and passed out important legislation during this session of Congress in very substantial numbers.

Senator BARTLETT. There has been no lack of bills.

Mr. PELLY. I wish we had acted on some of them. I was wondering about H.R. 912, which may be the Rivers bill; I think that also called for a new agency.

Senator BARTLETT. I am not sure if that is the number of the House bill.

Mr. PELLY. In looking through what is called a compilation of oceanography bills to be considered by this subcommittee, I notice it includes the report from the executive office of the President, and there the Director, Donald Hornig, has indicated a very strong preference for the other approach; namely, the approach of our chairman's bill, and some of us have introduced similar bills, which is a quite different approach.

I think that you were in conference on an oceanographic bill once with some of us on this committee and we thought we could work our will against the views of the White House and we got a veto on a bill, and that is why maybe we are here today.

Senator BARTLETT. I would think that would be one reason. I think at that time too there was not even as much comprehension of the importance of this whole broad subject as there is today. It is my conviction that as this understanding grows throughout the country we of the Congress will have better opportunity to send down to the White House legislation which will do the job and which will be approved.

Mr. PELLY. I think our chairman of the House side has done a tremendous job—

Senator BARTLETT. I agree wholeheartedly.

Mr. PELLY (continuing). In trying to work out some of the different viewpoints. I am confident that will happen. I might just ask you a question or two with regard to your statement.

You referred to the 1958 Fishery and Continental Shelf Convention which has expanded our resources so vastly, as you have pointed out. Have the Russians signed that convention?

Senator BARTLETT. The fishery convention?

They signed the Continental Shelf, but not the Fishery Convention.

Mr. PELLY. They recently signed I think a convention or a treaty with us covering king crab.

Senator BARTLETT. Not a formal treaty.

Mr. PELLY. Not a formal treaty.

Senator BARTLETT. But an understanding, which, by the way, they have lived up to very well. But the evidence is very strong that the Fishery Convention will have enough signatures to become effective next year.

Mr. PELLY. This would then compel the Soviet Union for one to recognize our rights in the Continental Shelf, would it?

Senator BARTLETT. Well, I don't know whether it would or not.

You and I recall so well the determination of the United States that the king crab was a creature of the Continental Shelf within the meaning of the convention and the Japanese, who had not signed that, said, no, it didn't bind them at all.

This is speculative.

Mr. PELLY. I was coming to that and going to ask you whether you knew if the Japanese had signed the 1958 Fishery and Continental Shelf Convention.

Senator BARTLETT. They have signed neither, Mr. Foster informs me, and they reject altogether our contention that the king crab, so important on the Continental Shelf off Alaska, is a creature of that shelf within the meaning of the treaty.

However, despite their failure to adhere to the treaty they have refrained from taking king crab in the areas that are in question.

Mr. PELLY. We have real international problems as far as oceanography and the resources of the sea go. I think you have gone to many of the various international meetings and are on your way maybe to helping solve some of these problems.

Certainly I think it might be helpful if we passed some legislation and had all agencies of our Government working toward this solution.

Senator BARTLETT. I think it becomes more understandable why we have so many difficulties in these negotiations with foreign nations where our viewpoints differ so radically when we appreciate how much trouble we in this country have in agreeing upon the proper approach to oceanography.

Mr. PELLY. I commend you for your very complete statement and I am going to take it back to my office and read it over again because I think it has a lot of information that many of us should have here.

It covers a wide field and I think it is a great addition to the record that is being made at this time.

Thank you, Mr. Chairman.

Senator BARTLETT. Thank you.

Mr. LENNON. Mr. Rogers.

Mr. ROGERS. Thank you very much, Mr. Chairman.

Senator, I too share the feelings of my colleagues of appreciation for your being here and the testimony you have given us. I also share your feeling that the Congress is going to have to do something in this field and that we just can't wait for proposals to come from the administration.

If past action is any guide I would think that we are going to have to be more forceful than we have ever been before and I think your testimony certainly has been helpful in pointing up the problem.

It is my hope from the hearings that we are having and the Senate has concluded that we can go into this entire problem and come out with a proposed solution of at least getting started to doing something

in this field and if, as I anticipate, although I hope not, the governmental agencies that we have called upon to comment on legislation and activity in this field come up and say, "Well, we don't think we ought to do. We are going to do an in-house study or we are going to do something ourselves," then I think we had better get together, some of the members of this committee and the Senate, and go over and see the President ourselves and let him know how strongly we feel about this matter.

I want to know how you feel about this matter.

Senator BARTLETT. Congressman Rogers, I will sum up my feeling by saying I applaud your sentiment and your intention.

Mr. ROGERS. I am glad to know that and I did feel with your strong interest in this field that we could count on your cooperation, and if we can get the House together here and if necessary call on the President ourselves after we come together on an understanding of what we think should be done, I think this must be necessary if we get the response from the governmental agencies that we have had in the past.

Senator BARTLETT. It is important enough to do just that.

Mr. ROGERS. Thank you. Thank you, Mr. Chairman.

Mr. LENNON. Mr. Tupper?

Mr. TUPPER. Thank you, Mr. Chairman.

Senator Bartlett, I would like to join my colleagues in commending you for a most constructive statement. My State of Maine shares many common problems with the State of Alaska in fishery matters despite the distance between those two States. It is my recollection that the Continental Shelf Convention specifically includes the rights to sedentary species and those species that depend upon constant contact with the ocean floor.

Wouldn't you say, Senator, that this most certainly should include all species of crabs and probably all species of lobster?

Senator BARTLETT. I hope it can be done.

Mr. TUPPER. Thank you. I have no other questions, Mr. Chairman.

Senator BARTLETT. I certainly hope so because I think that this is our resource and we should use it.

Mr. LENNON. Senator, would you comment on that. Are you in a position to spell out categorically the implementations of the Continental Shelf Convention with respect to the respective countries rights to the assets or the resources on the ocean floor or floor level.

Senator BARTLETT. No, I most assuredly am not, Mr. Chairman.

Mr. LENNON. That has been signed you say.

Senator BARTLETT. Yes, but all the determinations will be arrived at from evidence produced by scientists. I am not such and so I couldn't answer Congressman Tupper very authoritatively. To date our biologists, and the Russians agree with this, have determined to their own satisfaction that the king crab does come within this category. It may be that later a similar decision will be made with respect to the lobster.

I don't know, and so I am not the best witness on this subject.

Mr. TUPPER. Mr. Chairman, if the Chair will yield on this matter—

Mr. LENNON. Yes, sir.

Mr. TUPPER (continuing). It is again my recollection that this Continental Shelf Convention, and also a bill passed by the Congress last

year, and I believe it was Congressman Rogers' bill, provides for a list to be established. No list has been established yet—but it would seem clear to me that the king crab by any definition should be included and we hope in the State of Maine that lobsters will be included also.

MR. LENNON. You do a little lobbying for your lobsters then.

MR. TUPPER. I have done so.

MR. LENNON. Mr. Downing?

MR. DOWNING. Senator, I want to add my commendation to your excellent statement. It is interesting. It is scholarly. It is a good approach to a very challenging problem and I would hope that it gets wide publicity.

I think that we have the general public behind us in this move. I believe that they are aware of the necessity of doing something to corral our resources in the ocean.

Getting to your statement, on page 5 I notice that you say that we have increased our territory over which we will hold sovereign rights under the international law. Actually we do not hold sovereign rights, do we? They are more or less fishing rights?

Senator BARTLETT. No; my understanding is that it goes beyond that, according to the terms of the convention, and sovereign rights are conveyed over these delineated areas.

MR. DOWNING. Would this be an extension of the 3-mile boundary which we now recognize as the sovereign right?

Senator BARTLETT. No, not at all. We would have a sovereign right to the living and nonliving resources on the Continental Shelf, but the extension of the territorial limits would remain within the province of each maritime nation.

MR. DOWNING. Sovereign rights then would be limited to that field?

Senator BARTLETT. Those specific elements that are named—minerals, for example, fish.

MR. DOWNING. Thank you very much, Senator.

MR. CASEY. Will the gentleman yield so we can clear that up?

MR. DOWNING. Yes indeed.

MR. CASEY. Some of the others have not had the opportunity that the Senator has and some of the other members have had. With respect to the territorial waters as far as access, the control of foreign ships is still up in the air, isn't it, Senator? Each country kind of designates its own?

Senator BARTLETT. You mean the limit of the territorial waters?

MR. CASEY. Yes.

Senator BARTLETT. This is true.

MR. CASEY. And the 3-mile limit is just something that we have kind of picked out in our tradition. There is no law on that and no agreement on that, is there, Senator, the 3-mile limit for the United States.

Senator BARTLETT. The 3-mile limit I believe was established by Executive proclamation.

MR. CASEY. What I mean is there is no international agreement?

Senator BARTLETT. No; no international agreement.

MR. CASEY. That is one of the big problems in the world now, to try to establish these territorial waters.

Senator BARTLETT. Yes, that is a very great problem. Of course it is one that is of great interest to our Defense Department, particu-

larly the Navy, because in certain areas if there is any great extension of the limit of territorial waters it means that in certain cases our naval ships might have to sail an extra thousand miles in arriving at their destination.

What we have seen here in the last few years is an extension not so much of territorial limits, as of the limits in respect to fishing. Many European nations have done this within the last 2 years. Canada last year went out to 12 miles. There are various bills in the Congress now extending our fishing limits to 12 miles.

As we know, unhappily, some of the South American and Central American countries claim exclusive fishing jurisdiction out to 200 miles.

Mr. CASEY. Peru, for instance.

Senator BARTLETT. Peru. This has created agony for our tuna fleet.

Mr. CASEY. I know the Senator will recall in 1959 we missed by one vote, I believe, over there establishing territorial waters. Russia wanted 12 miles, which would have closed the English Channel and I don't know how many inlets and so forth.

Senator BARTLETT. I think at that time the United States was ready to agree to an extension of territorial limits from 3 to 6 miles and fishing limits an additional 6 miles.

Mr. CASEY. Thank you.

Mr. LENNON. Senator, just give me your comment as a member of the Senate Committee on Commerce. You will recall the history of the legislation. It went to conference with the conferees of the Senate and the House and we hammered out what we thought was a bill that would be accepted at the White House and, as you know, in the latter part of the 87th Congress, I believe, it received a pocket veto.

We were attempting to establish a commission which would aid, and assist, and counsel, and advise the President in establishing a national goal of oceanography and then subsequent to that pocket veto we sat down with the various executive agencies of the Federal Government, including the Bureau of the Budget, the Treasury Department, and more particularly, the Office of Science and Technology, and they conceded and we conceded and we finally reached a consensus, and that is a good work up here in this session.

Senator BARTLETT. Appropriate word.

Mr. LENNON. Then we introduced that bill and it was a clean bill. It passed the subcommittee, the full committee, and passed the House in August of 1963. We sent it over to the Senate and we didn't get any action on it since August of 1963, and I want to be frank with you, since you are certainly one of the most outstanding men in that body, and particularly on that committee, that it was our thinking that to avoid another presidential veto perhaps it would be judicious to go along with the approach that we finally hammered out and agreed to, and if it did not attain the objective that we sought within a 2-year period, and we have now reached that 2-year period—it is exactly 2 years ago that we passed the bill in the House—that then we would take a new look and determine whether or not it was wise to establish a separate and distinct agency in the Federal Government to administer the various facets and fields of oceanography.

I was disappointed that the Senate didn't go ahead and act on that bill, knowing that the President would sign it—I had that assurance—but with the understanding in our informal conferences with all of the agencies of the Federal Government, including the office of the President, if we did not attain the agreed objective that we were seeking, that within a period of not more than 2 years we would come back then and insist upon the establishment of a definite agency that would have the total and complete responsibility for administering and implementing the some 10 or 12 agencies of the Federal Government which participate in various facets of oceanography.

In retrospect, I might say that if we had passed that bill in the Congress and it had been signed into law in August of 1963 before that session adjourned we might be back here today not seeking something such as we are, but seeking to determine whether or not that legislation had provided or set the stage and implemented what we had in mind, and we could be reviewing it and then looking toward and considering the necessity of legislation such as is being presented here today, so I must confess my disappointment.

Do you want to add to that?

Senator BARTLETT. I should only say in response to your comment, Mr. Chairman, that I am confident that Mr. Drewry would make a much better witness than I on this general subject. I can only say that I shall carry your words from here to there.

Mr. LENNON. I have tried to carry them, not to my counterpart, because he is the head of the full committee, and we have had some discussion about that.

Senator BARTLETT. I think it all points up as nothing else could the complexity of the situation.

Mr. LENNON. The difficulties we have and how complex it is. I agree with that. Thank you so much. We do appreciate it. We think we have started this hearing on the right foot with your statement. Mr. Reinecke.

Mr. REINECKE. Thank you. I too would like to thank the Senator and express my appreciation for his fine statement.

To make it brief, in your statement you indicate your preference, though not a strong one, toward an independent and civilian agency. How do you see this agency working in conjunction with the various departments of the Federal Government that are now involved in the various oceanographic endeavors?

Senator BARTLETT. I would think that my plan would be entirely useless unless it were constituted in such a fashion that the Commission would have some real basic authority over the departments in this area.

We know Senator Muskie has offered another approach and I dare say many others will come. My idea perhaps was that in gradual way we should seek to bring together these efforts, which are very considerable, among the many departments and the multitude of agencies, but which I fear aren't too well coordinated.

It follows I think rather naturally that if we want to, and, as I sense it it is a strong feeling of this committee that we do want to have a broad, comprehensive, fast-moving program on the oceans, it never can take place if it is directed by agency A, B, and down through 22 of them. We have to get together some way or other and have top direction.

Mr. REINECKE. Do you feel that it is possible for these agencies to cooperate, bureaucrats being what they are?

Senator BARTLETT. I can only express a hope.

Mr. REINECKE. Thank you.

Mr. LENNON. Mr. Drewry, you have a question or two for the Senator?

Mr. DREWRY. Senator, one of the big criticisms about some of the earlier concepts for bringing oceanography into a single agency was that you would be stripping out the scientific or research functions from, let's say, the promotional and thus creating more problems than you solved.

For example, the Coast and Geodetic Survey has to do seismological work in the oceans and on land and to separate those similar types of functions would be more a matter of duplication than really of consolidation.

Do I understand that what you have in mind in your present approach is somewhat similar, let's say, to this new ESSA, which was created by the marriage of the Coast and Geodetic Survey to the Weather Bureau. Or is it similar to the Muskie approach to bring the functions of existing agencies, so far as they have functions either scientific or promotional, into your new agency? Or is it again going to be a separation of functions?

Senator BARTLETT. My idea at the time of the introduction of this bill, although I couldn't have foreseen it then specifically, was more the ESSA concept. These two Bureaus, Weather Bureau and Coast and Geodetic Survey, have been, as you put it so aptly, married, and although the honeymoon is some weeks old now, I don't think there has been a spat between the couple and it seems to be working out perfectly well.

I would see no difficulty at all in respect to an agency such as Coast and Geodetic Survey.

Mr. DREWRY. Would you bring, for instance, the fisheries in toto, their research, experimental fishing, as well as their marketing functions, and promotional functions into the same agency, or would you leave part of them out?

Senator BARTLETT. The number and the complexity of the functions involved would probably make it undesirable, at least at the outset, to shift them in toto to a new agency. I don't propose that.

Mr. DREWRY. That is all I have, Mr. Chairman. Thank you, Senator.

Mr. LENNON. Senator, are you familiar with S. 944 that was introduced by Senator Magnuson on February 1, 1965, which did provide for expanded research of the oceans and Great Lakes and establishment of a National Oceanographic Council and for other purposes?

Senator BARTLETT. Yes. I think that was the bill that was reported out by the committee and passed.

Mr. LENNON. That was similar to S. 2990 in the 88th Congress but it did expand the scope. That bill has not passed the Senate yet, has it?

Senator BARTLETT. Yes, I think that it did pass the Senate.

Mr. LENNON. How recently?

Senator BARTLETT. Oh, a couple of weeks ago. I am in error once more. It has just been reported. It hasn't passed.

Mr. LENNON. It is pending now?

Senator BARTLETT. Pending.

Mr. LENNON. Thank you, sir. We wanted to consider that if it had passed the Senate, and hopefully it will be passed at an early date so we can consider it during these hearings.

Senator BARTLETT. With Senator Magnuson as its author and as chairman of the committee I suspect it will be passed very soon.

Mr. LENNON. Send it over so we can consider it here.

Senator BARTLETT. All right. I think it will be on its way soon.

Mr. LENNON. Thank you very much, Senator.

Off the record, Mr. Reporter.

(Discussion off the record.)

Mr. LENNON. We will move to the next distinguished Member of the Congress, according to the list furnished me, the Honorable Bob Wilson of California.

Senator BARTLETT. Before I leave the witness chair, Mr. Chairman, let me express my thanks to you and every member of the committee for allowing me to appear.

Mr. LENNON. We are delighted to have you now and always.

Congressman, we have known for a long time of your great interest in the law and the various ramifications and facets of oceanography and particularly as it affects the great State of California. We are delighted to have you. Are you going to stay with your statement?

STATEMENT OF HON. BOB WILSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WILSON. Yes, Mr. Chairman, I would like to. It is a brief statement.

Mr. LENNON. You may proceed, sir.

Mr. WILSON. Thank you, Mr. Chairman and members of the committee, for giving me this opportunity. If it is not inappropriate before I read my testimony I would like to express my best wishes to the chairman of the full committee. He was a neighbor of mine in this building for about 8 years. He is one of the most genteel, distinguished, and I must say beloved Members of Congress and I know every one of his colleagues wishes him full and speedy recovery from his recent serious illness.

Mr. LENNON. Thank you. We know too that if he were in Washington and physically able he would be attending the sessions of this subcommittee. He always demonstrated a great interest in it and I would like to report for the committee that according to reports he is getting along just fine. Things are very hopeful.

Mr. WILSON. That is the best news of the year.

Mr. Chairman, we are here to work out a means to start our Government on a much needed full-scale program of oceanography. I, among others, have proposed that a Federal Oceanographic Agency be established. It would be the focal point, the information and directional center for an organized productive schedule of projects that would be valuable in many ways to the United States.

I introduced the bill H.R. 921 on the first day of this session of Congress. It is similar to legislation that was introduced in the last session of Congress.

I do not consider oceanography any longer to be merely important. I consider it crucial. An Oceanographic Agency is no longer an interesting experiment, it is rapidly becoming an actual national necessity.

First, from a defense standpoint, undersea knowledge is needed for survival. Other nations, some of them unfriendly to freedom, are working feverishly to gain knowledge of ocean currents, methods of undersea navigation and development of swift, potentially deadly vessels, devices and machines. We can ill afford not to match and surpass potential enemies in underwater defense technology.

We are now engaged in a massive war on poverty. It extends worldwide as well as within our own borders. The uses of the almost unlimited, renewable food supplies in the seas offer a natural solution to the world's problem of hunger. It offers better living standards for all our own people, as seafood is rich in protein, minerals and vitamins. The proliferation of our own and the world's population will make harvesting of the foods of the sea an important, needed operation. It will provide us with crops that are valuable not only as foodstuffs, but for the chemicals and fibers industries.

The sea contains many minerals. We are importing an increasingly greater share of the metals we use in the United States today—especially some of the rarer metals. Nearly all are floating in the sea in vast amounts. We must discover practical means to extract them from ocean water to preserve our independence, to lessen the chance that unfavorable international incidents can cut off our supply of vitally needed metal.

Water is a big problem in many areas. In this day when many cities are becoming thirsty, desalinization of water should become a crash program. A recently announced process suggests the chance of bringing the cost down to 25 cents a thousand gallons. We have water on three sides of our country. We must find ways to convert it for constructive use by our people.

Oceanography will give far more than it takes. There will be thousands of new jobs in the future created through developments in oceanography. Man will understand more about the mysteries of undersea rivers and the air masses that move above the surface to create much of our coastal weather.

The Associated Press the other day quoted Dr. Robert S. Dietz, an oceanographer with the Coast and Geodetic Survey, who said that the Russians are gaining rapidly on the United States in oceanographic studies.

Dietz said the Soviets now appear to have two-thirds the total effort in ocean sciences, and their program is growing 10 percent per year. There are about 1,200 Soviet oceanographers compared to about 1,500 to 2,000 in the United States. Four Soviet universities are offering oceanographic training and 50 research centers contribute to the programs. Oceanographers are among the highest salaried in the U.S.S.R.

Technical support of Soviet oceanographers is superior to ours, Dietz declares. He said each senior scientist has 5 to 10 assistants to help work up results of research in contrast to the American scientist who quite often works alone amid a morass of data.

The Russians have the world's only nonmilitary research submarine operating out of Murmansk.

It is obvious the Soviets mean business. They are probing the seas for military and economic use. Their trawlers roam our coastal waters in both the Atlantic and Pacific.

If we can afford to spend billions to send rockets on one-way flights into space, we can certainly afford to invest in a program that will more than repay our funds and efforts in future benefits.

What has been lacking, Mr. Chairman, is a real sense of need. We have not received from the administration the push that has been behind the multibillion dollar space program. It is up to us in Congress to give oceanography the push that is needed. I believe the first significant step should be the establishment of a Federal agency to coordinate and direct the many projects and programs now being worked on by the Federal agencies, private institutions and commercial enterprises.

I am generally not in favor of creating new Federal agencies. The oceans, however, are clearly a Federal enclave. They are a national responsibility and need a united, national approach to produce the results the Nation should have.

My bill would establish a National Oceanographic Agency roughly patterned after the National Aeronautics and Space Administration. I believe that when NASA was created in 1958 by the Eisenhower administration, it was the breakthrough which projected us into the lead in many space endeavors.

NOA, as the agency I propose would undoubtedly be called, would absorb related functions from many different agencies of the Federal Government and give them a definition of purpose and concentration of programs that would give us more work for a buck.

Oceanography today is parceled out among 22 different bureaus in nine departments or agencies. Space exploration was in the same state prior to NASA. It is obvious that many of these agencies are jealously guarding their tidal pools of oceanographic work.

Many agencies objected to NASA. The military was loath to see pet projects transferred to a civilian agency. The Navy has voiced objection to another agency taking over its oceanographic functions.

All of these problems can be worked out by the simple process of having an agency coordinate and parcel out work. Data can be shared. Duplication can be avoided. Programs needing concentrated work can be turned over to agencies that have the manpower, equipment, and experience to make real gains.

NOA would originate many projects. It would foresee the need for new machinery, for new vessels, for undersea living quarters, for means of discovering and extracting minerals—a host of programs. Where space is an airless void, signifying to a great degree nothing, the ocean is a bounteous treasury, willing to return tenfold the efforts we make to tap the wealth stored in it through the centuries by nature.

Since the new agency would be a creature of the executive branch, the President must be the enthusiastic sponsor of a departmental reorganization plan involving oceanography. Overlapping authority must be brought into order. This is the purpose of the legislation I have introduced.

Along with the active functions of this agency should go a significant educational program. The American people have not had the

opportunity to know the value of oceanography to our future survival and good living. Our schools do not provide the proper training for rewarding futures in oceanographic administration and research.

We are not jumping off into the unknown. We should all be grateful that many forward-looking institutions, such as the Scripps Institute of Oceanographics in my hometown of San Diego, and many private firms, such as the Lockheed Aircraft Corp., which recently set up a new research center in San Diego, have pushed forward in oceanographic research. But they suffer from the lack of a central data source, access to worldwide research information, and financial help that a Federal program could create.

Oceanography is an opportunity. More than that it is a necessity of national endeavor in today's science explosion. We would be ill served to have mastery of space and find ourselves vulnerable to undersea destruction. We would be foolhardy to know the composition of the craters on the moon, and not the food, mineral, and water resources of the seas which comprise 75 percent of our earth.

It's time to break oceanography out of the doldrums. It's a time to set full sail, to set a course and put a sound hand on the tiller. This committee could do no greater service to our people today and to posterity than to act favorably on legislation to give oceanography its proper place in our country's present and future.

Mr. Chairman, just one further comment. As you know, when a bill is introduced the committee very graciously asks for reports from the departments. I have in my hand reports, each one negative, from the various agencies involved in oceanography.

Mr. LENNON. I have reports here in this voluminous file on all the bills pending before the committee.

Mr. WILSON. Yes, I know, but this just points up the problem that we are faced with. Here the Department of the Navy says they don't want it because it is going to interfere with some of the things they are doing. I don't suggest that an oceanography agency should take away a lot of research, from the Navy, as far as the defense implications of underseas warfare, are concerned, but some aspects of their work undoubtedly would be put into a new agency.

The Atomic Energy Commission is objecting. The Department of Commerce objects. The Department of the Interior objects. The Department of Health, Education, and Welfare objects. The Smithsonian Institute objects because they lose some of their competence in biological oceanography in their Museum of Natural History.

This points up the problem and it also points up the problem that we in Congress have. All of us know the importance of oceanography. There is no question about it. It is as important as agriculture and yet agriculture has not only its own Department, but it has its own committee up here in Congress that is concerned solely with the problems of agriculture.

The Defense Department has its own committee that is concerned solely with the problems of defense. Foreign affairs has the same, and so forth.

This is one of the problems that oceanography faces. There is no real champion on the Hill. You men on this committee have those aspects of oceanography that fall under your jurisdiction, but very few of them are referred to you.

The Ways and Means Committee worries about the Treasury Department. The Interior Committee worries about the Interior Department and their fisheries, research, and so forth. This is the major problem. Until we get an agency of Government and a committee that is the champion of that agency up here on the Hill, we are just going to be spinning our wheels.

Of course when you start taking away responsibilities from various agencies they always buck it. It is going to take really a united effort, not only by Congress, but by the President before we come through with this.

I remember what happened with NASA. I was on the Armed Services Committee, as I am today and serve with your distinguished chairman. Incidentally, I think the Under Secretary is missing us today over there on the testimony on the Reserve merger, but I believe that the Defense Department resisted the creation of NASA in every possible way. The Navy didn't want their Vanguard program taken away from it, and the Air Force had visions of trips to the moon too, but wisely the Congress and the administration said, "You have to give up some of your responsibility as it relates to peacetime activity and put it into the National Aeronautics and Space Administration," and concurrently with that a special committee was set up, the Space Committee, so-called, that would be the champion of that new agency.

Until we just realize that we have to take these forward steps we are going to be doing a lot of debating Mr. Chairman, on this whole subject. I think oceanography is so vital to our future, surely from a defense standpoint, but also from a living standpoint, that I think one of the first steps should be this committee should change its name to the Merchant Marine and Oceanographic Committee so it would clearly be the committee that has the responsibility for oceanography on the Hill without any question. Then an attempt ought to be made through an agency of the type I visualize to bring as many of the current responsibilities under its jurisdiction and have it look to this committee. If this would happen I know our future expansion of oceanographic research would be tenfold over what it is now.

Mr. LENNON. Let me say that I have great respect for you, Mr. Wilson, having had the privilege of serving with you since the first of the year on the Armed Services Committee. I know you are knowledgeable and dedicated and you are certainly articulate and you make sense to me. We are delighted to have you.

Off the record, Mr. Reporter.

(Discussion off the record.)

Mr. LENNON. Mr. Rogers?

We are delighted to have our own member who over the years has shown great interest in this whole field. He has sort of carried the torch for this committee since he has been a member and we are grateful to you, Mr. Rogers, and look forward with a great deal of pleasure in anticipation of your statement.

STATEMENT OF HON. PAUL G. ROGERS, A REPRESENTATIVE IN THE CONGRESS FROM THE STATE OF FLORIDA

Mr. ROGERS. Thank you very much, Mr. Chairman. I do appreciate your courtesy in allowing me, and I appreciate the gentleman from California for allowing me to testify at this time, because we

do have an executive session of the Interstate and Foreign Commerce Committee where we are trying to write some health bills and I may be called upon to go over there.

Mr. LENNON. You have another member waiting for the same reason. Go ahead.

Mr. ROGERS. Mr. Chairman and fellow members of the subcommittee, thank you very much for this opportunity to testify on legislation concerning the U.S. efforts in the field of oceanography.

As the author of H.R. 9064, which proposes a 15-member National Commission on Oceanography, I am pleased that the subject will be fully considered during these hearings, and hopeful that this Congress will enact new legislation to intensify U.S. programs, research, and operations alike, in oceanography.

Oceanography is entering a new phase, and has become another yardstick in the competition between the United States and Russia. Even though we are in a race for first place in outer space, our national survival may ultimately hinge on how we utilize the oceans.

Water covers three-fourths of the earth's surface, yet right now we know no more about outer space than we do of the earth's "wet space." The United States was recently successful in putting Astronauts McDivitt and White 170 miles into outer space, and in accomplishing a space walk 170 miles above the earth's surface.

However, the deepest "oceanauts" from any country have penetrated below the water's surface is approximately 7 miles, and none have yet ventured beyond their environment to swim at that depth.

Yet oceanography has immediate and applied results to be gained from the vast, untapped resources of the seas. The earth's rising population may one day be fed from the oceans more than land, where food sources diminish in ratio to population.

Minerals are in large supply in the oceans, and advanced knowledge of the feasibility of harvesting them may one day signal a milestone in man's mastery of the earth.

We are increasing the size of trained oceanography manpower in the United States by approximately 10 percent per year.

In this figure alone are we equal to the Soviets, and some experts say they may be increasing their ranks by as much as 15 percent per year. However, while we presently have approximately 700 oceanographers, the Soviets have some 1,500.

In terms of research vessels, the Soviet Union has surpassed the United States with ships of total 65,000 gross tons in weight. The total weight of U.S. survey vessels comes to 60,000 gross tons. Here again a narrow margin makes the action to be taken by the United States in the next few years of critical importance.

It must be emphasized that the Soviet effort is entirely under the direction of the Government of the U.S.S.R. It is a highly organized program directed with the force of totalitarian state.

While our system allows more initiative and freedom, should the Soviet Union suddenly decide to expand their program an even more serious gap could exist between the United States and Russia.

To concentrate on marine research as applied to animal life, the bulk of U.S. efforts in this area are borne by the Bureau of Commercial Fisheries.

The Bureau has 22 vessels for research purposes, 10 of which are capable of the high seas. Russia has approximately 60 oceanographic research vessels engaged in purely fisheries research.

And it is in the field of fisheries research that the Soviet Union is reaping immense benefits.

In 1964, the U.S.S.R. brought in a catch of over 5 million metric tons of fish and other sea animal life. Over 80 percent of Russia's annual fish catch is obtained from waters outside its own territorial limits.

We in Florida are concerned with the growing presence of Russian fishing in the waters surrounding the Florida coast. Russian vessels are moving more and more into fishing areas once the traditional grounds of U.S. fishermen from the Carolinas, the Middle Atlantic States, New England, and the gulf coast area, as well as Alaska and west coast areas.

The use of Cuba as a refueling, supply, and processing center for the Soviet fleet has facilitated their move into the southeast region.

In Havana, the Soviet Union has constructed an oceanographic institute equipped with 26 laboratories. More than 100 Russian marine scientists are working out of Cuba, surveying the resources around the U.S. coastline.

The pride of the Soviet oceanographic fleet, the *Lomonsov*, a 6,000-ton vessel, is not only the largest of its kind in the world, but has been assigned to the Cuba-based marine research activities.

This vessel is outfitted with 16 laboratories, and carries 70 marine scientists.

It is known that Russian ocean researchers are vitally interested in the Gulf Stream. This rich and abundant "river in the sea" has been termed the "major oceanographic phenomenon closest to the United States" by Dr. Harris B. Steart, Jr., the Chief Oceanographer of the United States Coast and Geodetic Survey.

This agency has just embarked on a year-long study of the Gulf Stream in behalf of the United States, and is using two vessels from the Commerce Department, along with support aircraft from the Coast Guard and the U.S. Weather Bureau.

Additional cooperative studies will be carried out by the Marine Institute of the University of Miami, MIT, Columbia University's Lamont Geological Observatory, and the Lerner Marine Laboratory at Bimini, Bahamas, as well as the Woods Hole, in Massachusetts, Oceanographic Institution and the University of Rhode Island.

The concentration now beginning on the Gulf Stream, which has been likened to a river because it discharges each hour 22 times as much water into the sea as do all the world's rivers in a similar period, demonstrates the importance of these hearings.

The battleground for knowledge of the oceans may well become the fertile seas around America. What becomes the decision of this Congress will have a great bearing on who will be the first to unlock the secrets of Davy Jones' locker—the United States or Russia.

I, therefore, urge that the approach to fullest utilization of our resources be an orderly one as well as becoming a matter of national urgency.

The widespread interest in oceanography which has been generated in recent months can be a helpful impetus toward accomplishing the goals of U.S. superiority.

However, we must not allow the impetus now underway to decline into discord among the Nation's oceanography community. We must guard against those now agreed that more must be done in the field from reaching an impasse on how to do it.

The establishment of a National Commission on Oceanography would do three things: (1) it would provide a thorough review of the Nation's capabilities in the field; (2) it would set long-range goals of specific magnitude; and (3) it would set forth in specific language how those goals can be achieved, including an organizational plan and some measure of the finances necessary for these accomplishments.

The Commission would allow fair voice for the expression of interests representing Government, industry, and the academic community involved.

The 15-member Commission would be composed of 5 members each representing the above-listed segments of our national oceanography effort.

At present the Federal Government's research operations alone are scattered through 18 agencies. The Commission would provide an orderly approach to questions concerning expansion of the Nation's efforts in the field.

The Commission proposed in H.R. 9064 would have a temporary life of 2 years from the date of enactment of the legislation. The Commission must file an interim report within 1 year from the date of enactment, and within 2 years from enactment it must file final recommendations to the President and the Congress.

These recommendations would be the fruition of the Commission's survey and appraisal. The Commission would then cease to exist 30 days from the date its final report would be submitted.

I urge favorable action on legislation to establish such a commission, and particularly to give the impetus from the Congress to take it out of just a departmental study and to raise it to a level of a Presidential commission responsible not only to the President, but to the Congress itself.

I am very grateful to the chairman and committee for allowing me to say these few words.

Mr. LENNON. We are very grateful to you for a very informative, interesting, and I would think a very meaningful statement.

Mr. Reporter, off the record, please.

(Discussion off the record.)

Mr. LENNON. Congressman Fascell, we are happy to have you.

STATEMENT OF HON. DANTE B. FASCELL, A REPRESENTATIVE IN THE CONGRESS FROM THE STATE OF FLORIDA

Mr. FASCELL. Thank you, Mr. Chairman and members of the committee. I appreciate the change in agenda which the chairman has outlined which give us the opportunity to discuss this very important matter before the committee.

I want to commend you for taking the time and giving us the opportunity. I hope that I will not be put in the position of saying, Mr. Chairman, and members of the committee, "Let's do something."

Therefore, even though I may at times have to disagree with some of my colleagues, I would hope that I would lay down a line of reasoning for whatever it is worth.

As I see it now, you have three basic approaches pending before the committee. One is a national commission; one is the establishment of an independent agency; and the other is the format of the bill which I have cosponsored on the House side, H.R. 5654, the National Oceanographic Act of 1965, which would establish a national oceanographic council, among other things.

The bill has two major legislative purposes. One is to establish a clear set of policy objectives for this Nation's marine sciences and engineering, and the second is to provide sustained, high-level leadership, guidance, and coordination of the program which is necessarily supported in relation to missions of a number of separate agencies rather than one.

H.R. 5654, on the House side, corresponds to S. 944 sponsored by Senator Warren G. Magnuson and others, and I am happy to note that S. 944 was unanimously voted out favorably, with amendments, by the Senate Committee on Commerce on July 15.

I am hopeful that the testimony you will receive in these current hearings, including considerations that I shall outline subsequently, will be helpful and lead to favorable conclusions by this committee in support of the proposals I have outlined.

Frankly, Mr. Chairman, I will support any approach that comes out of this committee, but I believe an analysis of all of the approaches that are made will lead to a reasonable conclusion that the approach which is suggested in this legislation is the best approach at this time.

I intend to cover three major points very quickly: First, the importance of oceanography to the Nation; second, my concern about the lack of progress and the dangers of this country losing its leadership in this area; and third, a summary of provisions of H.R. 5654 that I believe will provide the necessary legislative base to a sound program in marine science and engineering.

I am not going to dwell too long on the importance of oceanography. I know that you will take judicial notice of that fact, but, Mr. Chairman, I can pose this one thought: Supposing it were possible for oceanographers to divert the flow of the Gulf Stream away from the United States? It is scientifically problematical whether life as we know it on this continent could exist.

It was your own committee 6 years ago that first responded to these opportunities for U.S. leadership advocated in the report by the National Academy of Sciences through the establishment on February 17 of a special subcommittee and you have continued your very fine work in this area ever since.

I would want to make comment about further study. In recognizing the need for careful review of the various functions and responsibilities of agencies engaged in ocean research it is my opinion we cannot afford to delay for any lengthy period the necessary reorganization of that activity.

Study may be all right, but we have had a lot of study and it has been reported on by many independent committees, scientifically, technically, politically, agencywise, congressionally, and every other way.

There is a wealth of information on this subject already available. I do see, however, considerable value in bringing together a group of experts, a small group, to do what my colleague from Florida, Mr. Rogers, has suggested. I think this would be responsible, reasonable,

and necessary. I would hope that we could get leaders in government, in the industry, and in science to do this job and do it quickly because I don't think we have much time.

It should not take longer than 6 months. In the meantime, it would seem to me that all of the doubts and the differences of opinion about national policy, about budget, about organization, ought to be resolved here in the Congress as rapidly as possible.

I don't think that we ought to slack our interest or our determination while we are trying to decide what our problems are and what the mechanics of organization are going to be.

It has been gratifying, Mr. Chairman, that the executive branch and the Congress have almost always been in agreement about the importance of the goals of oceanography, even though we have had a great difference of opinion as to how best to achieve them.

We have had increased appropriations. We have had healthy growth. We have had increases in our equipment, modernization, new techniques, strengthened our educational and manpower base, and we have made quite an auspicious start. What we are all talking about now is the new spirit, new direction of a program that we all concede is immensely important and valuable to the country for many reasons.

Right now we are \$50 million behind schedule in our 10-year program of oceanography as laid down by the Federal Council, and we can't maintain world leadership in an area in which the Soviet competition is so significant with that kind of performance. But it is not the uncertainties of the funding that alarms me the most.

The extensive interest by the 89th Congress reflects this concern, for, notwithstanding the good intentions of the executive branch to support this program, it has been obviously difficult to maintain priority attention and assignment of manpower and funds in the face of competition for other scientific programs in the national interest.

In the absence of any formal mandate from the Congress that the President could construe as a consensus by the American people that this field deserves the attention that has been focused on outer space, and in the absence of any single agency having identifiable responsibility for this program as is true in space exploration, some additional steps are essential.

We need a program compatible both with this Nation's role as a world leader and with the opportunities which the oceans offer in maintaining our welfare and our security.

We have taken such steps in connection with the Nation's space program, its atomic energy program, its water resources; but we have not succeeded in developing a similar charter for our activities in the oceans.

The very diversity of purposes makes impracticable the reorganization of all these functions in a single operating agency, in addition to which you have all of the agencies fighting this, and without a clear-cut decision, it seems to me, by the President which would direct the agencies otherwise and because of the differences of opinion that exist with respect to the military, the commercial, the scientific, and the industrial people, I don't see from a practical standpoint how you are going to ram through the establishment of an independent agency, as desirable as that might be from an organizational standpoint, a budget standpoint, and in the establishment of national goals.

Establishment of an independent agency in my opinion has certain organizational advantages, but from a practical standpoint where we are today it is extremely doubtful that we can get the necessary administrative support, support outside of the Congress, or even congressional support to create an independent agency. Such a proposal gives rise to the immediate difference of opinion as to whether it is practicable or desirable to excise the oceanographic components out of the various agencies such as the Bureau of Fisheries, the important scientific research carried on by the Navy, and others, and put them into a new civilian agency.

It might very well be, Mr. Chairman and members of the committee, that you gentlemen as experts might want to make the decision that the whole flavor of oceanography ought to be away from the military and have a civilian characteristic.

It is all too obvious to us that our budgets are always based on priorities. It is all too obvious that because of the military need and necessity and the response of the Congress to that military need and necessity the first money that comes out is military money.

You might decide in the national security and in the national interest that this whole program ought to have nonmilitary direction.

I am inclined to support that kind of approach. But I don't know whether or not it is scientifically right or not. This is a matter which I think would have to be based on the testimony of the military people and the scientists, oceanographers, and others who could tell you whether that is the correct approach.

It would seem to me, based on the evidence that is before us today and what we can deduce, that the independent agency approach is not practical from either a scientific point or a political point.

I realize of course that from the executive point of view it is contended that no legislation is necessary and that the present program is working. But I would point out to you that we have all kinds of legislative proposals pending. This indicates that some are dissatisfied, so I think that the administrative agencies need to take that into consideration if they think that the present setup is satisfactory.

I don't believe that under present arrangements, oceanography, and I think the evidence supports that view, has special status as a national program or that it has an overall budget definition.

I believe that if we have a council which has the responsibility as laid out in this bill, while it has its own faults because it is in the Office of the President and from an organizational standpoint this may not be desirable, it seems to be the most practical approach at this time. I concur with the chairman that had we done something that was practical 3 years ago we would be in a lot better shape than we are today.

Again as a practical matter I point out that in the other body, in the Senate, they have approved the approach of H.R. 5654. It would be very difficult for the agencies to make the same objections to this bill that they made to the bill advocating an independent agency.

The important action is to start. We could lay down an oceanographic charter for a broad objective national program. By acting on H.R. 5654 we would for the time bypass the very delicate and difficult problems of excising out of the agencies the component parts of the oceanographic program if that is ever desirable.

But that doesn't mean that we close the door on that. At least we move forward until we can get to a day closer when if this becomes desirable we can do that.

Therefore, I believe for all of these reasons H.R. 5654 is a practical approach at this time.

Mr. Chairman, one final word. I advocate the principle—Government agencies should be given increased capacity to perform their oceanographic missions. I likewise stress with equal vigor that university laboratories and research institutes should be given the responsibility of performing and supporting basic research in oceanography.

We talk about programs. We talk about budgets. We talk about new equipment. We talk about new facilities. But we have to keep our eye on the ball because what progress takes is highly trained, skilled men to make all of these facilities and equipment work. It seems to me that we must have the trained and skilled people as a condition precedent to any kind of expanded oceanographic program at the national level.

Obviously no clear cleavage is possible between the roles of supporting basic research and the other things that are necessary in oceanography. They merge and meet imperceptibly so that each kind of agency must have the capacity to do both, but none the less it seems useful to define the basic roles that way.

Also the question of duplication arises. There is too much research to be accomplished to allow duplication to exist, but it is not a simple principle to apply either. What might be regarded on casual inspection to be wasteful duplication might in fact be necessary cross-checking of experimental finds, an integral part of the scientific method.

To distinguish between duplication and necessary crosschecking requires the most active kind of cooperation. You would either have to put the entire responsibility in one agency or have the kind of high level coordination and cooperation we are talking about and which is inherent in this bill. This duplication determination requires the highest level of cooperation and coordination not only inside of government, but between government, universities and research institutes.

Without that we wouldn't accomplish very much.

In the enthusiasm for increasing the tempo of oceanographic and fishery research in the United States, involving massive new programs, I want to emphasize again that we need men, and trained scientists are not now available in the numbers necessary to staff existing programs, much less expanded programs.

Universities are faced with the necessity of training oceanographers and fishery scientists at rates far above the past, and these universities must be given the capability to do this heavy task, I would hope that in the charter which is laid out that this point is clearly recognized and emphasized.

Training in such complex professions as these must be at the graduated level. This is expensive. It has been estimated that the cost is about \$5,000 per year to train oceanographers, about the same as to train a medical student, and of course this is because of the elaborate equipment necessary and boat charters run anywhere from \$1,000 to \$2,000 a day.

To train men to become professional research scientists, they must be given continuous and varied practice in research, and this cannot be an artificial problem invented for class exercises.

They must be real problems to be solved by active participation of the student alongside an experienced and skilled research scientist.

Thus, the only realistic kind of support for universities given the responsibility of training oceanographers is for support for research programs. It is fortunate that this kind of support serves two valuable purposes: to solve the problems faced by the United States in its pursuit of understanding of the ocean, and to train scientists who will staff the laboratories and programs for future assault on these problems.

In the bills to strengthen oceanography and fishery research which you are considering, Mr. Chairman, specific provisions should be made for the kind of support for universities which I have been talking about, including the granting of specific authorization and direction to the Fish and Wildlife Service or its successors to support and finance grants and contracts to the universities for fishery problems.

Mr. Chairman, in conclusion I would state that in my humble judgment, based on what we now have available for us and analyzing the prospects that are possible, it would seem to me that the best approach to this problem lies in H.R. 5654 which has already passed the Senate committee as S. 944. A council which will lay out a national program and provide high level coordination would be the way to move now, keeping in mind always your committee's continued interest in the program and the availability and desirability of making changes as circumstances may warrant in the future.

Mr. Chairman and members of the subcommittee, let me thank you for allowing us the opportunity to be here with you today to discuss this important subject. Let me congratulate all of you for your continued interest in a subject which has too long been neglected and I am delighted that you have spent the years and the time that you have and that you keep prodding on this problem so something will get done.

Mr. LENNON. Unless there is objection, gentlemen, I ask unanimous consent that the full text of Congressman Fascell's statement be made a part of this record.

(The statement referred to follows:)

STATEMENT OF HON. DANTE B. FASCELL, A REPRESENTATIVE IN CONGRESS FROM
THE STATE OF FLORIDA

Mr. Chairman, I appreciate very much this opportunity to testify before your subcommittee in support of H.R. 5654, the National Oceanographic Act of 1965. I introduced this bill on March 2 to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.

This bill has two major legislative purposes. One is to establish a clear set of policy objectives for this Nation's marine sciences and engineering, and the second is to provide sustained, high-level leadership, guidance, and coordination of the program which is necessarily supported in relation to missions of a number of separate agencies rather than one.

H.R. 5654 correspond to S. 944 sponsored by Senator Warren G. Magnuson and others, and I am happy to note that S. 944 was unanimously voted out favorably, with amendments, by the Senate Committee on Commerce on July 15. I am hopeful that the testimony you will receive in these current hearings, including considerations that I shall outline subsequently, will lead to your committee's favorable action on this legislation. In this regard, I want to strongly

endorse your own statement at the time these current hearings were announced—that the Merchant Marine and Fisheries Committee “has been working hard at this subject for about 6 years now, and I think we are in a position to reach a mature conclusion in this session of this Congress.”

I intend to cover three major points: First, the importance of oceanography to the Nation; second, my concern about lack of progress and the dangers of this country losing its leadership in this area; and third, a summary of provisions of H.R. 5654 that I believe will provide the necessary legislative base to a sound program in marine science and engineering.

The importance of oceanography to the security and welfare of this country was first described in the study by the National Academy of Sciences, released February 15, 1959. It was your committee 6 years ago that first responded to the opportunities for U.S. leadership advocated in that report through establishment, on February 17, of a Special Subcommittee on Oceanography under Congressman George P. Miller. That subcommittee began extensive hearings almost immediately, and over the past 6 years, Mr. Chairman, your committee has developed abundant testimony on the goals of a national program in oceanography, and on resources and Federal organization needed for their achievement.

But in recognizing the necessity for careful review of the various functions and responsibilities of agencies engaged in ocean research we cannot afford to delay for any lengthy period the necessary reorganization of this activity. Two years of study is too long. The state of oceanographic research has been carefully studied and reported upon by a competent NAS-NRC committee. Other groups, including committees of Congress, have also done valuable work in this field. It would seem appropriate at this time, therefore, to have a small expert group bring up to date and pull together the knowledge already collated to give Congress a factual summary and to advance specific recommendations. This committee should include Government, university, and industry members. Its task should not take more than 6 months, both because longer time is not necessary and because the Nation cannot spare more time.

Congress and the public have a right to demand resolution of expressed doubts and differences of opinion as to national policy, budget, and organization; but, we must guard against any slackening in determination to enhance the ability of the United States to master the ocean for the food of mankind while we are sorting out our problems and mechanics of organization.

In reviewing the vast quantity of study material, I found some 16 objectives relevant to our national interests:

1. Increase the Nation's security from enemy sea or undersea attack, and to maintain the potency of a Polaris-type deterrent force.

2. Improve international trade and commerce and safeguard them from disruption in the event of a national emergency.

3. Improve understanding of weather phenomenon and the accuracy of long-range forecasts.

4. Comprehend changes in climate of world significance.

5. Afford greater protection to lives and property from ocean-bred wind and waves.

6. Restore and expand domestic fisheries and reduce costs to both fishermen and consumers.

7. Through aquaculture, to alleviate protein deficiency elsewhere in the world.

8. Identify ocean mineral deposits and develop methods for recovery and processing.

9. Expand knowledge of fossil fuels that lie beneath the oceans.

10. Diminish dangers of pollution from atomic, industrial, or domestic waste.

11. Facilitate discovery of new medical and pharmacological weapons in the war against disease.

12. Safeguard waterfront property from beach erosion.

13. Diminish damage to docks, piers, and ships from marine borers and fouling organisms.

14. Protect and enrich all kinds of seashore recreation, so important in a nation of increasing urban population.

15. Provide a rational basis for international agreements and domestic regulation in ownership, transit, fishing, and mineral rights.

16. Strengthen basic research, using the sea as a laboratory for extending knowledge of the world around us.

Mr. Chairman, I have had the opportunity of firsthand discussion of many of these points with the director and staff at the Institute of Marine Science at

the University of Miami. I am impressed with the progress we have made in the past few years, the significant discoveries, and extension of the potential for science to be applied to the public interest through a parallel development of ocean engineering.

It has been gratifying to see that the executive branch and the Congress were almost always in agreement about the importance of these goals. During the early 1960's, the program received an increase in appropriations that permitted healthy growth in all areas of marine science—oceanography developed from its earlier primitive state in comparison with other sciences, our fleet of ships and shore based laboratories were strengthened and the educational and manpower base necessary for a sound attack on our ignorance of the sea has been increased.

But, Mr. Chairman, after an auspicious beginning, this program needs spirit and direction. The budget is inevitably a measure of our priorities. In the case of oceanography, the President's fiscal year 1966 budget of \$141.6 million was only about 4 percent over that for fiscal year 1965—not enough to accommodate increased costs to operate new ships that the Congress authorized and funded in 1961-63; nor is it enough to provide funds for increased basic research associated with growing university enrollment, and especially to provide funds for applied research and engineering for the purposes outlined earlier.

In the 2 short years since transmittal to the Congress of the Federal Council's 10-year program in oceanography, the level of funding is almost \$50 million behind schedule.

We cannot maintain world leadership in an area in which Soviet competition is so significant with this kind of performance. But it is not the uncertainties in funding that alarm me most.

The extensive interest by the 89th Congress reflects this concern, for, notwithstanding the good intentions of the executive branch to support this program, it has been obviously difficult to maintain priority attention and assignment of manpower and funds in the face of competition for other scientific programs in the national interest. In the absence of any formal mandate from the Congress that the President could construe as a consensus by the American people that this field deserves the attention that has been focused on outer space, and in the absence of any single agency having identifiable responsibility for this program as is true in space exploration, some additional steps are essential. We need a program compatible both with this Nation's role as a world leader and with the opportunities which the oceans offer in maintaining our welfare and our security. We have taken such steps in connection with the Nation's space program, its atomic energy program, its water resources; but we have not succeeded in developing a similar charter for our activities in the oceans.

The very diversity of purposes makes impracticable the reorganization of all these functions in a single operating agency. But H.R. 5654 would be a major step in providing a statutory foundation of goals and leadership.

The Congress applauded leadership of the executive branch associated with the program during formative years, and the Congress looked to the Federal Council for Science and Technology as the coordinating agent of a program that is necessarily conducted in almost 20 departments, agencies, or bureaus. It was especially eager to see this mechanism utilized after the statutory Office of Science and Technology was established that permitted its Director, currently Chairman of the Federal Council, to provide information and advice to the Congress.

Legislative proposals in the 87th and 88th Congresses were based on concern over the possibilities of a transient determination to give oceanography the leadership it deserved.

I realize that the executive branch has contended that this program has advanced and will continue to progress without the need for new legislation. In testimony this spring before the Senate Commerce Committee, Dr. Donald F. Hornig (Director of the Office of Science and Technology, and Chairman of the Federal Council for Science and Technology) restated that over the past 5 years the program has been scientifically productive, that the Federal mechanism for coordinating oceanography activities has performed well. On the other hand, in response to written questions of Senator Magnuson related to the Federal Council's procedures of endorsement of the national oceanographic program Dr. Hornig notes that the "Federal Council made no specific recommendations with respect to the fiscal year 1966 program recommended by the Interagency Committee." This is the first time since the Interagency Committee on Oceanog-

raphy was given program planning responsibilities by its Council Chairman in 1961 that no endorsement was made. Dr. Hornig also noted that "National programs are not established by the executive branch in the sense of creating an entity which is given special treatment because of that designation." This is in direct contrast to contentions in previous years that legislation was unneeded because oceanography was being given special status as a "national program" and that it was effectively coordinated by overt action on the part of the Federal Council.

The Office of Science and Technology has statutory responsibility to advise and assist the President. But there is no language in the Reorganization Plan No. 2 under which it was established, or in Executive Order 10807 that earlier set up the Federal Council, that designates responsibilities for a unified or coordinated program in oceanography, or even requires regular reporting to the Congress in this important field. If, in fact, the term "national program" which has been applied over the years to oceanography by the executive branch is now meaningless, and if the program does not even earn budget defense through the Federal Council, then I feel it is all the more urgent that the Congress very clearly establish its own legislative intent in this regard, together with a mechanism with sufficient authority and responsibility to be sure that the intent is indeed carried out.

This is the purpose of my bill.

First, section 201 contains a declaration of policy and purpose as follows:

"The oceanographic and marine activities of the United States should be conducted so as to contribute to the following objectives:

"(1) The expansion of human knowledge of phenomena in and related to the oceans, the marine environment, and the Great Lakes, their boundaries and contents.

"(2) The preservation of the role of the United States as a leader in oceanographic and marine science and technology.

"(3) The enhancement of the general welfare and security of the United States.

"(4) The advancement of education and training in marine science and technology.

"(5) The development and improvement of the capabilities, performance, and efficiency of vehicles, equipment, and instruments for use in exploration, research, surveys, the recovery of resources, and the transmission of energy in the marine environment.

"(6) The coordination of activities of the various agencies concerned with the marine sciences, and the collection, storing, and distribution of significant data acquired as a result of these activities.

"(7) The establishment of long-range studies of the potential benefits to the U.S. economy, security, health, and welfare to be gained from the opportunities for, and the problems involved in, utilization of scientific marine and Great Lakes research and surveys.

"(8) The effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States in order to avoid unnecessary duplication of effort, facilities and equipment, or waste.

"(9) The making available to agencies directly concerned or affected by oceanographic or Great Lakes phenomena of knowledge obtained through U.S. scientific marine research and surveys which is of value or significance to the agency.

"(10) The cooperation by the United States with other nations and groups of nations in oceanographic and marine research and surveys when such cooperation is in the national interest."

The designation of authority and responsibility to implement this policy is set forth in section 301. First, there would be established in the Executive Office of the President a National Oceanographic Council chaired by the Vice President and composed of other Federal officials of high policy rank. It is the function of this Council to advise and assist the President in the field of oceanography and marine sciences, including such matters as:

(1) Survey all significant oceanographic and marine sciences activities, including the policies, plans, programs, and accomplishments of all departments and agencies of the United States engaged in such activities;

(2) Develop a comprehensive program of oceanographic and marine science activities, including but not limited to, exploration, exploitation, and conservation of marine resources, oceanographic engineering, studies of air-sea interaction, transmission of energy, and communications, to be conducted by departments and agencies of the United States;

(3) Designate and fix responsibility for the direction of major oceanographic and marine science activities, including, but not limited to, exploration, exploitation, and conservation of marine resources, oceanographic engineering, studies of air-sea interaction, transmission of energy, and communications;

(4) Provide for effective cooperation among all departments and agencies of the United States engaged in oceanographic and marine science activities, and specify, in any case in which primary responsibility for any category of the oceanographic and marine science activities has been assigned to any department or agency, which of those activities may be carried on concurrently by other departments or agencies;

(5) Resolve differences arising among departments and agencies of the United States with respect to oceanographic and marine science activities under this act, including differences as to whether a particular project is an oceanographic and marine science activity; and

(6) Review annually all existing oceanographic and marine sciences activities conducted by departments and agencies of the United States in light of the policies, plans, programs, and priorities developed pursuant to this act.

In my view, this Council would thus bring together wisdom and experience as well as reflection of agency views that would foster the needed policy in program planning and coordination not only from the point of view of science but from the point of view of technology and such considerations as economic development and foreign affairs.

Establishment of this Council thus takes note of the fact that numerous Federal departments and independent agencies have statutory missions which directly or indirectly deal with the oceans. These responsibilities relate to our national security, to development of our national resources, to public health and safety and to recreation. Each of these activities in the ocean is thus related to the broader mission of the parent agency. Because of the different public purposes for which these agencies were established it does not seem possible to me to excise the oceanographic component and consolidate these functions in one new superagency. Nevertheless, to make sure that all of the agencies contribute to a common base of scientific data and survey, and make use of a common base, to be sure that goals are consistent, that there not be unnecessary duplication of ships or shore facilities, that there be a common concern for manpower training and utilization, that there be uniform policies in the development of Federal relations with State and private interests—for these reasons it is essential that there be a policy coordinating body that could deal with common problems and common goals.

Section 301 would also provide for a full-time staff through a civilian Executive Secretary appointed by the President with advice and consent of the Senate. Such full-time staff is essential to this program and it is important both for the President and for the Congress that there be someone of policy rank working with the Vice President to provide the necessary staff back-up operations of the Council and continuity for day-to-day communications with the constituent agencies.

We have precedent for this type of mechanism. Title II of the National Aeronautics and Space Act of 1958 established a National Aeronautics and Space Council with very similar functions. As amended in 1961, it provides for the Vice President as Chairman. That Council performs all of the functions outlined above and, in addition, participates in budget analyses prior to their formal presentations to the President; supplies the Congress with competent and objective information about the program under its surveillance. I visualize the National Oceanographic Council having a similar function.

I need not remind this committee that H.R. 4276, introduced by Congressman George P. Miller early in the 87th Congress, would have created a somewhat similar National Oceanographic Council to the one I propose. Your hearings that year provided testimony in support of this concept that is still relevant today.

In closing, Mr. Chairman, I speak as one concerned about our neglect of the potential of the oceans for our national welfare.

When he transmitted budget proposals for this year's oceanographic program, President Johnson in a letter to the Speaker of the House said:

"* * * now our view of the seas has had to undergo a drastic change. We have always considered them as barriers to navigation; we now must see them as links not only between peoples but to a vast new untapped resource * * *". It is essential that the Congress review this program as a unified thrust seaward.

I, therefore, urgently recommend when the various committees of the Congress review this portion of their program they keep its entirety in mind."

Mr. Chairman, H.R. 5654 provides the mechanism by which this unified view of oceanography can be developed as a matter of purpose and implemented as a matter of executive management that now displays lack of continuity and sustained momentum. This bill would also provide an unprecedented opportunity for the Congress also to view this program as a single entity.

While I advocate the principle that mission-oriented Government agencies should be given increased capacity to perform their missions, I likewise stress with equal vigor that university laboratories and research institutes should be given the responsibility of performing the supporting basic research. Obviously, no clear cleavage is possible between these roles which meet and merge imperceptibly so that each kind of agency must have the capacity to do both, but nonetheless it seems useful to define the basic roles in this way.

Of course, there is too much research to be accomplished to allow duplication to exist. But this is not a simple principle to apply either, since what might be regarded on casual inspection to be wasteful duplication might in fact be necessary cross-checking of experimental finds, an integral part of the scientific method. To distinguish between duplication and necessary cross-checking requires the most active kind of cooperation. This implies consultation at the highest level between various agencies in Government and between Government and university and research scientists.

In the enthusiasm for increasing the tempo of oceanographic and fishery research in the United States, involving massive new programs, new vessels and new laboratories, one all-important aspect is frequently brushed aside lightly or even completely ignored. This is the problem of who is going to staff the programs and laboratories and to man the vessels. What makes research go is not equipment or buildings or boats, no matter how elaborate or expensive, but trained men. These are not available now in the numbers necessary to staff existing programs. Yet the United States is making plans for twice to four times the amount of work in the next few years. So the universities are faced with the necessity of training oceanographers and fishery scientists at rates far above those in the past. These universities must be given the capability to do this heavy task—a point nearly ignored up to now.

Training in such complex professions as these must be at the graduate level, and this is expensive. It has been estimated that it costs about \$5,000 per year to train oceanographers—about the same as to train a medical student. The high cost in both cases is because of the elaborate equipment necessary; in fishery science and oceanography there is the additional cost of expensive boat time (which often runs to \$1,000 to \$2,000 per day).

To train men to become professional research scientists, they must be given continuous and varied practice in research. And this cannot be in artificial problems invented for class exercises; they must be real problems to be solved by active participation of the student alongside an experienced and skilled research scientist.

Thus, the only realistic kind of support for universities given the responsibility of training oceanographers is for support for research programs. It is fortunate that this kind of support serves two valuable purposes: to solve problems facing the United States in its pursuit of understanding of the ocean, and to train scientists who will staff the laboratories and programs for future assault on these problems.

In the bills to strengthen oceanography and fishery research being considered here, specific provision should be made for the kind of support for universities described above, including the granting of specific authorization and direction to the Fish and Wildlife Service or its successors to support and finance grants and contracts to universities for fishery problems.

Mr. FASCELL. Thank you, Mr. Chairman. As usual, you are very alert and very courteous.

Mr. LENNON. One question. Your bill, H.R. 5654, corresponds to Senate bill 944 but is wider in scope, is it not?

Mr. FASCELL. I believe it is. I haven't checked the amendments that came over from the Senate side.

Mr. LENNON. I was very much interested in the last paragraph of your statement on page 5 and all of page 6. We will not have time

out of deference to the other gentleman to question you about it. Could you be here tomorrow for just a few minutes at 10 o'clock?

Mr. FASCELL. I will certainly try. I have a committee hearing of my own tomorrow so I don't know what kind of conflict I might have but I will be happy to work with Mr. Drewry or the committee and try to answer any questions.

Mr. LENNON. Thank you very much.

Mr. FASCELL. Thank you, Mr. Chairman.

Mr. LENNON. Our next witness is Congressman Huot, who is the sponsor of H.R. 7798, which is identical to Senate bill 944.

Congressman, we are sorry you were delayed. You know how these things work out. You just go right ahead, sir. We won't interrupt you.

STATEMENT OF HON. J. OLIVA HUOT, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW HAMPSHIRE

Mr. HUOT. I appreciate your problem and I guess we all have a problem when it comes to meetings.

Mr. LENNON. Did you want to bring, since we won't be able to get into the question period, your expert, who I see sitting alongside you, on this subject matter?

You go ahead.

Mr. HUOT. We will probably have that tomorrow then. I want to say, Mr. Chairman, that I welcome the opportunity to express my feelings relative to H.R. 7798—legislation that I introduced in the Congress on May 3 to establish a directing and coordinating body concerned with strengthening the Nation's efforts in the vast area of oceanographic research and development.

Mr. Chairman, the fact that we are meeting here today, the many bills presently before Congress, and the present keen interest by the scientific, commercial, and industrial segments of our society attest to the great need for a formal and intensive national commitment to the exploration and utilization of hydrospace.

I would first like to congratulate the agencies and departments of our Government now engaged in hydrospace activity for the degree of progress they have made to date.

I would specifically like to single out the Interagency Committee on Oceanography for their efforts in pursuit of a logical program of oceanographic development.

I am sure we all agree that it is in the national interest to fully explore the greatest potential source of resources on this planet. I am also sure we all agree that this potential has remained untapped far too long.

I am equally sure we do not agree on the most effective means to accomplish a hydrospace program, as my bill is a similar bill to Mr. Fascell's.

As Mr. Fascell has already indicated, though we do not agree in this area we would probably come to some agreement if something could be done.

However, as he has pointed out, we agree that something ought to be done and we have to start somewhere. Let us then look at how the

United States is presently pursuing ocean exploration, for it is this situation which H.R. 7798 would change.

Ninety percent of our Nation's oceanographic programs is contained within four agencies. They are the Navy, National Science Foundation, the Department of the Interior, and the Department of Commerce.

The National Science Foundation is supposed to provide the core of basic science activity to the oceanographic activities of all agencies and to the general field of oceanography itself.

The mission-oriented agencies, those 21 agencies now engaged in various forms of oceanographic studies, are supposed to draw on basic knowledge provided by the National Science Foundation for furtherance of the agencies' missions.

The Interagency Committee on Oceanography is supposed to coordinate the basic research provided by the National Science Foundation and the Navy against the needs of the mission oriented agencies.

What actually happens is that since the ICO is only an advisory and coordinating body and not, by their own admission, an action body—it cannot provide either the direction of the basic research nor prevent the possible duplication of effort among the mission oriented agencies.

In testimony before the Senate Committee on Commerce, it was brought out that the Office of Science and Technology, which is the organization through which the ICO reports, has no professional staff member devoted to oceanography at this time.

The testimony further stated that the OST utilizes only 10 percent of a temporary man's work as its interest in oceanography.

The national commitment to oceanographic research and engineering certainly warrants more than one-tenth of one man at this level.

Any organization which is solely able to "coordinate" and not provide direction through budget support will face precisely the same problem as the ICO in trying to tie together the existing diversity of missions and the dispersion of oceanography among a number of operating agencies.

What then will these bills accomplish to insure the United States of meeting its commitment to full exploration of the oceans and waterways?

There are basically four main purposes to this legislation. The first is to expand human knowledge of phenomena in and related to the oceans. The second is to further develop and improve the capabilities, performance, and efficiency of vehicles equipment, and instruments for use in exploration, research, surveys, the recovery of resources and the transmission of energy in the marine environment.

The third is to more effectively coordinate the activities of the various agencies concerned with the marine sciences; and the fourth is to insure full cooperation by the United States with other nations and groups of nations in oceanographic and marine research, and surveys when such cooperation is in the national interest.

The bill calls for the establishment of a National Oceanographic Council consisting of Cabinet members of departments presently involved in various studies of oceanography. Also on the Council will be the Directors and Chairmen of the Smithsonian Institution, Atomic Energy Commission, Office of Science and Technology and the Na-

tional Science Foundation. The Vice President will act as Chairman of this Council.

A National Oceanographic Council of this type will employ a regular staff headed by a full-time civilian executive secretary appointed by the President whose main function will be to develop a comprehensive program of oceanographic and marine science activities and provide for effective cooperation among all departments and agencies of the Federal Government.

This Council will submit to Congress within 1 year from its establishment a comprehensive program of proposed legislation in furtherance of oceanography and the marine sciences.

A \$500,000 appropriation is attached to establish operation of the Council.

In addition, the President will be authorized to submit to the Congress in January of each year a report including a comprehensive description of the programmed activities and accomplishments of our Nation's commitment to oceanography and a full evaluation of such activities and accomplishments.

I believe, Mr. Chairman, that this is the proper approach to rectifying the lag this Nation is presently experiencing in the field of ocean research and engineering. It is no secret that we know much more about areas hundreds of miles above the earth, than about areas hundreds of feet below the surface of the ocean.

The possibilities of new discoveries are simply fantastic and its exploration and utilization is consistent with the scientific and defense goals of the United States.

The United States has made tremendous gains in the race for space. But we must not be singular in our purpose and now must lay the groundwork for other avenues and the only unexplored avenue which has been literally ignored since the beginning of time is located here on earth and encompasses nearly two-thirds of the earth's surface.

I would like to stress again that I do not intend to be critical of those agencies now performing the tasks of coordination. But I do intend to stress the importance of establishing an action body whose main responsibility is directing the necessary research and engineering to fully explore all the potential in the marine field.

As programs and aims are established by this Council and annual reports submitted by the President are known, we will be clear as to the next approach to make, whether it be further coordination and direction or movement to the next step of funding large operations and encouraging commercial industries to increase their activity in this field.

Many questions have been asked as to the relation of H.R. 7798 and the national defense. My intentions are solely scientific at this time.

With the establishment of a National Oceanographic Council and an increase in oceanographic activity, all information gathered and computed would surely complement our national defense commitment.

Mr. Chairman, admittedly I am not an authority on oceanography and I am sure that you people are better qualified in this area, and I am sure that once you have heard the testimony of Members of Congress and experts in this field you will make a decision that will be in the interest of oceanography.

But my limited knowledge, I feel, is shared by the great proportion of our population. Our late President, John F. Kennedy, once answered a question on why this country is taking the lead in exploring outer space. The President said, "Because it is there and we know very little about it."

President Johnson stated in a letter to the Honorable Speaker of the House recently, "We are looking forward to a period where our investment in ocean research may bear fruit in terms of strengthening our national defense."

I believe the establishment of a National Oceanographic Council with the authority of full-time direction and subsequent funding is necessary as it will be a forerunner to even larger operations in oceanography, which I again believe, is inevitable.

In conclusion, Mr. Chairman, I would like to stress one very important factor. In the past and at the present, a great deal of criticism has been leveled at the Federal Government for interfering in the private sector of our economy.

Some of this criticism has been warranted and some of it has not been warranted.

I know of no greater opportunity for the Federal Government to assist the private sector of the economy and to open the horizon for a commercial and industrial exploration of our oceans than with the passage of this legislation.

The Government with its vast resources and experience must avail itself again to bolster the concept of the free enterprise system by taking the initiative to create a directing body for marine research and development.

It is the duty of the Congress and the Executive to lay the groundwork for the exploration of an unknown field of endeavor. As we have learned in the past and as it will probably always be in the future, private industry will be encouraged to begin programs of their own or to increase existing activity in this very important field.

I would like to thank you, Mr. Chairman and members of your committee, for listening to my testimony and hope that it might contribute in some small way to a decision that you might make later on and I am sure all of those who are being heard appreciate your very fine courtesy.

Mr. LENNON. Congressman Huot, I want to highly commend you for a very splendid statement in support of your bill, H.R. 7798.

Would you be available tomorrow morning at 10 in order that some of us may ask you a few questions along with the other members?

Mr. HUOT. I would be delighted to, Mr. Chairman.

Mr. LENNON. Thank you very much.

The committee will stand adjourned until tomorrow morning at 10 o'clock, at which time the hearings will be resumed in this particular room, unless you are otherwise notified.

If we get another room we will let you hear from us.

Thank you very much.

(Whereupon, at 12:15 p.m., the hearing was recessed to reconvene at 10 a.m., Wednesday, August 4, 1965.)

The first thing I feel is shared by the great proportion of our population. Our first step is to get a clear picture of the situation. We know that the situation is not good and we know that it is not going to get any better unless we take some action.

I believe the establishment of a National Geographic Program is a necessary step. It will help us to get a better picture of the situation and to take the necessary action. It will also help us to get a better picture of the situation and to take the necessary action.

In addition, the program will help us to get a better picture of the situation and to take the necessary action. It will also help us to get a better picture of the situation and to take the necessary action.

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NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

WEDNESDAY, AUGUST 4, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington D.C.

The subcommittee met at 10:15 a.m., pursuant to recess, in the caucus room, Cannon House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The committee will resume its hearings from the recess of yesterday.

Our first witness this morning, is our friend and colleague from Massachusetts, and a very able member of this committee, Congressman Hastings Keith. I believe you have authored one of the bills we are considering today.

STATEMENT OF HON. HASTINGS KEITH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS

Mr. KEITH. Yes, Mr. Chairman, I am the sponsor of H.R. 6009 and I greatly appreciate the opportunity to make this brief statement. As a member of the subcommittee and one who ardently supports an expanded national oceanographic program, I want to note that I am going to remain as objective as possible in the consideration of all of these bills. Like you, I am anxious to hear the testimony of not only my colleagues, who have sponsored these 16 or 17 bills, but also the departmental witnesses and the experts from science, education and industry.

My bill is companion to bills filed by Senator Bartlett, who testified yesterday, and Congressman Ralph Rivers. It would "provide a program of marine exploration and development of the resources of the Continental Shelf." It would do this by creating a special commission and funding a special exploration and development fund.

Within the past few days, we have received the various departmental reports requested by the chairman. Frankly, I was rather disappointed to learn that they are signing the same old song—the words to which go something like this—"While the Department is in favor of the purpose of the bill, it is believed that its functions would overlap the duties and responsibilities currently vested in other offices and agencies." Another version is to the effect that the idea may be a good one, but it would be "premature" at this time.

In short, we have received the customary plea from the executive branch as in other years and with other bills, for retention of the status quo.

I couldn't disagree more with this negative and shortsighted outlook, and that is why I filed H.R. 6009. Another factor that prompted my interest in this particular approach was the convention on the Continental Shelf, which entered into force for the United States on June 10, 1964. The convention, as the subcommittee knows, recognizes the rights and responsibilities of a littoral nation to the resources of the Continental Shelf to a depth of 200 meters—and beyond that, to the limits of our technical capabilities.

Mr. Chairman, I have had this large map prepared to illustrate the area with which my bill is concerned. Prepared through the cooperation of the Coast and Geodetic Survey, it depicts the limits of the Shelf to the 200-meter curve. I have an 8 by 10 black and white photograph of this same map, which I will be glad to make available to the subcommittee for the hearing record.

Mr. LENNON. Without objection, the map may appear at this point in the record.

(The map referred to faces this page.)

Mr. KEITH. This international agreement not only safeguards our coastal resources, it presents to us a challenge which must be met. There is just no question that as a nation we are ultimately going to have to exploit the resources of the oceans—it will be a matter of survival. It is imperative, as a world leader, that the United States recognize this in a meaningful way in the very near future.

H.R. 6009 provides the machinery for beginning to meet this challenge right now. The commission for which it provides can be at work, in earnest, and pioneering projects can be initiated and funded while the Congress and the executive branch further consider the wisdom of creating an all-encompassing National Oceanographic Agency or the even broader concept proposed by some members, which would establish a distinct Department of Marine and Atmospheric Affairs.

Another very important aspect of my bill and those filed by Senator Bartlett and Congressman Ralph Rivers is that careful provision is made to make private enterprise and private industry full partners in the exploration and development of hydrospace. This is the greatest advantage our free society has over a nation like the Soviet Union, which clearly ranks oceanography as a national priority program. The competitive spirit and technical excellence of American industry can be a tremendous asset in the race to unlock the mysteries of the sea and to put its vast resources to work for the security and the economic welfare of the free world.

Perhaps this particular bill's greatest immediate virtue is that it is a sound and workable compromise somewhere midway between the superagency approach—the so-called Wet-NASA—and the other end of the spectrum of proposals before the subcommittee, which is basically a statement of purpose and congressional interest coupled with a legislative affirmation of what is currently being done in the national oceanographic program by the executive branch with existing executive authority. Congressman Bob Wilson's NOA, National Oceanographic Agency, may be too ambitious at this time, in a political sense. The bills at the other extreme, in my opinion, are not commensurate with the challenge.



OFFSHORE AREAS IN WATER DEPTHS OF LESS THAN 200 METERS



UNITED STATES

COMPILED AND PUBLISHED

FOR THE

SECRETARY OF COMMERCE

BY THE

COAST AND GEODETIC SURVEY

H. Arnold Karo, Director

THE CONSTRUCTION OF THIS CHART

This chart is constructed on the Lambert conformal conic projection, with standard parallels of true scale at latitudes 33° and 45°. The meridians appear on the chart as straight lines and the parallels as concentric circles, meridians and parallels intersect at right angles and the angles formed by any two lines on the earth's surface are correctly represented.

Along the two standard parallels the scale is exactly 1:3,000,000; between them, the scale is slightly smaller, and beyond them it is slightly larger. For most purposes it will be sufficiently accurate to use the scale at latitude 45° for the measurement of distance. For long distances wholly without or wholly within the standard parallels greater precision may be attained by using the scale of miles for the average latitude of the line to be measured.

A straight line on this chart closely approximates the path of the great circle.

THE STATE OF TEXAS



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In summary, Mr. Chairman, I believe that the creation of a National Commission on the Exploration and Development of the Continental Shelf would be a good step in the right direction and one that could be taken in the immediate future without disrupting the existing national oceanographic program.

On the other hand, since I favor the maximum effort in the opening of this final frontier, I will be listening with great interest to subsequent testimony on all of these bills. My objective, as I know is the case with my distinguished colleagues on the subcommittee, is to come out of this series of hearings with the best possible bill and the one that does the most to give our oceanographic program the goals, emphasis, and administrative and financial authority suited to meet the great challenges and opportunities of the years just ahead.

One final comment. While I earlier indicated that the Departmental reports on H.R. 6009 were negative, I should point out that there was one notable exception—that was the report of the Department of State, which offered some suggestions for amended language with respect to the definition of the Continental Shelf which I think are constructive and which I feel should probably be incorporated in the bill.

In addition to these technical suggestions, the State Department, in a report signed by Assistant Secretary Douglas MacArthur II, made this observation, which I think is very significant:

The Department would interpose no objection to the enactment of the bills from the standpoint of foreign relations. In fact, the Department believes that the bills might prove most useful in the development of oceanic capability and use which would not only provide a source of raw material for our economy, as the bills contemplate, but forestall domination of the ocean by forces inimical to our welfare.

Mr. LENNON. Thank you, Mr. Keith, for a very informative and enlightening statement. If there are no questions at this time, I would like to proceed as expeditiously as possible.

I wonder, Congressman Huot, if you would come back to the witness stand, and if at this time, if you care to bring your technical assistant with you, would he just take that chair and move it right over there, so if there are any questions that you might desire to defer to him, for any technical answers.

Your bill, that you introduced and spoke so eloquently on yesterday, H.R. 7798, is identical with the Senate bill, I believe, which, I understand, now has been reported out of the Commerce Committee of the Senate.

STATEMENT OF HON. J. OLIVA HUOT, REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW HAMPSHIRE; ACCOMPANIED BY CHARLES SKILLAS—Resumed

Mr. HUOT. Yes, and it is also identical to Mr. Fascell's and the Fulton and Hanna bills.

Mr. LENNON. H.R. 5654, and Mr. Fulton's H.R. 6512, and that of Mr. Hanna of California, 7301.

Mr. HUOT. Mr. Chairman, if I may, I would like to introduce the gentleman who is with me, Mr. Charles Skillas, who is a consultant to the Seacoast Regional Plan in Maine and New Hampshire.

Mr. LENNON. I am delighted to have you. I don't know what questions might be asked of you, but we are delighted that you are here this morning.

Mr. CASEY, since the gentleman from Florida, Mr. Fascell, spoke for 5654, and Mr. Huot of New Hampshire spoke for the identical bill, 7798, which, of course, is identical, that is, Mr. Huot's bill is identical, to the Senate bill, S. 994, which has been reported out of the Senate Committee on Commerce with amendments, I wonder if there are any questions that you desire to ask Mr. Huot or the gentleman sitting with him?

Mr. CASEY. Well, I presume your bill also takes into consideration research grants or educational institutions.

Mr. HUOT. Yes; it does, sir.

Mr. CASEY. As Mr. Fascell points out that his did. Is that correct?

Mr. HUOT. That is correct.

Mr. CASEY. Well, I am quite interested in that phase of it. I know that we have followed a program in the space program of research grants to develop new talent and to further the resources of the universities in this field of space, and I think we are going to have to do the same thing in oceanography.

Now, I have noticed that most of us have, and I have been guilty of it, too, been kind of—but I noticed that you were very careful to say that you were not being critical of the agencies, but a lot of us are prone to say that since we are a little disorganized, the agencies aren't doing a good job. Frankly, I think that the agencies are probably doing a better job than most of us realize because there is a lack of coordination and a lack of communication.

Now, it is true that the Inter-Agency Office of Oceanography does put out a report, quite frequently, but, of course, it is limited, and it is limited in its distribution, and I don't believe it quite shows what the various agencies are doing and, of course, another thing I want everybody to understand is our chairman and his predecessor have been quite vigorous in trying to accomplish the very thing that we are holding hearings on again here today. And I think that some of the progress that has been made in due to the diligence of this committee under the leadership of the present chairman.

The Navy has instituted a Data Center on Oceanography, which was, in my opinion, a great step forward to try to create a central information center, and they endeavored to make this a center available to all agencies, as far as that is concerned, that are interested in oceanography.

Are you familiar with any of the—I do not believe it is your statement, but someone mentioned there were just a few universities and institutions in oceanography, but I just wonder if that is as well known as it should be.

Mr. HUOT. I don't believe it is, but I do think that we need to develop people in this field of oceanography, and I might say that perhaps in introducing this bill, this companion bill, I do have some selfish motives.

We have districts that we are concerned with and, as your map indicates over there, the east coast, the Continental Shelf, we have our share of it, and we have fine facilities off our shore so that we would hope to share in any expansion, because we feel that our area is very

ideal for that type of work, with a fine university in our State. Anything that would be done to expand oceanography, we feel that our area could make a contribution in this area.

This council that this bill proposes would certainly make everything available that is going on. As you indicated, these people are working, and we are not being critical of them, except that we ought to know what everybody is doing, and to expand on these facilities.

Mr. CASEY. Don't you apologize for introducing a bill for selfish motives. Practically everything in this world is done on a selfish basis, in some degree. You are either after credit, or you are after profit, or you are after help for some friend or some institution.

Just like you, I am a little selfish and have a little special interest. We have just a new organization called, I think it is, the Gulf Universities Research Association—I believe I have got the name right—just recently created, which two universities in my hometown, my own city, Houston, the University of Houston and Rice University are members of it, Texas A. & M. and, incidentally, Texas A. & M. has been in the oceanography field for some time, and is gaining stature quite a bit, and the University of Texas, Florida State, LSU, if I recall correctly, are those that have so far joined it, and I believe that they expect to have Mississippi and Georgia and Alabama all in this, to form a united approach instead of each university trying to—

Mr. HUTT. Yes; do a project of their own.

Mr. CASEY. They want to pool the resources and, by the same token, it follows everything that you recommend in the bill instead of one university trying to get research grants, they pool their efforts for a united development of a research program.

I want to commend you for your efforts in this regard, and I assure you that you have contributed a lot here.

Mr. HUTT. Thank you very much, Mr. Casey.

Mr. LENNON. If the members will refer to the compilation of the oceanography bills that are pending before the committee, and will turn to page 27, you will see a somewhat brief analysis of the bill, H.R. 5654, by Mr. Fascell, H.R. 6512 by Mr. Fulton of Pennsylvania, H.R. 7301 by Mr. Hanna, and H.R. 7798, the bill to which the witness is speaking now.

And we know now that Senate bill 994 at the time of its introduction was identical with your bill, Congressman, but when it was reported out of the committee of the Senate, it was reported with amendments, and it does differ to some degree.

If the members of the committee will take that compilation and turn to the brief analysis of these bills, which the remarks are now being addressed to, I think they would find it advantageous to them.

Any questions, Mr. Rogers, of the witness?

Mr. ROGERS. Mr. Chairman, I just want to say that I do appreciate the testimony here and the interest of the gentlemen in this problem, and I think and agree that something has got to be done, and that by working together, I am sure we will come out with a solution that I am hopeful will be acceptable to the President.

Thank you, Mr. Chairman.

Mr. LENNON. Yes, Mr. Downing?

Mr. DOWNING. Thank you, Mr. Chairman.

I am sorry I missed most of your testimony. But I would like to follow up Judge Casey's question.

I had an interesting conversation this morning with Dr. William Hargiss, director of the Virginia Marine Institute, and he was concerned that perhaps not enough attention is being directed to the State-oriented phases of oceanography. As of this time, perhaps 30 to 40 percent of the effort is in State jurisdiction, and he was hopeful that any program such as you are contemplating would be careful to make use of the progress that the State has made, and incorporate them in the overall program. And I assume that you would agree with that.

Mr. HUOT. Well, yes, because I think that many States have an interest. Some States might be interested more than other States because of the facilities that they might have. If a Council is established, we would certainly hope that it would encourage and assist the efforts made by the individual States as well as the effort made at the Federal level.

The Council would also know the facilities that are available in each State, for instance, what the coast comprises, and its facilities, and depth, and what research could be done to the best advantage in what area of the country. Whereas, now, I don't think that we have that pooling and coordinating that we should have, but certainly the States individually would have an interest, depending on their facilities or coastlines.

Mr. DOWNING. Thank you very much, sir.

Mr. HUOT. Thank you.

Mr. DOWNING. Thank you, Mr. Chairman.

Mr. LENNON. Any other questions, Mr. Downing?

Mr. DOWNING. No; thank you, sir.

Mr. LENNON. Mr. Ashley?

Mr. ASHLEY. No questions; thank you, Mr. Chairman.

Mr. LENNON. Mr. Dow?

Mr. DOW. As a freshman Congressman, I would like to say that I have valued my association with the distinguished gentleman from New Hampshire, who is also a freshman here, and I am sorry I didn't hear his testimony yesterday. I have high regard for him, and I am going to follow very closely his advice on this question of oceanography.

I have had some experience with oceanography in this country, and, in my opinion, it is quite hit or miss at the present time. It deserves to be pulled together, and I want to join with all the Congressmen like Congressman Huot who have that objective in mind.

Thank you, Mr. Chairman.

Mr. HUOT. Thank you very much, Mr. Dow. I am happy to share by inexperience in Congress with you.

Mr. LENNON. Any other questions?

Mr. DOW. That is all, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Dow.

Congressman, your bill established in the Executive Office of the President a National Oceanographic Council, designates the Vice President as the Chairman, and then names what would amount, to the Cabinet, all Cabinet-level officials. That is true, is it not?

Mr. HUOT. Yes, it is, sir.

Mr. LENNON. And, in addition thereto, it designates also as members of the Council the Secretary of Health, Education, and Welfare, in the Cabinet, and the Director of the Office of Science and Technology, the Chairman of the Atomic Energy Commission, the Director of the National Science Foundation, and the Secretary of the Smithsonian Institution.

Now, the bill that same over here, S. 944, and I assume that since your bill was identical with that when you introduced it, the amendments that have been added to the Senate bill provide for a Commission on Marine Science, Engineering, and Resources to assist the President and the Council that is enumerated in your bill, of 15 members, 5 representatives from Government, 5 from industry, and 5 from universities, institutions, and laboratories engaged in marine science, and so forth, and provides for per diem of \$100 a day, \$100 per diem for these Commission members when they are actually serving.

Do you think that, in your opinion, there is a justification for a commission as provided for in Senate bill 944?

Mr. HUOT. Of course, I haven't studied that yet, as I don't have it, but I would assume that, judging from what you say, the members that were being part of this Commission, I would assume that these were intended to be of an advisory capacity.

Mr. LENNON. Well, I would think so, and I think it is an afterthought on the part of the committee over there, that since their bill and your bill provide only for counsel in the office of the President at the Cabinet level with 6 exceptions, that in order to diffuse it in to get into the universities and laboratories and the private sector of our economy engaged in oceanographic material, that that is perhaps the reason why they added this 15-man Commission at the advisory level to the Council, itself.

Now, something was said by Mr. Casey about whether or not your bill, and the same question would be directed to the Senate bill, as to whether or not it provided some grants to laboratories or any of the universities or what-not who might be engaged in any one of the many facets of oceanography. I do not believe that either your bill or the Senate bill 944 provides for grant, does it?

Mr. HUOT. In the bill, itself, it does not provide for grants. We would assume, we would hope, that this Council, once established would provide later on for funding, but this is a point of getting started, and establishing this.

Mr. LENNON. I know, but wouldn't it be necessary for additional authorization legislation to be passed before that Council or that Commission under this bill would have the authority to make any grants whatever? A grant can't be made unless there is legislative authority for it. At least, I hope not. It should not be done, but I suspect sometimes it is done under the cover of some other language in the bill, and I know, too, that your bill provide for—it is an openhand authorization, but it provides that not exceeding the sum of a half a million dollars shall be appropriated in any fiscal year for the operation of the Council.

Now, the Senate bill had raised that to a million dollars, on an annual basis, but put a limitation of a million on any one year, and it, too, does not provide for the authorization for grants to any of these things that we have been discussing, and it also, I notice, gives a target

date for the expiration of that, section 9 of the Senate bill, as amended. Section 9 provides:

The provision of this Act shall expire at the termination of June 30, 1970.

Now, have you had an opportunity, and I commend you, Mr. Dow said something about being a freshman member, and I was very much impressed by his intense interest in this and other matters, and I want to commend you, and somebody said you were a freshman member.

Mr. HUOT. Yes; I am.

Mr. LENNON. I don't believe it. I think it is wonderful that you jumped in so quickly and established yourself so well in this field.

Have you had any opportunity to compare your legislation with the legislation that was introduced by Mr. Bonner, the chairman of the Merchant Marine and Fisheries Subcommittee, 3352, the identical bill introduced by Mr. Pelly, of Washington, 3310, and another identical bill, 2218, introduced by myself?

Have you had an opportunity to compare your bill with the three bills that I have just mentioned?

Mr. HUOT. No, I haven't, Mr. Chairman.

Mr. LENNON. All right.

In general, in reading your bill, and Mr. Fascell's bill, and hearing this discussion on the Senate bill, it looks like the objective is somewhat the same, but your bill and the Senate bill require the President to establish this Council, whereas the bills that I last mentioned by numbers are on an authorization basis. The President is authorized to do it and is not required to do it by statute.

Do you have any questions, Mr. Drewry, counsel for the committee?

Mr. REINECKE. Thank you.

I apologize for being late, and perhaps the question has been asked, but I have been wondering, the basic structure of the Council, as I understand, that you propose, would be to have the Secretaries, or their appointees, of the various departments—

Mr. HUOT. Well, the bill calls for a staff, also, which would, of course, carry the brunt of this. The Cabinet members being a part of it is more of a liaison, I would say and, of course, we know very well these Cabinet members individually will not attend the Council meetings, or that sort of thing. This will be handled by the staff, but it was in order to keep all these departments informed, that they would be part of the makeup of the Council. I am sure that they would be represented.

Mr. REINECKE. What I am getting at is that the Inter-Agency Committee on Oceanography at the present time is represented by various appointees from the various departments, and Cabinet level members, and I just wonder what you envision as being the basic difference between the ICO and the Council which you propose.

Mr. HUOT. I am not sure that I am familiar enough with the complete setup, Mr. Reinecke, to answer your question, except that the ICO does not have the scope that this Council would have over all departments of the Government that have any interest or any workings in oceanography. I think this would be an all-encompassing council, which would have some, not necessarily control, but coordinating jurisdiction over all of the agencies, including the ICO.

Mr. REINECKE. As you probably know, ICO includes representatives from Defense, Commerce, Interior, Treasury, National Science

Foundation, HEW, Atomic Energy, Smithsonian, State, National Academy of Sciences, Bureau of the Budget, Office of Science and Technology, and the Bureau of the Navy, or Office of the Navy. It seems like this is a pretty comprehensive cross-section of the existing departments that are involved in this program at the present time. I am simply trying to understand how your Council would differ from what we already have set up in the ICO.

The ICO apparently has not functioned to the satisfaction of Congress, and I am interested in seeing differentiation you are making.

Mr. HUOT. Well, isn't the ICO strictly an advisory group to these others?

Mr. REINECKE. Pretty much so.

Mr. HUOT. And has no power as a coordinating agency that this Council would have. It has no power to get this information from all these. It merely advises, as I understand, the various departments. It is an advisory group.

Mr. REINECKE. Do you feel that your bill is structured strong enough so that this coordinating function would be effective?

Mr. HUOT. Well, it is probably structured as strongly as it ever has a chance of getting anywhere. Any stronger bill probably would not get very far. I think it is a beginning, and it also provides for it to propose legislation which would probably, as time went on, give us much better results. I hope that this would provide better results than we are having now, in expanding the field of oceanography, but legislation could come out of this Council, through this Council, rather, that would continually improve the operation.

As I said earlier, we are not being critical of any other agency or anything. It is only a hope to expand this field of oceanography of which it is felt that it certainly has not advanced as fast as many other areas of our Government operations.

Mr. REINECKE. Thank you very much.

No further questions.

Mr. LENNON. I think the fundamental difference there, if I could be permitted to comment on what you said, Congressman, is the fact that, under the language of the legislation, there would be statutory establishment of a coordinating committee in the Office of the President as distinguished between an ad hoc committee with no statutory authorization, except unless you want to relate it back to the inherent power of the President and the Office of Science and Technology, as advisers to him, to do it. This would establish, by statute, and therefore permit the Congress to share—well, I won't say "share" in the responsibility, because Congress has to take responsibility for almost everything that does not turn out all right, but I think there is a meaningful difference there.

Are there other questions, gentlemen, of this witness?

If not, thank you very much, gentlemen. We appreciate your presence. And, if you want to amplify your remarks, why, the record will be open for at least 10 days for that purpose, Congressman.

Mr. HUOT. Thank you very much, Mr. Chairman.

Mr. LENNON. Congressman Bob Wilson. Would you return, please sir?

**STATEMENT OF HON. BOB WILSON, A REPRESENTATIVE IN
CONGRESS FROM THE STATE OF CALIFORNIA—Resumed**

Mr. LENNON. Yesterday, we cut you off as soon as you finished your statement, and I wondered if you had any afterthoughts.

Mr. WILSON. Yes, Mr. Chairman. Thank you.

I have been listening to the testimony on these other bills with great interest. I am a firm believer that politics is the art of the possible, and I recognize that my bill, which calls for a complete new independent agency, is something in the future. We would have a problem, unless the President was enthusiastically back of this concept, in forcing it through against his wishes.

But, inherently, I would say in the bills that call for a Cabinet level council, you are going to build in a problem, in that the major problem that exists today is the minor oceanographic interest of a number of important departments, headed by Cabinet level officers. It is not the inclination of any department or Cabinet level officer, and I can understand it, to cut off a part of his own activity in, which he is interested but this proliferation is the problem that we face in oceanography today.

Now, I have heard the Inter-Agency Committee on Oceanography mentioned several times. I believe the establishment of that committee was a forward step, a tremendous forward step, in oceanography. I think it is one of the reasons that interest has been created in recent years, and there has been a better coordination of activities as a result of this Inter-Agency Committee, under the leadership of Bob Abell, particularly. I think it has done a tremendous job, but it isn't enough, to accomplish the job that needs to be done.

Of all the bills that have been submitted to this committee for immediate action, your bill, Mr. Chairman, holds actually the most practical promise in that it sets up an independent or an advisory committee on oceanography, made up of people outside the Government who can probably take a less biased view on the over-all problems of oceanography. I like the idea of the tying it into the President's Office of Science and Technology, because this is a means of attracting executive attention to the over-all problem.

I would think that S. 944 as passed by the Senate, which sets up Cabinet officials as the policymaking body, is a mistake. I know that most Cabinet officials belong to from 15 to 20 similar organizations. They haven't time to give it any real attention, and you would be just, in effect, putting it into a pigeonhole, a Cabinet level pigeonhole, if you put this program into a committee of that type. I would much rather have an advisory committee on oceanography made up of tremendously knowledgeable experts outside the Government who are on fire on this problem, who are concerned about it, and who come in with a meaningful recommendation for the future.

Mr. LENNON. Thank you very much, Mr. Wilson.

Mr. Casey?

Mr. CASEY. Congressman Wilson, I appreciate your comments, and I think that you are right. The Executive has to be interested in it, and, as I see your proposal, you want this, kind of, patterned after the NASA organization.

Mr. WILSON. That is right.

Mr. CASEY. And it is true, if you have got an organization of that type, or similar to it, and had a highly articulate gentleman like Jim Webb selling the program, and working at it as he does, and being spokesman for it, and where now you have to go to 20 different spokesmen to find out what is going on, why, you would have a better program.

Mr. WILSON. And, Bob, don't forget the other aspect, too, the fact that NASA has a committee up here that is the champion of the space program. I believe your committee could very well be this if the various oceanographic activities were taken out of some of the other agencies and put into an agency that was responsible to this committee.

Mr. CASEY. Well, I am pleased to be on that Space Committee. We only had 11 votes against the authorization bill this year, which shows that the members of Congress are advised and are informed, and I think that is what it takes.

Incidentally, you mentioned, and I don't blame you, trying to point out that the NASA was established under the Eisenhower administration, but I think there was reluctance on the executive department when that was created, and the gentleman who now occupies the White House was one of the authors of the bill to create the space council, and so forth. If we could just get him as interested in oceanography as he was in space, along with the other problems he has, why, I think we would be in pretty good shape on this.

Mr. WILSON. Right.

Mr. CASEY. One thing I do think will give you an opportunity to clarify for us some things your good Californians might misconstrue, because I don't think—in fact, I know you did not mean it in that way—what you meant was the resources available, minerals or what-have-you. You said that:

Where space is an airless void, signifying to a great degree nothing—and I know you do not mean that the program we have is not worthwhile.

Mr. WILSON. No. I am in favor of all support of the space program.

Mr. CASEY. I think you meant that, before some of; your aerospace industries in California—

Mr. WILSON. Before some of the aerospace industries in my district find out about this. There is no implication that I am not heartily in favor of the space program. I am. I have supported it.

Mr. CASEY. I know you have. That is why I wanted to call this to your attention.

Mr. WILSON. I appreciate that, Mr. Casey.

Mr. CASEY. And that you generously made your statement brief, and I don't want you to get caught on brevity here.

Mr. WILSON. I have no problem in my district about their knowledge of my attitude toward the space program. I think it is the fact that we did concentrate and put the whole weight of the Federal Government back of a single problem here, which has resulted in tremendous gains in this area. We were lagging before, as you know. And I think we are going to be lagging in oceanography behind some of the other great powers of this world unless we get a singleness of purpose here.

Mr. CASEY. Well, I certainly appreciate your interest, Bob, and I know we can count on you to help any way on your side of the aisle and, after all, this is a bipartisan effort at something, I think, that I can agree with you, that it is a great national interest, and belongs in the Federal realm.

Thank you.

Mr. WILSON. Thank you.

Mr. LENNON. Thank you, Mr. Casey.

Mr. ROGERS?

Mr. ROGERS. Thank you, Mr. Chairman.

I, too, think that you have made a real contribution to the consideration of the committee in pointing up, I think, very factually, the problem we face. We do need a committee here that has a responsibility for the entire field, rather than having it spread, and we need someone to deal with it.

Now, I also share your feeling on the Inter-Agency Committee. I think it has done a good job. I think it has been very helpful, able, and has shown some real leadership there. Jim Wakelin has been very effective.

And, one of the concerns I have about forming the council is that we just upgrade the interagency approach, which may be helpful. I don't see that it would do any harm, perhaps, but I think eventually we are going to have to have some agency that we can deal with, and I think maybe you are just about 2 or 3 years ahead of what we are ready to do yet, and I think we need a really comprehensive, effective study from all elements of those concerned with oceanography, not just a governmental group study, but put it on a level where it will really have some impact when the report comes out to suggest organizations, to suggest funding, and goals, and then, as soon as this adequate study has been made, where we will know how to tie in the various groups that are now doing that work in oceanography, then I think we can proceed; and it may be we may want to start out with a separate agency—I do not think quite on the stature of NASA, probably, to start out with, but one which maybe could do basic research that could be used by all of the various departments now engaged, and start pulling in, but I do think what you are suggesting essentially is going to have to come about in some form, but I think with an adequate study, this is the first basis, and the first step toward that.

Thank you.

Mr. LENNON. Mr. Pelly, you are just in time to question your friend and colleague, our friend and colleague.

Mr. PELLY. Mr. Chairman, I want to apologize for being late. It is very difficult to be at two committees at the same time, and I tried to save the best part, the icing, for the last; namely, your committee.

Mr. LENNON. Thank you.

Mr. PELLY. I am at least here in time to express to my colleague from California my gratification for his interest. I think our committee went down close to his district at La Jolla, and to the wonderful University of California Scripps Oceanographic Institute, that we are very much interested in, and I know I will have a chance to read your testimony later on, Mr. Wilson. I won't take more time of the committee.

Mr. LENNON. Mr. Downing.

Mr. DOWNING. No questions, only the comment that you made a fine statement, and you made a great contribution.

Mr. WILSON. Thank you, Mr. Downing.

Mr. LENNON. Mr. Dow?

Mr. Dow. No, sir.

I enjoyed your statement, Mr. Wilson.

Mr. WILSON. Thank you, Mr. Dow.

Mr. LENNON. Mr. Wilson, you commented on the political realities with respect to establishing a central agency of oceanography, that would coordinate and correlate all of the various agencies which have various interests in it.

My recollection is that at the time NASA was established statutorily, that you had basically only the armed services in a single Department of Defense who had a real governmental interest in a space program. Is that a fair statement?

Mr. WILSON. Well, the Navy and the Air Force and the Army all had space programs, but don't forget that the NACA, National Advisory Committee for Aeronautics, which as a civilian agency, I believe, under Commerce or it might have been under the Smithsonian Institution, was also conducting independent space research, and it was a combination of military and nonmilitary functions that formed NASA.

Mr. LENNON. Yet, I believe one of the factors in the final establishing of that, though, was because it was not a proliferation in the program, as we have in oceanography. Now, here we find ourselves dealing with the Department of Defense, right on down to the Department of Army and the Corps of Engineers, the HEW, the Coast Guard, that is, the Treasury Department, about nine agencies who have some funding every year, and in the Department of Commerce, of course, and Weather Standards. I just think it would be impractical, and even if we had a kind of look at such a proposal, even at the administration level, I doubt the practicality of trying to bring them into a central group that would be responsible for the recommendations or the funding of each one of them. That is the thing that concerns me.

Mr. WILSON. I think in contrast to Senator Bartlett's testimony yesterday, I believe that an executive agency like this should take all of the aspects of fishing from the various other departments, Interior, and any other departments that have fishing as an interest.

State Department, even has an Office of International Fisheries, if I am not mistaken.

I think fishing is a prime area of responsibility for your oceanographic agency. This would be the start of it, and then meteorology and other related ocean sciences would come into it.

But, Mr. Chairman, unless you get an agency that can come down here and deal with one committee and then go to the Appropriations Committee and deal on a package basis, and point out the importance of a tremendous program, rather than piecemeal, you are going to have the small bite-size approaches to the Appropriations Committee also whittled down, and never given the proper attention.

Unfortunately, in every aspect except perhaps the military, oceanography is a completely side-pocket operation of the major department. Interior has an Office of Fisheries, but this is not the prime respon-

sibility of the Department of the Interior, and so they don't fight for the appropriations the way they would if this was their whole lifeblood. You are not going to get the enthusiasm from the agency to plan big and to fight big for their program until you do get them into one agency.

Now, we faced the same problem in space that we face in oceanography, as far as the military application is concerned, and you and I see that on the Armed Services Committee. We are constantly questioning the Air Force if they are doing enough in the space race, or if they are letting NASA have too much authority.

And, I think there is a problem, but we didn't take the prime military responsibility for space away from Air Force and give it to NASA. We recognized that Air Force should have that, and I think you would have to recognize that with the Navy. The Navy operates on the oceans. They have got to have a vital program, relating to research and development on the military, the acoustics, the military problems of inner space, if you want to call it that.

Now, they will benefit from an oceanographic program, just like Air Force benefits from NASA, but I don't visualize taking away all the ASW activity of the Navy, and all the sonar activity and the other related direct military oceanographic responsibilities, and putting them into civilian agencies. I don't think this would be right from a defense standpoint, any more than it would be right in the space area to take away the space activity from the Air Force.

Mr. LENNON. What would you take in a central agency? What agencies would you take from that are presently interested?

Mr. WILSON. Well, for example, the Navy runs an oceanographic data center. Now, this is something that the data from it, if it were available, for every other peacetime oceanographic use, should be under an outside agency; in other words, a nonmilitary agency. The data does not have military implications, except in various minor ways. It has to do with water temperatures, and so forth, but the Navy has complete charge of that today, and I believe, until we can open up the data that the Navy is accumulating and can make a bigger program of data accumulation, that you are not going to get a full return on the dollar investment. And there is duplication in this area, particularly.

Mr. LENNON. Well, of course, you and I know that, as far as the Department of Defense is concerned, and particularly the Navy, they have no difficulty at all in obtaining whatever authorization they request for any sonar or anything in the world related to oceanography. Now, you recall just about 6 weeks ago that, without any debate or any questions, we approved the bill or the authorization for two oceanographic vessels for the Navy.

Mr. WILSON. Right.

Mr. LENNON. They run around \$4 million each.

If that same authorization had been before the Coast Guard Subcommittee, of which I happen to be a member, for an oceanographic vessel costing that much, it would have taken us a month to make up our minds that we ought to authorize that much money for oceanography in the Coast Guard.

Mr. WILSON. Well, Mr. Chairman, you forget this: that the Navy, when the program originates at the working level in the Navy, has to run a gauntlet of the Navy budget officers and then the Budget Bureau,

before Congress even knows whether there is a program in the works we don't see those until the office, the Oceanographic Data Center, shall we say, has fought for its dollars with some other program which has more military implications some other sexier military program, and so it does not, it just does not, survive.

I am sure that the Oceanographic Data Center has asked for more modern computerized systems and so forth and have been turned down by the Navy before Congress ever got a chance to ask for it. This is the problem with agency after agency. Oceanography is the low man on the totem pole. It has to fight for the budget dollars that are allowed to each one of those departments before it even gets its head above water so that we know what requests are needed. We do honor them, because we recognize in Congress the importance of oceanography. I think oceanography is such a popular subject right now that when you bring a program up here for appropriations and once it makes it through the gantlet down at the Budget Bureau and through the various departments it will survive but too much of it is lost before it even reaches us.

Mr. LENNON. I think your counsel wanted to ask—oh, did you want to ask a question?

Mr. PELLY. If you would yield, since Mr. Wilson mentioned taking fisheries out from under the Interior Department, I thought that I could certainly go along, if he would take conservation of fish from the State Department, because their interest is in the overall picture, and, as a result, we have always had difficulty, because the State Department has considered our fisheries as being expendable.

Mr. WILSON. Well, I have problems with the State Department, when our tuna boats operating out of my area get apprehended 150 miles at sea down off Latin America. We can't even get the State Department interested in the case, but you are right. I think when you have to go to all these different agencies, you get the back-of-the-hand treatment, usually, because there is no concentration of interest or authority.

Mr. PELLY. Well, we have these nations like Japan, the great fishing nations, but they are not conservationists when it comes to fish, and our State Department always seems to lean toward helping our foreign relations, and forgetting all about our fishermen here, or, at least, not giving sufficient weight to the plea of our fishing industry.

Mr. WILSON. Well, let me just say one further thing, Mr. Chairman. You are right about NASA being easier to form than an independent agency for oceanography—mainly because it is a new area, a new area of responsibility, and you are starting from scratch. It is like building a new building. In fact, what we have been trying to do is remodel about nine different buildings for oceanography, and have something worthwhile, and it does not work. It would be better to get out and build a new building for oceanography, in effect, by forming a new agency, than to try to spend the money we are doing in nine different areas.

It is harder, certainly. If it were easy, it would have been done before you have the gravest responsibility, Mr. Chairman, in trying to solve this riddle. I don't envy you, because I think it is imperative that something be done, and the wisdom of your decision is very important. It can mean billions of dollars to us. It can mean millions of lives in the future.

Mr. LENNON. Are you finished, Congressman?

Mr. PELLY. Thank you, Mr. Chairman.

Mr. LENNON. Go ahead, Mr. Drewry.

Mr. DREWRY. Mr. Wilson, I would like to get your thoughts on something which I suppose we can't very well ask the agencies for. If we do, we get a somewhat shy, holdback type of an answer. The question is, that as things stand at the present time, wouldn't you say a part of the problem lies not only with the proliferation of agencies, but the proliferation of committees that have something to do with all this? We hear that the ICO program will be worked out as well as it can be, and then when the different agencies go to separate appropriations committees, each one of which appears to be reasonably autonomous, they say they are asked, for examples, "Can you justify all this million dollars for your agency?"

And the answer may be, "We can only justify \$500,000 of it for our agency, but the other \$500,000 is part of a coordinated program," to which there may be a reply, "Well, we are only concerned with your agency, not with any coordinated program which is somebody else's responsibility."

Isn't that part of your problem, at the present time?

Mr. WILSON. There is no question about it. The fact that it is not only divided downtown, but it is divided on Capitol Hill, the interest and the responsibility, and it should not be, in an area like this. Imagine what would happen to development of agriculture if you had agriculture going to nine different agencies for various programs, one for wheat and one for soil conservation, and so forth. You would have a real hodgepodge.

But the point is that the advocates of agriculture have certainly not only the champion in the Department, but they have got a committee up here that is knowledgeable on their total problem. When a problem comes up, they can either knock it down or support it, and I will say flatly that oceanography, including the Fisheries Department and the farming of fish, if you want to call it that, has more prospects for the future good of this country than even agriculture has. Unless we can get a meaningful program, and I don't mean by that a few million more than we are spending, I mean in terms of billions of dollars going into this area, we are going to suffer from it.

We could make money for the Government, actually, if it were done properly in research programs that could be sponsored by an agency that had a prime responsibility in this field.

Mr. DREWRY. Short of your single agency, what would be your thoughts about the effectiveness of having an authorization legislation each year for an oceanographic program? Would that help to bring the problem to home to a single place in the Congress?

Mr. WILSON. Well, I would think you would need some sponsoring group to do it. If you mean perhaps the Office of Science and Technology requesting it, and then deciding on grants, that might be the next step. I do think that you are going to have to get some single overall responsible bureau or department or Government independent group that has its own complete structure. You have got to get some kind of a group, requesting appropriations and authorizations from the committees up here before you get very much done.

Mr. DREWRY. They focus at both ends of the street.

MR. WILSON. That is right.

MR. DREWRY. That is all, Mr. Chairman.

MR. LENNON. Thank you very much, Mr. Wilson.

Mr. Tom Downing, a distinguished member of the full committee, we would be delighted to hear from you at this time, please, sir.

For the record, Mr. Thomas N. Downing of the Commonwealth of Virginia.

STATEMENT OF HON. THOMAS N. DOWNING, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF VIRGINIA

MR. DOWNING. Thank you very much, Mr. Chairman and gentlemen. I have a brief statement in support of this proposition.

Like my good friend and colleague, Judge Casey, I sit on the House Science and Astronautics Committee as well as this subcommittee. I am closely familiar with our Nation's objectives and goals in space. Space, we are fond of saying, is our new frontier and we are, in this country, committing about \$7 billion annually to explore outer space.

To me, ocean research is just as important as space research. I see two new frontiers—outer space and inner space, and I believe the public generally shares this subcommittee's view that the United States must achieve preeminence in inner space as well as outer space.

But, Mr. Chairman, while I see two frontiers, I see only one national frontier program. We have, in the United States, recognizable and broadly known national goals and objectives in space. Every American knows of our national deadline on moon landings.

Americans know what our space policies are and Americans support our space programs but, Mr. Chairman, in the other frontier in inner space there has been no determination of policy for the utilization of our ocean resources.

Quite the contrary, as many of my colleagues have already pointed out in testimony before this subcommittee, inner space exploration in the U.S. Government is splattered among 5 departments, 3 independent agencies and 22 operating bureaus and/or offices. The plans, programs and budgets of this conglomerate activity are considered and disposed of by some 32 authorization and appropriation committees and subcommittees. Our executive branch oceanographic activity is clearly a classic example of messy administration.

Let me hasten to add, Mr. Chairman, that I do not make my statement critically. Oceanography, like Topsy, "just grew," and I do not believe we could say that anyone is fairly at fault for the administrative omelet we have in oceanographic research today.

But I do sincerely believe that we would be somewhat blameworthy if we do not immediately move to clarify the role of the various representatives of the Federal Government in oceanographic research and provide the United States with national goals and national objectives—a national ocean program, if you will—so that we can begin to reap some benefit out of the exploratory activities we have been carrying on at sea.

There are, of course, any number of ways to deal effectively with the administrative difficulties we are facing in our oceanographic activity. I, personally, would be entirely willing to be openminded and accept any solution that is generally acceptable to this subcom-

mittee: and, as a member of this subcommittee, Mr. Chairman, I pledge myself to approach the development of a legislative solution in a cooperative spirit. I have suggested a solution in a bill, H.R. 9667, but I am not inclined to the belief that the solution I have suggested is the golden solution. I believe it is a sound solution but, again, my only objective in this area is the development of a national ocean program.

You already know, of course, Mr. Chairman, and gentlemen, that I believe we should establish a national commission on oceanography, to—

make a comprehensive investigation and study of all aspects of oceanography in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs.

I believe that the national commission on oceanography should be self-liquidating because I foresee that the group would have no reason for existing after it submits its recommendations to the President and to the Congress. Its major work and its major recommendations would deal with the composition of a national ocean program and the specific organizational structure that would be required to effectively implement the program.

That is, of course, an oversimplification of the work of the commission, Mr. Chairman, but I know you and the members of the subcommittee have received a considerable amount of testimony on this point and I will not repeat the list of study areas and recommendations proposed for the commission.

In conclusion, we found ourselves at the crossroads of outer space in 1958. I believe we are now at the crossroads of inner space. I believe we must immediately proceed to develop a national ocean program and an effective organization to implement the program. We either move now—and by “now”, I mean this year—or we sacrifice any hope of seeing the United States achieve preeminence in inner space.

Thank you so much, Mr. Chairman, and gentlemen.

Mr. LENNON. Mr. Casey?

Mr. CASEY. I want to compliment our colleague for the excellent statement which I knew he would make, because he has been a long-time member, ever since he has come to Congress, of the full committee as well as of this subcommittee since it was created. And, I agree with you wholeheartedly, Mr. Downing, that we should be moving, and this committee has tried to move and we have begun to gain some support, and I think that the fact that so many of our colleagues who are not on our committee have introduced bills indicates that we are beginning to make some headway.

I know that we have some Von Brauns in the oceanographic field; if we could just bring them out into the open and focus attention on it a little more so, and pull this together, why, I believe that we might accomplish this over this year.

Your approach is the same as our colleague, Mr. Rogers, here, to establish this commission, and I think your approach is very meritorious, and the more we run into headwinds on an immediate agency, such as NASA, why, I think the more favorable your approach appears to be. We just have to wait and see, but certainly I appreciate the contribution you have been making.

Mr. DOWNING. Thank you, sir.

Mr. LENNON. Mr. Pelly?

Mr. PELLY. Well, I just want to say from this side of the aisle that I know those of us here want to join in complimenting Mr. Downing and to say that I am particularly pleased that he has stated that any step in so many words, any step in the direction of progress, he will support, because I think that he will agree with me, our chairman has shown real leadership in a practical way here in trying to iron out some of the differences between the executive branch and the Congress, and I look forward with him to reporting some legislation that will move in the right direction.

Mr. DOWNING. Thank you, Mr. Pelly. I agree with you completely. Our chairman has done a tremendous job in getting this off the ground.

Mr. PELLY. Well, I think his approach is the one that will meet the objectives that you have stated in your very fine statement.

Mr. DOWNING. Thank you, sir.

Mr. LENNON. Mr. Rogers?

Mr. ROGERS. Thank you, Mr. Chairman.

I, too, concur in the feeling that the gentleman has stated that we must do something, and we must know where we are going, that just to jump into some large organization quickly probably is not the best approach, but, rather, it is more the part of wisdom to know exactly where we are going, and to have a commission with some range, as the gentleman has proposed in his bill, of all the interests, to let them help to formulate the movement in the correct direction; so I commend the gentleman for his strong interest, and certainly agree with him.

Mr. DOWNING. Thank you, sir.

Mr. LENNON. Mr. Reinecke?

Mr. REINECKE. Thank you, sir.

I, too, like my colleagues, would like to join in congratulating Mr. Downing.

As an agreement, I have introduced an identical bill.

I don't think I need to say any more, except that it was a fine statement.

Thank you, sir.

Mr. LENNON. Thank you.

Mr. Dow?

Mr. Dow. I have a great deal of sympathy with your remarks, Mr. Downing, but at this time I have no questions.

Mr. DOWNING. Thank you, sir.

Mr. LENNON. Mr. Downing, before you leave the witness seat, your bill, 9667, is identical with the bill of the gentleman from Florida, Mr. Rogers, 9064, and another member of the subcommittee, Mr. Reinecke, of California, H.R. 9483, and another gentleman from California in the room at this time, Mr. Hanna, H.R. 9617.

Have you had an opportunity to read the comments of the Director, Dr. Hornig, of the Office of Science and Technology, in response to a letter from Chairman Bonner on H.R. 5654, which is found—you might want to make a note of this, Tom—on page 38 of the compilation of the bills pending before the committee? And, more specifically, the comments of Dr. Hornig of the Office of Science and Technology,

Executive Office of the President, dated July 6, 1965, concerning your bill—that is, at the time the entry was submitted, it was Mr. Rogers' bill, 9064, which is identical with your bill, 9667, which is found on page 106?

It is interesting to note the comments of Dr. Horning on page 39, and we will query him about that at the appropriate time, but you might be reading them, because you will be back up on the podium and have a chance to ask questions, too.

Thank you very much, Mr. Downing.

Mr. DOWNING. Thank you, Mr. Chairman.

Mr. LENNON. Mr. Hanna, we are delighted to welcome you to the committee, and we will expect to hear from you now in support of your bill, H.R. 9617.

STATEMENT OF HON. RICHARD T. HANNA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. HANNA. Mr. Chairman, and members of the committee, I would like to make first an opening statement on a broader base, about this whole hearing, in which you are trying to take an overview of what is being suggested in oceanography. May I say that it does this committee and its leadership great credit that you are taking this kind of an approach at this time, because I think the proliferations as have been indicated need to be focused in order to get effective action.

I think that perhaps the committee knows, I think that maybe in other places the reports of the committee may reflect, that the national oceanographic program at the present time for the fiscal year 1965 amounted to \$135.1 million. Now, this program does not include applied oceanography of a military classified nature, and it is reported that about \$80 to \$380 million is being expended there.

This does not include certain programs such as Mohole, which is categorized under earth science, but it is happening out in the ocean. It does not reflect the unclassified engineering programs the Navy has on deep submergence which were initiated by the *Thresher* loss.

It does not include, for instance, the States' expenditures which were from \$7 to \$9 million; private endowments, which are from \$2 to \$3 million; the in-house industry research, which is from \$3 to \$5 million; and the geophysical surveys being made by oil companies which amount to \$200 million.

It indicates that the United States is involved officially and in all of its activities in expenditure of from \$427 million to \$732 million, somewhere along the line, in oceanography for this fiscal year.

Now, that may appear to be quite a bit of money in one view. But, on the other hand, I think that this committee knows and appreciates the fact of the great potential that there is in the ocean, and I think perhaps you knew before I did that about 80 percent of the whole population of the United States is encompassed in that area which you could describe by drawing a line 50 miles in from all of our waters. That is, if you went in 50 miles from the Atlantic Ocean, from the gulf, from the Pacific Ocean, you would encompass 80 percent of the people of the country, and all of these, it seems to me, have a contiguity and an understanding and some kind of contact with these waters, and what we are talking about; and I think it is an exciting thing to

realize that this committee now is considering a subject matter which is of paramount interest, economically, militarily, and in every other way, to those people, and in a more immediate way than it is to the whole interior of the country, but as this is an interdependent country as things happen on the coast that are beneficial, that benefit is ultimately felt across the land.

Insofar as the program of oceanography is concerned, I find people talking about it in about three different categories. The scientific studies, that is, those elements of the earth covered with sea water, that are approached on a scientific, classic discipline basis, as a study in physics, chemistry, biology, et cetera. The systematic mapping, the charting which is done for purposes of navigation and now going on into the deep ocean for observation, and, finally, the new, and, I think, much more important area of engineering oceanography.

Engineering studies are a prelude to real accomplishment and an integral part of looking into matters and finding them then effective in the economic pattern in your country, and this engineering effort has to come ahead of a real impact in the economic activities of your country. It is very important that engineering effort is now being seen, and it certainly should be encouraged.

Many people have spoken about what are the potentials in the ocean, and how they would contribute to the national interest. I would just like to give a list of 19.

First, it will increase our security from enemy sea or undersea attack.

Now, our good colleague, Mr. Downing, indicated the representation of inner space and outer space, which are the two great thrusts of our day, and I suggest to you that we are involved in both a cold war and a wet war, and it is as important, I think, to the country how we are proceeding in the wet war as it is as to how we are proceeding in the cold war, and that wet war is going to be waged under the seas, under the oceans of the world, and it is moving ahead now in a very important way.

Second, augment the efficiency of our own undersea forces.

Third, advance underwater acoustics and communications.

Fourth, improve commerce and navigation, and safeguard it against disruption in the event of a national emergency.

Fifth, increase the accuracies of long-range weather forecasts.

Sixth, ultimately enable mankind to foresee climatological changes of world significance.

Seventh, afford greater protection of lives and property from ocean-bred hurricanes and other vital storms.

Eighth, restore and strengthen fisheries and reduce costs to both fishermen and consumer.

Ninth, alleviate the protein deficiencies in the diets of millions of undernourished children and mothers in the underdeveloped nations of the world, and on that one, may I say, gentlemen, that scientific information indicates that there is in the oceans of the world enough protein to feed 30 billion people; so, before man has tried to multiply or to improve what the ocean has to offer, it can already feed 10 times more people than there are in the whole world, and this would be like looking at the United States when the Pilgrims first put their foot on the land to say that there is protein here in wild turkeys and elk and

deer, and so forth, and not take into consideration the great beef and turkey and chicken and other industries we have built up since then to prove how productive the land can be.

Tenth, reveal ocean depths of scarce and strategic minerals and materials, and develop methods of recovering and processing them.

Eleventh, to find on the ocean floor deposits of sand and gravel and clay that can be used in such things as beach erosion and the construction industry, and I can tell you where I live it is very important that we find new sources for sand and gravel, because the old sources are going very quickly, and, yet, we are going to be multiplying our population by a factor of two by 1980, which means that we have got to build homes and houses for all of these people with a depletion in the kind of basic materials it takes.

Twelfth, to expand our knowledge of the fossil fields that lay beneath the ocean.

Thirteenth, diminish the pollution dangers from atomic and other wastes.

Fourteenth, facilitate discovery of many new medical or pharmacological weapons in the eternal war against disease.

Fifteenth, safeguard waterfront properties from beach erosion.

Sixteenth, diminish damage to docks, piers, vessels, and so forth, from marine borings and fouling organisms.

Seventeenth, protect and encourage seashore recreation.

Eighteenth, provide a base for international agreements on ownership, transit, fishing and mineral deposits.

And, nineteenth, strengthen basic research, using the sea as a laboratory for extending knowledge of the world around us, as a long-range investment for developing the base potential and practical application.

I think that these potentials warrant some kind of an expression of our national attitude, our national interests, and our national goals, and I think that is what some of this legislation is designed to do.

Now, I would like to speak specifically about two programs that I hope you will include in your considerations.

I was pressed into doing a little background work on what the Lewis and Clark Expedition meant to the United States. The history of this endeavor started primarily out of, you will recall, the interest of Thomas Jefferson. Now, before that very astute and, I am sure, far-reaching, planning man really made a deal with the French and those other interests that were already involved to obtain for the United States some of this land by purchase, he was already planning to send a group of people from the United States to explore the unexplored areas in this land. His notes indicate that as early as 1783, he already had the framework for a Lewis and Clark operation.

It actually wasn't funded until 1803, when in a secret message to Congress, he pointed out the advantage of sending an exploring party into this area; and he ultimately received an appropriation of \$2,500, which started this operation, and I was interested to learn that even at that early time, there was a participation by private enterprise, to go along with this exploration.

And it also had a scientific arm, which was not very well publicized. Actually, there were some scientists went along on the expedition, to introduce what was called a kine pox to the Indians, because they were dying off so heavily, because of this particular disease.

I was interested to read what the definition of the mission was, because I think it could very well be utilized today in an exploration of some of the phases of oceanography.

This group was told to note the sources and the courses of the rivers, the locations of the lakes, to observe the routes of all of the traders, to chart the strategic military points, and to list all visible resources of the country.

Besides doing their medical work, this group brought back a full report which included a description of 273 animals and 260 plants.

They probably made less impact on the flora and fauna in science because they didn't have all of the fancy ways of keeping their specimens, and so all they had was the descriptions in the books, for the most part.

The overall cost of this expedition, which started out with \$2,500, was \$27,000. So that, when you start one of these things, you can see that our pattern today hasn't changed from what it was back in those days. We get in with an estimate of one cost, and we come out with what, in this instance, was a little more than 10 times what they had initially put forth. But, certainly, what it meant to the country is so much more that that was probably the finest investment this country ever made.

One other point about the Lewis and Clark Expedition which is of some interest. Of the starting group, most of them were young men. Clark was 33 years old and he was older than 40 of the other men who were in the group. Oceanography is a new science, and there are a lot of young men in it, but they can make the same kind of a contribution.

Now, there is one other point about an exploration project, and I think, Mr. Chairman, one of these bills suggests an approach on an exploration or expedition type of an endeavor.

I don't think we are ever going to get all of these agencies or maybe even some of the committees impressed until we get an entire thrust on a project basis with new funding that suggests that there is something in it for anybody who wants to make a contribution and become part of that effort. I think this is where we will get the real test of what kind of coordination you can get. If you put in the new money, there isn't a defense of the old budget, and it may be one way to test what kind of coordination we need, and how much interaction there really should and could be for the overall efforts which will not dilute the individualized interests that are already very deeply entrenched, and which are not going to change overnight, and maybe we shouldn't change. Maybe there should be some individualized efforts on particular problems, but certainly some overall mix, so that our advance in this important field will make sense.

Now there is one other bill that is introduced—Mr. Chairman, I think it is your bill—that suggests that we ought to put in some money to begin more actively to study the law of the sea. And I introduced an almost identical bill in the last Congress, and I can't emphasize to this committee too strongly how important I think this matter is. I really am very concerned when I see the approaches, for instance, in international law, that allow countries to extend outward the borders of their jurisdictional waters, particularly in the straits and the narrows of this world.

Don't forget, the United States is a great seapower, and every time one of those borders is extended outward as was the attempt in the Tonkin Bay, for instance, this means that the fluidity and the effectiveness of the fleet of the United States is thereby diminished. It is very possible that there will be very important stretches of the ocean which if we don't draw some attention to this thing may soon be cut off for the operation of our fleet and the interests of the security of the United States will be drastically and is now being drastically affected.

In addition to that, I would hate to see us go into oceanography with no more background than what the exploration of the west had, because if you will recall the pattern of the west was as soon as we got out there where the law had not yet arrived, the best of our people were out there trying to make their way against the wilderness, and right behind them came the scavengers; and, as soon as there was something worthwhile stealing, somebody came along with a fast gun and stole it, and I suggest that the law of the sea, in many instances, right out on our Continental Shelf, is in a position now of where the fastest gun in the submarine world may very well be the most important owner in the undersea world.

And I am very much in favor of your bill, Mr. Chairman, and I think that there should be some really aggressive work done in letting the world know and letting the people of the United States know that we are concerned about the law advancing with the science, so that we know that there is some kind of control and dominion in what we are trying to discover, and I thank this committee very much for the opportunity to be before you on this historic occasion in which the Congress is looking forward, and one of the great, I think, situations of the future, and the great explorations that will be launched in our times.

(The following information was supplied for the record:)

THE LIBRARY OF CONGRESS,
LEGISLATIVE REFERENCE SERVICE.
Washington, D.C., January 28, 1965.

E. DIGEST OF INTERNATIONAL TREATY ON OWNERSHIP OF OCEANIC RESOURCES
AND FEDERAL LEGISLATION PERTAINING THERETO

To: Hon. Richard T. Hanna.

From: American Law Division.

Subject: Information concerning the Continental Shelf.

We are enclosing a Verifax copy of pertinent provisions of an International Convention on the Continental Shelf which the United States approved in 1958; but which did not become effective as an international agreement until June 10, 1964. Also enclosed is a Verifax copy of pertinent sections of the statute pertaining to Outer Continental Shelf lands.

As to whether any Federal agencies, other than the Secretary of the Interior, are vested with any authority to exploit the resources contained in this offshore area, the following may be noted:

(1) By a law enacted in 1964 (78 Stat. 986; Public Law 88-607), a temporary Public Land Review Commission was established with instructions to submit a final report to the President and Congress not later than December 31, 1968, concerning the disposition or retention of public lands, included among which are the mineral resources defined "as being under the control of the United States in the Outer Continental Shelf" (43 U.S.C. 1391, 1394, 1400).

(2) By a proclamation, No. 3339, issued on March 17, 1960 (25 F.R. 2352), President Eisenhower withdrew from disposition as part of the Outer Continental Shelf lands the Key Largo Coral Reef Preserve, situated seaward from the coast of Florida, and directed the Secretary of the Interior to issue regulations,

in cooperation with conservation agencies of Florida, for the preservation of this coral reef. (See also: 43 CFR 15.1-15.14.)

(3) By an amendment to 43 U.S.C. 1341, all uranium, thorium, and all other materials contained in the "Outer Continental Shelf" which are found by the Atomic Energy Commission "to be essential to the production of fissionable material * * * are reserved for use of the United States." (See also: 42 U.S.C. 2092; 10 CFR 60.5-60.9; 43 CFR 3545.1-3545.3.)

(4) The Geological Survey in the Department of the Interior administers regulations issued by the Secretary of the Interior with reference to private leasehold "oil, gas, and sulfur operations in the Outer Continental Shelf" (30 CFR 250.1-250.100; 43 CFR 201.1-201.150; 202.1-202.13; 3380-3387.6).

(5) The Bureau of Land Management in the Department of the Interior also shares authority pertaining to assignments of such leases and collection of certain payments thereunder (43 CFR 201.3-201.150; 202.1-202.13; 3380.4, 3382).

(6) The Secretary of Defense, with the approval of the President, may designate any part of the Outer Continental Shelf necessary for national defense; and as long as this designation remains in effect, exploration of the area may be restricted or suspended (43 CFR 201.119).

(7) Since under 43 CFR 3387.1-4 the United States "reserves the right to authorize the conduct of * * * geophysical exploration in the leased" areas, it is conceivable that the Coast and Geodetic Survey, which is authorized to make surveys "and related geophysical measurements" (33 U.S.C. 883a) also may be empowered to perform certain functions in the Outer Continental Shelf.

Indicative of possible confusion as to the jurisdiction of established Federal agencies is the following statement appearing in 43 CFR 3380.0-3:

"The Outer Continental Shelf Lands Act of 1953 * * * authorizes the Secretary of the Interior to issue on a competitive basis leases for oil, gas, sulfur, and other minerals in submerged lands of the outer Continental Shelf * * *. The inclusion of this part in this title shall not be construed as an interpretation that the laws and regulations pertaining to public lands are applicable to the submerged lands of the outer Continental Shelf."

NORMAN J. SMALL,
Legislative Attorney.

Mr. LENNON. Mr. Congressman, we want to thank you for what I think is a most interesting and informative and articulate statement on the subject. It is very helpful.

Mr. CASEY, any questions of our distinguished colleague?

It certainly indicates the great interests of California with all these bills coming from California, and that great coastline.

Mr. HANNA. Thank you, sir.

Mr. CASEY. I, too, want to commend our colleague, Mr. Hanna, for a most interesting statement, and background material shows that he has really dug into the subject, and the potentials, and I see that he sees that we have got a vast horizon here that needs to be explored.

I was quite interested in your comments on the private industry being in the Lewis and Clark Expedition. You know, private industry now gets very little credit for the amount they do in the oceanography field. I am sure in your State, as in mine, of Texas, the oil industries have been great contributors to the oceanography field, and the offshore drilling has resulted in their not having for commercial purposes their own individual purposes to do a lot of oceanographic work, but they have made this available, and have since become interested, and many of the research projects of the universities in my locality and some of the stimulus for, for instance, this Gulf Universities Research Association, has come from the major oil companies.

Mr. HANNA. Well, Mr. Casey, on that score, I can inform the gentleman that 80 to 85 percent of the oil extracted from the tidelands is extracted in my district.

Mr. CASEY. Is that right?

Mr. HANNA. That is, for the State of California.

Mr. CASEY. Beg pardon?

Mr. HANNA. For the State of California.

I am not encroaching on Texas, but I mean for the State of California, 80 to 85 percent of the oil extracted from the tidelands in California is extracted off the coast of Huntington Beach Oil Fields, and so I certainly—

Mr. CASEY. Don't wave the flag at me, because I was ready to go after you.

Mr. HANNA. I wanted to clarify that, but I just wanted to say that I certainly agree with the gentleman, and I have every reason out of experience to agree.

Mr. CASEY. I think the private industry and, of course, you have some private foundations, too, who are to be highly commended on the part that they have taken in stimulating and trying to put more emphasis behind oceanography, because they have discovered in the researches they have done that we have just scratched the surface, and with new resources in fuels and goods and metals being needed all the time, this is an untapped field which private industry is one of the first to recognize, and those in my particular community, Humble Oil, in particular, because Humble Oil has been interested in all fields of science; they contributed heavily to the NASA program, by making large grants of land to Rice University, who in turn made it available to NASA, and that all stimulates a real excellent effort which I am proud to be a part of.

Mr. HANNA. Thank you, Mr. Casey.

Mr. LENNON. Any further questions, Mr. Casey?

Any further questions?

Mr. CASEY. No; thank you.

Mr. LENNON. Mr. Pelly?

Mr. PELLY. Thank you, Mr. Chairman.

Mr. HANNA, you are the author of H.R. 7301, I notice.

Mr. HANNA. Yes, sir.

Mr. PELLY. Which would establish in the Executive Office of the President the National Oceanographic Council.

Now, I also have read the reports on your bill, and I find that they are almost uniformly unfavorable. The administration does not like that approach.

We have mentioned before our chairman's approach, that he has introduced legislation, and I joined him doing it. His bill is H.R. 2218, which takes the position that the President is authorized to appoint an advisory committee on oceanography, and my question is: Would you support the latter approach to this thing as a step in the right direction?

Mr. HANNA. Well, Mr. Pelly, I thank you for giving me the opportunity to clarify my position on that. I certainly would.

In introducing the bill that I have introduced, which was, I think, to give credit where credit was due, was Mr. Magnuson from the other body.

Mr. PELLY. I have done the same thing.

Mr. HANNA. Yes, but the truth of the matter is that you have to recognize the sensitivities that exist in regard to the domains that are already carved out, and you are going to have to use some really

imaginative thinking in order to get around that, and I think the chairman has suggested what will probably be a more practical approach, or one maybe that is a step just before that, such as Mr. Rogers' bill envisions, and I have introduced a companion bill on that, to indicate that we are going to have to start moving toward the business of bringing this all together in some way in which we can see what is going on, and that people aren't knocking each other down.

We are going to try to start to put new money in. It is one thing when everybody is kind of going quietly along at a dingdong pace, but it is another thing when we begin to excite our interest and decide we are going to really get behind this with a substantial amount of dollars and, Mr. Pelly, your point is well taken.

Mr. PELLY. Well, we have to satisfy the executive branch in legislation, and I am glad to know that you would support that approach.

Mr. HANNA. Yes, sir.

Mr. PELLY. Thank you.

Mr. LENNON. Mr. Rogers?

Mr. ROGERS. Thank you, Mr. Chairman.

Well, I think it is good for all of us to have heard your statement. I think you have shown a great deal of effort in bringing this problem in the proper focus.

I thought your analogy was good, of going out into the West, and this a great new field, and, unfortunately, the people that have been in the field, it seems to me, in the executive department—and I hope this won't be true in their testimony—have shown a lack of vision, and/or a holding of the status quo, and I am not so much concerned with pleasing the executive branch right now as for the Congress to do something, and I think if we can get to the President and explain the concern of the Congress, I have confidence that the President will be concerned, too, and will act.

Mr. HANNA. Mr. Rogers and Mr. Chairman, the point that the gentleman makes has always affected me this way: I have found that we are moving out of an era when the science at the stage it was when I was going to school indicated a man had to be a specialist, and so we made a lot of specialists, and there were so many things to be done, we had what was called a division of labor, and so everybody found their particular niche, and the problem of that was we developed a whale of a lot of tunnel vision. People got to dividing the world into little segments, and the people within those segments thought that when they looked at the sky from the well they were sitting in, that is all the sky there was; or if they sat long enough, all the sky would certainly go by. And it just isn't so, and I think it is very dangerous in a field such as we are exploring here if we are going to try to satisfy everybody sitting in their particular well with their particular tunnel vision, and I think that is exactly what the gentleman is pointing out, and I certainly agree with that thinking.

Mr. ROGERS. Thank you, Mr. Chairman.

Mr. LENNON. Mr. Reinecke?

Mr. REINECKE. Thank you.

I am happy to welcome my California colleague, and to congratulate him on a fine statement. Obviously, he has done his homework very, very well.

I think there is very little disagreement from the members that have testified, and certainly the members of the committee, that there is a very pressing need, a very demanding need, and it is time that we really get to work and get an action program that will be sufficiently well coordinated that we can move this program ahead in spite of the executive branch, if that is the way it has to be. We hope that it can be done on cooperative basis but, if it cannot, I think, then, we had better take the bull by the horns and get it moving.

No further questions.

MR. LENNON. Thank you, Mr. Reinecke.

Mr. Downing?

MR. DOWNING. Thank you, Mr. Chairman.

You have made an interesting statement, and I think you have made a contribution to this effort.

MR. HANNA. Thank you, Mr. Downing.

MR. LENNON. Mr. Dow?

MR. DOW. Yours is a very imaginative statement, Mr. Hanna.

I have only one rather narrow question, and that is: You mentioned the extension of sovereignty over a wider extent of territorial waters. Do you find the offshore oil drilling is causing the United States to extend its sovereignty over adjacent waters, or have we allowed this drilling to continue in international waters without attempting to protect it with our own extension of sovereignty?

MR. HANNA. Well, I think that there is a move on, both by the United States in its interests and by the various other nations. I think, for instance, the fight we are having over fisheries, about the claims of Chile and some others, indicates that where there is a particular national interest, right now, the move is to move out the territorial boundaries. I suggest that that is so, because there is such a lack of international law, and the strength and effectiveness of it.

People, if they are going to put in money to develop resources, make an investment, want to know it is assured, and the only way you can back it up is by some kind of legal power, so we are trying to do that, I think, with the extension for domestic reasons of domestic jurisdictions, but I want to point out that that is not always the wisest kind of a move. And we might be protecting something at home and losing far much more abroad.

I think we need to look at this with a very critical eye, and this is why I am very strongly in favor of Mr. Lennon's approach about our getting a little more concerned, a little more relating a national policy to what is happening to this law of the sea, both internationally and domestically.

MR. DOW. That ends my question, and I yield to Mr. Downing.

MR. DOWNING. You have made a most interesting point.

Several years ago, I was very interested in extending the international boundary from 3 miles to 12 miles. As you know, the 3-mile limit was established way back there, and that was the maximum range of a cannonball.

MR. HANNA. That is right.

MR. DOWNING. And that was the basis for a 3-mile limit, but when I got into it, the Navy and the State Department very quickly informed me that perhaps that was not too wise, in that other countries, if they extended their limits to 12 miles, could effectively cut off, say,

the Mediterranean, and we could not get our ships in there. But it is a problem that has got to be gone into.

Mr. HANNA. I have, and if the chairman has no objection, I have asked for the Library of Congress to give me a digest of the international treaties on ownership of oceanic resources and the Federal legislation pertaining to that. It has a very interesting bit of material about the Continental Shelves, and how they are being affected by international law. I would be glad to submit it for the record, or for the staff.

Mr. LENNON. Without objection, then, it should be made a part of your statement, following the conclusion of your statement.

Mr. Hanna, I would like to hear you comment on the comments of Dr. Hornig, Director of the Office of Science and Technology of the President, who has asked to comment on your bill, and the bill that perhaps Mr. Rogers introduced a little bit ahead of yours.

He says:

The functions of the proposed Commission are essentially the same as those of the President's Science Advisory Committee Panel on Oceanography that has been charged with recommending improved oceanographic program in terms of scientific merit, effectiveness, and technological application and scientific engineering leadership.

Then he goes on.

And that was dated July 6, 1965.

I am reminded that he was asked to comment on H.R. 5654, a bill introduced fairly early in the session. A letter was received from Dr. Hornig on May 6, 1965, and he stated then:

A study group composed of outstanding scientists is being established under the auspices of the Federal Science Advisory Committee to review these questions. They are also under study by the National Academy of Sciences Committee of Oceanography.

I must confess my disappointment in that these panels that are now giving this matter consideration to review and to make its recommendation, which we hoped that they could do, were not set up back there during the hearings that we had on this subject matter in 1959 and 1960 and 1961. Frankly, I was under the impression that when this Ad Hoc Oceanographic Committee was formed representing all of the agencies and the bureaus of the Federal Government that out of that would come a special recommendation that the panel be created to make the study and make the recommendation to the Congress that they now say they are studying, and I frankly am inclined to believe these panels have been created since the influx of these bills to make these studies.

Thank you very much.

Mr. HANNA. Mr. Chairman, I just want to comment on that.

I think that we have got to expect that many of these panels are going to be created out of some kind of a pact for mutual protection of already vested programs, and that this is going to happen, and, as legislators, we should expect it, and I just think that you are one of the prime examples, Mr. Chairman, and this committee of yours, of how the legislature really provides leadership in this country and does not get much credit for it, because I think that the real leadership and dynamics in oceanography is emanating from this committee and

the spur that your committee has brought into the picture, and I hope that you will continue to ride high in the saddle.

Mr. LENNON. Thank you very much.

Off the record.

(Discussion off the record.)

Mr. LENNON. The committee will now stand adjourned until tomorrow morning at 10 o'clock in the same place.

(Whereupon, at 11:50 a.m., the hearing was recessed, to reconvene at 10 a.m., Thursday, August 5, 1965.)

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

THURSDAY, AUGUST 5, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:05 a.m., pursuant to recess, in the caucus room, Cannon House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will come to order and will resume its hearings on sundry bills with respect to the many facets of oceanography.

This morning, we are delighted to welcome from the "Today" show Dr. J. Herbert Hollomon. Some of you may have in your possession a biographical data on Dr. Hollomon. It is impressive to me, but I was even more impressed, Doctor, with your splendid presentation in your interview with the charming reporter from NBC on the "Today" show this morning. Let me congratulate you. I agree with what you had to say; that is the reason I congratulate you.

We are delighted to have you here, Assistant Secretary of Commerce for Science and Technology. All of the Federal agencies have at least a division in them of science and technology, and the Department of Commerce is certainly one of the best.

Dr. Hollomon, we would be delighted to hear from you at this time, sir.

STATEMENT OF DR. J. HERBERT HOLLOMON, ASSISTANT SECRETARY OF COMMERCE FOR SCIENCE AND TECHNOLOGY; ACCOMPANIED BY GORDON A. CHRISTENSON, ASSISTANT GENERAL COUNSEL, DEPARTMENT OF COMMERCE; AND VICE ADM. H. ARNOLD KARO, DEPUTY ADMINISTRATOR, ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION

Dr. HOLLOMON. Thank you, Mr. Chairman.

I have with me this morning, on my right, Arnold Karo, who is the recently appointed and confirmed new Deputy Administrator for the new organization known as Environmental Science Services Administration, or ESSA; and, on my left, Mr. Christenson, who is Assistant General Counsel for the Department of Commerce, and he works mostly in the areas that have to do with science and technology and problems of this sort.

Mr. Chairman, members of the committee: I am pleased to be here today to discuss with you the various bills on oceanography that are pending before this committee. I shall not take them up bill by bill,

section by section. The Department of Commerce has already commented to the committee by letter on each of these bills, and I think it will be more fruitful for the committee if I simply discuss the salient principles that should govern programs in the area of oceanography.

A large number of bills relating to oceanography have been introduced in the present session of Congress, and I think this fact in and of itself is important. In my view, this spate of bills reflects three important concerns.

The first is an awareness of the importance of the oceans to man. The oceans cover about 70 percent of the globe's surface. They provide major transportation routes. They help shape our coastlines. They help determine the world's weather. They contain vast food resources, rich in protein, which will become increasingly important as the world's population expands. They are rich in minerals, most of them untapped. They contain a tremendous store of energy and may play a vital role in filling our power needs. And, one day—through nuclear desalination—they may provide the answer to the serious problem of the growing scarcity of fresh water.

The second concern is with the state of our knowledge of the oceans. Frankly, our present knowledge is very limited. We know very little about ocean currents and ocean waves. Our ability to predict ocean surface conditions, ocean temperatures, and ocean salinity is not very far advanced. Our ability to predict the magnitude of seismic sea waves must be improved. We need to know more about the ocean floor—how it was formed, how old it is, and how stable it is—and about its subsoil. And there is much yet to be learned about marine biology and the mineral resources of the oceans.

I think the third concern that lies behind all these bills is the view that the Federal Government is not doing all that it should to probe the secrets of the oceans, to improve navigation on the high seas, to deal with the pollution of our harbors and estuaries and with the erosion of our coastal shorelines, to extract the riches of the oceans, and to harness their power. In short, there is a feeling that the Federal effort in oceanography is too little. There is also a feeling that the Federal effort in oceanography is fragmented among too many departments and agencies and that there is poor coordination among them.

The bills now before this committee have responded to these concerns in a number of ways. Most of them would create a special council, committee or commission to develop a comprehensive plan of Federal activities in oceanography. Some would go further and have this group apportion responsibilities in oceanography among the various Federal departments and agencies, coordinate their activities, and resolve their differences. Several bills would create new independent agencies to carry out programs in oceanography.

While the Department of Commerce agrees with the sponsors of these bills that we must move ahead vigorously and imaginatively in the area of oceanography, the Department has opposed all these bills except H. R. 2218.

I think that there must be increased attention to oceanography within the executive branch and that there must be strengthened leadership in those areas of oceanography that are presently not receiving sufficient attention. Oceanography, of course, is not a single unitary

concept. Speaking very generally, it embraces two broad areas, primarily—the description and prediction of oceanic conditions and the exploitation and utilization of ocean resources.

I believe that each of these areas would be enhanced if a single agency were to provide a focus for the activities in each area—and to provide strong leadership for these activities.

Let's now discuss a little bit more fully these two most significant areas in oceanography.

Where physical oceanography is concerned—and by “physical oceanography”, I mean the description and prediction of the physical properties of the oceans—I believe that we should consider whether the program in this area is adequate.

A focal agency should also be designated for the years ahead in this field, I believe, as has been done in the case of meteorology. This might be done through Presidential action pursuant to H.R. 2218, if enacted. Alternatively, additional authorizing legislation might be desirable.

This focal agency need have no direct concern with fisheries, with ocean minerals, or with ocean transportation. Its concern would be with the state of the oceans—with physical oceanography as I have defined it. And to go a step further, its concern would be with physical oceanography for civilian applications. As you know, the Department of the Navy has long had an extensive program in oceanography. It is concerned with the oceans as they affect naval operations and the defense of the Nation. A program of this sort—which relates uniquely to the national defense—is properly within the direct control of the Defense Establishment.

The task of the agency that serves as a focus for physical oceanography would be to obtain and prepare comprehensive information about the state of the oceans and to make this information available to all within the civilian sector who need it and seek it. It would serve our maritime industry and all others who engage in civilian marine operations. It would serve those who are concerned with the pollution of our harbors and estuaries, but would not necessarily do all the work that is particularly related to control of stream pollution or harbor pollution. It would serve those who are concerned with the use for recreation. And it would serve those who are concerned with preservation of the national beauty of our shore areas and with their the exploitation of the resources of the oceans—of its fish, its minerals, and its energy—for example, by exploring the Continental Shelf.

I believe that the executive branch now has an agency that can provide a strong focus and energetic leadership for Federal activities in civilian physical oceanography. I am referring to the new Environmental Science Services Administration (ESSA), which came into legal existence about a month ago—on July 13, to be precise.

ESSA is an agency of the Department of Commerce. It was created by the President's Reorganization Plan No. 2 of 1965 and is a consolidation of the Weather Bureau and the Coast and Geodetic Survey. In October, the Secretary of Commerce will transfer to ESSA the central radio propagation laboratory of the National Bureau of Standards. ESSA will then provide—and I am using the words of

the President in his message to the Congress accompanying Reorganization Plan No. 2—

a single national focus for our efforts to describe, understand, and predict the state of the oceans, the state of the lower and upper atmosphere, and the size and shape of the earth.

I have given considerable thought to this problem, and I do not think that ESSA—or any other single Federal department or agency—should be given all the Federal responsibilities that somehow relate to the oceans. The creation of ESSA is a response to the fact that the oceans, the lower and upper atmosphere, and the earth all interact and help determine each other—that the physical environment is a scientific whole and that one aspect of the environment cannot be studied and understood in isolation.

But because ESSA is concerned with the physical aspects of the oceans, it does not follow that it must also be concerned with every aspect of the oceans. It seems no more appropriate, for example, to bring physical oceanography and marine transportation together because both are related to the oceans, than it does to bring geology and agriculture together because both are related to the earth. Certainly, the physical oceanographer can assist those concerned with marine operations. But I think we may continue to leave them in separate agencies.

Or take the example of pollution. Those who are concerned with the biological effects of pollution on man should continue to bear this responsibility. When they deal with harbor and estuary pollution, the oceanographer can provide invaluable help. But simply because the oceans are involved is no warrant for placing the primary duty of dealing with harbor and estuary pollution in the focal agency for physical oceanography.

The Federal departments and agencies have grown out of major national concerns—with such vital matters as the proper utilization and conservation of our natural resources, the protection of the public health, and the national defense. If we were to integrate the entire Federal effort related to the oceans in a single agency, we would do so at the cost of fragmenting Federal responsibilities for these matters. I think this would be a mistake—this sort of fragmentation would only weaken the ability of the Federal Government to look at such problems as the Nation's resource problems or its pollution problems as a single whole.

What binds together the Federal departments and agencies that have a concern with one aspect or another of the oceans is that they all need extensive information about the physical characteristics of the oceans. And, so, I come back to my basic point—that we must have a single focus within the executive branch for physical oceanography to serve these various needs. Again, I think it is appropriate to consider whether the Federal civilian programs in physical oceanography need strengthening.

It should be clear that I do not feel it necessary for the Congress to create a new council, committee, or commission to assign or to recommend the assignment of functions in the area of oceanography. I think that by enacting H.R. 2218, the Congress could lend the President increased support in developing a comprehensive oceanographic

program and in assigning responsibilities to help him develop and carry out such a program.

While I see two main areas of responsibility in oceanography—physical oceanography and ocean resources—I am aware that a number of Federal departments and agencies have activities of one sort or another relating to the oceans. This dispersal of activities always raises the question of how the various departments and agencies talk to each other, of how they coordinate their activities to prevent duplication and to prevent gaps.

Many of the bills now before this committee proceed on the assumption that the present interagency coordination in the field of oceanography is relatively poor and that a fresh coordinating body is needed. I would disagree. For oceanography, we already have an effective coordinating group—the Interagency Committee on Oceanography (ICO). ICO was established in 1959 by the Federal Council for Science and Technology, which is an advisory committee made up of the science heads of the major Federal departments and agencies under the chairmanship of the President's Special Assistant for Science and Technology.

My own experience is that ICO works well—that Federal activities relating to the oceans are well coordinated. If anything, I would go the other way—that these activities may become overcoordinated if there is a proliferation of coordinating committees.

ICO is not only a good coordinating body. It also provides us each year with a valuable preview of the total Federal effort in oceanography—of the direction in which it is moving and of the areas on which it is laying emphasis. For several years now, ICO has been publishing an annual document entitled "National Oceanographic Program". It outlines the Federal programs in oceanography for the fiscal year ahead.

The document is reviewed and approved by the Federal Council for Science and Technology, and the task of preparing it gives the executive branch a valuable opportunity to reevaluate priorities and to refine programs. I think the Congress would find this sort of Federal plan for oceanography extremely useful in reviewing the authorization and appropriation requests of the Federal departments and agencies involved in oceanographic activities.

I would, in fact, recommend that the Congress require that such a plan be submitted to it each year, as provided under H.R. 2218. With a Federal plan for oceanography before it, the Congress would be better able to determine whether the executive branch is moving ahead in oceanography with proper speed, wisdom, and effectiveness.

Some of the bills now before this committee would establish a high-level commission or committee to advise the President on Federal programs in oceanography. I do not think such a commission or committee is necessary. These programs are already under high-level study. ICO has them under review, and the President's Science Advisory Committee, which is composed of eminent scientists outside the Federal Government, has recently established a panel on oceanography.

If Congress believes legislation is necessary, we think that action along the lines of H.R. 2218 would be desirable.

This committee might also consider the degree to which the missions of civilian agencies should be strengthened by additional legislation.

This brings me to my last point—the matter of appropriations. Over the last few years, total expenditures for oceanography by the civilian departments and agencies of the Federal Government have hovered close to \$70 million each year. This figure takes in all the agencies except the Department of Defense and covers their expenditures for oceanographic research, ocean surveys, ship construction, and ship operations.

But what has been happening over the last few years is that the cost of operating oceanographic ships have been rising and claiming a continually larger share of each year's expenditures for oceanography—which means that the money being spent on oceanographic research has in reality either declined or not risen very rapidly, and so I would urge the Congress to look at Federal research programs in oceanography very carefully and in a less fragmented way than in the past—to insure that adequate funds are authorized and appropriated to carry out these programs as the Congress wishes them carried out.

Mr. Chairman, this concludes my statement.

I want to thank you for the opportunity to appear here today, and express my own personal appreciation to you and your committee for looking into this very complicated and important subject.

Mr. LENNON. Well, Dr. Hollomon, we are just as pleased to have you.

I think you have given us a rather comprehensive and accurate picture of the situation as I, personally, see it.

Mr. Pelly, questions, please, sir?

Mr. PELLY. Dr. Hollomon, in the final part of your statement, you refer to the increasing costs of operating oceanographic ships.

Would you spell that out a little?

Dr. HOLLOMON. The general problem is the following: We have two factors that are involved. First, the Congress has authorized for the oceanographic program the construction and operation of new ships that we did not have before. Every time you build a new ship—take the case of the Coast and Geodetic Survey, which has now and is now building new ships—we add approximately a million or a million and a half dollars to the yearly cost of the oceanographic program, just for that operation. And that goes on forever, essentially, as long as we operate the ship. So, that is one aspect of the problem.

The second aspect of the problem is that the cost of pay of people in the maritime industry rises and rises to some degree somewhat faster than does the average salary of people, and many of these ships, both civilian and Government; that is, private and Government ships, have had to deal with the rising cost of maritime labor. Both of these are factors in the rising cost.

Mr. PELLY. Actually, however, isn't it true that much of this is simply an expanded program? It is not the increased general cost of operating an oceanographic vessel; it is the cost which has gone up due to the fact that we now are having these other agencies do oceanographic work.

Dr. HOLLOMON. Part of it is that, and part of it is the increased cost. Both factors are involved.

Mr. PELLY. Well, I must say that originally, I had an idea of a great new agency, and I finally became convinced that President Kennedy was wise when he wanted to step up this program, but he wanted to move slowly to be sure that we did it in a proper way, and I have come to the conclusion after listening to your testimony that you favor following out that program. He certainly—the late President, certainly—was enthusiastic, and was responsible, in my opinion, for our stepped-up program.

But I have come to the conclusion that I support your approach to this thing, and the approach of our chairman, Mr. Lennon, whose legislation we have been discussing. I certainly think you made a very fine statement and, as I say, I certainly agree with you.

Dr. HOLLOWOM. Thank you, sir.

Mr. PELLY. Thank you.

Mr. LENNON. Mr. Rogers?

Mr. ROGERS. Thank you very much.

I am sorry I was late, Mr. Hollomon. I am sorry I was not here to hear you read your statement. I tried to look over it quickly here. I do intend to go over it thoroughly.

Just from what I have heard, and I may not have heard it all, it seems to me your position is that things are going along pretty well, and if we have got to enact something, we should enact a bill like 2218, and you don't think that is too necessary, and that the studies are going along, and probably things will be worked out if we will just appropriate a little more in the areas that are now getting the money.

Is that about your testimony?

Dr. HOLLOWOM. I think it is, in part. I think that I should like to make clear that it may be desirable for the Congress explicitly to identify the agencies of Government that have and should take the leading responsibility for the oceanographic program.

Mr. ROGERS. Well, now, how are we going to do that, unless we have a really high level group to come in and study this thing, with the backing of the President, put some public attention on the whole problem, as we have seen in national commissions before?

For instance, heart, cancer, and stroke. They have the De Bakey group, which is appointed by the President, has focused national attention, and now legislation has come forth. What is wrong with that approach?

Dr. HOLLOWOM. My own view is that this is certainly a possible approach to the problem. My feeling at the moment is you have a committee here now discussing and Congress discussing and analyzing what is going on, and if the Congress, in its wisdom, is dissatisfied with the level of the effort, there are two major programs that ought to be supported. They are clearly—it seems to me, at any rate—clearly identifiable.

One of these is the problem, and a very important problem, of exploration for resources, determining what is there, how much it is worth to get it out.

Mr. ROGERS. Who should do this?

Dr. HOLLOWOM. It seems to me—this is an opinion that I express personally—it seems to me that the Interior Department has the natural resources responsibility, and that this is a responsibility that

normally falls within what I understand to be the charter and responsibility and goals of the Interior Department.

It seems to me, further, that it is logical to put it there for the following reason: The real question which you face in ocean resources is whether it is cheaper in the long run to get a given resource from the ocean, or is it cheaper in the long run to develop that resource on land. We should not have any bias about this.

In other words, we should not say, well, it is going to be cheaper to get manganese ore from the land and exploit it and, therefore, have all the interests and geological surveys, and so forth, but we also ought to ask the question, maybe it would be cheaper in the long run, and more to the country's advantage, to develop manganese resources from the ocean.

Now, offhand, there have been many studies of this question, many of which say that it is cheaper to get it from the land, but I don't know, in the future, what the answer to that question will be. We may not have sufficient information. But we ought to have one agency making the decision between the two alternatives, rather than having two agencies both trying to sell their particular product, if you will, to the public, and what engineering calls the trade-off decisions ought to be made in a single place. I would suggest, as a personal view, that the proper place is the agency that has responsibility for all the other resources, the mineral resources, the geological survey, and so forth.

In this instance, I don't speak for the administration. I am just replying frankly to your question.

Mr. ROGERS. I understand.

All right. Now, what is the other problem?

Dr. HOLLOWOM. The other major interest in oceanography and the problem that faces us is what I refer to as physical oceanography. This is no more nor less than the adequate, appropriate, thorough description of the ocean—where it is, its salinity, its ocean currents, its depth, the character of the subbase and subsoil under the ocean—not from a particular point of view, but objectively, in the same way in which we describe the atmosphere in meteorology.

We describe its wind stem; we describe its temperature; we describe how much pollutant is in it; we describe the ocean and seek understanding. By this, I mean getting the science of it, so we understand it. This it seems to me is a second logical major oceanographic issue.

Mr. ROGER. Now, who should do that?

Dr. HOLLOWOM. In my view, and I may be parochial in this view and can only give you my own personal feeling, the major program in this area has been and is, outside of the military—I am now referring to the civilian issue, not to the military—through the Coast and Geodetic Survey which is now a part of the organization which we call—because it is easier to say—ESSA. This organization has the responsibility in the Department, and in the Federal Government generally, for the description of the physical world in which we live.

Mr. ROGERS. All right.

That is the Department of Commerce?

Dr. HOLLOWOM. Yes, sir.

Mr. ROGERS. They have the decisions, under your suggestion, your own personal views, for physical oceanography.

Dr. HOLLOWOM. Yes, sir.

Mr. ROGERS. Now, what else is left?

Dr. HOLLOWOM. There are a number of things, then, which each agency, in my view, ought to carry on for its particular benefit. I won't pretend to enumerate them, but I will give you some examples.

We charge HEW with work about pollution. How do we remove the pollutants of the atmosphere and of the estuaries? I think they should continue to do so, and call upon the other two groups for tests or techniques to carry out their mission. I don't think that mission should be taken away because we are worrying about pollution of the streams, and say, "All right, some central agency should have it. It is charged to HEW; they should maintain it."

The Atomic Energy Commission has an interest in oceanography. It has to worry about where it disposes of radioactive wastes. That is a very special kind of thing. In order to do that, you need to know a great deal about ocean currents and diffusion which the other agencies can provide, but special studies would be required for their particular mission, and they should carry on those studies for their purposes.

Mr. ROGERS. Well, now, suppose the Department of Commerce in a study on physical oceanography finds that if they put atomic energy wastes down off Florida it is going to pollute Maine, but the Atomic Energy doesn't agree with you. Who makes the decision?

Dr. Hollowom. I believe that that is the responsible decision of the Atomic Energy Commission who is charged with that responsibility to make the final decision about the radioactive wastes.

Mr. ROGERS. Even though your research might show that they were wrong.

Dr. HOLLOWOM. Let me give you an example.

In the case of the radioactive tracer levels, here is an exactly analogous situation, where we in the Weather Bureau have the responsibility of trying to predict as the winds blow, and so forth, what the radioactive tracer levels will be. If there is a disagreement, this finally has been resolved at the highest levels in the Government.

This occurs if there is a real disagreement between the experts in the Weather Bureau and the experts in the Atomic Energy Commission, but the Atomic Energy Commission is charged with responsibility for nuclear testing.

Mr. ROGERS. Now, does your interagency committee come in here?

Dr. HOLLOWOM. In that instance, they participate in the health levels that are established; yes, sir.

Mr. ROGERS. Well, would they help make this decision?

Dr. HOLLOWOM. They provide guidance to the Atomic Energy Commission in the same way. There is a Federal Radiation Council for this very purpose.

Mr. LENNON. Would you let me interrupt you just a minute, please.

Mr. Dan Markel, of the Senate staff on commerce, an oceanography consultant.

Mr. Markel, can you hear the colloquy between the witness and the members?

Mr. MARKEL. Very well.

Mr. LENNON. Are you having any trouble hearing the colloquy and questions between the witness and the members?

Mr. MARKEL. No. I am doing pretty well so far.

Mr. LENNON. We would be delighted to have you sit here with our staff, since you graced us with your appearance, and we appreciate your coming over from the Senate to participate in these hearings.

Mr. MARKEL. Thank you very much. This is just fine.

Mr. LENNON. You can hear all right. I want you to hear everything that goes one here.

Very well. Proceed.

Mr. ROGERS. So you left the Federal Radiation Council.

Dr. HOLLOMON. It may be a special subject, but my point is that the charging of the responsibility for the nuclear aspects, it seems to me, ought to reside with the fellow who has finally to make that decision for the President and be responsible to the Congress and, in my view, he should be given, as he is now given, all the data possible on ocean currents and the diffusion of things in the ocean.

Mr. ROGERS. All right. Now, what else that you think of that needs to be handled by another agency? I understand Defense. Defense would still have the Navy, I presume.

Dr. HOLLOMON. I hadn't proposed to take it away from them, Mr. Congressman.

I think that the National Science Foundation should support basic science that has to do with oceanography as it is now doing.

Mr. ROGERS. Would they go into physical oceanography?

Dr. HOLLOMON. In the basic science and the academic fraternity, certainly, just as they do in meteorology, for example.

Mr. ROGERS. Ocean resources—they would go into?

Dr. HOLLOMON. They would for the basic science aspect of these problems, which are basic to the whole question, particularly if it has to do with the development of university capabilities, particularly for the education of future people to come into this field.

Mr. ROGERS. Well, now, are you going to do any basic research in physical oceanography through the Commerce Department?

Dr. HOLLOMON. I think we do now, and I think we should continue to do so.

Mr. ROGERS. Aren't you going to have an overlap then, and duplication?

Dr. HOLLOMON. Well, this problem of overlapping research is a very difficult one. I would say that if you charge an agency with the responsibility, say, of ocean resources, they will do that research and development that is essential to providing the future ocean resources. They will do some research which is basic to that mission.

I believe that there is other research which builds the scientific capability of the country that is logically appropriate to the National Science Foundation. That kind of coordination ought to take place in an activity like ICO, to insure that there is no duplication, and I think, from my—

Mr. ROGERS. Well, wouldn't the best way to insure that there is no duplication be to put the responsibility in one place?

Dr. HOLLOMON. You mean for all the research, let's say?

Mr. ROGERS. Say your basic research on physical oceanography.

Is that too impossible to do?

Dr. HOLLOMON. No. It is not impossible to do, Mr. Rogers.

Mr. ROGERS. Well, what is the point of having the diffusion and the splintering? This is what I don't understand.

Dr. HOLLAMAN. All right. I will try to go to that question.

One of the great strengths of American science today is, in my view, that there are many agencies of the Government that support it. And that if one agency, one activity, does not think the idea, maybe, is just right, or is outside of the current stream of thinking, a man can go to another agency and maybe get a hearing. In my view, if we operated a system as they do, for example, in the Soviet Union, where all the scientific research in the Soviet Union—and I am going to an extreme now—were controlled by a single agency, it would be very difficult really to introduce new ideas into the system.

Mr. ROGERS. Well, then, according to your theory, we ought to break up NASA, right now, ought we not?

Dr. HOLLAMAN. No, sir.

Mr. ROGERS. Well, we have got a splintering.

Dr. HOLLAMAN. No, sir. Let me go to that question, if I can.

The National Science Foundation and, for example, the Weather Bureau, support a modest amount of research that has to do with satellites. Both do, right now. For example, the Weather Bureau supports basic work in instrumentation that needs to go on weather satellites, in full cooperation with NASA, but we have a very special need.

Mr. ROGERS. Where is the funding? Where does the funding come from?

Dr. HOLLAMAN. The funding comes from the Weather Bureau and from the Commerce Department appropriation.

Mr. ROGERS. You don't get any moneys from NASA?

Dr. HOLLAMAN. NASA gets money for its expenditures. We don't get transfer funds from NASA; no, sir.

Mr. ROGERS. For any work you do for them?

Dr. HOLLAMAN. We don't do work for them in this case. They do some work for us. We transfer some funds to NASA, but not conversely.

Mr. ROGERS. So they are taking instruments up.

Dr. HOLLAMAN. Yes, sir; they take the instruments up; they help develop the platforms upon which these instruments are going to be placed, but, for example, the job of the basic interpretation of the results of satellite explorations of the weather, which is really some basic research, is supported and directed by the Weather Bureau.

Mr. ROGERS. How about the Atomic Energy Commission? Would you split it up?

Dr. HOLLAMAN. In which field, sir?

Mr. ROGERS. In its field.

Dr. HOLLAMAN. No, sir.

Mr. ROGERS. You think it is good to have it all in one agency?

Dr. HOLLAMAN. All of what?

Mr. ROGERS. All of its activities, on development of atomic energy.

Dr. HOLLAMAN. I think that is a reasonable thing to do; yes, sir. But the basic research in nuclear physics is supported by the National Science Foundation.

Mr. ROGERS. But the basic atomic energy research is done there, is it not?

Dr. HOLLAMAN. That which is specifically related to the mission of nuclear weapons or to the development of nuclear power. That is right.

Mr. ROGERS. Well, the National Science Foundation, I suppose, does research in everything. It is supposed to, isn't it?

Dr. HOLLOMON. That is right.

Mr. ROGERS. So this is not for any one particular agency at all?

Dr. HOLLOMON. That is correct. That is the distinction I was trying to make.

Mr. ROGERS. Now, the distinction I am trying to make is that we are trying to concentrate on one area.

Dr. HOLLOMON. Right.

Mr. ROGERS. Like we did in space, with NASA; like we have in Atomic Energy, with that; and like we have in weather in the Weather Bureau.

Dr. HOLLOMON. Let's go to that issue for a moment. I really think it would be a mistake, as I have tried to point out, to take all the activities that had to do with oceanography away from the mission-oriented agencies and put it in one place. The reason I think it is a mistake is because many agencies of the Government need to have oceanographic competence in order to do their job.

Now, the same thing is true about meteorology, and there has been a lot of concern about the fragmentation of meteorology. The Federal Aviation Administration, for example, needs to have special meteorological activities for flying airplanes. I think they should make the choices. For those unique needs that they have, they carry out research and development and operations. What we have in the weather system, I think, is very analogous to what I believe we ought to have in oceanography. We have a central agency that provides the core service, the core.

Mr. ROGERS. A central agency?

Dr. HOLLOMON. Yes.

Mr. ROGERS. Do you have a head of that agency?

Dr. HOLLOMON. Yes.

Mr. ROGERS. Can he make decisions?

Dr. HOLLOMON. With respect to the core service.

Mr. ROGERS. To the core service.

Dr. HOLLOMON. Right. And that is exactly what I am suggesting here, there be two core services.

Mr. ROGERS. Right.

Dr. HOLLOMON. Now, each agency has very specialized requirements, very special to those agencies. In meteorology, we have specialized requirements for the military, specialized requirements for aviation, specialized requirements for pollution, specialized requirements for agriculture, and each of those agencies funds and directs its program. But they do not provide support for the central core work.

Mr. ROGERS. I thought you just had a reorganization of the Weather Bureau and the Coast and Geodetic Survey.

Dr. HOLLOMON. We did, sir.

Mr. ROGERS. Well, now, why do you keep them fragmented?

Dr. HOLLOMON. The reason here is a different reason. In the case of the atmosphere and the environment, you have the following situation. Up here at the top, we have a thing above about 100,000 feet, and on out to the sun, which we call aeronomy.

Mr. ROGERS. Space gets into that one.

Dr. HOLLOMON. Yes.

Mr. ROGERS. Space Agency?

Dr. HOLLOMON. Up to the edge of space. Let's call it the upper atmosphere. The study of this part of the upper atmosphere is called aeronomy. Then, between the earth and that, we have a thing called meteorology. From the earth's surface, the ocean surface, and the center of the earth, we have a thing called geophysical and ocean sciences.

Now, it turns out that the ocean affects the weather; the sun's radiation affects the weather; the character of the earth affects meteorology; the nature and shape of the earth affects meteorology.

The interaction between the upper atmosphere and weather—the lower atmosphere and the ocean—all interact with each other closely, and this kind of integration, we believe, is desirable and essential, but it does not integrate across the other way. It is a different kind of integration, and we think that this integration is a very desirable and effective one, so we study the environment as a whole.

Mr. ROGERS. So, you don't think the oceans go together enough to make a unit?

Dr. HOLLOMON. No, because in meteorology and nuclear science, for example, there are legitimate concerns of other agencies and appropriate concerns, in my view.

Mr. ROGERS. I am not saying there are not plenty of concerns.

Dr. HOLLOMON. Right.

Mr. ROGERS. But what I am getting back to is to your thinking that there has got to be some core, some head to coordinate these.

Dr. HOLLOMON. No. I suggested that the President and the Congress should decide who is going to have the responsibility, and appropriate those funds to those agencies with those responsibilities.

Mr. ROGERS. Well, now, how is it going to decide unless we get various people who are concerned with it to do a study for him and get it organized and moving?

Dr. HOLLOMON. I am suggesting that that is an appropriate course, of course, if Congress—

Mr. ROGERS. You don't recommend it in your statement, your legislative statement here.

Dr. HOLLOMON. That is right. The President could do that, under the legislation that is suggested, or could do it now. My suggestion—

Mr. ROGERS. Now, we are not concerned with what the President may be able to do. We are talking about some legislation that proposes that.

Dr. HOLLOMON. I understand that, sir.

Mr. ROGERS. And, yet, you say, "Well, now, I am not going to recommend it."

Dr. HOLLOMON. Right.

Mr. ROGERS. And now you tell me we have got to have a study before we really decide what course of action to take.

Dr. HOLLOMON. No, sir.

Mr. ROGERS. You think there is no study necessary?

Dr. HOLLOMON. I think that the major problem with respect to oceanography is that there have been enormous numbers of studies. Your committee here is devoting your attention to it.

Mr. ROGERS. Now, we are not experts on that, and you know that. I am talking about an expert study to recommend how all of these

agencies can be handled appropriately with the necessary organization, if necessary, to bring them together, or not. You don't think that a study is necessary?

Dr. HOLLOMON. No, sir. I don't.

Mr. ROGERS. You do not.

Dr. HOLLOMON. No, sir.

Mr. ROGERS. You think we are ready to move right now?

Dr. HOLLOMON. I am suggesting that there are some things which the Congress should be able to do and the executive branch to move now.

Mr. ROGERS. Well, then, you would have us set up all the responsibility, the basic responsibility, for ocean resources in the Interior Department? You would be willing to support this legislation?

Dr. HOLLOMON. I think I would—I speak personally on that.

Mr. ROGERS. And, then, second, you would put all of physical oceanography in the Commerce Department.

Dr. HOLLOMON. No, sir. I would put the responsibility for insuring the adequate descriptions of the ocean in the Commerce Department, but not all the physical oceanography, as I tried to describe.

Mr. ROGERS. Yes. Well, I understand. You let everyone else do whatever they are doing now?

Dr. HOLLOMON. No, sir. I would insist on, as we now have, a coordinating body for this purpose, to insure that there is not duplication and overlap between the agencies.

Mr. ROGERS. Well, is that any change from the present system?

Dr. HOLLOMON. No, sir.

Mr. ROGERS. Then you don't believe the present system should be changed?

Dr. HOLLOMON. As far as coordination is concerned, I think the present system operates moderately well. As far as coordination is concerned.

Mr. ROGERS. Have you ever been on a study commission on oceanography, Dr. Hollomon?

Dr. HOLLOMON. I have never been on one. I have listened to a large number of such studies.

Mr. ROGERS. You have never participated in one?

Dr. HOLLOMON. I participated in both the President's Scientific Advisory Committee's hearings on oceanographic studies and in the Federal Council's hearings on this subject.

Mr. ROGERS. And what have they come out with?

Dr. HOLLOMON. Many things. For example, there are numbers of studies that have recommended a substantial strengthening of the ocean survey program.

Mr. ROGERS. How did you strengthen it? Just by money, or in the organizational sense?

Dr. HOLLOMON. In this instance, Mr. Rogers, money is the strengthening.

Mr. ROGERS. In other words, most of the studies have gone toward the money angle; is that right?

Dr. HOLLOMON. Most, but not all.

Mr. ROGERS. But there has been no real recommendation of a change from the present system nor, as I understand it, are you recommending such.

Dr. HOLLOWOM. That is correct.

Mr. ROGERS. Now, you knew we had a study, a 10-year study, of oceanographic goals.

Dr. HOLLOWOM. Yes, sir.

Mr. ROGERS. Do you think that has been adequate for the Nation to meet its responsibility in this area?

Dr. HOLLOWOM. The President's Science Director has recently set up a special panel of outside scientists to look at the oceanographic program anew to see whether that is, in fact, the case. That panel is now meeting—

Mr. ROGERS. You are just now setting up a panel?

Dr. HOLLOWOM. No. It has been meeting this summer.

Mr. ROGERS. How often?

Dr. HOLLOWOM. I think they are in frequent session.

Mr. ROGERS. Once every 2 months?

Dr. HOLLOWOM. Oh, no, sir. As I—
I stand corrected here.

Admiral KARO. They are having a meeting at the end of this month to review another situation.

Dr. HOLLOWOM. They are meeting a week at a time, every month, or 10 days at a time, during the summer. I can't tell you the exact schedule, but it is not just a once-every-2-months' kind of panel meeting; it is a survey of the whole ocean.

Mr. ROGERS. Do you think things are going along pretty well about oceanography, then, except we could use a little more money?

Dr. HOLLOWOM. And I think a clear assignment by Congress as to responsibilities, possibly.

I also believe—

Mr. ROGERS. As to responsibilities?

Dr. HOLLOWOM. Yes. This is the question that we were discussing a moment ago.

Mr. ROGERS. You mean, this is your personal view you are giving now?

Dr. HOLLOWOM. Yes.

Mr. ROGERS. We do need to set forth some responsibilities.

Dr. HOLLOWOM. Yes. I suggested that it might be a question we would want to take a look at. I think also that Congress should look at the problem of oceanography as a whole, some way of reviewing, as I suggested, the whole program, in oceanography.

Mr. ROGERS. Do you think it would do us any good to have an expert committee report to use after a thorough study on it?

Dr. HOLLOWOM. It might well be.

Mr. ROGERS. Would you be willing to go along with that?

Dr. HOLLOWOM. More importantly, I think that the Congress, which looks at the oceanographic program in many diverse committees, might well try to arrange a way to integrate its activities with respect to oceanography.

Mr. ROGERS. You think that an expert committee recommending how we should have an executive organization set up in order for us to centralize our interests might be helpful?

Dr. HOLLOWOM. If that is the way you think you should do it, I don't know how Congress should act in this matter. But if that's what you would think, I would agree that there needs to be some way for the Congress to look at the oceanographic program as a whole.

Mr. ROGERS. You think that this is necessary?

Dr. HOLLOMON. I think it is necessary for Congress as I suggested in my statement.

Mr. ROGERS. And timely.

Dr. HOLLOMON. And timely; yes, sir.

Mr. ROGERS. Thank you very much.

Thank you, Mr. Chairman.

(The material requested follows:)

PRESIDENT'S SCIENCE ADVISORY COMMITTEE—PANEL ON OCEANOGRAPHY

As early as the fall of 1964, the Chairman of the President's Science Advisory Committee felt that a Panel on Oceanography should be formed. In early spring of 1965, Dr. Gordon J. F. MacDonald informally agreed to serve as Chairman of such a Panel. This was discussed at the May meeting of PSAC and on June 8, 1965, Dr. MacDonald was formally appointed. During June and July formulation of the full panel was completed and the first meeting was held at Woods Hole, Mass., on July 23-24, 1965. The second meeting is planned for August 28-29 and a third meeting for September 17-18. Meetings of about two days a month for nine months are presently planned. Staff functions will be supplied by the staff of the Office of Science and Technology with the assistance of the Staff of the Interagency Committee on Oceanography. The membership follows:

CHAIRMAN

Dr. Gordon J. F. MacDonald, Institute of Geophysics and Planetary Physics, University of California.

MEMBERS

Dr. Douglas L. Brooks, the Travellers Research Center, Inc.

Dr. Robert Charpie, Union Carbide Corp.

Dr. Robert Fleagle, Department of Atmospheric Sciences, University of Washington.

Dr. Finn J. Larsen, director of engineering, Honeywell, Inc.

Dr. William D. McElroy, chairman, Department of Biology, the Johns Hopkins University.

Dr. John Meyer, Department of Economics, Harvard University.

Dr. Walter H. Munk, Scripps Institution of Oceanography.

Dr. Jack P. Ruina, director, Institute for Defense Analyses.

Dr. Henry Stommel, Institute of Earth Sciences, Massachusetts Institute of Technology.

Dr. Gerald B. Whitham, chairman, Department of Applied Mathematics, California Institute of Technology.

TECHNICAL ASSISTANTS

Dr. Henry W. Menard and John C. Fry, Office of Science and Technology.

Mr. LENNON. Thank you, Mr. Rogers.

If the gentleman would permit me at this point, in order to get something in the record, Doctor, there is such a panel that is known as the President's Science Advisory Committee Panel on Oceanography.

Dr. HOLLOMON. Yes, Sir.

Mr. LENNON. And was that the panel that you are referring to?

Dr. HOLLOMON. I believe that—oh, yes; that is correct.

Mr. LENNON. And when was that brought into being, Doctor?

Dr. HOLLOMON. I can furnish it for the record. I just don't know, personally.

Mr. LENNON. Do you know the names of the members of that particular panel, the President's Science Advisory Committee Panel on Oceanography?

Dr. HOLLOMON. I know the Chairman of that Committee.

Mr. LENNON. That is whom?

Dr. HOLLOMON. Dr. Gordon McDonald.

Mr. LENNON. Would you furnish it for the record, and, with the permission of the reporter, if it could be included in the report following you and Mr. Rogers.

Dr. HOLLOMON. Right.

Mr. LENNON. The date of its organization, its membership and identification of the members, please, the number of meetings that have been held since its organization.

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. It was referred to in a letter from Dr. Hornig to Chairman Bonner on May the 6th.

Now one other question: Would you identify for the record, too, the National Academy of Sciences Committee on Oceanography?

Dr. HOLLOMON. The National Academy of Sciences Committee on Oceanography, referred to as NASCO, is a committee which was set up by the National Academy of Sciences, I believe at the original request of the President's Science Advisory Committee, but I may be mistaken, and it is a committee that reviews the overall state of oceanography and ocean sciences for the National Academy of Sciences.

Mr. LENNON. Now, would you establish for the record, please, sir, the date of the organization of that committee, identify its members by name, profession, or association with business, industry, or Government, and, also, the number of meetings that it has had since its composition? Because, again, in the same letter of May the 6th, Dr. Hornig says that this matter was also under study by this panel.

Dr. HOLLOMON. Yes, sir. I will furnish that for the record.

(The material requested follows:)

NATIONAL ACADEMY OF SCIENCES COMMITTEE ON OCEANOGRAPHY

The present National Academy of Sciences Committee on Oceanography (NASCO) is the third Academy-Research Council's Committee on Oceanography. The first was formed in 1927, the second in 1949, and the third in 1957. The present NASCO Committee was organized by the NAS-ROCS in response to requests from the Office of Naval Research, the Fish and Wildlife Service, and the Atomic Energy Commission. These three agencies still provide financial support to the Academy for this Committee, and have subsequently been joined by the Coast and Geodetic Survey and the National Science Foundation. Since the first meeting, held in November 1957, there have been 43 additional meetings. The 45th meeting is scheduled for August 27, 28, and 29, 1965. The list of members, panel chairmen, and staff as of July 1965 is attached. There is also attached a list of the panels, together with the members and their affiliations. The first chairman was Harrison Brown of the California Institute of Technology, the second chairman was Athelstan Spilhaus of the University of Minnesota, and the present chairman is Milner B. Schaefer of Scripps Institution of Oceanography.

COMMITTEE ON OCEANOGRAPHY

MEMBERS, PANEL CHAIRMEN, AND STAFF, JULY 1965

- Karl Banse, Department of Oceanography, University of Washington, Seattle, Wash.
 Wayne V. Burt, Department of Oceanography, Oregon State University, Corvallis, Oreg.
 Paul M. Fye, Woods Hole Oceanographic Institution, Woods Hole, Mass. (Research Ships Panel Chairman).
 Fritz Koczy, Marine Laboratory, Institute of Marine Science, University of Miami, Miami, Fla.

Sumner Pike, Lubec, Maine.

Donald W. Pritchard, Chesapeake Bay Institute, Johns Hopkins University, Baltimore, Md. (Radioactivity in the Marine Environment Panel Chairman).

Roger R. Revelle, Center for Population Studies, Harvard School of Public Health, Cambridge, Mass.

Milner B. Schaefer, Institute of Marine Resources, Scripps Institution of Oceanography, La Jolla, Calif.; Committee Chairman; (International Cooperation in the Marine Sciences Panel Chairman).

Athelstan Spilhaus, Institute of Technology, University of Minnesota, Minneapolis, Minn.

Henry M. Stommel, Massachusetts Institute of Technology, Cambridge, Mass.

George P. Woollard, Geophysical Institute, University of Hawaii, Honolulu, Hawaii.

AIR-SEA INTERACTION PANEL CHAIRMAN

George Benton, Department of Mechanics, Johns Hopkins University, Baltimore, Md.

BIOLOGICAL METHODS PANEL CHAIRMAN

Elbert H. Ahlstrom, Bureau of Commerical Fisheries, La Jolla, Calif.

CHEMICAL METHODS PANEL CHAIRMAN

James H. Carpenter, Department of Oceanography, Johns Hopkins University, Baltimore, Md.

LAWS, UTILIZATION OF THE SEA AND TECHNOLOGY PANEL CHAIRMAN

W. M. Chapman, Van Camp Foundation, San Diego, Calif.

OCEAN ENGINEERING PANEL CHAIRMAN

John D. Isaacs, Scripps Institution of Oceanography, La Jolla, Calif.

OCEAN-WIDE SURVEYS PANEL CHAIRMAN

Warren Wooster, Scripps Institution of Oceanography, La Jolla, Calif.

EXECUTIVE SECRETARY

Richard C. Vetter, National Academy of Sciences-National Research Council, Washington D.C.

NAS—NRC COMMITTEE ON OCEANOGRAPHY PANELS, JULY 1965

Air-Sea Interaction.—George Benton, Chairman, Johns Hopkins University; Robert Arthur, SIO; Jacob Bjerknes, University of Calif.; Duncan Blanchard, WHOI; Douglas Brooks, The Travelers Research Center, Inc.; Donald Portman, University of Michigan.

Biological Methods.—Elbert Ahlstrom, Chairman, BCF; Allan Be, LGO; Robert Holmes, SIO; John Ryther, WHOI; Howard Sanders, WHOI; Milner Schaefer, SIO; E. J. Ferguson Wood, University of Miami; Charles Yentsch, WHOI.

Chemical Methods.—James H. Carpenter, Chairman, Johns Hopkins University; Dayton Carritt, MIT; Edward Goldberg, SIO; Fritz Koczy, University of Miami; J. D. H. Strickland, SIO.

International Cooperation in Marine Sciences.—Milner Schaefer, Chairman; Columbus Iselin, WHOI; Fritz Koczy; Arthur Maxwell, ONR; Roger Revelle, Harvard University; Athelstan Spilhaus, University of Minnesota.

Laws, Utilization of the Sea and Technology Panel.—W. M. Chapman, Chairman, Van Camp Foundation; Kenneth Boulding, University of Michigan; Milner Schaefer; Athelstan Spilhaus.

Ocean Engineering.—John Isaacs, Chairman, SIO; Charles Cox, SIO; Theodor Hueter, Honeywell Seattle Development Lab.; William V. Kielhorn, Lockheed Calif. Co.; Fritz Koczy, University of Miami, Stanley Murphy, University of Washington; Francis B. Porzel, Institute for Defense Analysis; D. S. Potter, G.M. Defense Research Labs.; Milner B. Schaefer; James Snodgrass, SIO; Allyn

Vine, WHOI. Liaison members: John Craven, Department of the Navy; Gordon Lill, NSF. Consultant: Russell Keim, SIO.

Ocean-Wide Surveys.—Warren Wooster, Chairman, SIO; Maurice Blackburn, SIO; Charles Drake, LGO; Richard Geyer, Texas Instruments, Inc.; Bruce Heezen, LGO; H. H. Hess, Princeton University; Columbus Iselin, WHOI; John Knauss, University of Rhode Island; Henry Stommel, MIT; Victor Vacquier, University of California, San Diego, Calif.

Radioactivity in the Marine Environment.—Donald Pritchard, Chairman, John Hopkins University; James Carpenter, Johns Hopkins University; Dayton Carritt, MIT; Edward Goldberg, SIO; John Isaacs, SIO; Bostwick Ketchum, WHOI; Fritz Koczy; Frank Lowman, University of Puerto Rico; T. R. Rice, BCF; Milner Schaefer; Allyn Seymour, University of Washington.

Research Ships.—Paul Fye, Chairman, WHOI; Fritz Koczy; Donald Pritchard.

Mr. LENNON. So, we are a little bit interested to know when these panels were organized, who composes their membership, and, since constantly in our letters from the agency, they always say that the very matter that the Congressman So-and-So proposes or Senator So-and-So proposes by his bill has been and is under study. So, we would like some answers soon as to when they are coming up with these questions that are proposed in these bills, on which the departments always say, "Well, they are under study by a panel that is set up to do exactly what this bill says."

All right.

Thank you.

Mr. Keith?

Mr. KEITH. Thank you, Mr. Chairman.

Mr. Secretary.

Dr. HOLLOMAN. Good morning, sir. How are you this morning?

Mr. KEITH. Nice to see you again.

Dr. HOLLOMAN. Glad to see you, sir.

Mr. KEITH. If I may say to my chairman and to those interested in oceanography, I regret my inability to have been present earlier, but there are matters of great importance before the Commerce Committee on which I serve, and one of those is a subject very dear to the heart of Mr. Hollomon, and I have been working in his vineyard in the Commerce Committee rather than here in oceanography.

Dr. HOLLOMAN. I appreciate that, sir.

Mr. KEITH. I have filed a bill which has been reviewed by the departments and which is contained, together with departmental reports. On page 41, the discussion deals, primarily with getting into the business of determining the resources that are claimed by reason of legislation which the Congress passed a year ago; namely, the exploitation of the Continental Shelf, which is the area outlined on the map appearing to my left.

(The map referred to appears on p. 158.)

Mr. KEITH. And, as you can see, that is a very extensive area, and those of us who filed that legislation which gave us as a nation, rights which have been recognized internationally, feel that we should at least get a stake in these new resources. We, in our bill, utilized existing agencies pretty much in accordance with your philosophy. In our bill, certain of these areas fall within the jurisdiction, I would say, which you would claim for the Commerce Department.

Dr. HOLLOMAN. Or for Interior.

Mr. KEITH. Or for Interior. Certainly, those above the ocean bed fall into your bailiwick.

Dr. HOLLOMAN. Yes, sir.

Mr. KEITH. What plans has the Department of Commerce made to determine in the national interest what our rights, responsibilities, and opportunities are with reference to this increase in your domain?

Dr. HOLLOWOM. We have done several really quite modest things.

First off, I would like to indicate to you that the capability of the Commerce Department to do this necessary survey is being substantially increased, in the next year or so, by the acquisition of additional ship capacity. We have two ships now being constructed—two new ships—and one authorized, so these ships will be used in substantial measure for ocean and Continental Shelf surveys. So that, there is a capability coming along.

Mr. KEITH. In your request for the funds to build these ships, did you tie it in directly with this particular area?

Dr. HOLLOWOM. No. The requests for funds for the first two ships were before the effective date of the Continental Shelf treaty.

Mr. KEITH. What specifically have you done with reference to the Continental Shelf?

Dr. HOLLOWOM. Specifically, the Continental Shelf?

Specifically, we have let a contract with the Battelle Memorial Institute to examine the question of what sorts of surveys are required, what the economic benefits might be from such surveys, and to lay out a program for the analysis of the Continental Shelf. We hope to have that available by the end of the month.

Mr. KEITH. This is a specific contract for that specific purpose?

Dr. HOLLOWOM. For that specific purpose, to give us guidance as to what we should do, and to how much of our resources should be put into that.

Mr. KEITH. How much of a contract is that in dollars?

Dr. HOLLOWOM. About \$58,000. This is an analysis of what we should do. This is not, of course, the action program.

Mr. KEITH. Was this correlated with Interior?

Dr. HOLLOWOM. I can't answer the question.

Admiral KARO, is Interior participating in that study?

Admiral KARO. Not financially in this particular one, though they were consulted.

Dr. HOLLOWOM. We are making it available through ICO, through the Interagency Committee on Oceanography, which is aware of the study, and the study specifically is not coordinated with Interior in letting the contract.

Mr. KEITH. Doesn't that indicate a need for some coordinating agency to give direction and cohesion?

Dr. HOLLOWOM. The results of the study, the facts of the study, the way the analysis is to be carried out, and so on, is available to and has been discussed, I am sure, with ICO, which is the coordinating agency. You may want to respond to this question, Admiral.

Mr. KEITH. Well, I have specific reference to your testimony as to the responsibility of the Interior Department here.

Dr. HOLLOWOM. Right.

Mr. KEITH. And it would seem to me that that should be recognized in the directive to that Agency or the independent contract that has been let for the purpose.

Admiral KARO. Mr. Keith, when we worked out the terms of reference for this contract, we did discuss this with the various other agen-

cies, but we went ahead to award the contract ourselves to meet a specific requirement, telling them that the result of this would be available for their use.

Mr. KEITH. You talked about vertical integration, a few moments ago.

Dr. HOLLOMON. Right.

Mr. KEITH. And here was, it seems to me, a good opportunity to have achieved that.

I must commend you, however, on attacking at least a part of the problem, but I concur with your statement as to philosophy, that, with reference to the need to have coordination in a vertical or in a horizontal plane, and it seems that in this particular contract you lost an opportunity to do just that.

Dr. HOLLOMON. I think there is a slight misunderstanding. When we said that this was a contract, we took the initiative to let the contract ourselves, and not try to split up the funds between several agencies. In other words, we funded the contract, but we discussed the terms of reference of the contract with the agencies that would be involved.

Mr. KEITH. But the scope of it was only that pertaining to your responsibility, as I understand it, as you outlined initially.

Dr. HOLLOMON. I would like to furnish for the record, Mr. Keith, the scope of the contract. I don't have it at my fingertips.

Mr. KEITH. You say that the President has a Special Advisory Committee on Oceanography. How many oceanographers are on it, and who are they?

Dr. HOLLOMON. I agreed to furnish this for the record. I gave the Chairman's name. I am frank to say I don't know the rest of the composition of the Committee. I agreed to furnish it for the record. I know that Dr. Munk of Scripps is one. Admiral Karo may know some of the other members of the Committee.

Mr. KEITH. Are any of the so-called big names of oceanography on it?

Dr. HOLLOMON. Could I have a list of the members? We are getting the list of members of the Committee in just a minute.

Mr. KEITH. Well, we can come to that later, but it is rather interesting to me that you don't know offhand whether or not any of the big names of oceanography are on it, and you can't give us offhand—apparently, other than Dr. Munk, you, personally, can't identify them. Not the admiral; you.

I don't mean to embarrass you, and if the admiral would like to give it, he is your adviser. Go ahead.

Dr. HOLLOMON. No. The significance of this is that the field of oceanography is one of the very important interest, and there are many, many committees functioning in oceanography. I just don't happen to know the names of the people who are on that Committee.

Mr. KEITH. I think there ought to be an interface between the Assistant Secretary level and such an influential committee as this one.

Dr. HOLLOMON. Oh, there will be, Mr. Keith. There will be very much so. The prime reports of this Committee will be made. The prime reports will be made to the President's Scientific Advisory Committee, to which I serve as a consultant, and to the Federal Council for Science and Technology, of which I am a member, and this will be

done before the final report is issued. We will have an opportunity to discuss with all the members of that Committee their recommendations.

Mr. KEITH. The thing that concerns me is that our bill, that is, Senator Bible's bill, and Congressman Rivers' bill, and my bill, specifically calls for an appropriation of substantial amount to exploit or to study and exploit the means of exploitation of these resources, and I think that the Commerce Department and perhaps the Department of the Interior, and perhaps the Navy, should come up with some kind of means of accomplishing the objectives of my bill, which has not received too much recognition, insofar as I can observe in the testimony that you have offered.

Dr. HOLLOMON. Mr. Keith, I should like to make one point clear, on which you and I are in full agreement, and that is this country should take adequate steps, and I am not saying what those steps are, to be sure that we preserve the rights and have full exploitation of the resources of the Continental Shelf. You and I are not in any disagreement on that general principle. I believe that to be the case, and I think we should insure that we do so. We should do it to whatever degree is required, to assure that the resources which are available and the descriptions which are necessary of the Continental Shelf are carried out. On this principle, there is no disagreement.

I think the question is, which I think is an appropriate thing for this committee to examine, the appropriate means of doing that, and I don't have any disagreement with you on the national need.

Mr. LENNON. Would the gentleman yield to me at that point?

Mr. KEITH. Certainly, Mr. Chairman.

Mr. LENNON. If you have there, and I know you have it before you, a compilation of the oceanography bills, if you will, turn to page 83, in a letter dated July 29, 1965, addressed to the chairman of the full committee, Mr. Bonner, signed by the Acting General Counsel of the Department of Commerce, you will find on page 85 in the first paragraph the following language, which I believe is directly related to the colloquy between you and the Secretary. I quote:

"The Secretary of Commerce presently has the authority, which he has delegated to the Environmental Science Services Administration (ESSA), to survey and map the Continental Shelf. ESSA has the competency, through its Coast and Geodetic Survey, for these activities. From its surveying activities, ESSA obtains knowledge about the Continental Shelf including the locations of its mineral resources. Furthermore, ESSA cooperates with the Department of the Interior and other agencies while surveying the Continental Shelf so that mineral, biological, and other resources can be located in the same operation."

So, I would say, Mr. Keith, that in commenting, and your bill was what, 7894? I think it was.

Mr. KEITH. I think so.

Mr. LENNON. That the General Counsel, or the Acting General Counsel of the Department of Commerce says that the Department of Commerce has the authority, which it in turn has delegated to the Environmental Science Services Administration of the Department of Commerce, to do specifically and exactly what your bill calls for.

Dr. HOLLOMON. A piece of that.

Mr. LENNON. Pardon?

Dr. HOLLOMON. A part of what it calls for.

Mr. LENNON. Yes; a part, so far as it relates to the coast and the Continental Shelf.

Dr. HOLLOMON. Right.

Mr. LENNON. Now, I would ask you one question that occurs to me. This contract that ESSA has made for the survey of the Continental Shelf was made with a subsidiary of an oil company—

Dr. HOLLOMON. Oh, no; the Battelle Memorial Institute.

Mr. LENNON. Beg pardon?

Dr. HOLLOMON. The Battelle Memorial Institute, which is a private organization.

Mr. LENNON. I just wanted to get that in the record.

Dr. HOLLOMON. It is in Columbus, Ohio. It is one of the most competent institutions of its kind in the country.

Mr. LENNON. Thank you, Mr. Keith.

Go back to your questioning.

Mr. KEITH. It is good to see such rapid progress since ESSA has been organized as of, I believe, July 13th, and the letter to which you refer, using the present tense, was written on July 29th.

This looks as though we were really going to make progress, at least, as a condition of these hearings, and I think that is commendable.

How did they happen to pick this organization to do the research? What kind of bids were asked for in order to undertake and accomplish this? I am curious about an agency in Ohio being selected to do this.

Dr. HOLLOMON. Well, the purpose of the analysis is to get at the economic benefits of analyses of surveys, of the Continental Shelf. It is partly an economic study, and I am confident, as is usually the case, that they had proposals from several institutions. I don't have them, again, right here, but I can furnish them for you, and these were evaluated by a team.

The general practice is that these are evaluated by a team of technical people, including oceanographic people, and the contract let on the basis of competence.

Mr. KEITH. I feel certain that those procedures were followed, but I think it would be very good for the record if we could have, Mr. Chairman, an outline as to how this contract was arrived at, that is, the procedures confirmed that he has outlined would be of reassurance to me, and I feel helpful to the committee, because, oftentimes, we do recommend, or at least adopt the recommendations of departments for the farming out of many different research contracts, and occasionally, some have been brought to my attention that are being done by engineering associations in which there is no engineer on the payroll.

Dr. HOLLOMON. I understand your concern.

Mr. KEITH. And we wouldn't want to have that kind of thing taking place. I think it would be a good idea to have it for the record.

Dr. HOLLOMON. Very desirable.

Mr. LENNON. Would it be appropriate to furnish for the record a brief summary as to the basis on which the contract was arrived at?

Dr. HOLLOMON. I would be very happy to.

Mr. LENNON. Without objection, then, gentlemen, it will be included as part of the record.

(The information mentioned follows herewith:)

U.S. DEPARTMENT OF COMMERCE,
COAST AND GEODETIC SURVEY,
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION,
August 19, 1965.

U.S. GOVERNMENT MEMORANDUM

To: Deputy Assistant Director, Office of Oceanography.

From: Economic Advisor, Program Planning Coordination Staff.

Subject: Contract with Battelle Memorial Institute for a study of "User Benefits accruing from the U.S. Coast and Geodetic Survey in Continental Shelf Regions."

In February 1965, the Assistant Secretary of Commerce for Science and Technology requested the Coast and Geodetic Survey to propose to him their consideration of the most effective mechanism for obtaining a thoroughgoing review of the Nation's needs for the activities which derive from Continental Shelf surveys. This request was prompted by a Bureau of the Budget request to the Secretary of Commerce for a review of the value of the Coast and Geodetic Survey activities with respect to Continental Shelf surveys.

In April 1965, the Secretary of Commerce informed the Bureau of the Budget that a special study of the need and role of the Coast and Geodetic Survey in Continental Shelf activities would be made. Also, a special public group would be asked to review the study and make recommendations regarding the programs necessary to carry forward the appropriate responsibilities. The President's Office of Science and Technology also agreed to participate in evaluating the needs and requirements of these programs.

On April 12, 1965, an identical letter inviting proposals was sent to companies who indicated interest in carrying out such a study. A copy of the letter, with attachments, is enclosed. These companies were:

1. Economic Associates, Inc., 1820 Jefferson Place, NW., Washington, D.C.
2. Arthur D. Little, Inc., 1725 Eye Street, NW., Washington, D.C.
3. Battelle Memorial Institute 1755 Massachusetts Ave., NW., Washington, D.C.
4. Corplan Associates (ITT), 10 West 35th Street, Chicago, Ill.

Proposals were submitted by all companies with the exception of Arthur D. Little, Inc., who declined submission because of their present workload.

The evaluation of the proposals was coordinated by Dr. Milton G. Johnson (economic adviser); the following personnel of the Coast and Geodetic Survey were among those who reviewed the proposals: Capt. Harley D. Nygren (Chief, Program Planning Coordination Staff), Dr. Harris B. Stewart, Jr. (Deputy Assistant Director, Office of Oceanography), Mr. Alfred W. Anderson (Technical Assistant, Office of Oceanography), Mr. Charles A. Whitten (Acting Assistant Director for Physical Sciences), Dr. William Dorfman (Chief, Operations Research), Dr. John S. Rinehart (Assistant Director for Research and Development), Mr. James M. Klaasse (Deputy Assistant Director for Research and Development), Mr. Dwight L. Greene (Chief, Resources Programming), and Miss Joan F. McLaughlin (Legal Assistant). In addition, evaluations were given by two other Commerce Department constituents, namely, National Bureau of Standards and Area Redevelopment Administration.

The contract, a copy of which is appended, was awarded to Battelle Memorial Institute based upon the analysis by the reviewers. The reviewers believed Battelle had the best understanding of objectives, the best approach to the study, and the most diversified staff. A copy of the Assistant Director of Administration's recommendation based upon this analysis is a part of the enclosed contract.

MILTON G. JOHNSON.

U.S. COAST AND GEODETIC SURVEY,
April 12, 1965.

BATTELLE MEMORIAL INSTITUTE,
Washington, D.C.

DEAR SIRS: We are interested in carrying out an economic study of the relationship of the scientific survey activities of this agency with respect to the Continental Shelf and their impact on economic development of the United States. This would include the historical mission of surveying and charting as well as

the extended functions. You are invited to send us a proposal on this study. We want to ascertain particularly the benefits, both present and potential, of hydrographic and ocean study programs, as well as future requirements, and whether our present facilities and ships used for this purpose are excessive or inadequate. In order for this study to be utilized, we must have a final draft report by mid-August, 1965. If you are interested in being considered for this work, please submit your proposal in at least four copies, within 2 weeks.

With the above objectives in mind, we would like to call your attention to the following enclosed materials which summarize scientific and technological activities of this agency:

(1) The Coast and Geodetic Survey; its Products and Services (U.S. Dept. of Commerce Publication 10-2, 1965).

(2) Coast and Geodetic Survey Programs and Objectives (Sept. 15, 1964).

(3) Need for Comprehensive Oceanographic Project on the Continental Shelf and Margin.

Keep in mind that our focus for this study is the analysis of the needs for Continental Shelf Surveys with associated oceanographic research, also the determination of whether our present facilities and ships used for this purpose are adequate.

There should be a determination of economic benefits both direct and indirect of the scientific and technical activities of the Coast and Geodetic Survey relating to the Continental Shelf. We would expect some analysis of costs in relation to benefits. Through inventory of the current and proposed work of the Bureau, the study should outline the avenues for translation into economic development. This would require intensive study and evaluation of each part of the inventory and its relationship to industrial and commercial development.

Some attention would be given to the priority for development with suggested timetables. Locational factors would receive appropriate attention. Consideration would also be given to other near-term economic prospects for the development of resources through the Bureau services. There would be recognition of the coordination with Federal Government agencies. Also of concern would be the relationship with State economic development agencies and oceanographic institutions and the efforts of private scientific foundations and university programs. Progress reports would be expected on a monthly basis.

Your proposal should also include (a) sources and methods of gathering information, (b) breakdown of time and cost estimates, and (c) qualifications of personnel to be engaged on the project.

Sincerely yours,

(Signed) H. ARNOLD KARO,

Rear Admiral, U.S. Coast and Geodetic Survey, Director.

NEED FOR COMPREHENSIVE OCEANOGRAPHIC PROJECT ON THE CONTINENTAL SHELF AND MARGIN

The first step in the exploration and development of any geographical area for cultural, industrial, or scientific purpose is the adequate mapping of that area. Virgin areas are usually explored and mapped on a reconnaissance basis at first, and they are subsequently explored and mapped in detail, as civilization expands geographically and becomes enriched with knowledge of and use of our planet. We are now reaching out into our solar system with initial explorations, yet we have explored very little of the ocean areas and have only begun to unlock the secrets of our continental lands extending seaward from the coastline to the abyssal plains of the adjoining ocean basins.

This inner band is a continental structure with a cap of consolidated sediments eroded from high places or precipitated in shallow seas. The great heaving, folding, thrusting, warping, subsiding, erosion and sedimentation of the underwater lands as well as the lands above the sea have created varied conditions which cannot be adequately determined by extrapolations from the elevated lands. Furthermore, the sea environment, its life and natural resources, is individualistic and it can be known only by competent oceanographic exploration and study in situ.

The explorations require a comprehensive mapping of the submarine topography by conducting engineered surveys, and the observation and collection of various data properly coordinated with the primary survey. The various data are categorized as physical, chemical, or geological oceanography, and

geophysics. The first step in determining environmental conditions is a thorough mapping of the sea-bottom horizon.

HYDROGRAPHIC SURVEYS

Maps of underwater areas are based on hydrographic surveys. Two types of maps are required; the bathymetric chart is composed of detailed delineations, the contours, comparable to contoured maps of land areas; the nautical chart shows large numbers of soundings, a few contours, and considerable surface detail needed for navigation. Although the nautical chart serves as a very useful tool in scientific and commercial explorations, it is the bathymetric chart frequently supplemented with original data, which provides the most useful guide to engineering, mineral and fisheries resources, and the scientific explorations of the Continental Shelf. It is the irregularities in the submarine topography which control many elements in the sea environment.

To be fully effective, the sounding data and data on the character of the deep sea bottom need to be far more profuse and well-defined than is the requirement for nautical charting. Yet, it is conceivable that in the immediate future the marine navigator will accept and desire a fully contoured chart as an improved aid in port-to-port navigation and in locating specific areas for fishing and other activities referred to above and discussed below.

GEOLOGICAL OCEANOGRAPHY

In conjunction with hydrographic surveys, the bottom needs to be systematically sampled in order to prepare a sediment-type chart as an overlay of the bathymetric chart. This chart outlines the area and type of bottom—mud, silt, sand, gravel, rock, etc., and includes information on sediment analyses. This information is valuable for anchoring ships and floats containing instruments; for guidance in selecting sites for bottom installations of structures serving as navigational aids, observation platforms, and drilling platforms, and for monitoring instruments and defense hardware; for guidance to the marine biologist in commercial fisheries who relates sediment types to the abundance of paucity of organisms which attract and support certain species of fish and shellfish; for guidance in locating mineral resources—the quartz sands of certain sizes needed to replenish specific sands now nearly exhausted in certain inland areas near the coast—the carbonate sands, heavy minerals, and the environmental conditions which establish the present habitat of future petroleum accumulation; for determining the acoustical properties of the bottom in sonar operations; and for information of scientists in many fields, who are concerned with attaining knowledge of the offshore sea bottom horizon.

In conjunction with the bottom sampling of sediments there is a need to determine systematically the distribution of sediments on the Continental Shelf and the horizons of underlying rock by operation of a geological echo-profiler which reveals the variations of thickness of unconsolidated sediments and the areas of rock outcrop. These data provide the third dimension and are valuable adjuncts in engineering and scientific considerations of the Continental Shelf platform.

GEOPHYSICAL DATA

In order to obtain full use of the forces exerted by or modified by the mass of continental rocks, it is necessary to determine the variations in mass and types of rock by extending observations to the limit of the continental margins and into the ocean basins. These observations include the use of gravity meters and magnetometers; the geological echo-profiler, a seismic tool, also contributes to these geophysical data. The resulting data are useful in oil and mineral explorations, in satellite, missile, and inertial guidance systems, and in measurements of the earth's geoid and the magnetic field.

PHYSICAL AND CHEMICAL OCEANOGRAPHY

Knowledge of the movement of water masses in the ocean—the tides, surface, and internal currents—is important to surface and subsurface navigation, to recovery of derelicts, to forecasting migrations of sea life, and to an understanding of weather systems originating with the sea-atmosphere environment. This

knowledge is fulfilled only by extending observations to the maximum in the the ocean areas.

The physical and chemical properties of sea water—temperature, salinity, oxygen, nutrients, turbidity—are important to the many activities already mentioned. Knowledge of these properties is particularly important over the Continental Shelf and margin.

SEPTEMBER 15, 1964.

COAST AND GEODETIC SURVEY—PROGRAMS AND OBJECTIVES

The Bureau conducts hydrographic surveys, mapping of coastal areas by photogrammetric or other means, geodetic control surveys, field surveys for aeronautical charts, and surveys of tides and currents; carries out seismological, geomagnetic, gravity, and astronomic observations, studies of earth movement, and investigations of oceanographic phenomena; and conducts basic and applied research and development in these various disciplines. It compiles, reproduces, and distributes nautical, aeronautical, magnetic, and special purpose charts; publishes geodetic control, tidal, current, and coast pilot information; analyzes and disseminates seismological, geomagnetic, gravity, and oceanographic data; and operates a seismic sea wave warning service.

There is considerable interrelationship among the various activities of the Bureau and many of the end products involve an input from various segments of the organization. In order, therefore, and to insure efficient management control and coordination of the Bureau's activities, the planning functions and review of operations are carried out on the basis of six major programs. These are ocean studies, geomagnetism, seismology, geodesy, hydrography, and aeronautical charting. Bureau direction and general support for the major programs are considered as a separate function.

Ocean studies.—This program involves, for the most part, those operations which represent the Bureau's contribution to the national oceanographic program developed by the Interagency Committee on Oceanography. It involves the operation of oceanographic ships; studies of oceanographic phenomena; deep ocean soundings; obtaining bottom sediments; studies of the Continental Shelf; investigations of the oceanographic aspects of air/sea interaction; estuarine investigations; sea gravity and magnetic observations; analysis and publication of oceanographic data; and research and development in instrumentation, automation, and ship design.

The program is part of a nationwide effort to better comprehend the world's oceans, including their physical, biological, chemical, and geologic processes. The knowledge thus gained will make possible the production of deep sea charts for subsurface navigation, safe disposal of radioactive wastes, an increase in the commercial fish catch, discovery and utilization of the mineral and other resources of the oceans, the prediction of sea conditions for the economic routing of ships, and the improvement of weather predictions.

The role of the Bureau is to gather and disseminate knowledge in the form of publications and charts of bottom topography, currents, tides, and the geophysical aspects of the oceans. The resulting data will be used not only as charts for marine navigation but will also serve as a basis for present and future development and utilization of the sea as a natural resource. Improved current charts and sea wave forecasting techniques will permit safer and faster navigation. The gravity data collected will permit better positioning of remote islands and, when combined with data collected under the geodesy program, will make possible the prediction of perturbations in satellite orbits, and the effect of the earth's gravity field on manned space travel. In addition to its regular functions of collecting, analyzing, and disseminating data, the Bureau assists in the other aspects of the national oceanographic program by providing scientists in other disciplines with the facilities of its ships for the collection of data in which they have an interest.

Geomagnetism.—The program in geomagnetism is part of an international effort to understand, predict, and utilize the natural phenomenon of the earth's magnetic field. It involves the operation of magnetic observatories; magnetic surveys; repeat surveys; magnetic chart compilation; processing, analysis, and dissemination of magnetic data; and research and development in various aspects of this discipline.

The objectives of the geomagnetic program are to define the time and space variations of the earth's magnetic field as an aid to air and marine navigation and to land surveyors; to facilitate forecasting radio propagation conditions; to indicate solar-terrestrial physical relationships with respect to cosmic rays, auroral phenomena, ionospheric physics, and interplanetary space physics; and to aid in the study of the core, mantle, and crust of the earth.

The Bureau operates 13 magnetic observatories, many of which are on a co-operative basis with universities, research institutes, and other Government agencies. The principal function of the observatories is to record changes in the magnetic fields.

Magnetic surveys are conducted to portray the distribution of the magnetic field over the surface of the earth. The secular change of the magnetic field is not predictable. Because the annual rate of change is small compared with the daily changes and irregular variations, several years are required to detect and evaluate a new rate of annual change or impulse. It is necessary, therefore, to maintain a continuing program of repeat surveys, in addition to observatory operation and the regular magnetic surveys, in order to provide the necessary data.

Seismology.—The seismological program is concerned with teleseismic seismology including operation of a worldwide standard semismograph network; strong motion earthquake studies; operation of a seismic sea wave warning system; analysis and dissemination of seismological data; research and development in seismological equipment and interpretation of data; and special seismological investigative projects.

Under the teleseismic function, the Bureau conducts a worldwide earthquake location service for use in the protection of life and property throughout the world, and to furnish pertinent data for seismological research. Studies are also made of the mechanics of earthquake phenomena and the earth's structure. Through an integrated worldwide network of seismograph stations, part of which are operated by the Bureau and the remainder by universities, private institutions, and foreign governments, data on earthquakes are collected, analyzed, and disseminated.

A network of strong motion stations is operated in the Western United States to study the nature and magnitude of destructive earthquake motions. The information obtained indicates the acceleration and displacement of ground motion and building motion from earthquake forces. This information is used in the design of earthquake resistant structures in areas of known disturbance and for establishing earthquake codes and regulations.

The seismic sea wave warning system is operated in the Pacific Ocean area for the protection of life and property along the rim of the Pacific and among the islands likely to be affected by a seismic sea wave. The systems headquarters is at the Honolulu Observatory, operated by this Bureau, where the technical data are compiled for evaluating the sea wave potential. Upon the confirmation of the existence of a seismic sea wave generated by a coastal or submarine earthquake, the observatory issues alerts and warnings as to probable time of its arrival to the countries around the Pacific that are participating in the warning service.

Geodesy.—The program in geodesy is concerned with the precise measurement of the various physical parameters of the earth, including its configuration and the properties of its gravity field. The operations involved include the establishment of horizontal and vertical control stations; gravity and astronomical observations; studies of earth movement; observation of satellites for the expansion of horizontal control networks; publication and distribution of geodetic control data; and research and development in new techniques and procedures.

The primary objective of the program is to provide a spacing of accurately determined control points, horizontal and vertical, that will meet the needs of our national program for the conservation and development of natural resources, the needs of broad scientific and engineering projects such as the microwave network for communication, the Interstate Highway System, petroleum exploration, transcontinental pipelines, transmission lines, urban development and renewal, and the national mapping program.

The plan calls for the establishment of a network of horizontal control with spacing to meet the economic needs of the particular area involved. This spacing varies from 3 to 4 miles in urban areas to 10 to 15 miles in mountainous areas in the West and Alaska. These limits will change as our economy expands and the density of population increases. In the case of vertical control, it is planned to establish leveling lines at approximately 6-mile intervals in urban areas with bench marks spaced one-half to 1 mile apart along these lines, and to provide 10- to 15-mile line spacing, with bench marks at 1 mile intervals, throughout the rest of the country, except in mountainous areas and in Alaska where spacing will be at approximately 25-mile intervals.

Another objective of the geodetic program is the determination of the exact size and shape of the earth so that a more accurate spheroid may be determined to serve as the base for latitude and longitude positions. Through gravity and astronomical observations the differences between geoidal and ellipsoidal surfaces will be determined. Space tracking, missile trajectories, and many scientific aspects of geophysics depend upon this geoidal separation in data reduction.

Hydrography.—This program is concerned with all the various operations involved in the production of nautical charts and related publications required for the safety of marine navigation. It includes such activities as hydrographic surveys, including the operation of ships; coastal photogrammetric surveys and mapping; geodetic control surveys; current and circulatory surveys; tidal surveys; investigations of hazards to navigation; charts compilation and maintenance; reproduction and distribution of charts, tidal and current data, and coast pilot information; and research and development in instrumentation, automation, and cartographic techniques.

Nautical charts are published in several scales and formats to meet the needs of all maritime interests, including maritime commerce, the fishing industry, small recreational craft owners, national defense, and for exploration and development of marine resources.

The objectives of the program are to complete and maintain on an up-to-date basis the charting of the coastal areas, including harbors and estuaries, of the United States and its possessions. Included also is the charting for recreational boating purposes of lakes and reservoirs which are not included in the areas of responsibility of other agencies of Government.

A substantial part of the program involves chart maintenance to insure that they provide the information needed for safety of navigation. Chart revisions and maintenance consisting of corrections to existing charts account for approximately 55 percent of the annual cost of chart preparation. An indication of the magnitude of the chart maintenance program is the fact that there are approximately 90,000 linear miles of coastline around the United States and its possessions, and the areas in which nautical charting is required comprises over 2 million square miles.

Aeronautical charting.—The program in aeronautical charting involves each activity required for the production and maintenance of aeronautical charts and related publications needed for the safety and control of air navigation in the United States and its possessions. It includes field surveys and investigations; compilation, reproduction, and distribution and research and development in portrayal of aids to the navigator.

Aeronautical charts consist of two main series—visual and instrument. The visual charts provide considerable topographic cultural, and aeronautical detail to enable pilots operating under visual flight rules to check their position at all times. Instrument charts are designed to provide the air pilot with the information required for instrument navigation and radio communication to rapidly determine his precise location when operating by instruments only. Both series of charts are used by private pilots, commercial airlines, and the military services.

Requirements, in terms of format and information to be shown on aeronautical charts, are determined by the Federal Aviation Agency in carrying out its responsibility for administering the Federal airways system. A major part of the aeronautical charting program involves the revision of charts to implement changes in procedures and regulations adopted by the FAA to improve its system of air traffic control.

FORM CD-57 11-20-59		U.S. DEPARTMENT OF COMMERCE		BUREAU OR OFFICE Office of Administrative Services Procurement Division	
CONTRACT FACE SHEET				CONTRACT NO. C-300-65(Reg.)	
INSTRUCTIONS - Please submit this form in original and two (2) copies.					
NAME OF CONTRACTOR Battelle Memorial Institute					
ADDRESS (Street, City, Zone, State) 505 King Avenue Columbus, Ohio					
CONTRACT FOR Furnishing necessary professional services to conduct a study on "User Benefits Accruing From The Activities of U. S. Coast and Geodetic Survey in Continental Shelf Regions." (Coast and Geodetic Survey)					
AMOUNT OF CONTRACT Estimated \$55,030.00		DATED JUN 15 1965		EFFECTIVE May 18, 1965	
RENEWABLE NO		PAYMENT \$ NONE		PERFORMANCE BOND \$ NONE	
ANTI-DISCRIMINATION CLAUSE <input checked="" type="checkbox"/> IS <input type="checkbox"/> IS NOT PART OF CONTRACT		ARBITRATION ACT <input type="checkbox"/> IS <input checked="" type="checkbox"/> IS NOT PART OF CONTRACT		APPROPRIATION CHARGED 1350809, S&E, 1965 104/Proj. Code to be assigned. (Coast and Geodetic Survey) 02384	
The amount of this contract will be paid from the above named appropriation against which an insurance has been placed in an amount sufficient for the payment of all obligations incurred under the contract. Legal authority: 33 U.S.C. 883 a-1, P. L. 88-527 and 41 U.S.C. 252(c)(4)					
SIGNATURE OF APPROVING OFFICER <i>[Signature]</i>				TITLE OFFICE OF THE GENERAL COUNSEL	
Examined and found to comply with all the requirements of law and to be correct in form and execution. JUN 8 - 1965 Bernard A. Stoj FOR GENERAL COUNSEL					
REMARKS (For use of General Counsel's office)					
RECOMMENDED FOR APPROVAL				APPROVED	
DATE	<i>6/11</i>	<i>6/11</i>	<i>6/11</i>	DATE	<i>6/11</i>
INITIALS	<i>6/11</i>	<i>6/11</i>	<i>6/11</i>		<i>George J. Malino</i> Acting Chief, Contracting Branch
				SIGNATURE AND TITLE OR/jwf	

U.S. DEPARTMENT OF COMMERCE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20230

Contract No. C-300-65(Neg)

FINDINGS AND DETERMINATION
USE OF COST-PLUS-A-FIXED-FEE CONTRACT

In accordance with the requirements of Section 304(b) of the Federal Property and Administrative Services Act of 1949 (41 U.S.C. 254), I hereby find that:

- (1) The Contractor, Battelle Memorial Institute, has submitted a proposal in response to a Coast and Geodetic Survey Request for Proposal a study on "User Benefits Accruing from the Activities of U.S. Coast and Geodetic Survey in continental Shelf Regions" on a cost-plus-a-fixed-fee basis, and,
- (2) The contract price exclusive of fee is \$51,920.00 and the fee is \$3,110.00 (5.9%) and,
- (3) The proposed study requires the evaluation of present hydrographic and ocean study programs and objectives and will consider future requirements with special emphasis on cost as related to benefits. The study is to be completed within 14 weeks and because of the time limitation and complexity neither the Government nor the Contractor can estimate the cost with such certainty as would warrant the use of a fixed price contract and,
- (4) The Contractor has refused to accept the contract on a fixed price or cost-sharing basis because of the aforementioned difficulty of estimating the costs with any degree of certainty and,

Further, I hereby determine that:

- (1) It is impractical to secure the services required under Contract No. C-300-65(Neg) without the use of a cost-plus-a-fixed-fee contract.

(Signed) George F. Marline

(Acting Chief, Contracting Branch)

(Date)

Standard Form No. 1036
7 GAO 4509
1036-104

STATEMENT AND CERTIFICATE
OF AWARD

No. C-300-65 (Neg.)
(Contract)

Date May 18, 1965

U. S. Department of Commerce Office of the Secretary Washington, D. C. 20230
(Department or establishment) (Division or office) (Location)

METHOD OF OR ABSENCE OF ADVERTISING
METHOD OF ADVERTISING

FOR USE BY G. A. O. ONLY			
Indexed	Card	Reviewed	Date

1. By advertising in newspapers. Yes No

2. (a) By advertising in circular letters sent to dealers.

(b) And by notices posted in public places. Yes No

(If notices were not posted in addition to advertising by circular letters sent to dealers, explanation of such omission must be made below.)

ABSENCE OF ADVERTISING

Without advertising in accordance with 41 U.S.C. 252(c)(4)

(Write law pursuant to which contract was negotiated and the applicable section and paragraph thereof. If contract was negotiated under a public accountancy which would not exempt the agency incident to advertising, or because of it being impracticable to secure competition, state below or on the reverse hereof, the circumstances requiring negotiation.)

AWARD OF CONTRACT

	Yes	No
A. To lowest bidder as to price (Expenditures)	<input type="checkbox"/>	<input type="checkbox"/>
B. To highest bidder as to price (Receipts)	<input type="checkbox"/>	<input type="checkbox"/>

CERTIFICATE

I CERTIFY that the foregoing statement is true and correct; that the written findings required by law to be submitted with the contract in case of negotiation, upon a determination by the agency head or other authorized official that such method of contracting is necessary, are attached thereto; that the total number of bids received is, and that where lower bids (expenditure contracts), or higher bids (receipt contracts), as to price were received, a statement of reasons for their rejection, together with an abstract of bids received, including all lower than that accepted in case of expenditure contracts and all higher in case of receipt contracts, is given below or on the reverse hereof or on a separate sheet attached hereto; that the articles or services covered by the agreement (expenditure) are necessary for the public service; and that the prices charged are just and reasonable.

Name of Contractor

Amount

Corplan Associates	\$39,892.00
Battelle Memorial Institute	55,030.00
Economic Associates, Inc.	51,340.00

On April 12, 1965, the Coast and Geodetic Survey mailed a Request for Proposals to an unknown number of Commercial Firms in an effort to obtain offers for furnishing the necessary professional services to conduct this study.

The above three firms submitted proposals, which were evaluated by the Coast and Geodetic Survey.

Battelle Memorial Institute submitted the highest offer. For detailed reasons as to why Battelle was accepted, see attached memorandum dated May 12, 1965, signed by the Assistant Director for Administration, Coast and Geodetic Survey.

Acting Chief, Contracting Branch
(Title)

(Signed) George F. Harline

(Signature of contracting officer)

NOTE.—This statement and certificate will be used to support all agreements, both formal contracts and less formal agreements of whatever character, involving the expenditure or receipt of public funds. It must be executed and signed by the contracting officer (unless the award is made by or subject to approval by an officer other than the contracting officer, when execution and signature may be made by such officer).

UNITED STATES GOVERNMENT

U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY*Memorandum*

TO : Mr. Donald B. Moore
Director, Office of Administrative
Services

FROM : Assistant Director for Administration
Coast and Geodetic Survey

SUBJECT: Recommendation for contract, Continental Shelf Study

DATE: May 12, 1965

In reply refer to: 7

We are ready to move ahead with a contract to carry out a study which would analyze the needs for Continental Shelf Surveys. A high-level ad hoc group (mostly nongovernmental) is being formed to evaluate the study in relation to our programs. The urgency to get under way is underscored by the requirement of Assistant Secretary Hollomon that a report be in his hands by September 1, 1965.

Of the firms with whom we discussed the study, the following submitted written proposals which are attached herewith: Battelle Memorial Institute, Corplan Associates and Economic Associates. Our analysis of the proposals led us to the conclusion that the two latter proposals were not responsive enough to be acceptable; we believe that our aims for the study can be satisfactorily carried out by the Battelle Memorial Institute and, therefore, urge that negotiations begin as quickly as possible, in order that they may proceed with the necessary work. We would suggest that a letter of intent might be appropriate. Our analysis of the proposals is given below.

It is important to understand that the work of this study requires a balance between the scientific-engineering inputs and the elements of economic development analysis. It is also important that the firm undertaking the study should have a maximum of inhouse capability; although some subcontracting might be desirable, the interests of this study would be better served if subcontracting could be eliminated or kept to a minimum. One of the major difficulties is the small amount of time available for carrying out the study, therefore, the capability of a firm in being able to cope with this problem is of vital concern.

Personnel

Each firm appeared to have well-qualified people prepared to work on this project. The approximate man-months of work were calculated as 10 for Corplan, 15.5 for Battelle and 16 for Economic Associates. The Battelle proposal offers



the best balance of qualified scientists-engineers and economists. Economic Associates, on the other hand, seemed overbalanced on economics, while Corplan would have only a small portion of specialized economic services (this refers to the lone economist from the University of Washington).

Financial Aspects

Battelle showed the highest overall cost at slightly over \$55,000, while Corplan was low with slightly under \$40,000. The Corplan estimate of overhead at 160% seems high in relation to 80% for Economic Associates and 64% by Battelle. The fixed fee of \$3600 by Corplan appeared to be proportionately high.

Methodology


The Battelle description of procedures was more delineated and systematic than the others. The Corplan proposal showed a fairly good understanding of the Coast and Geodetic Survey and the significance of the study effort. The Economic Associates proposal envisages a two-fold assessment: (1) Priority (ordering of projects). (2) The economic costs and benefits of each program. This firm also proposed studies resulting in separate chapters for each of five major activities with a summary chapter of findings and recommendations; this might present a problem of coordination.

Summary


The proposal by Economic Associates, although fairly well developed, was overbalanced on the economic side and outlined an approach which appears too general for our purposes. The Corplan proposal appears to be overbalanced on the engineering side with insufficient treatment of the scientific and economic aspects. Although the Corplan proposal stated objectives and methodology clearly and well, it did not appear to back this up with commensurate capability. The Battelle proposal was better balanced from the scientific, engineering, and economic standpoints. Battelle also appears to have a better outlined and more detailed systematic approach. Furthermore, their field work would be more extensive.

Taking the above factors into consideration and the desire to complete the study in a minimum of three months means that a firm of wide capability should be utilized. On the basis of a well-outlined proposal in light of the invitation given and the qualifications of the firm and personnel to be assigned to the project, we have, therefore, recommended the selection of the Battelle Memorial Institute to carry out this study.

The scope of work as outlined by the complete proposal of the Battelle Memorial Institute dated April 28, 1965 is satisfactory. They would submit two progress reports (see their page 11) and a final draft prior to presentation of the final report. There should be included a stipulation that oral briefings be given at our request when each of the above reports is presented. The draft reports should be submitted in 8 copies; the final printed report in 225 copies. With respect to the final printed report, provision should be made for offset printing so that reproducible would become our property, thereby enabling us to make additional copies if we choose to do so.



Raymond A. Girard

FORM 308 (11-23-59)		CONTRACT AND AWARD (NEGOTIATED)		U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY CONTRACT C-300-65 (Neg.) <small>(Contract No. 01-0107)</small>		PAGE NO. 1	NUMBER OF PAGES 12
ISSUED BY U. S. Department of Commerce Office of Administrative Services Procurement Division				ADDRESS Contracting Branch Commerce Building - Room 6527 Washington, D. C. 20230			
DATE ISSUED JUN 15 1965							
Contract in <u>Triplagate</u> , subject to (1) the accompanying Schedule, (2) general provisions (Standard Form 01 - June 1964 edition), which are incorporated herein by reference, and (3) such other contract provisions and specifications as are attached or incorporated by reference in the Schedule, will be received at the above office <u>within 30 calendar days</u> for furnishing the supplies or services described in the accompanying Schedule, for delivery to <u>Washington Submarine Corporation</u> <u>1200 Old Deer Run</u> <u>Rockville, Maryland</u>							
ITEM NO.	SUPPLIES OR SERVICES	QUANTITY (No. of units)	UNIT	UNIT PRICE	AMOUNT		
1.	Furnish necessary professional services to conduct a study on User Benefits Accruing from the Activities of the United States Coast and Geodetic Survey in Continental Shelf Regions.			Estimated Cost - - Fixed Fee - - - Total - - -	\$51,920.00 3,110.00 \$55,030.00		
Overhead to be billed at provisions rates approved by the Cognizant audit activity. Overhead rates to be calculated for calendar years ending December 31. (9) See Page No. 9.							
DATE OF CONTRACTOR'S SIGNATURE							
In compliance with the above, the undersigned offers and agrees, if contract be accepted within _____ calendar days (or calendar days unless different period be inserted by Contractor) from the date of receipt, to furnish any or all of the items upon which prices are quoted, at the price set opposite each item, delivered at the designated point(s) within the time specified in the Schedule. Discounts will be allowed for prompt payment as follows: _____ percent, 15 calendar days; _____ percent, 30 calendar days.							
CONTRACTOR REPRESENTS <small>(Check appropriate boxes)</small>							
(1) (a) That he _____ was not, employed or otherwise connected with any other person (other than a full-time bona fide employee working solely for Contractor) to solicit or secure this contract, and (b) that he <input type="checkbox"/> has, <input type="checkbox"/> has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for Contractor) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to (a) and (b) above as requested by the Contracting Officer. <small>(For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 44, Part 150.)</small>							
(2) He operates as an <input type="checkbox"/> individual, <input type="checkbox"/> partnership, <input type="checkbox"/> corporation, incorporated in the State of _____							
NAME AND ADDRESS OF CONTRACTOR (Street, city, and State. Type or print)				SIGNATURE OF PERSON AUTHORIZED TO SIGN CONTRACT			
Dattelle Memorial Institute 505 King Avenue Columbus, Ohio				 R. D. WILLIAMS CONTRACTING OFFICER			
ACCEPTED AS TO ITEMS NUMBERED				DATE OF AWARD <u>May 13, 1965</u>			
AWARD		AMOUNT		UNITED STATES OF AMERICA			
1		See Schedule		by (Signed) <u>George F. Morlino</u> <u>Acting Chief, Contracting Branch</u> <small>Contracting Officer</small>			
SUBMIT INVOICE FOR PAYMENT TO Coast and Geodetic Survey Washington, D. C. 20230 Attention: WSC 3222				ACCOUNTING AND APPROPRIATION DATA 1350309, 522, 205 104/Proj. Code to be assigned. Reqn. No. 009-5132-02384			
PAYMENT WILL BE MADE BY Coast and Geodetic Survey Washington, D. C.							

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SPECIAL PROVISIONS

ARTICLE 1. SCOPE OF WORK:

The Contractor shall provide services to conduct a study and prepare required reports on the "User Benefits Accruing from the Activities of the United States Coast and Geodetic Survey in Continental Shelf Regions." The study shall be conducted in accordance with the following documents, which are incorporated and made a part of this contract by reference:

- A. Coast and Geodetic Survey letter (Request for Proposals) WSC-7, dated April 12, 1965.
- B. Contractor's proposal dated April 28, 1965.

ARTICLE 2. PERFORMANCE TIME:

The performance time allowed for completion of the work to be performed under this contract is fourteen (14) weeks. In accordance with Department of Commerce telegram dated May 18, 1965, work shall begin immediately and shall be completed no later than August 24, 1965.

ARTICLE 3. PROJECT DIRECTOR:

All services shall be performed under the direct supervision of Mr. Noah A. Frazier, who is hereby named Project Director for this study. Mr. Frazier will be assisted by the fourteen (14) key individuals reflected on Page No. 14 of the Contractor's proposal. The Contractor agrees that the qualifications of any successors to any of these key individuals will be equal to or exceed the qualifications of the individuals initially assigned to perform the work. The Contractor further agrees to furnish the contracting officer, in writing, a full and comprehensive statement of the experience and qualifications of any successor that may be assigned.

ARTICLE 4. PROJECT OFFICER (GOVERNMENT REPRESENTATIVE):

Dr. Milton G. Johnson, Chief Economist, Coast and Geodetic Survey, is hereby designated as Project Officer for this contract. The Project Officer, or his authorized representative, is responsible for the technical aspects of the project and technical liaison with the Contractor. Dr. Johnson is located in Room No. 1019, Washington Science Center, 11800 Old Georgetown Road, Rockville, Maryland, and his telephone number is (Area Code 301) 496-8256. The Project Officer shall not make any commitments or authorize any changes which affect the contract price, terms or conditions. Any such changes shall be referred to the Contracting Officer for action. No changes shall be made without the written authorization of the Contracting Officer.

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ARTICLE 5. Limitation of Cost

- (a) It is estimated that the total cost to the Government, exclusive of any fixed fee, for the performance of this contract will not exceed the estimated cost set forth in the Schedule, and the Contractor agrees to use his best efforts to perform the work specified in the Schedule, and all obligations under this contract within such estimated cost. If at any time the Contractor has reason to believe that the cost which he expects to incur in the performance of this contract in the next succeeding sixty (60) days, when added to all costs previously incurred, will exceed seventy-five percent (75%) of the estimated cost then set forth in the Schedule, or if at any time, the Contractor has reason to believe that the total cost to the Government, exclusive of any fixed fee, for the performance of this contract will be substantially greater or less than the then estimated cost thereof, the Contractor shall notify the Contracting Officer in writing to that effect, giving the revised estimate of such total cost for the performance of this contract.
- (b) The Government shall not be obligated to reimburse the Contractor for costs incurred in excess of the estimated cost set forth in the Schedule, and the Contractor shall not be obligated to continue performance under the contract or to incur costs in excess of the estimated cost set forth in the Schedule, unless and until the Contracting Officer shall have notified the Contractor in writing that such estimated cost has been increased and shall have specified in such notice a revised estimated cost which shall thereupon constitute the estimated cost of performance of this contract. When and to the extent that the estimated cost set forth in the Schedule has been increased, any costs incurred by the Contractor in excess of such estimated cost prior to the increase in estimated cost shall be allowable to the same extent as if such costs had been incurred after such increase in estimated cost.

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ARTICLE 6. Allowable Cost, Fixed Fee, and Payment

- (a) For the performance of this contract, the Government shall pay to the Contractor:
- (1) the cost thereof (hereinafter referred to as "allowable cost") determined by the Contracting Officer to be allowable in accordance with -
 - (A) Part 2 of Section 15 of the Federal Procurement Regulation as in effect on the date of this contract; and
 - (B) the terms of this contract; and
 - (ii) such fixed fee, if any, as may be provided for in the Schedule.
- (b) Once each month (or at more frequent intervals, if approved by the Contracting Officer), the Contractor may submit to an authorized representative of the Contracting Officer, in such form and reasonable detail as such representative may require, an invoice or public voucher supported by a statement of cost incurred by the Contractor in the performance of this contract and claimed to constitute allowable cost.
- (c) Promptly after receipt of each invoice or voucher and statement of cost, the Government shall, except as otherwise provided in this contract, subject to the provisions of (d) below, make payment thereon as approved by the Contracting Officer. Payment of the fixed fee, if any, shall be made to the Contractor as specified in the Schedule; PROVIDED, however, that after payment of eighty-five percent (85%) of the fixed fee set forth in the Schedule, further payment on account of the fixed fee shall be withheld until a reserve of either fifteen percent (15%) of the total fixed fee, or one hundred thousand dollars (\$100,000), whichever is less, shall have been set aside.
- (d) At any time or times prior to final payment under this contract, the Contracting Officer may have invoices or vouchers and statements of cost audited. Each payment theretofore made shall be subject to reduction for amounts included in the related invoice or voucher which are found by the Contracting Officer, on the basis of such audit, not to constitute allowable cost. Any payment may be reduced for overpayments, or increased for underpayments, on preceding invoices or vouchers.
- (e) On receipt and approval of the invoice or voucher designated by the Contractor as the "completion invoice" or "completion voucher" and upon compliance by the Contractor with all the provisions of this contract (including, without limitation, the provisions relating to patents and the provisions of (f)

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below), the Government shall promptly pay to the Contractor any balance of allowable cost, and any part of the fixed fee which has been withheld pursuant to (c) above or otherwise not paid to the Contractor. The completion invoice or voucher shall be submitted by the Contractor promptly following completion of the work under this contract but in no event later than one (1) year (or such longer period as the Contracting Officer may in his discretion approve in writing) from the date of such completion.

- (f) The Contractor agrees that any refunds, rebates, credits, or other amounts (including any interest thereon) accruing to or received by the Contractor or any assignee under this contract shall be paid by the Contractor to the Government, to the extent that they are properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract. Reasonable expenses incurred by the Contractor for the purpose of securing such refunds, rebates, credits, or other amounts shall be allowable costs hereunder when approved by the Contracting Officer. Prior to final payment under this contract, the Contractor and each assignee under this contract whose assignment is in effect at the time of final payment under this contract shall execute and deliver --
- (1) an assignment to the Government, in form and substance satisfactory to the Contracting Officer, of refunds, rebates, credits, or other amounts (including any interest thereon) properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract; and
 - (11) a release discharging the Government, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this contract, subject only to the following exceptions --
 - (A) specified claims in stated amounts or in estimated amounts where the amounts are not susceptible of exact statement by the Contractor;
 - (B) claims, together with reasonable expenses incidental thereto, based upon liabilities of the Contractor to third parties arising out of the performance of this contract; PROVIDED, that such claims are not known to the Contractor on the date

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of the execution of the release; and PROVIDED FURTHER that the Contractor gives notice of such claims in writing to the Contracting Officer not more than six (6) years after the date of the release or the date of any notice to the Contractor that the Government is prepared to make final payment, whichever is earlier; and

- (c) claims for reimbursement of costs (other than expenses of the Contractor by reason of any indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Contractor under the provisions of this contract relating to patents.
- (g) Any cost incurred by the Contractor under the terms of this contract which would constitute allowable cost under the provisions of this clause shall be included in determining the amount payable under this contract, notwithstanding any provisions contained in the specifications or other documents incorporated in this contract by reference, designating services to be performed or materials to be furnished by the Contractor at his expense or without cost to the Government.

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ARTICLE 7. Negotiated Overhead Rates.

- (a) Notwithstanding the provisions of the clause of this contract entitled "Allowable Cost, Fixed Fee, and Payment", the allowable indirect costs under this contract shall be obtained by applying negotiated overhead rates to bases agreed upon by the parties, as specified below.
- (b) The Contractor, as soon as possible but not later than ninety (90) days after the expiration of each period specified in the Schedule, shall submit to the Contracting Officer, the cognizant audit activity and the Chief, Finance Branch, Coast and Geodetic Survey, Washington, D.C., a proposed final overhead rate or rates for that period based on the Contractor's actual cost experience during that period, together with supporting cost data. Negotiation of final overhead rates by the Contractor and the Contracting Officer shall be undertaken as promptly as practicable after receipt of the Contractor's proposal.
- (c) Allowability of costs and acceptability of cost allocation methods shall be determined in accordance with Subpart 1-15 of Federal Procurement Regulation as in effect on the date of this contract.
- (d) The results of each negotiation shall be set forth in a modification to this contract, which shall specify (i) the agreed final rates, (ii) the bases to which the rates apply, and (iii) the periods for which the rates apply.
- (e) Pending establishment of final overhead rates for any period, the Contractor shall be reimbursed either at negotiated provisional rates as provided in the Schedule or at billing rates acceptable to the local cognizant Government auditing agency and the Chief, Finance Branch, subject to appropriate adjustment when the final rates for that period are established. To prevent substantial over or under payment, the provisional or billing rates may, at the request of either party, be revised by mutual agreement, either retroactively or prospectively. Any such revision of negotiated provisional rates provided in the Schedule shall be set forth in a modification to this contract.
- (f) Any failure by the parties to agree on any final rate or rates under this clause shall be considered a dispute concerning a question of fact for decision by the Contracting Officer within the meaning of the "Disputes" clause of this contract.

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ARTICLE 8. REPORTS:

The Contractor agrees to furnish the following progress reports which shall be delivered to the address reflected under Article 4.

- (a) One by June 15, 1965, consisting of eight (8) copies.
- (b) One by July 13, 1965, consisting of eight (8) copies.
- (c) A draft of the final report by August 10, 1965, consisting of twenty (20) copies.
- (d) Final report by August 24, 1965 consisting of two hundred twenty five (225) copies.

The Contractor further agrees to:

- (1) Present an oral briefing if requested to do so by personnel of the Office of Administration, Coast and Geodetic Survey, upon submission of each of the above reports.
- (2) Use offset printing for reproduction of the final report and surrender the reproducible masters to the Coast and Geodetic Survey as Government Property. The master copies shall be delivered with the 225 copies of the final report.

ARTICLE 9. Rights in Data

- (a) The term "Subject Data" as used herein includes writings, sound recordings, pictorial reproductions, drawings or other graphical representations, and works of any similar nature (whether or not copyrighted) which are specified to be delivered under this contract. The term does not include financial reports, cost analyses, and other information incidental to contract administration.
- (b) All Subject Data first produced in the performance of this contract shall be the sole property of the Government. The Contractor agrees not to assert any rights at common law or equity and not to establish any claim to statutory copyright in such Data. The Contractor shall not publish or reproduce such Data in whole or in part or in any manner or form, nor authorize others so to do, without the written consent of the Government until such time as the Government may have released such Data to the public.

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- (c) The Contractor agrees to grant and does hereby grant to the Government and to its officers, agents and employees acting within the scope of their official duties, a royalty-free, nonexclusive, and irrevocable license throughout the world (1) to publish, translate, reproduce, deliver, perform, use, and dispose of, in any manner, any and all Data not first produced or composed in the performance of this contract but which is incorporated in the work furnished under this contract; and (11) to authorize others so to do.
- (d) The Contractor shall advise the Contracting Officer, at the time of delivering any copyrightable or copyrighted work furnished under this contract, or any adversely held copyrighted or copyrightable material incorporated in any such work and of any invasion of the right of privacy therein contained.
- (e) Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government under any patent.
- (f) Paragraphs (c) and (d) above are not applicable to material furnished to the Contractor by the Government and incorporated in the work furnished under the contract; PROVIDED, such incorporated material is identified by the Contractor at the time of delivery of such work.
- (*) Contractor's attached letter dated June 23, 1965 is incorporated and made a part of this contract with the following exception:

On Page 2, Paragraph 3 is deleted. Subparagraph (d) of Article 9 has been changed as reflected hereon in accordance with telephone conversation of June 25, 1965 between Mr. Holcomb and Mr. Roberts, Commerce Department.

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SECURITY REQUIREMENTS

ARTICLE 10. SECURITY REQUIREMENTS.

- (a) The provisions of this clause shall apply to the extent that this contract involves access to information classified "Confidential" or higher.
- (b) The Government shall notify the Contractor of the security classifications of this contract and the elements thereof, and of any subsequent revisions in such security classification, by the use of a Security Requirements Check List (DD Form 254), or other written notification.
- (c) To the extent the Government has indicated as of the date of this contract or thereafter indicated security classification under this contract as provided in paragraph (a) above, the Contractor shall safeguard all classified elements of this contract and shall provide and maintain a system of security controls within his own organization in accordance with the requirements of --
- (1) the Security Agreement (DD Form 442), including the Department of Defense Industrial Security Manual for Safeguarding Classified Information as in effect on the date of this contract, and any modification to the Security Agreement for the purpose of adapting the Manual to the Contractor's business; and
- (ii) any amendments to said Manual made after the date of this contract, notice of which has been furnished to the Contractor by the Security Office of the Military Department having security cognizance over the facility.
- (d) Representatives of the Military Department having security cognizance over the facility and representatives of the contracting Military Department shall have the right to inspect at reasonable intervals the procedures, methods, and facilities utilized by the Contractor in complying with the security requirements under this contract. Should the Government, through these representatives, determine that the Contractor is not complying with the security requirements of this contract the Contractor shall be informed in writing by the Security Office of the cognizant Military Department of the proper action to be taken in order to effect compliance with the requirements.

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- (c) The Contractor agrees to insert in all subcontracts hereunder which involve access to classified information, provisions which shall conform substantially to the language of this clause, including this paragraph (c).
- (d) The Contractor also agrees that he shall determine that any subcontractor proposed by him for the furnishing of supplies and services which will involve access to classified information in the Contractor's custody has been granted an appropriate facility security clearance, which is still in effect prior to being accorded access to such classified information.

ARTICLE 11. INSPECTION:

The Government, through any authorized representatives, has the right, at all reasonable times, to inspect, or otherwise evaluate the work performed or being performed hereunder and the premises in which it is being performed. If any inspection, or evaluation is made by the Government on the premises of the Contractor or a subcontractor, the Contractor shall provide and shall require his subcontractors to provide all reasonable facilities and assistance for the safety and convenience of the Government representatives in the performance of their duties. All inspections and evaluations shall be performed in such a manner as will not unduly delay the work.

ARTICLE 12. ADVANCE NOTICE OF SUBCONTRACTORS OR PURCHASE ORDERS:

The Contractor will notify the Government in advance of any subcontract or purchase order which exceeds in dollar amount either \$25,000.00 or 5% percent of the total estimated cost of this contract. The Contractor agrees that no subcontract or purchase order placed under this contract shall provide for payment on a cost plus-a-percentage-of-cost basis.

ARTICLE 13. BUY AMERICAN CERTIFICATE:

The bidder or offeror hereby certifies that each end product, except the end products listed below, is a domestic source end product (as defined in the clause entitled "Buy American Act"); and that components of unknown origin have been considered to have been mined, produced, or manufactured outside the United States:

Excluded end products (show country of origin for each excluded end product):

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ARTICLE 14. ACCESS OF RECORDS AND RIGHT TO AUDIT

A. The Contractor agrees that the Secretary of Commerce or his duly authorized representatives shall, until the expiration of three years after final payment under this contract, have access to and the right to examine any books, documents, papers, and records of the Contractor involving transactions related to this contract.

B. The Contractor further agrees to require all subcontractors under this contract, if any, to agree to the "access of records and right to audit" clause as provided in paragraph A of this article, for subcontracts in excess of Two Thousand, Five Hundred Dollars (\$2,500.00).

ARTICLE 15. - TERMINATION FOR CONVENIENCE OF THE GOVERNMENT:

The Contracting Officer, by written notice to the Contractor, may terminate this contract in whole or in part for the convenience of the Government, whenever he determines that such action is in the best interest of the Government. If this contract is so terminated, the Contractor shall be compensated in accordance with the provisions of "Federal Procurement Regulations" Subpart 1-8.701 in effect as of the effective date of this contract, such regulations are incorporated by reference as part of this contract.

ARTICLE 16. GENERAL PROVISIONS

Standard Form 32, June 1964 edition, is incorporated in this contract by reference, except that the following paragraphs are not applicable to this contract and are deleted therefrom: 4, 5, 6, 7, 9, and 17.

ARTICLE 17. TAXES

The attached Form CB-7b(12-30-64), Federal, State and Local taxes is incorporated in and made a part of this contract.

ARTICLE 18. RELATED DOCUMENTS:

The following related documents are attached and made a part of this contract.

- (a) Department of Commerce telegram of May 18, 1965.
- (b) Contractor's telegram of May 20, 1965.
- (c) Supplement to contract proposal containing an Equal Employment Opportunity Representation and a Certificate of Independent Price Determination.

ARTICLE 19. AUTHORITY:

The Contract to which these provisions apply has been negotiated under the provisions of the Federal Property and Administrative Services Act of 1949, as amended, 41 U.S.C. 252(c)(4).

NAME OF AGENCY U. S. DEPARTMENT OF COMMERCE PROCUREMENT DIVISION ACCOUNTING CLASSIFICATION: C. 20220	PRECEDENCE ACTION: INFO: TYPE OF MESSAGE <input type="checkbox"/> SINGLE <input type="checkbox"/> BOOK <input type="checkbox"/> MULTI-ADDRESS
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TELEGRAPHIC MESSAGE
OFFICIAL BUSINESS
U. S. GOVERNMENT

THIS BLOCK FOR USE OF COMMUNICATIONS UNIT

MESSAGE TO BE TRANSMITTED (Use double spacing and all capital letters)

THIS COL. FOR AGENCY USE

URGENT

**URGENT: MR. E. U. CLEWER, ASSISTANT DIRECTOR
COAST AND GEODETIC SERVICE, WASH DC**

THIS IS OFFICIAL ACCOUNTS OF YOUR SIGNAL DATED APRIL 20, 1965 FOR FURNISHING THE NECESSARY PROFESSIONAL SERVICES TO CONDUCT A STUDY ON YOUR BENEFITS ARISING FROM THE ACTIVITIES OF THE UNITED STATES COAST AND GEODETIC SURVEY IN CONGRESSIONAL HEARING ROOMS FOR THE ESTIMATED MONETARY AMOUNT OF \$25,000.00 ON A COST BASIS UNDER THE ABOVE PERFORMANCE TIME OF THE STUDY SHALL BE FOR CONTRACT (16) WEEKS AFTER THE DATE OF THIS TELEGRAM. CONTRACT NO. C-000-65(16) IS ASSIGNED AND SHOULD BE IN YOUR ABOVE TELEGRAM SUBJECT TO CONTRACT NO. C-000-65(16) DATED APRIL 12, 1965, WHICH WAS SIGNED BY H. ARTHUR HARR, DIRECTOR, COAST AND GEODETIC SERVICE. LIABILITY OF GOVERNMENT HEREUNDER IS LIMITED TO \$27,515.00 INCLUDING FAVORABLE OF SUBJECT DEFERRED CONTRACT. THIS TELEGRAM IS REFERRED TO AND CONTRACT NO. C-000-65(16), WHICH WILL BE MAILED SEPARATE, INCLUDE GENERAL PROVISIONS, STANDARD FORM 32, JUNE 1964 EDITION, TERMINATION FOR CONVENIENCE CLAUSE CITED IN 1-1.301 OF FEDERAL PROCUREMENT REGULATIONS, OBLIGATION OF INDEPENDENT PRICING STATED AT 1-1.317 OF FEDERAL PROCUREMENT REGULATIONS AND RIGHT OF ACCESS TO CONTRACT RECORDS AND AUDIT THROUGH BY DEPARTMENT OF COMMERCE. REIMBURSEMENT OF COSTS WILL BE MADE IN

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DO NOT TYPE MESSAGE BEYOND TR-5 LINE

PAGE NO. 1	NO. OF PAGES 2
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NAME OF AGENCY ACCOUNTING CLASSIFICATION THIS BLOCK FOR USE OF COMMUNICATIONS UNIT	PRECEDENCE ACTION: INFO.: TYPE OF MESSAGE <input type="checkbox"/> SINGLE <input type="checkbox"/> BOOK <input type="checkbox"/> MULTI-ADDRESS	SECURITY CLASSIFICATION STANDARD FORM 14 REV. MARCH 13, 1957 OSA REGULATION 2 IX 703.04 14-303 TELEGRAPHIC MESSAGE OFFICIAL BUSINESS U. S. GOVERNMENT		
MESSAGE TO BE TRANSMITTED (SEE 2-1.1)				
<p> ACCORDANCE WITH SUBPART 1-15-2 OF THE FEDERAL PROCUREMENT REGULATIONS, IN EFFECT AS OF THE DATE OF THIS CONTRACT. PARIAL PAYMENTS UP TO A TOTAL OF \$2,500.00 WILL BE AUTHORIZED AGAINST THIS TELEGRAM IF DE- SIRED BY THE CONTRACTOR. REQUEST TAX CONSEQUENCES. </p> <p> DEPARTMENT OF COMMERCE PROCUREMENT DIVISION </p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p> CC: Confirmation (Signed) WSC-3222 (signed) WSC-7 ✓ C-300-65 (Neg.) signed WSC-3105 Office of the General Counsel Mr. Merlino </p> </td> <td style="width: 50%; vertical-align: top;"> <p> Accounting Data: 1350809, S&E, 1965 104/Project Code to be assigned Reqn. No. 009-5132-02384 (Obligate \$27,515.00) </p> </td> </tr> </table>			<p> CC: Confirmation (Signed) WSC-3222 (signed) WSC-7 ✓ C-300-65 (Neg.) signed WSC-3105 Office of the General Counsel Mr. Merlino </p>	<p> Accounting Data: 1350809, S&E, 1965 104/Project Code to be assigned Reqn. No. 009-5132-02384 (Obligate \$27,515.00) </p>
<p> CC: Confirmation (Signed) WSC-3222 (signed) WSC-7 ✓ C-300-65 (Neg.) signed WSC-3105 Office of the General Counsel Mr. Merlino </p>	<p> Accounting Data: 1350809, S&E, 1965 104/Project Code to be assigned Reqn. No. 009-5132-02384 (Obligate \$27,515.00) </p>			
DO NOT TYPE MESSAGE BEYOND THIS LINE				
NAME AND TITLE OF ORIGINATOR (Type)		ORIGINATOR'S TEL. NO.		
GEORGE F. MERLINO ACTING CHIEF, CONTRACTING BRANCH		NO 7-4971		
I certify that the message is correct and is not personal, and is in the interest of the Government.		DATE AND TIME PREPARED		
<i>George F. Merlino</i> (Signature)		MAR 21 1965 4:30 P.M.		

MAY 20 1965

K06020 480P EDT MAY 20 65 UN155

(MC) (TLK200) THIS MESSAGE RECEIVED DIRECT FROM SENTER VIA

RE TELETYPE PD TLR COLUMBUS OHIO 20 541P EDT

GEORGE F MERLENO

UNITED STATES DEPT OF COMMERCE PROCUREMENT DIV WASHDC
RECEIPT OF YOUR TELEGRAM DATED MAY 18, 1965, IN WHICH YOU ACCEPTED
OUR PROPOSAL DATED APRIL 23, 1965, TO CONDUCT A STUDY ON "WATER
BENEFITS ACCRUING FROM THE ACTIVITIES OF THE U. S. C. AND G.
C. IN CONTINENTAL SHELF REGIONS" IS HEREBY ACKNOWLEDGED. BATTELLE
WILL PROCEED ON A LIMITED BASIS WITH THIS RESEARCH WITH THE
UNDERSTANDING THAT CONTRACT NO. C-300-65 WILL BE NEGOTIATED
AS SOON AS POSSIBLE. IF EXECUTION OF THE CONTRACT CAN BE EXPEDITED
BY OUR PRESENCE IN WASHINGTON, WE WILL BE HAPPY TO DO SO.

IF THERE ARE QUESTIONS, PLEASE CONTACT ME AT 220-3151.

EXTENSION 375

PHILIP H WATSON CONTRACTS COORDINATOR BATTELLE MEMORIAL INSTITUTE

SUPPLEMENT TO
CONTRACT PROPOSAL FOR

(Furnishing Necessary Professional Services To Conduct A Study On "User Benefits Accruing From The Activities of U. S. Coast and Geodetic Survey In Continental Shelf Regions.")

Est. \$55,000.00

EQUAL OPPORTUNITY REPRESENTATION: The bidder (or offeror) represents that he _____ has, _____ has not, participated in a previous contract or subcontract subject to either the Equal Opportunity clause herein or the clause originally contained in section 301 of Executive Order 10925; that he _____ has, _____ has not, filed all required compliance reports; and that representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards.

CERTIFICATE OF INDEPENDENT PRICE DETERMINATION:

(a) By submission of this bid or proposal, each bidder or offeror certifies, and in the case of a joint bid or proposal each party thereto certifies as to its own organization, that in connection with this procurement:

(1) The prices in this bid or proposal have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or offeror or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this bid or proposal have not been knowingly disclosed by the bidder or offeror and will not knowingly be disclosed by the bidder or offeror prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other bidder or offeror or to any competitor; and

(3) No attempt has been made or will be made by the bidder or offeror to induce any other person or firm to submit or not to submit a bid or proposal for the purpose of restricting competition.

(b) Each person signing this bid or proposal certifies that:

(1) He is the person in the bidder's or offeror's organization responsible within that organization for the decision as to the prices being bid or offered herein and that he has not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above; or

(2)(1) He is not the person in the bidder's or offeror's organization responsible within that organization for the decision as to the prices being bid or offered herein but that he has been

authorized in writing to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above, and as their agent does hereby so certify, and (1) he has not participated, and will not participate, in any action contrary to (a)(3) above.

(c) This certification is not applicable to a foreign bidder or offeror submitting a bid or proposal for a contract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(d) A bid or proposal will not be considered for award where (a)(1), (a)(3), or (b) above has been deleted or modified. Where (a)(2) above has been deleted or modified, the bid or proposal will not be considered for award unless the bidder or offeror furnishes with the bid or proposal a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

OFFEROR REPRESENTS: (Check appropriate boxes)

(1) That he is, is not, a small business concern. Generally, a small business concern for the purpose of Government procurement is a concern that (1) is not dominant in its field of operation and, with its affiliates, employs fewer than 500 employees, or (2) is certified as a small business concern by Small Business Administration. (See Code of Federal Regulations, Title 13, Part 103, as amended, which contains the detailed definition and related procedures.)

(2) (a) That he has, has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract, and (b) that he has, has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to (a) and (b) above as requested by the Contracting Officer. (For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 44, Part 150).

(3) He operates as an individual, partnership, corporation, incorporated in the State of Ohio.

Battelle Memorial Institute

BY : R. D. Williams
(Signature)
TITLE: R. D. WILLIAMS
DATE : -CONTRACTING OFFICER

Battelle Memorial Institute · COLUMBUS LABORATORIES

505 KING AVENUE COLUMBUS, OHIO 43201 · AREA CODE 614. TELEPHONE 299-3151 · CABLE ADDRESS: BATMIN

June 23, 1965

U. S. Department of Commerce
Office of the Secretary
Washington, D.C. 20230

Attention Mr. George F. Merlino
Acting Chief, Contracting Branch

Dear Mr. Merlino:

Contract No. C-300-65(Neg)

Enclosed are three signed copies of the subject contract. We have signed them subject to the following changes either being made in the subject contract or incorporated into the subject contract by reference.

1. Article 2, Performance Time, appearing on Page 2 should be revised to read as follows: "The performance time allowed for completion of the research to be performed under this contract is thirteen (13) weeks. In accordance with Department of Commerce telegram dated May 18, 1965, work shall begin immediately, be completed, and a draft of the final report submitted no later than August 17, 1965. Notwithstanding the foregoing, costs associated with Battelle's preparation and submission of the final report in final form will be allowable through September 30, 1965.
2. Article 8, Reports, which appears on Page 8 should be revised to read as follows: "The Contractor agrees to furnish the following progress reports which shall be delivered to the address reflected under Article 4.
 - (a) One by June 23, 1965, consisting of eight (8) copies.
 - (b) One by July 26, 1965, consisting of eight (8) copies.
 - (c) A draft of the final report by August 17, 1965, consisting of twenty (20) copies.

Battelle Memorial Institute

U. S. Department of Commerce

-2-

June 23, 1965

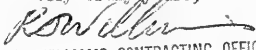
- (d) Final report within ten (10) days after receipt by Battelle of the approved draft of the final report. Fifty (50) copies will be submitted."

The Contractor further agrees to:

- (1) Present an oral briefing on June 21, 1965, and upon submission of the final report in final form (Paragraph d).
 - (2) Use offset printing for reproduction of the final report and surrender the reproducible masters to the Coast and Geodetic Survey as Government Property. The master copies shall be delivered with the 50 copies of the final report.
3. Paragraph (d) should be deleted from Article 9, Rights and Data, appearing on Page 8 and 9. Because Battelle is engaged solely in research and development, it cannot assume the legal liability imposed by copyright or patent indemnification.

Your prompt preparation and submission of the subject contract for our review is appreciated and if there are questions, please do not hesitate to contact P. H. Watson at Extension 375. The above changes were discussed by Mr. Watson and your Mr. Roberts in a telephone conversation on June 22.

Very truly yours,


R. D. WILLIAMS CONTRACTING OFFICER
FOR E. E. Glover
Associate Director

EES:cvg
In duplicate
Enclosures (3)
Air mail

Dr. HOLLOMON. I would like to take the initiative to introduce another study that we have had underway, just completed, which is a study, with full participation of the other agencies in the letting of the contract and analysis of what is to be done, that has taken about 18 months, on how to carry out in the most efficient way ocean surveys.

And here you have a problem, of course. You have that vast ocean, and that vast Continental Shelf. What is the most efficient way to do this? How many stations? How much observation? What size ships, how you deploy them? Do you use ocean buoys or do you use ships? What is the most effective way to carry out such studies, and at what time?

We have just gotten the results of it. It is a major analysis carried on by the Operations Research, Inc., of the operational problems, if you will, having to do with ocean surveys, and that is another analysis which is partly pertinent to the question of the Continental Shelf.

Mr. KEITH. When you say "physical oceanography," I think you mean chemical, biological, and geological oceanography, as well, because all are a part of descriptive oceanography, as you speak of it.

Every Government department with a major interest in oceanography has as an internal part of the overall program a large program for descriptive oceanography. By the general import of your statement are you not suggesting, then, that these Government departments now look to ESSA for information in descriptive oceanography, and discontinue their own descriptive oceanographic programs?

Dr. HOLLOMON. No, sir. What I am saying is that we have the concept in this field, as what I would refer to as a core program, that program which provides the overall leadership and coordination of that aspect of the problem, and that each agency then would have to do those special studies which they believe are absolutely essential to their mission, and then we provide a mechanism of coordination through an activity such as ICO, to be sure that the studies are, in fact, coordinated.

Mr. KEITH. Thank you, Mr. Chairman.

Mr. LENNON. Mr. Dow?

Mr. Dow. I think I am out of turn here. I believe that Mr. Downing would be next.

Mr. DOWNING. Go ahead.

Mr. Dow. All right.

I would like to compliment you, Dr. Hollomon, on a very good expression of your convictions and a very thoughtful presentation. I am sure you are familiar with H.R. 2218.

Dr. HOLLOMON. Yes, sir.

Mr. Dow. Which is the bill that you mentioned yourself in your presentation.

Now, section 5 of that bill says that the President shall report annually during the month of February to the Congress. Such reports shall contain the following, and that is a general review of the problems of oceanography, in the year, a general analysis, a financial analysis, and also current and future plans and policies of the United States with respect to oceanography.

Do you believe, sir, that it would be advisable to have such an annual stocktaking as this represents, coupled with recommendations for the coming year?

Dr. HOLLOMON. I so stated in my testimony, and I will reiterate, I believe this is highly desirable.

Mr. Dow. Thank you, sir.

That is all, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Dow.

Mr. Reinecke?

Mr. REINECKE. Yes, sir.

Dr. Hollomon, on page 3, you say :

I think there must be increased attention to oceanography within the executive branch and that there must be strengthened leadership in those areas—

Dr. HOLLOMON. Yes, sir.

Mr. REINECKE. You apparently don't want to rock the boat. You like things pretty much as they are, in general.

Where do you think this increased motivation is going to come from?

Dr. HOLLOMON. It strikes me—the reason I was laughing is because some of the feelings of others in the executive branch and elsewhere is I do like to rock the boat, and sometimes I feel the boat is rocking so badly I can hardly keep on it.

Mr. REINECKE. We haven't noticed that here this morning.

Dr. HOLLOMON. I have suggested that initiative might come from either or both. I strongly recommend that the Congress look at the programs that are now underway, and decide whether or not they believe they are adequate and whether, for example, in the exploration of the Continental Shelf, we are doing enough work in the country, in the country's interest.

My suggestion is, however, that the agencies that ought to be responsible are identified within the general complex of things. I have taken initiative to start the study with Coast Survey as to what we ought to do on the Continental Shelf.

We have sought increases from the Congress each year for our oceanographic program, every year since I have been in Washington, and we have increased our capability within those activities which we have. We intend to strengthen it by hiring additional people. I think that the level of the effort is determined by the level of the appropriations, in large measure.

Mr. REINECKE. Well, I think the reason we have so many bills and bills of such diversity is simply that the members of Congress are, frankly, frustrated at the slow motion on the part of the executive branch, and, yet, if we don't make some fairly drastic administrative changes, I don't see any reason why the executive is going to do any more now than it has in the past. We have no reason to think that you will change the dead-center type of programs that we feel that you have.

Dr. HOLLOMON. I make two suggestions in this regard: One is that I strongly believe that Congress should look at the oceanographic program as a whole. Somebody, somewhere in Congress, should look at this program as a whole.

According to the suggestions in the bill we are discussing, it is that we would have to present an annual plan, and that it be reviewed in terms of the oncoming appropriation and possible legislative changes. I think that the fact that we look at oceanography in so

many places in the Congress, for example, could be helped by such an overall look once a year.

Mr. REINECKE. Don't you feel it is rather difficult to really look at something that is being carried on in 22 different departments?

Dr. HOLLOMON. I don't know that that is so difficult. It depends on whether Congress would have the necessary data and reviews and hearings that are required. We have in the case of meteorology 13 major departments. We present, starting 2 years ago, a single Federal plan which analyzes that work from various points of view. I think that could be done.

I think that both President Kennedy and President Johnson have indicated their support for oceanography, but you can't do it without money. And I think that this is a decision that the Congress, itself, has to make, as to that problem. I really don't see it as an organizational problem. This is what I am trying to say.

Of course, we can always improve what we are doing. I think that we should make every attempt to do so, but the ICO and two Assistant Secretaries of the Navy who have responsibility have devoted substantial attention to the problem. They have a staff which may not be sufficient. But both administrations have supported oceanography.

Our own program, though it isn't a tremendous one, has increased each year in a very substantial way, and will increase next year.

Mr. REINECKE. Do you have the feeling that Congress has been shorting you funds, that you have not had sufficient funds?

Dr. HOLLOMON. I have not done an analysis, but it might be useful to look at the requests to the Congress overall for oceanography.

Mr. REINECKE. I am not aware that such was the case.

Dr. HOLLOMON. I think it might be a useful thing to do. I haven't done the analysis, either, but I think this committee might look at the requests for all the agencies for oceanography and see what the action of Congress has been with respect to them. I think this might be a useful thing to take a look at.

Mr. REINECKE. Another area of interest: You indicated that a single agency—

Dr. HOLLOMON. Before going back, may I make one other comment?

Mr. REINECKE. Surely.

Dr. HOLLOMON. There is another aspect of this problem which I think that the Congress should take account of, and that is that the facilities for studying the ocean, both the institutions and the ships and so forth, take a time to build. Now, for example, we have two ships on the ways, ready, we hope, by fall. They were authorized 3 years ago. Now, it takes time. We have another ship which we are just about to let the contract for—another ship for oceanographic studies. This will mean we have, then, what? Five?

Admiral KARO. We will have a total of four ships on ocean studies.

Dr. HOLLOMON. A total of four ships on ocean studies.

In the next few years, we will quadruple our effort to do that. I would like to make the point that though we are very diffuse if you have many agencies doing it, I think that in our kind of society, to have that kind of multiplicity of agencies is good. I don't think there is a single nation in the world that has a more effective broad-scale oceanographic, ocean study program than does the United States.

Mr. REINECKE. You indicated that—you had a certain fear that a single agency would, as you put it, fragment Federal responsibilities in these matters.

Dr. HOLLOMON. Yes. I do.

Mr. REINECKE. Do you feel that NASA has fragmented the Federal responsibilities in the space area?

Dr. HOLLOMON. NASA is a somewhat different problem. At the very beginning, as was commented yesterday in testimony, there were no people, substantially, other than the military and some parts of the old NACA that had to do with space at all. It is a new technology. It is not a requirement—an established, long-time requirement—of many agencies and missions.

But, now, let's take what is happening with respect to even the NASA activities. The Congress, and I think wisely, has assigned to the Department of Commerce the responsibility of the operation and funding for the meteorological satellites which have been so successful, after the fundamental work had been done by NASA.

We also have to fund the development of the instrumentation for those satellites.

Now, whether we need them or not, and how good they are for weather observation, in my view, should be decided by the Weather Bureau. If those costs get out of line, relative to some other way to get the same observations, the Weather Bureau should make that decision.

Now we are in the process. That is one step that the Congress took.

The second step the Congress took was the establishment of COM-SAT Corp., which is to utilize the technology of space for the purpose of communication. And this kind of activity is now diffuse and dispersed, because we are now able to say, "All right; here's something we can do with it," and then the funding for that is, as you know, in private hands.

I think increasingly we will use satellites for geodetic measurement. We have a joint project with NASA and the Department of Defense which we hope will be funded in the new ESSA organization, because now we can use it for measuring the land, which is a responsibility formerly of the Coast and Geodetic Survey. Here again, we will have some other activities in satellites, so as we begin to develop the use of these tools, they get diffuse, and properly so, in my view.

Now, in the case of oceanography, the knowledge of the oceans is essential to the missions of many agencies of the Government, and they, in my view, have to make the trade-offs, the relative judgments as to what they ought to be.

Mr. REINECKE. Well, I agree that in any particular scientific endeavor, diversity is the keynote of success, but we seem to be lacking coordination.

One final question: You seem to indicate that you felt that the Interagency Committee on Oceanography was doing a good job, and I am interested in knowing why, then, the President felt the necessity of setting up his Oceanography Panel.

Dr. HOLLOMAN. First off, the Interagency Committee on Oceanography is primarily, but not exclusively, a Government interagency committee. It represents the Federal establishment and coordinates it.

Now, one of the things we learned during the war, and I think

learned very well, is from time to time, we ought to take a look at the scientific community outside the Government, and be sure we haven't missed a bet, that there isn't something new in the wind like nuclear fission which can come up over the top and really modify what the establishment thinks is a good idea.

And we learned the lesson, I hope we have learned it forever, that we shouldn't always depend on any existing bureaucracy or organization to have all the wisdom in the world. We ought to bring in some outsiders every now and then, to ask the question, "Are you doing a good job, or should you change it?"

And I think that technique is fundamental to the operation of the Government, and we ought to do it from time to time, and that is what—and I, as I say, understand it to be the reason for having the special committee on oceanography.

Mr. REINECKE. Thank you. I appreciate your comments, and I think you defend your position very well.

No further questions, Mr. Chairman.

Mr. LENNON. Mr. Downing?

Mr. DOWNING. Mr. Secretary, although I disagree with your well-expressed point of view, I think you have made a splendid statement on its behalf.

Dr. HOLLOMON. Thank you, sir.

Mr. DOWNING. I think Mr. Reinecke has pretty well expressed the concern of this committee. Most of us feel that there is an apathy on the part of the Federal Government to implement this program, and I think we can recall back to the time when the NASA proposal was being debated in the Congress. We had this same sort of testimony. There was reluctance on the part of the various agencies of Government to join in this proposal for a unified NASA, and you must remember that space was more complex and intangible than oceanography is now.

But it was the wisdom of the Congress to go ahead with NASA and, because of that, I think we have at least maintained a preeminence in space.

And I think the same thing holds true of oceanography. I think it is time now to have our Government implement this new front, and I think it is going to take a single agency to do it. I notice—well, take the letter from your General Counsel to Chairman Bonner. It is a letter which says more or less what you said, that we think we have got enough now, but it concludes with:

However, we recognize that it may become desirable in the future to have an intensive general review of the national oceanographic activity, conducted by a commission of highly qualified persons. If your committee now desire to recommend legislation directed toward possible future review of oceanography, we suggest it include the following amendments, * * *—and so forth.

Dr. HOLLOMON. Yes, sir.

Mr. DOWNING. No firm position.

Dr. HOLLOMON. I thought that I had taken a firm position with respect to the overall problem. Let me try to—

Mr. DOWNING. You did, but your General Counsel didn't.

Dr. HOLLOMON. I think that such a commission should be discretionary to the President to establish that commission, if he thinks it is a proper thing to do at this stage of development. This is what our General Counsel said.

Now, let's go back to the question. I think to take all oceanography and put it in a single agency would create problems of the kind we have had with respect to the relationship between oceanography and meteorology in a little bitty microcosm in our own department. You can't separate the problem of oceanography from the problem of meteorology for aircraft.

You have a problem here of insuring that the whole program of oceanography, for whatever purposes, is adequately carried out. I believe that if you set up a separate agency, you will do more harm than good to the interaction of oceanography with all of the diverse activities of the public, both private and Government.

Mr. DOWNING. Mr. Secretary, how can you say that, in view of our experience with NASA?

Dr. HOLLOMON. Because NASA is a different animal.

Mr. DOWNING. No; it isn't. Now, you take the meteorology, weather. NASA is contributing toward this; our weather, the TIROS satellites.

Dr. HOLLOMON. Right. But we fund—

Mr. DOWNING. It is working hand in glove with your Weather Department.

Dr. HOLLOMON. Right, but there is a program of operational and development of the use of satellites for weather in the Department of Commerce, and we fund it.

Mr. DOWNING. But it is under NASA.

Dr. HOLLOMON. It isn't. I beg your pardon, sir.

Mr. DOWNING. You transfer funds to NASA to carry on your—

Dr. HOLLOMON. Only for the construction and launching of the satellites. We operate all the read-out stations; we operate; we integrate, interpret the results; we develop the instruments. It is not centrally located.

Mr. DOWNING. But you still have one agency, NASA, which coordinates the whole thing.

Dr. HOLLOMON. The weather use of satellites is the responsibility of the Weather Bureau, not of NASA. By action of Congress.

Mr. DOWNING. You are not getting through to me, Mr. Secretary. That is my fault.

Dr. HOLLOMON. No.

Mr. DOWNING. How do you do it? For instance, is it manganese that we have to import?

Dr. HOLLOMON. Manganese—

Mr. DOWNING. Now, there is manganese on the bottom of the ocean.

Dr. HOLLOMON. Yes, sir.

Mr. DOWNING. Is the Government doing anything to experiment to extract manganese?

Dr. HOLLOMON. I can't answer the question explicitly, but I am sure that there have been studies of the economic benefits of recovering manganese. I know of one study by a private corporation.

Mr. DOWNING. Have you extracted one ounce of manganese from the bottom of the ocean?

Dr. HOLLOMON. Yes, sir—I don't know. I think there have been pilot plans on this.

Mr. DOWNING. Well, I will tell you. A shipyard in my hometown has gone out on its own and equipped an oceanographic vessel which is now operating off the coast of Florida, and they believe they can recover manganese in commercial quantities, but I think the Government should have done that long ago.

Off the record.

Dr. HOLLOMON. Well, I will put this off or on the record.

The real question here is whether it is cheaper to get manganese out of the ocean or out of the earth. That is the real question, and this is a decision which you have to make with respect to the private sector of the economy, largely. Now, if it isn't cheaper and more effective to do that, then you don't want to do it just because it is in the ocean, do you?

Mr. ROGERS. Would the gentleman yield just a minute for a question there?

Now, you are surely not taking this position, that because it may be expensive now that we should not do it.

Dr. HOLLOMON. Oh, no.

Mr. ROGERS. We would never have flown the airplane, simply because it would have been cheaper to go by horse at the time.

Dr. HOLLOMON. Oh, no.

Mr. ROGERS. And this is about the attitude that we are getting from the governmental departments.

Dr. HOLLOMON. I don't think that is so.

Mr. ROGERS. And this is what is upsetting to me. No; no. It is too expensive to get manganese—or whatever it is.

Dr. HOLLOMON. Whatever it is? [Laughter.]

Mr. ROGERS. Out of the ocean and, therefore, we won't even try, or experiment.

Dr. HOLLOMON. Mr. Rogers, I suggested that there is a need to have an agency responsible for the determining that necessary work on exploring the ocean for resources. I said that as clearly as I know how.

Mr. ROGERS. The point we are making is that has not been done. We have had an oceanography program. We had a 10-year report in 1955. You did your in-house study on it. There has been study after study, as you have told us. The Presidential Commission even had a study; we have had an interagency committee, but we still haven't found out about the manganese. We still haven't, evidently, given the necessary research to our industry to go out and do something about it, and to pare away where it is cheap enough to bring in, and so we have to import it, evidently, from other countries.

But this is the point that I am concerned with, that everything is just a lackadaisical sort of approach and that, well, we will just do it the same old way, and we will have an interagency committee study or a Presidential scientific study.

Excuse me.

I thank you.

Mr. DOWNING. Well, Mr. Secretary, we have a divergence of judgments, and I respect yours, but I would like to conclude by saying you have two frontiers. You have got space, and you have got inner space, and we only have one national program, and it is my judgment we need another national program.

Dr. HOLLOMAN. I understand your point of view, sir.

Mr. DOWNING. Thank you, sir.

Dr. HOLLOMAN. It is well stated, also.

Mr. LENNON. Mr. Secretary, the glamour and success of our space flights have created an image, particularly among the laymen of the country, that because of the concentration into the single Government agency, NASA, that a comparable central organization should be established in the whole facet and field and environment of oceanography.

Dr. HOLLOMAN. Yes.

Mr. LENNON. I realize myself that there is a vast difference, because we were dealing then primarily with three agencies within the Defense Department, and the Defense Department had the final say-so. We didn't have 16 other Federal agencies involved in space.

But the thing that concerns me, sir, is that the scientists and the engineers and those who for years have been engaged in oceanography are now reflecting, through a series of editorials and public statements, somewhat of the concern that has been shown by the interest of the members of this committee. I have here in front of me an editorial from one of the large papers of one of our great States, in which they quote a recent editorial by the Ocean Science News, and I shall read it for the record. This was August 2 of this year. I quote:

Apropos of nothing in particular except one man's frustration, we quote the following outburst as pertinent to the proliferation of committees, panels, societies, study groups, et cetera, that tout themselves as the answer, all to the woes and aspirations of oceanography. Oceanography in the United States is becoming one vast bureaucratic bowl of noodles. The only way to get anything done is to push one of the noodles and hope that this same one comes out at the other end.

Now, when editorials written by a so-called knowledgeable person, the editor of the Ocean Science News, appears as editorial quotes in editorials across the country, then our people write to Congressmen, write the Members of the House and the Senate, and say, well, why isn't something done? Why don't you bring these various agencies together, and get on the road? Get the show on the road?

So, you can see why the Members of Congress are, at this point concerned about what some of us seem to think is perhaps not being quite as aggressive as we should.

Now if we could go to your statement, on page 3 you say:

Speaking very generally, oceanography is embraced in two broad areas, one, the description and prediction of oceanic conditions.

Now, what agencies of the Federal Government should be charged with that responsibility, the description and prediction conditions, in your judgment?

Dr. HOLLOMAN. In my judgment, Mr. Chairman, that should be clearly defined as the responsibility of the new organization ESSA.

Mr. LENNON. You say that that should be defined by statute?

Dr. HOLLOMAN. I leave that to the judgment.

Mr. LENNON. Now I want your opinion, and your judgment.

If Congress is to share, and it has demonstrated a concern, because I remember the hearings of this committee in 1959 and 1960, when the proposal for the interagency on oceanography was proposed, it came into being, and as your hearings continued, the witnesses who were

allegedly knowledgeable on the subject of the functions and the responsibilities of the interagency on oceanography, and we were asked the question, "Well, doesn't the National Science Foundation have a member on this interagency committee on oceanography?"

"No."

Then about 6 weeks later, we would hear another witness before the committee, and we would ask him. "Now, does IIEW have a member on the committee?"

And they would search frantically through the list. "No."

We would say, "Why don't you put one on there?" because, under the budget, they get so much money for some facet of it; and they did, and if it hadn't been for this committee, in its hearings, back in 1961 and 1962, and thereafter, and we were sort of an oversight committee.

Now we have got this problem with respect to financing our funding. It is spread across every committee in this Congress.

Dr. HOLLOMON. There are four major, aren't there, really?

Mr. LENNON. Now, the Department of Commerce doesn't have to go to a legislative committee for authorization for funding.

Dr. HOLLOMON. That is correct.

Mr. LENNON. That is a continuing thing.

Dr. HOLLOMON. That is correct.

Mr. LENNON. On the other hand, when the Department of Defense wants two oceanographic vessels, they have to come to the Committee on Armed Services for authorization. And the same thing is here, there, and yonder.

Now, you spoke of the ships that you were building. In fiscal 1966, there wasn't a nickel in the President's budget for shipbuilding in the Department of Commerce for oceanography, was there?

Dr. HOLLOMON. That is correct, sir.

Mr. LENNON. You say, that is a fact?

Dr. HOLLOMON. That is a fact.

Mr. LENNON. Well, we didn't get much help there, then, did we?

You couldn't go to the Appropriations Committee when you didn't have an authorization for ship construction, when it was not in the President's budget, but if you had an authorization committee, and it had authorized on the basis of whatever need you may have proposed before that authorization committee, you might have got a ship on the way in 1967 that would have been launched in 1969.

Dr. HOLLOMON. Mr. Chairman, to go to your original question, which was, do you think that the Congress should take action to define this matter, which is, I think, the original question, my view of this matter is this: It is clearly within the authority, the broad legal authority of the Secretary of Commerce, and I suppose other agencies of the country; it is my view—and this is a personal view—if the Congress is, as you appear to be, concerned that this hasn't been accepted, and that this is not clearly defined, then it would be my suggestion that you consider whether clarifying legislation is required.

Mr. LENNON. Well, of course, the Congress has that responsibility. But the fact remains, sir, that in all of the bills that have been introduced on this subject this year, this was the only one that got the consensus—I say that advisedly—of favorable reports from all of the agencies of the Federal Government and the Executive Office of the President, on up or down, or however way you want to term it, so you

say, in your judgement, the description and prediction of oceanographic conditions should be the responsibility of what we now refer to as ESSA?

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. That is your judgment?

Dr. HOLLOMON. That is my judgment.

Mr. LENNON. Is that view shared by the other agencies of the Federal Government?

Dr. HOLLOMON. I think I should speak for myself, sir.

Mr. LENNON. So, there on that No. 1 question, we have got to go back—

Dr. HOLLOMON. The President stated, and I quoted in my testimony, in the reorganization plan, what the statutory responsibilities of ESSA are, and I stated that on page 5 of my testimony.

Mr. LENNON. On page 5, where you quoted him on page 5, did that mean exactly what you said here, the description and prediction of oceanographic conditions?

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. That is in your judgment.

Now we move to the No. 2—

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. The exploitation and utilization of ocean resources.

What are your views, sir with respect to where, so far as the Federal Government was concerned, the exploitation and utilization of ocean resources—what agencies of the Federal Government should those be lodged in, statutorily?

Dr. HOLLOMON. In my view? And I can't, of course, speak for anybody but myself.

Mr. LENNON. That is exactly what we hope to get some day, when some man can come before some committee of the Congress and speak for—

Dr. HOLLOMON. I am trying.

Mr. LENNON. I am not quarreling, sir. I am saying how frustrated we are.

Dr. HOLLOMON. I believe it should be in the Department of the Interior, sir, to answer your question.

Mr. LENNON. In the Department of the Interior?

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. But in your report, commenting on one of these bills, you say that ESSA cooperates with the Department of the Interior and other agencies.

Dr. HOLLOMON. Certainly.

Mr. LENNON. Now, is that in the field of exploitation and utilization or in the prediction of oceanic conditions?

Dr. HOLLOMON. In the prediction and measurement of oceanic conditions.

Mr. LENNON. But you say that the Department of the Interior ought to have the authority to make the exploitation and to determine the utilization of how that ought to be done.

Dr. HOLLOMON. Of resources; yes, sir.

Mr. LENNON. The Department of the Interior?

Dr. HOLLOMON. Yes, sir. We have, for example, now, some of their people on our ships, and we think that is the way it ought to work.

Mr. LENNON. Now, you don't know the reactions of the other agencies to what you just recommended in your professional opinion, and I have great respect for you, sir. I have learned to have it. I think you are sincere in what you are thinking, and I think I almost believe you know what you are talking about.

Dr. HOLLOMAN. That is a great compliment from you, sir. I think that the way to do that, in my suggestion, is ask them.

Mr. LENNON. All right. Then you move on in, after you say that speaking generally, it embraces two broad areas, and you define them and discuss them; then you say that you believe each of these areas would be enhanced if a single agency were to provide a focus for the activity in that area.

Dr. HOLLOMAN. In each area.

Mr. LENNON. In each area?

Dr. HOLLOMAN. In each of those two areas.

Mr. LENNON. Now let me ask you this, please, sir: In what agency should there be lodged statutory authority to provide a focus for the activity in the area of prediction and description of oceanic conditions?

Dr. HOLLOMAN. In ESSA, in the Department of Commerce.

Mr. LENNON. The focus should come there?

Dr. HOLLOMAN. Yes, sir.

Mr. LENNON. All right.

Now, in what agency should the focus come in the exploitation and utilization of ocean resources?

Dr. HOLLOMAN. In the Interior, sir.

Mr. LENNON. In the Department of the Interior.

Dr. HOLLOMAN. Now, I also believe, which I did not mention in my testimony, but I think I made it clear in answer to questions, that, of course, the Defense Department should retain its full responsibility of doing what is necessary in the national defense, and the National Science Foundation should retain its responsibility to support broadening the science, particularly in the universities of America. Those are the four agencies today that fund the primary oceanographic program today. You really are only talking about four agencies. The rest of them are very small.

Mr. LENNON. Relatively, that is certainly true, in dollars.

But, well, now, you go on to say that on page 4, where you continue your thought on this same subject matter, this might be done through Presidential action pursuant to H.R. 2218 if enacted.

Dr. HOLLOMAN. Right.

Mr. LENNON. Now, is there some question in your mind that this focal attention on both of the facets that you have described could best be done by statutory authority in the Department of Commerce and in the Department of the Interior, rather than through Presidential action pursuant to H.R. 2218? Now I am not asking you to be critical, but you did say, you indicated it might be done.

Dr. HOLLOMAN. Yes, sir. I think the two sentences follow each other. I say, this might be done through Presidential action pursuant to H.R. 2218, if enacted, or, alternatively, additional authorizing legislation might be desirable. That is to say that your committee may want to take some action in this regard.

Mr. LENNON. Well, now, do you think it could be best done through this Presidential action pursuant to the enactment of 2218, or whether

or not it could best be done by the authority which by legislative authority which would place in the Department of Commerce and in the Department of the Interior the two focal points of the development of both the description and the definition and the exploration and seeking the other objective?

Dr. HOLLOMON. I think I should answer this question in this way, Mr. Chairman: If your committee feels that these responsibilities and appropriate authority for appropriations are not clearly defined, I think you should follow the second course. If you feel that the time is not right to so define it, and you need some additional study and advice, I think you should follow the first course.

Mr. LENNON. Now, Mr. Secretary, your agency was the only one of the numerous who commented on the bill, H.R. 2218, and I might say that that bill was drafted after consensus with all the agencies, departments, about 15 months ago, but your counsel suggested an amendment to that bill, and you recommended, that is, Mr. Giles, the general counsel, on April 15, 1965, you suggested an amendment as follows:

We recommend that page 5, lines 2 and 3, be amended to read "hydrographic and coastal survey, and geophysical data, and those aspects of marine meteorology directly related to oceanography."

Then you go on to say, "It is felt that climatology and most meteorology do not pertain to oceanography."

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. Now, you did not comment at all today on your suggested changes.

Dr. HOLLOMON. No, sir; I did not.

Mr. LENNON. But I noted that earlier in reading this. I wondered if you want to give us briefly your reasons for the suggestion that this bill ought to be amended.

Dr. HOLLOMAN. Yes, sir. The reason for that is that meteorology, while it relates to the ocean as such, likewise has a vast number of coordinating activities. More specifically, it has the direction that there be a Federal meteorological coordinator for meteorology. That coordination does exist. We present a Federal plan for meteorology, and meteorology is really a big thing that is quite separate from oceanography.

The total expenditures in meteorology in the Federal Government exceed \$300 million. It is a big program. It includes all the weather services, all the upper atmosphere soundings, and I believe it would just create an extraordinary amount of overcoordination if one included that in the definition of oceanography. I feel the same thing about climatology. Climatology is nothing but long-term meteorology, what happens over 100 years or 10 years.

So what I am really saying is, let's for heaven's sakes, don't have another coordination mechanism which coordinates meteorology and climatology, which is really one thing, and oceanography. It will just overwhelm every oceanographic activity. It will again produce this inability to focus on the single problem which is oceanography.

Mr. LENNON. Now, does the Department of Commerce, under this—has it delegated to ESSA the authority to make oceanwide surveys at one time—I think that the Coast Survey has the authority?

Dr. HOLLOMON. Yes. The Coast Survey is a part of ESSA, and ESSA now has that responsibility; yes, sir.

Mr. LENNON. In other words, under existing law today—

Dr. HOLLOMON. Yes, sir.

Mr. LENNON (continuing). This division or agency or administration within the Department of Commerce could not only contract as you have already done for the study of the Continental Shelf—

Dr. HOLLOMON. Right.

Mr. LENNON (continuing). But could contract to make oceanwide surveys?

Dr. HOLLOMON. Yes, sir. And, in fact, we carry them out ourselves.

Mr. LENNON. You are engaged in oceanwide surveys?

Dr. HOLLOMON. Yes, sir. We have the only oceanographic ship, as I understand it, outside of the Navy, outside of the Military Establishment, that can make such surveys.

Mr. LENNON. Has there been such an ocean survey made by the Department of Commerce or any agency in the Department of Commerce?

Dr. HOLLOMON. Yes, sir. We have been operating, as Admiral Karo just commented, since 1961. The two areas with which I am familiar—there may be others—is an area off the coast in the Pacific Ocean, a vertical—

Mr. LENNON. In what depth are those surveys, Mr. Secretary?

Dr. HOLLOMON. Admiral Karo says anywhere from 2,000 to 3,000 to 4,000 fathoms.

Mr. LENNON. Mineral resources?

Dr. HOLLOMON. No. Here we take, in some cases, bottom sampling, which are provided for the Interior Department to evaluate them as mineral resources.

We measure salinity, temperature, pressure, ocean currents, what else? Depths gravity, magnetic characteristics, in an attempt to describe the oceans.

Mr. LENNON. Now, in those particular fields that you have enumerated, that you—is a comparable ocean survey being made by other agencies of the Federal Government?

Dr. HOLLOMON. Admiral Karo responds, and I simply repeat, not outside of the Navy; not deep ocean surveys. No, sir.

Mr. LENNON. This data, unless it relates to national security, is interchangeable with the Department of Commerce and the Navy?

Dr. HOLLOMON. Yes, sir; absolutely.

Mr. LENNON. And with, of course, the other agencies of the Federal Government.

Dr. HOLLOMON. Not only that, but, as I pointed out before, we have representatives of other agencies and scientific community aboard those ships when they make the surveys, and help define what the studies will be.

We had an Indian Ocean survey, for example, in which the ship went out to the Indian Ocean, in part of the national program of cooperation with other nations, and here we had members of the scientific community aboard, and the type and character of the surveys were fully integrated with the scientific community.

Mr. LENNON. Now, Mr. Secretary, did you testify before the Senate Committee on Commerce?

Dr. HOLLOMON. No, sir. I did not so testify.

Mr. LENNON. Well, you know that, sir, there were four bills pending before this committee, one by the gentleman from Florida, Mr. Fascell; the gentleman from Pennsylvania, Mr. Fulton; the gentleman from California, Mr. Hanna; and the gentleman from New Hampshire, Mr. Huot.

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. Those four bills that are now being considered by this committee were identical with the bill, Senate bill 944, sponsored by Senator Magnuson and others; they were identical at the time they were introduced and referred to this committee. Now, since that time, S. 944 has been reported unanimously by that committee, with amendments, and my recollection is the amendment was related to the establishment of a Commission in addition to your high-level Council.

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. Do you know what agencies of the Federal Government engaged in this overall activity of oceanography appeared before the Senate Commerce Committee or the subcommittee in the consideration of Senate bill 944?

Dr. HOLLOMON. I know from my own memory that the Navy appeared, and I am now just looking at it here. Dr. Hornig appeared; Mr. Morse, the Chairman of the Interagency Committee, appeared. These are the major agencies that appeared. That is, the Navy, the ICO, and Dr. Hornig appeared.

Mr. LENNON. That is the Interagency on Oceanography?

Dr. HOLLOMON. Yes, sir; that is right. You had Dr. Hornig, the Navy—

Mr. LENNON. And the Federal Science Director.

Now, do you suppose that at that hearing, Mr. Secretary, it was made as crystal clear there, as it has been here today, that there is now in the Department of Commerce, through ESSA, the authority and the responsibility not only to survey the Continental Shelf but to make oceanwide surveys?

Dr. HOLLOMON. I don't think we testified to that, Mr. Chairman.

Mr. LENNON. I understand you didn't testify. Did the Department of Commerce, through any of its officers, at any level, make an appearance before the Senate Commerce Committee on this bill?

Dr. HOLLOMON. No, sir; not this year, sir.

Mr. LENNON. Do you know whether or not the Department of Commerce has submitted its report on the bill, 994?

Dr. HOLLOMON. Yes; we have, sir.

Mr. LENNON. And I would assume, since you made an unfavorable report on the four House bills which were identical up until the time the Commission was added, that, similarly, an adverse report was made on that?

Dr. HOLLOMON. Yes, sir.

Mr. LENNON. Captain, we are delighted to call on your technical knowledge now.

Captain BAUER. Thank you, Mr. Chairman.

With respect to, Mr. Secretary, the Bureau of the Budget Circular A-62, November 13, 1963, which gave you in the Department of Commerce the coordinating authority for all weather operations, does that include Fleet Weather Service?

Dr. HOLLOMON. Yes, sir.

Captain BAUER. And it includes the Air Force weather service?

Dr. HOLLOMON. Yes, sir.

Captain BAUER. Now—

Dr. HOLLOMON. It does not include classified.

Captain BAUER. Well, I grant that. That is true.

Mr. LENNON. Well, you gentlemen will have to explain when you are getting technical, now, because we are not technical. You all are.

Captain BAUER. Classified has to do with defense.

Mr. LENNON. Yes; classified. Keep it out. Go ahead.

Captain BAUER. Now, with respect to this coordinating authority, you suggested today that physical oceanography should have a core coordination in ESSA. Is that correct?

Dr. HOLLOMON. Yes, sir. It should have a core program, and should, in my view, coordinate that aspect of the program as well as should ICO.

Captain BAUER. And this would include our Navy operations similar to your meteorological coordinations?

Dr. HOLLOMON. Those which are divided explicitly and in the public domain having to do with physical oceanography, sir.

Captain BAUER. Then where would the Office of Naval Research come in supporting institutions and so on?

Dr. HOLLOMAN. That activity could be coordinated through that agency. Basic science related to meteorology is not coordinated by the Federal Coordinator. He coordinates those things that have to do with the observational, prediction, and description system, and directly related to that. He does not coordinate the basic science. The basic science in this case is coordinated by ICAS, which is an organization very similar to ICO, which is an interdepartmental committee on atmospheric sciences.

Captain BAUER. Now, if this activity is followed through, and I presume we can expect the Bureau of the Budget giving you that authority, in view of your success with meteorology, what happens then to the Oceanographic Office of the Navy with its preferred ship routing, and so on and so forth? What happens to the ASWEP system, that part of it which is not classified? Will you then be in the coordinating position for that?

Dr. HOLLOMON. You made an assumption, sir, which I cannot make.

Captain BAUER. You said that you wanted to have a core of coordination.

Dr. HOLLOMON. You said the Bureau of the Budget was going to do this. You said the Bureau of the Budget was going to do something.

Captain BAUER. If they do.

Dr. HOLLOMON. I was speaking here as I have tried to as frankly as I can, and I certainly cannot speak for the Bureau of the Budget. I think that this is a mechanism which, if it proceeded as in the case of meteorology, would have the operational aspects of the description, prediction of the weather coordinated by an activity not unlike the Federal Meteorological Coordinator. But, mainly, what I have tried to say here is that the lead responsibility should be given to someone.

Captain BAUER. Now, who is going to coordinate, Mr. Secretary, ESSA?

Dr. HOLLOMON. The Administrator.

Captain BAUER. No; the ICO, or ICAS?

Dr. HOLLOMON. It depends on which field.

Captain BAUER. In other words, you have split coordination in one organization. Is that correct?

Dr. HOLLOMON. No. Of certain aspects of one organization. This is the problem. You see, in any company, for example—let's take it so we get outside our present—each part and diverse part of a company made up of many operating components, each has research. And most companies find it most efficient to have somebody coordinate each of its operating components of research. What you have is somebody who coordinates research.

Another thing that has to be coordinated is engineering; another thing, its manufacturing; and it is not unreasonable to have oceanography coordinated and the oceanographic program of ESSA coordinated by one agency, and its atmospheric sciences coordinated by another.

Captain BAUER. In other words, you would be in the situation of coordinating the nonclassified work of the oceanographic offices of the Navy?

Dr. HOLLOMON. That is a possibility, sir.

Captain BAUER. We will find out how the Navy feels about that later.

Now, with respect to survey, this Continental Shelf survey, have you made any inquiry of the oil industry that have surveyed the Continental Shelf of the United States shown here in great detail to get their information, to get the data?

In other words, are you going to duplicate what the oil industries have already done?

Dr. HOLLOMON. As I understand, our people have been in contact with the oil industry in their plans or surveys.

Captain BAUER. And they will supply you the information so you won't have to send your ships there to do it?

Dr. HOLLOMON. Not necessarily. It could be proprietary in some instances. I don't think that they will necessarily agree to supply everything.

Captain BAUER. In other words, you have come to no basic agreement with the oil industry?

Dr. HOLLOMON. Not to my knowledge.

Captain BAUER. You realize the funding level of industry in the surveys of the Continental Shelves of the United States is around \$300 million a year?

Dr. HOLLOMON. I don't know the details of the funding. I can't agree that that is the number, because I don't know. I do know that they spend a substantial amount of money on coastal surveys.

Captain BAUER. Now, when you get to the surveys of the oceans of the world, which you apparently are doing—

Admiral KARO. Mr. Chairman, may I discuss this earlier one?

Mr. LENNON. Go ahead.

Admiral KARO. We had representation down to discuss this matter with various geophysical prospecting companies to see whether or not the data they provide could be used to supplement our surveys. The universal opinion we got from those people was that it was not the type or accuracy that we required for navigational charts, that their

data were used for a specific purpose. However, they said, if we will put somebody aboard to work with them, it possibly could be made available; but the information they had was not useful at the present time. We will continue to work with them, and if they have any information that would be useful in the Continental Shelf surveys for our charts, we will try and use it.

Captain BAUER. How far behind your boat charts are your produced charts of the Continental Shelf? How many years?

Admiral KARO. The normal cycle, when we complete the surveys through the processing is from 1 to 2 years. However, we are automating our processes so that we hope that will be shortened down to a few months.

Captain BAUER. Now, with respect to the ocean surveys, where does this differ from what Hydrographic Office of the Navy's Oceanographic Office has been doing?

Dr. HOLLOWOM. The deep ocean surveys that we are doing are systematic surveys with close spacing and we are using this opportunity to determine as much of the geophysical parameters of the ocean and the earth as we pass over it as can be made with one pass.

Captain BAUER. Well, is not the Navy Oceanographic Office doing the same thing?

Dr. HOLLOWOM. Through the ICO, we coordinate our areas of operation with the Navy, so that the area we have picked out where we are now operating does not conflict with what the Navy is doing; in fact, it complements the work that they are doing.

Captain BAUER. Have you any plan for the surveys of the oceans of the world?

Dr. HOLLOWOM. Yes, sir.

Captain BAUER. Do you have a copy available for us?

Dr. HOLLOWOM. Yes, sir.

Mr. LENNON. You would have a copy for the use of the committee, sir?

Dr. HOLLOWOM. Yes; I have just prepared a copy for the record. (The statement referred to follows:)

OCEAN STUDIES PROGRAM

LONG-RANGE PLAN

(a) Ocean survey subprogram

1. *Requirements.*—The Coast and Geodetic Survey's present program in ocean surveys is the outgrowth of many years of dreaming and urging that such a program be undertaken, it is an outgrowth of the recommendations contained in the reports of three generations of National Academy of Sciences Committees on Oceanography (1927, 1952, and 1959), of the generalized plan prepared by the Ocean Surveys Advisory Panel of the Interagency Committee on Oceanography, of the Operations Research Study of the Ocean Survey Program prepared by Operations Research Inc., and finally it is the outgrowth also of 4 years of actual ocean survey experience aboard the USCGS ship *Pioneer*. In its present form the ocean survey program of the Coast and Geodetic Survey reflects the blending of these many recommendations and requirements into one workable program put together by the organization that will actually carry out the work.

The need for systematic surveys of the sea has been extremely well documented over the years: Some of these documents are:

1899: Resolution of the Conference of the International Council for the Exploration of the Sea. Copenhagen, translated in hearings of Subcommittee on Oceanography, House Merchant Marine and Fisheries Committee, 87th Congress, 2d session, February 28, March 1 and 2, 1962, pages 13-18.

- 1924-5: Extensive documentation to justify the proposed Naval Oceanographic Expedition to be called the Maury-United States Naval Oceanographic Research (See the Literary Digest, Sept. 19, 1925, Journal of Geology vol. 32, No. 8, 1924 editorial, pp. 690-695).
- 1931: "Oceanography," Henry B. Bigelow, Houghton Mifflin Co.
- 1937: "International Aspects of Oceanography," T. Wayland Vaughn et al., National Academy of Sciences, Washington, D.C.
- 1952: "Oceanography 1951," National Academy of Sciences Committee on Oceanography Report, NAS-NRC Pub. 208, Washington, D.C.
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- 1963: "National Plan for Ocean Surveys," Interagency Committee on Oceanography, ICO Pamphlet No. 7, Washington, D.C.
- 1963: "The Global Sea," Harris B. Stewart, Jr., D. Van Nostrand, Princeton, N.J.
- 1963: "Oceanography, The Ten Years Ahead," Interagency Committee on Oceanography, ICO Pamphlet No. 10, Washington, D.C.
- 1964: "General Scientific Framework for World Ocean Studies" (draft) Intergovernmental Oceanographic Commission, UNESCO, Paris.
- 1965: "User Requirements and National Ocean Survey Program Planning," H. Nisselson, Operations Research, Inc., Technical Report No. 311, one of a series of reports on the national ocean survey program made to the Coast and Geodetic Survey.

Some of the requirements for ocean surveys will be summarized but the detailed justifications and spelling out of the requirements are contained in the documentation listed above. The most important material resources of the sea today and probably for many years to come are the animals and plants. In Europe and North America only 5 to 20 percent of the animal protein in human diet comes from the sea, and in many other nations this is considerably larger and forms an indispensable part of the human diet. The world's ocean fisheries increased from 25 to 40 million metric tons between 1955 and 1962, and this rate of increase (about 7 percent each year) will be maintained or even increased in the near future. Fishmeal for feeding poultry and livestock was produced at the rate of about 4 million tons in 1955 and was up to nearly 10 million tons in 1961. The human population of earth took about 10,000 years to reach a total of 1 billion persons by the year 1830. Yet this figure was doubled between 1830 and 1930, a mere 100 years. In the 35 years since 1930 we have added still another billion. At this rate there will be 6 billion persons on earth by the year 2000, and in a mere 600 years there will be only 1 square yard of living space per person. The growth rate of the human population demands that new food sources be developed. The present growth rates of oceanic fisheries cannot be maintained for many more years unless oceanic investigations on a worldwide scale are carried out to ascertain (1) the ocean conditions that bring about economically catchable fish concentrations, (2) the locations and sizes of fish populations and how these vary with variations in the oceanographic conditions, and (3) those aspects of fish behavior that can be exploited to reduce the costs of catching fish.

Of the utmost importance is the determination of the large-scale changes in the physical characteristics of the waters of the sea and the causes for them. The correlation of such changes with changes in the fish catch is known to be high where such environmental changes have actually been measured, but these instances are presently few. The tremendous anchovy fishery off the west coast of South America, for example, suffers almost total destruction with the occurrence of the warm surface water called *el niño* covering the normally cooler upwelled water which contains a rich abundance of fish. Mass mortalities of both fish and the guano birds that feed on them are common, yet the causes for *el niño* are still unknown. The ocean survey program includes the systematic measurement of the water characteristics which the fisheries oceanographers need to obtain the more complete picture of the interrelationship of the fish and his environment that is required for an increased catch. The fisherman must be able to anticipate major changes in the oceanic environment to improve his efficiency and lower his costs per ton. Needed here is the regular periodic production of maps of the world ocean that show existing conditions and point out anomalies and comparisons with earlier synoptic maps. Similarly, the environmental conditions in especially important fishing grounds should be

monitored on a continuous basis. Provisions for such observations are also made in the ocean survey program.

Before any resource can be exploited, it must first be mapped, and this is as true at sea as it is on the land. Man has been at the task of mapping his land areas for hundreds of years, and accurate maps for many varied purposes are now available. Of the ocean, however, maps of even moderate accuracy are available for only its shallow edges. We know only the grossest features of the better than 90 percent of the sea that lies seaward of our Continental Shelves. These areas, as well as the Continental Shelf, must be mapped not only for bottom topography but for gravity and magnetics, for the distribution of sediments, and for the subbottom structures. These measurements and others such as meteorological measurements and measurements of the characteristics of the surface waters can be made from a ship underway without necessitating stops. The costs of the ship time could be justified for most of these measurements even if only one of these characteristics were being measured. Gravity measurements at sea, for example, have indeed done just that on the historic work of the Dutch submarine *K-XIII* in the East Indies, Vening Meinesz' later work in the same area, and the U.S. submarines *S-21* and *S-48* in the Caribbean Sea. Similarly the magnetic work of the nonmagnetic ship *Carnegie* is well known. Today's technology enables the modern oceanographer to do both gravity and magnetic observations on a continuous basis while steaming at 14 to 16 knots and providing a detailed topographic section of the sea bottom at the same time. It is these advances in instrumentation that makes it possible to do so much at one time on each ship and make the running of a full-scale ocean survey program considerably more feasible than would have been possible as little as 15 years ago. The maps that such a survey program will produce will be the base maps for all future exploration and exploitation of our global sea. They will also pinpoint those areas where research vessels can return to get the detailed data that will be needed to answer specific research questions which the basic surveys will raise.

Marine mineral resources will need surveys for their discovery and maps for their exploitation. Manganese nodules are known to exist in parts of the sea and probably exist in those many areas which have never been traversed by a research or survey ship. These nodules run 25 to 30 percent manganese and as much as 1 percent cobalt, copper, or nickel. Actually, these deposits are forming now at a rate faster than the present rate of world consumption of these metals, and within a few years as our supplies on land diminish, these may be economically recoverable. Present knowledge of the distribution of these nodules is not sufficient as yet to justify large industrial investment, since the known samples have been isolated grab samples or were seen in deep-sea photographs. Their distribution must be determined by a systematic survey. Phosphorite nodules are found in shallower waters, and these low-grade ores have been estimated to bring \$12 per ton delivered on the dock. Oil, gas, and sulfur are already produced from the Continental Shelves, and recent surveys in the Sigsbee Deep in the Gulf of Mexico suggest that salt domes favorable as traps for oil exist there. Diamond-bearing gravels off Africa are being exploited at the rate of about \$15,000 per day. Gold-bearing sands have recently been discovered off Nome and Juneau, tin is being dredged from the sea floor off the Malay Peninsula, magnetite sands are being mined from the sea floor off Japan for their iron content, and even plain sand is now required for U.S. beaches to such a degree that surveys of the offshore areas have been carried out just to try to locate sands for beach replenishment. It has been estimated in a report prepared for UNESCO that several million dollars a year in geological and mineralogical research and surveys directed specifically toward the location of mineral deposits on the Continental Shelves could generate new industry of gross product of at least \$50 million a year within a decade.

Studies of the shape of the earth and the tying of remote islands into the major geodetic nets require gravity data at sea. The world magnetic charts for navigation require magnetic data at sea. Charts of the sea for the marine navigator require hydrographic surveys at sea. Resource exploitation—as well as discovery—requires maps of the seas. Long-range weather prediction needs synoptic meteorological data at sea as well as oceanographic data for a better understanding of the air-sea interaction mechanism. Commerce requires maps. National defense requires all of these data. Pollution control needs to know of the currents and rates of dispersion of pollutants. Basic research which provides the pool of basic knowledge on which we must draw for our future ap-

plications requires the basic data from the ocean survey program not only to help answer some present questions but also to help formulate new and challenging questions to ask of the ocean. The requirements of the various agencies of the Federal Government for the data to be developed by the ocean survey subprogram are presented in general terms in ICO publication 7, and in more specific terms in the ORI reports (see especially ORI Technical Report No. 311, "User Requirements and National Ocean Survey Planning"). In actuality, however, it is difficult to justify this ocean survey program solely in terms of present needs. It is primarily an exploration program and should be understood as such. As an exploration program, it should not and does not require specific justifications in terms of present-day data needs. It is, for example, almost impossible to establish cost-benefit ratios for such a program, for many, if not most, of the benefits will be realized only after the program is well underway. It would be unfortunate if the United States were to undertake only those programs for which there were immediate needs; we must also think of the long term needs and be perfectly willing to provide some answers for which the questions have yet to be formulated.

2. *Objectives.*—To meet these requirements, the objective of the ocean survey program is to provide within a reasonable amount of time accurate base maps of the topography of the sea floor, of its geophysical and geological characteristics, and to provide for the systematic collection, compilation, and presentation of statistically significant data on the time-dependent variables in the water of the sea and in the atmosphere above it. One characteristic of land mapping is that it is never completed. So too the mapping of the sea will probably never be completely done to the satisfaction of all possible requirements in the most minute of detail. However, the magnitude of the task to provide base maps of the ocean can be fairly well calculated as a function of the distance between lines of underway operations and the number of oceanographic stations to be occupied. Assuming 10 nautical miles between lines and a total of 10,000 stations, the requirement is for 295 ship-years. The time to accomplish this task thus becomes merely a function of how many ships can be devoted to the task at one time. A mathematical model has been prepared whereby the various input parameters can be varied to determine just how long such a survey might take at any given line spacing, or number of stations, or length of time on station, speed of the ships, numbers of ships, even anticipated survey limitations due to weather. This model will prove an invaluable tool as the work is planned in detail.

The immediate end product of the program will be charts and data listings. A secondary end product will be interpretive papers to be published following detailed analysis of the processed and published data.

3. *Courses of action.*—When the ocean survey program was originally developed by the Interagency Committee on Oceanography, it was anticipated that the Navy would carry out one-half of the effort. This was also the specific recommendation of the National Academy of Sciences Committee on Oceanography. However, as the actual program planning began to take place, the Navy quite specifically stated that their ships and manpower were totally committed to urgent military requirements that precluded them taking any part in a national ocean survey program. The Weather Bureau and the Bureau of Commercial Fisheries have played active roles in the meteorological and biological phases of the program to date and will continue to do so. Similarly, the Geological Survey has also had people aboard the *Pioneer* in the limited work to date, and the Smithsonian Institution will assist in the sorting and storage of both biological and geological samples when the analyses and research work on them are completed. However, the major portion of the program, including all of the ship operations at sea, must by default become the responsibility solely of the Coast and Geodetic Survey.

As T. Wayland Vaughn stated in the preface of the 1937 report of the NAS Committee on Oceanography, "It is obvious that any comprehensive systematic investigation of the oceans must be in large measure an international enterprise." The same sentiment was echoed in the NASCO report of 1959, and plans for such international cooperation have been outlined in ICO Pamphlet No. 7, National Plan for Ocean Surveys (pp. 29-31).

However, the Coast and Geodetic Survey will not delay its own survey efforts pending the completion of the international cooperative plan. The task is so large—295 ship-years—that the international plan will hopefully have been worked out long before the United States completes even the 30 percent that

corresponds to our portion of the support of UNESCO and of other specialized intergovernmental organizations. The ocean survey program of the Coast and Geodetic Survey is in fact the U.S. program of ocean surveys, and we will modify the program as necessary to take into account any commitments made by the Government in support of the international effort to achieve these same goals. In the meantime, the Coast and Geodetic Survey will pursue the program as though it alone were to be the sole agency to accomplish the task.

The goals can be achieved only by providing 295 ship-years of survey work at sea plus the manpower and shore facilities to process, analyze, publish, and distribute the information. There are, however, alternative means for accomplishing this. One ship could work for 295 years, but this is tacitly ridiculous in the light of the urgency for the surveys. The present plan calls for a total of nine ships for the ocean survey program programed as shown in table I. Assuming that each ship will put in the full season on this program and that the first full year of operations for each ship is the year following its planned delivery date, then the United States 30 percent of the world ocean survey can be accomplished by 1979, the total program by the year 2002. This is detailed in table II. Provision can be made, however, for contracting out part of the work, should the urgency of completing the task require more facilities than the Coast and Geodetic Survey could provide in time.

TABLE I.—*Coast and Geodetic Survey oceanographic shipbuilding program*

[Dollars in millions]

Ship class	Amount	Appropriation year	Delivery date
I.....	9.4	1962	October 1965.
I.....	9.7	1963	March 1966.
Ia.....	9.0	1965	January 1968.
Ia.....	¹ 10.5	1967	September 1969.
Ia.....	10.5	1967	June 1962.
III.....	4.0	1968	January 1970.
Ia.....	10.9	1968	June 1970.
Ia.....	11.3	1969	June 1971.
Ia.....	11.3	1969	September 1971.

¹ Replacement for *Pioneer*.

TABLE II.—*Ship-years available for ocean survey program*

Year	Ship-years available each year	Cumulative total	Year	Ship-years available each year	Cumulative total
1966.....	1	1	1971.....	7	20
1967.....	2	3	1972.....	9	29
1968.....	2	5	1973.....	(¹)	38
1969.....	3	8	1979.....	9	² 92
1970.....	5	13	2002.....	39	⁴ 299

¹ 9 (et seq.).

² 30 percent of the total job.

³ This assumes a 1-for-1 replacement as ships become obsolescent.

⁴ Total job.

The calculation of 295 ship-years is based on underway surveys at 10-nautical-mile spacing plus 10,000 oceanographic stations. One alternative is that at least part of the information to be gained from the station observations can be obtained at less cost per unit of data and the information would be more meaningful if oceanographic buoys were used. This phase is still in the very early stages, and the worth of buoy observations still needs to be evaluated. The plan, therefore, calls for an early evaluation of buoys as oceanographic data collectors. The major problem with buoys is that the oceanographers themselves are not yet sure of just what the range and spectrum of variations are that exist in the ocean. The plan is to set out a small network of buoys to measure the whole range of variables on a very small scale as a starter. Once this network has determined what is there to be measured and how the various parameters vary

with time, then a larger scale program will be developed to measure those characteristics that are most meaningful, and this will be carried out on the scale of at least a half ocean. In the meantime, the oceanographic survey ships will continue to carry out limited oceanographic station measurements—particularly along the north-south section already established between the Hawaiian and Aleutian Islands, and along other comparable sections in other areas of ocean survey operations.

One additional operational alternative is that some of the ships be built specifically for carrying out the underway portions of the survey, and others be configured specifically for the ocean station operations. Each ship, however, must be able to carry out the other phase to at least a limited degree. Thus the underway ships should be able to carry out limited station observations, and the ships configured primarily as ocean station ships should be able to do the underway observations between stations. Similarly, all ships shall have the capability of launching and recovering one or two oceanographic buoys to carry out observations of the time-dependent variables on a limited scale while the ship is carrying out other observations in the area.

4. *Schedule*.—The schedule of accomplishments is tied directly to the delivery dates of the various new ships designed and built for this survey program (table I). The models for planning purposes developed by Operations Research, Inc., allow us to determine the level of accomplishment as a function of the delivery of ships to work on the program. Each year the program will be planned according to this model. If the ship-construction slips, then the entire program can be rescheduled with the use of this mathematical model.

5. *Identification of resources*.—The resources available to carry out this program are tied primarily to the ship-construction schedule (table I). On this schedule depend the level of manpower for the ships—officers, technicians, crew, and scientists both ashore and at sea. To this schedule is also tied the construction of new ships' bases with their attendant oceanographic laboratory facilities. Thus there is in the fiscal year 1967 budget funds for the design of a new base for which funds will be requested in fiscal year 1968. Similar design funds will be requested in fiscal year 1970 for an additional base in fiscal year 1971. In the past, the budgetary cycle has somehow eliminated the requests for funds to provide for support personnel to process, analyze, interpret, and publish the data. Automation at the data collection and data processing levels will in part alleviate this situation, but only in part.

The ocean survey program will include a steady buildup of personnel commensurate with the rate of delivery of the new ships. Personnel must be trained in advance of delivery of the ships, and processing personnel must be attracted to the Bureau and be trained to accommodate the regularly increasing inflow of data. The work of Operations Research, Inc. (see especially ORI Technical Report No. 296, "Planning Implications of Coast and Geodetic Survey Personnel Requirements for a National Ocean Survey Program") has shown that the personnel will be available when the time for their services is at hand. In brief, these requirements call for a doubling of the C. & G.S. personnel base for the ocean survey program by 1970.

Two specific areas where increased resources are absolutely required should be pointed out. The first is in the area currently assigned jointly to the Office of Research and Development and to the Office of Oceanography. The interpretation of the data obtained at sea—the conversion of processed oceanographic data into new knowledge—is essential to a viable ocean survey program. Presently a part of the Office of Research and Development is a very small staff (four persons) working on the conversion of hydrographic (bathymetric) data to meaningful maps with their attendant geomorphological interpretation. This work is especially important. The necessity of this work was realized by the Geological Survey to the extent that they hired a marine geologist and supporting staff to take the basic hydrographic surveys of the Coast and Geodetic Survey and convert these into a complete bathymetric chart of the entire east coast continental shelf and slope. This was done only because the Coast and Geodetic Survey was unable to take the excellent work started by G. F. Jordan and build an effective research group on the foundation which he so effectively started. Therefore, it is planned to add a minimum of two persons to the present group with each new ship that is delivered. This will mean a total of 16 new people in this group by the year 1971. Similarly within the Research Group of the Office of Oceanography, there is now (1965) only one man with the experience necessary to

program into meaningful new knowledge. This group will be expanded at the rate of one man per new ship.

A second phase where new resources are needed is in the area of bathymetry. This function will serve not only the ocean survey program of the Coast and Geodetic Survey, but the entire Federal and nongovernmental oceanographic community. Currently the collection of hydrographic (bathymetric) data at sea is the only large-volume data accumulation program that is not completely automated, and the data must still pass through the stage where men hunch over chart tables to put down by hand the information that is continuously recorded from depth sensors and in a short time will be continuously recorded from accurate navigation systems. The new ships planned by the Coast and Geodetic Survey, the steadily increasing numbers of ships becoming available to the private oceanographic institutions, and the imminent availability of an all-weather, all-ocean navigation system of high accuracy demands that a system of automatic recording, storage, and contoured printout of deep-sea soundings be developed and made operational in the very early stages of the program. Discussions with industry have already shown that such a system is feasible. It remains only for some agency with foresight to establish such a system. It is planned that such a system be developed and operated under the aegis of the Coast and Geodetic Survey and as a part of the ocean survey program. Preliminary feasibility-study funds are programmed in fiscal year 1967, and based on the results of this study the funds for the whole system will be requested as appropriate in subsequent years.

An additional resource that must be developed is a small planning staff within the Office of Oceanography whose efforts are devoted solely to the planning for the ocean survey program. The work performed by Operations Research Inc. has developed a whole series of planning tools that must be utilized for an effective prosecution of the survey program. (See especially ORI Technical Report No. 316, Summary Report of the Operations Research Study of the National Ocean Survey Program.) This will require a minimum of three persons as a planning staff by fiscal year 1968. Other requirements for shipboard and shore-based personnel are detailed in ORI Technical Report No. 296, but in brief these requirements are geared to the delivery of the new ships.

6. Mechanism for changes.—No plan should be so locked in concrete that it cannot be changed as the conditions warrant. The present plan is merely intended as a spelling out of the goals and the presently planned mechanism for achieving these goals. There has been in the past, and there will undoubtedly be in the future, slippage in the proposed ship-construction schedule. As the present schedule changes, all of those factors which are geared to this schedule will change accordingly.

The various mathematical models prepared by Operations Research will enable the planning staff in the Office of Oceanography to make the necessary modifications in the plan. As the survey itself progresses, there will be new criteria developed and, for example, the spacing of survey lines will change as a function of what has been found to date. These changes can also be accommodated by the mathematical planning models. By the same token, as the small grid of oceanographic buoys developed its data on the ranges and spectrum of oceanic variables, the relative proportions of the task to be accomplished by ships and buoys can also be modified with the models. It is anticipated that there will be continuing advisory committees (see ICO pamphlet 7, National Plan for Ocean Surveys) which will continually monitor the results of the work at sea and offer advice on the general conduct of the surveys. This group will work in conjunction with the Ocean Surveys Advisory Panel of the Interagency Committee on Oceanography in the planning of each year's operations. In this manner the surveys will continue to be responsive to the overall requirements of the oceanographic community—both Federal and nongovernmental.

Summary

In summary, the ocean survey program of the Coast and Geodetic Survey is devised to provide within a reasonable amount of time accurate base maps of the topography of the sea floor, of its geophysical and geological characteristics, and to provide for the systematic collection, compilation, and presentation of statistically significant data for a wide range of users. The resources required are geared to the rate of delivery of the requisite new ships, and these include personnel and shore facilities. The total task as now envisioned will require 37 years to complete if the United States is to do it alone. It will require 14

years—if the schedule as planned is met—to complete the 30 percent of the world ocean survey that might be considered as that portion to be accomplished by the United States if a truly international effort in this endeavor can be developed through the Intergovernmental Oceanographic Commission. The need for surveys of this type has been well documented in a series of publications. The planning tools to carry out the surveys in an effective manner have been developed in detail. There remains only the administrative decision to get on with the job for the satisfying of the various immediate user requirements, and for providing future generations of Americans with the basic tool for the exploitation of the world ocean for their economic growth, general well-being, and their national defense.

Mr. REINECKE. Do any of your research or other programs involve the use of private industry as a means of assisting not only to collect the data but as a means of contracting to them to do the work?

Admiral KARO. Not as to the actual field operations at the present time; no, sir. But we do have contracts with institutions in certain phases, as in the tidal work. We have given a grant to Scripps to work out some of the basic theories, and we utilize the competence of the various technical institutions when we have the funds.

Mr. REINECKE. As far as making any of your surveys or any of the ocean data is concerned, you are not trying to contract this out to encourage free enterprise to get into this field?

Dr. HOLLOWON. No, but we do contract out all the shipbuilding, of course, and we do contract out the development of special instruments that are necessary for carrying out the survey.

Mr. REINECKE. But not the use of any of these.

Dr. HOLLOWON. But not the use of the ships.

Mr. REINECKE. Do you contemplate that?

Dr. HOLLOWON. No, sir; not at the moment.

Mr. REINECKE. Even though there are many ships that could be used for this?

Dr. HOLLOWON. I am not so sure about that. Admiral Karo can speak to the question. In knowing the difficulties we have had constructing the special oceanographic ships with the characteristics that are needed in sea keeping and the instrumentation aboard, I would doubt whether there were many ships so available, but Admiral Karo may speak to the question.

Admiral KARO. The industry, of course, is developing competency, and in the future, if the funds are sufficient and we can work out a modus operandi with them and be sure of the results we get, we will consider that. From our operations research study, which has just been completed, and the recommendations, we will redefine our operational program to get the maximum benefit from this study.

Mr. REINECKE. To date, though, you have not asked any private contractors to bid on such exploration?

Admiral KARO. No, sir; for the simple reason is that we find difficulty having enough funds to operate our own ships.

Mr. REINECKE. Sometimes private enterprise can operate less expensively than the Government.

Dr. HOLLOWON. Could I go off the record a minute?

Mr. REINECKE. Certainly.

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. REINECKE. No further questions.

Mr. ROGERS. Mr. Chairman, I realize the bells have rung, and we have to leave, but I just wonder before the second bell if I could ask a question.

Mr. LENNON. Go ahead.

Mr. ROGERS. What is your total program as far as a funding of money?

Dr. HOLLOMON. \$12 million, approximately.

Mr. ROGERS. About \$12 million?

Dr. HOLLOMON. Yes, sir; I think that is correct. That is not including ship construction.

Mr. ROGERS. This is just for research alone?

Dr. HOLLOMON. Research, surveys, analyses, data collecting, and so forth; about \$12 million. In Commerce, it was, in fiscal—it is \$13 million. In fiscal 1964, it was \$23 million; 1965, about \$19 million. And both include ship construction. The 1966 budget, about \$13 million, which did not include ship construction.

Mr. ROGERS. Yes, sir.

Thank you very much, Mr. Chairman.

I just wanted to say that I, too, appreciate the testimony today, but I am very disappointed that our departments are not more aggressive in presenting the problems and holding to the status quo as much as they are.

Thank you, Mr. Chairman.

Mr. LENNON. The committee has not adjourned, but you may go off the record, now, if you will.

(Discussion off the record.)

Mr. LENNON. Now, the committee will resume its hearings this coming Tuesday morning, at 10 o'clock, in the Longworth Building, in the regular committee room, at 10 o'clock. The acoustics are a little better.

Thank you for your attendance.

(Whereupon, at 12:15 p.m., the hearing was recessed, to reconvene at 10 a.m., Tuesday, August 10, 1965.)

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

TUESDAY, AUGUST 10, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:10 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will come to order and resume its hearings.

Our first witness is my good friend and colleague and a member of the Subcommittee on Oceanography, the Honorable Tom Ashley.

STATEMENT OF HON. THOMAS L. ASHLEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OHIO

Mr. ASHLEY. Thank you, Mr. Chairman. During the past week you and members of this subcommittee have heard numerous requests and statements in support of the establishment of a National Oceanographic Council. All of these statements, aside from outlining the substantial benefits to science that would be derived from such a council, have pointed out the necessity for some form of coordination of this Nation's undersea research and development efforts.

The dire need for this authority, and the strong tide of support for its establishment can hardly be denied. There are many considerations that provide ample justification for a national council to guide our collective exploration of the seas—and I would like to review these briefly, along with the salient features of my own bill, H.R. 6457.

The past few years, Mr. Chairman, have witnessed an awakening of the world, and the United States in particular, to the realization that the vast oceans of this planet conceal the greatest physical wealth known to mankind. Dramatic technological advances have now breached the oceans' depths and opened an entire new world, filled to the brim with seemingly inexhaustible deposits of man's most dire necessities. Mineral wealth, bottomless wells of petroleum, and protein sufficient to defeat the greatest enemy of man—the hunger and poverty that has always driven him over the brink of self-destruction—exist in such fantastic quantities that all of mankind will never be able to consume it all.

This natural treasure alone would be reason enough for an immediate, all-out oceanographic research and development effort. But there is even more need.

Millions of dollars have been appropriated in the past decade to enable man to pierce the outermost reaches of space. In addition to the considerations of acquiring scientific knowledge of our universe—leading to later development of its potential resources—we have launched this Nation's military and defense efforts toward the heavens with resounding success.

Our national security, for almost 200 years a matter of landlocked concern tenuously guarded by the expanse of oceans, has recently become a matter of great concern for those who guide our space programs. We have effectively met this challenge, only to be faced with another of equal seriousness.

Only last week, members of this subcommittee heard Mr. David Strang, a specialist in the field of Soviet oceanography, relate the Soviet Union's formidable program for the study of the world's oceans and continental coastlines. Mr. Strang's report, as well as other available sources of information, indicate such a great Soviet expansion of effort in this area that the position of our leadership as explorers of the oceans is in serious doubt. His primary conclusion, that the Soviet Union has oriented a major portion of its oceanographic programs toward the areas of military science, undersea warfare, and defense development, strikes a note of urgency into our present deliberations.

It is a foregone conclusion that we can hardly afford to place second best in any area of endeavor, let alone one of such recognizable magnitude.

The objective of the bill I have introduced is to establish a program which will insure the United States mastery of the seas. Without imposing upon the rights and prerogatives of the legislative and executive branches of our Government, as well as the important interests of private industry, this bill seeks the establishment of a comprehensive, coordinated national program of oceanographic research, exploration and engineering, guided and reviewed by Congress, prosecuted by the executive, and joined in by all the people. Direction of the program is appropriately assigned to the President, who would be aided by a National Oceanographic Council for Science and Technology.

This bill allows the widest possible latitude to accomplish the aims of the program. These goals, already stated admirably by my colleagues in both Houses, have included:

First, the expansion of human knowledge of phenomena in and related to the oceans, the marine environment, and the Great Lakes, their boundaries and contents.

Second, the preservation of the role of the United States as a leader in oceanographic and marine science and technology.

Third, the enhancement of the culture, general welfare, and security of the United States.

To these I have added:

The exploitation of the oceans, in terms of recovery of mineral and living resources, safer waste disposal, improved recreation, expanded commerce, and extended weather prediction.

Under the provisions of this bill, members of the Council shall be selected and delegated by the President's department heads, thus permitting membership at the highest science policy level of Government, equivalent to that of the Federal Council for Science and Tech-

nology, yet at an echelon which realistically presumes understanding of, and availability to, this important scientific field. I believe that this compatibility of authority, know-how, and accessibility is the crucial key to success of the Federal organization for oceanography.

In addition to the provisions of other bills introduced, this bill directs the Council to coordinate the efforts of the Government to combat natural and manmade phenomena adversely affecting the public welfare, including sea storms, floods, seismic activity, offshore pollution, and radioactive waste disposal.

Another important addition to the bill I have presented is the provision for including the largest group of inland waters in the world, and one of this Nation's greatest natural resources, the Great Lakes, into this proposed program. Mr. Chairman, the Great Lakes area encompasses the heartland of the United States, and the center of its industrial wealth—20 percent of U.S. population and 27½ percent of our Nation's main wealth. In any comparison of world commerce, these lakes support more commercial traffic, acre for acre, than any body of water in the world. And these vast waterways are subject to the same laws of nature, the same consideration for scientific development and the same concern for our national security that we give for the deeper and wider oceans that surround our Nation.

Viewing the enormous problems we confront in exploiting the vast potential that these resources—our oceans and inland seas—it is impossible to ignore the inevitability that the Federal Government must take the reins of leadership in developing a strong national program of oceanography and all its related sciences.

The oceans represent a resource just unfolding, and a potential cure for many of the world's most severe dilemmas. We would be negligent in our responsibilities if we continued to allow a sincere, dedicated, and willing—but haphazard confederation of interests—to manage the program without the authority, resources, and harmony that only this great Congress can provide.

Mr. LENNON. Thank you, Congressman, for an excellent statement.

If there are no questions, I would next like to call on our good friend from the State of Texas, Congressman Olin Teague.

STATEMENT OF HON. OLIN E. TEAGUE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. TEAGUE. Mr. Chairman, I appreciate the opportunity of appearing before your subcommittee today in behalf of my bill, H.R. 7849; a bill to provide for economic development of the Continental Shelf and for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council.

This bill addresses itself to the need for a comprehensive national oceanographic program. It includes needs for expanded research in the oceans and the Great Lakes, for economic development of the Continental Shelf as a newly recognized area of sovereignty, for the development of ocean resources beyond the Continental Shelf where national interests are involved and for establishing mechanisms through which national policy can be planned and executed.

Because the oceanographic problem has many facets, and is great in magnitude, the proposed legislation involves four parallel actions.

First, it clarifies the intent of national oceanographic policy so that our policy is directed toward the peaceful and economic uses of the ocean (over and above its defense uses) instead of being centered upon science development. Second, it establishes a National Oceanographic Council whose responsibilities are to carry out national planning, policy formulation, and broad discussion of national goals with respect to ocean problems and ocean resources at the highest executive branch level. Third, the bill creates the Marine Exploration Development Commission as a new operating agency to provide a center for implementing national goals relative to nondefense uses of the ocean and to fill in the gaps not now provided for by missions of other agencies doing oceanographic work. Fourth, the legislation recognizes the need for accelerated action and the need for developing partnerships with universities and industries by authorizing a separate marine exploration and development fund.

If we do any less than provide for all four of these parallel actions, we will not have treated the total oceanographic question nor will we have placed the consideration of ocean resources at the level of importance which it ought to command.

A principal difficulty of our present national posture on oceanography is that we tend to think of it in the context of science and technology. The existing coordination is carried on under the Federal Council for Science and Technology through the Interagency Committee on Oceanography. This results from the fact that our considerations of the oceanographic question have stemmed mainly from our desires to explore and understand the oceans. It is also a recognition that our sights are too limited.

It is time we gave national visibility to our interests in the ocean as a broad resource pool and as an area of geography. That part of the ocean designated as the Continental Shelf has been recently acknowledged to be a matter of national sovereignty. The extent of the geographical area of the Continental Shelf is said, in fact, to be greater than that involved in the Louisiana Purchase. Our approach to developing the Continental Shelf should be in keeping with the development of other national resources. In this sense, we have established precedents in dealing with development of our West. The Continental Shelf can be viewed as additional geography which should be handled with the same foresight that was used in the development of other new lands.

National policy should recognize furthermore that the oceans are a common source of supply of resources beyond the Continental Shelf. It should be our national goal to establish a resource development position that will make our international posture competitive. Those working under our free enterprise system in developing economic resources of the ocean should enjoy a favorable position with respect to competitors from other nations who come to this same source of supply. In a very real sense, superiority in developing the ocean's resources will go to the nation which is able to develop the best technology.

Consequently, the first intent of this proposed legislation is to indicate that the science element of oceanography is only a part of the broader national policy on oceanography as a subject of resource development and resource economics.

The continual examination of policy in this area and the discussion of national goals, with an examination of the many interrelated interests concerned with the ocean, is a matter to be placed only on the highest policy level in our executive branch. Deliberation of goals with respect to ocean problems and ocean resources will include goals for defense purposes, food supplies, transportation, mineral resources, energy transmission and communication, recreation, pollution control, the prediction of storms, tides, and other possible disaster events, and the scientific exploration of natural phenomena.

There are broad interrelationships between these goals. Many of them have international implications. The ocean environment is a major part of our total globe. Therefore, in magnitude and importance these questions demand that policy be deliberated and formulated at the Cabinet level. To provide ongoing attention to this matter, with necessary staffing for continuity, the National Oceanographic Council is proposed.

The intent of this recommendation is to recognize that the policies of ocean development, including both its defense and nondefense interrelationships, are of sufficient importance to place their treatment on a par with policies related to space development.

It is not enough to provide for policy formulation. It is necessary also to provide a focused responsibility for implementing the policy. In particular, it is desirable to centralize the authority for carrying out the program or seeing that it is carried out. The needed action includes those things which will develop the Continental Shelf, will bring into being the ocean-operating and ocean-technological skills to place our Nation at the forefront of ocean technology, will stimulate private individuals, industry, and institutions in the exploration and economic development of the ocean, and will expand and accelerate our ocean exploratory efforts.

The tasks that need to be done cannot be viewed simply as "add-on" tasks to existing authorities. A new approach is required. The responsibilities that are envisioned go beyond existing agency responsibilities.

No one of the individual missions of existing agencies is broad enough to cover the entire activity of ocean resource development. Outside of the Navy, no agency has a responsibility and mission directed toward the total ocean and toward the full examination of technological skills and operating capabilities that will reduce the ocean and its resources to our peaceful utilization.

In structuring a new focus to take on this task, it is not possible, however, to ignore the existing operating activities in agencies that are concerned with oceanography. Such agencies as the Bureau of Commercial Fisheries and the Coast and Geodetic Survey will need to continue operative type missions in the oceans. Therefore, the new responsibility for action in this field is proposed to be neither a new department of the executive nor an agency with the complete responsibilities in its field, such as NASA. The proposed action focus is a Commission, on which will serve the Secretaries of the three agencies which are now the principals engaged in ocean operations—Defense, Commerce, and Interior. It is the intent of the proposal that, insofar as possible, actions that are needed will be done through existing agencies. Coordination of all these activities will be a part of the Com-

mission's task. But, the important thing is that the Commission is charged with going beyond coordination to the doing of new tasks.

To provide for the accelerated level of effort that is anticipated to bring into being mechanisms for stimulating private investment and to carry on developmental-type activities of ocean resources where the risk is too high to be absorbed entirely by private enterprise, there is need for increased funding. The bill asks for up to \$50 million a year for activities over and beyond those that are authorized through existing operating agencies. Even this will not go far when one considers the high cost of operating oceangoing vessels, of constructing undersea platforms, or of testing other technological devices that will be necessary for man to learn how to effectively perform and live within an ocean environment.

In addition, however, the bill proposes a special fund that will permit loans, grants, and other partnership arrangements with universities, private institutions, or individuals. From the underwater production of oil, it is possible to see the enormous benefits that might accrue to the Nation if other similar industrial resources activities can be stimulated. The provision of such a fund is in line with our national tradition of providing seed development support for nuclear technological capabilities, desalting of sea water, or land patents and claims for mineral development.

The job of ocean resource development cannot be done by the Government. It is necessary to use all the scientific, technical, and economic tools that are in our universities and industries. The Federal Government should, however, embark upon an action program that will encourage these talents to be directed toward this underdeveloped part of our resource picture. That is the purpose of the special fund.

In summary, it seems to be clear that existing arrangements for concentrating our national talents upon development of the oceans are lagging. Our view of the problem has been one of science policy and this has been one of its shortcomings. It is time to state the broader picture. It is time to provide a national focus and a stronger action group. This proposed legislation will accomplish these ends.

Mr. LENNON. The subcommittee appreciates your fine statement, Mr. Teague.

Our next witness this morning is known to all Washingtonians and most of the scientific and technological world—Dr. Donald F. Hornig, Director of the Office of Science and Technology.

Doctor, if you have associates you would like to bring to the witness table with you, bring them right along, sir.

Dr. HORNIG. I will avail myself of that, Mr. Chairman.

STATEMENT OF DR. DONALD F. HORNIG, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY; ACCOMPANIED BY JOHN C. FRY AND HENRY W. MENARD

Dr. HORNIG. Mr. Chairman, I have with me Mr. John Fry of my Office and Dr. Menard, recently of the Scripps Institution of Oceanography, who has just joined the staff of OST.

Mr. LENNON. Thank you, Dr. Hornig. We are delighted to have you gentlemen with us.

Dr. HORNIG. Mr. Chairman and members of the subcommittee; thank you for the opportunity to appear before your subcommittee

this morning to discuss the central problems and issues relating to the organization of the Federal Government for oceanography, an area, I believe, to be of high importance to this Nation's scientific and technological effort.

I was privileged to appear before this subcommittee roughly 1 year ago, at which time I discussed the nature of the oceanographic program, its contribution to national and agency goals, and budget proposals for Government-wide programs in oceanography. As a result of those hearings, the subcommittee is generally familiar with the broad aspects of the program itself, and, therefore, today I will focus my discussion on the administrative and organizational questions relating to oceanography raised in the several congressional bills you have before you.

Nevertheless, any discussion of new administrative approaches to oceanography should recognize what this country has already achieved in this field. In the first place, the United States has maintained world leadership. No other country can match either the scope or quality of our oceanographic program and our capabilities have been improving. For example, since 1960:

The oceanographic budget has increased by nearly a factor of three;

Thirty-four new or converted ships have been added and 22 additional ships are currently under construction or conversion;

Seven new marine laboratories have been constructed;

The number of graduate students in oceanography has increased by a factor of 3, from 110 in 1960 to 315 in 1964;

Three thousand people are now engaged professionally in oceanography, more than double the number in 1960.

In addition to these increased resources, new dimensions have been added to the program:

A national center provides services related to the quality control, stowage, and retrieval of oceanographic data;

New towers and platforms such as FLIP, special-purpose ships for sediment coring; oceanographic buoys, and communication relay satellites are now employed in the program;

New deep submergence vehicles such as *Triesta II* and *Alvin* are being used for research and exploration of the seas;

Laboratories have been built for underwater living, for divers to perform useful work on the sea floor for prolonged periods of time at great depths.

Ocean engineering programs, in general, are accelerating.

In terms of accomplishments, also, I believe the program has progressed rapidly:

Entirely new ocean current systems have been identified;

Improved ocean wave theories have been advanced;

A vast sedimentary basin that may be oil bearing has been discovered under the Continental Shelf of the Northeastern United States;

New sources of fish and shellfish have been discovered for the fishing industry;

Reliable forecasts can be made of the distribution and abundance of certain species of fish for the fishing industry:

A tsunami warning service for Hawaii and States bordering the Pacific Ocean has been established;

With the advice and assistance of oceanographers, an extensive network of submarine cables has been laid across the Atlantic and Pacific by industry in a way which avoids natural hazards;

Extensive mineral deposits have been discovered on the sea floor;

The nature of the sea in terms of the shape and structure of the sea floor, the effect of radioactive materials on marine life, the interaction between the sea and the atmosphere, and the dispersion of pollutants is certainly better understood than it was 5 years ago.

In short, in considering what new steps to take, it is important to recognize that we have built up a very good program in oceanography. The question now is how to make it better, how to reconcile the need to satisfy a variety of purposes and still to have a coordinated, coherent program.

The existence of scientific and technological programs having common characteristics divided among a number of agencies is not unique to oceanography. There are a number of such programs and each requires coordination to achieve the greatest economy and efficiency in Government operations as a whole.

This situation is often encountered because science and technology is simply not organized to fit the structure of the Federal Government, with agencies established for various purposes and assigned to accomplish diverse missions. When we identify programs in science and technology that several agencies depend upon to fulfill their missions, then some means of coordination must be developed.

At this point I would like to review for the committee how the Executive Office of the President is organized to handle the problem of Government-wide program coordination. In the Executive Office there is the Office of Science and Technology, a small executive agency established with the approval of the Congress by Reorganization Plan No. 2 of 1962, to insure the President has adequate staff support in developing policies and evaluating programs, to insure that science and technology are used most effectively in the interests of national security and general welfare.

Although the OST, as it is called, reports directly to the President, it is ultimately responsible to the Congress, as are other executive agencies. I am the Director of OST, and I also serve in a different but related capacity as Special Assistant to the President for Science and Technology.

The essential task of OST, insofar as oceanography is concerned, is to advise and assist the President with problems of science policy and with the coordination of Federal activities in science and technology in concert with the Bureau of the Budget.

An additional function of OST, which I consider to be of great importance, is to serve as a point of contact and communication with Congress on scientific and technical issues, especially those of a Government-wide character, such as oceanography. Recognizing the importance of oceanography in the activities of OST, I have recently recruited an outstanding oceanographer from the Scripps Institution of Oceanography, Dr. Menard, to serve on my staff.

In addition to OST, two important committees exist to provide advice to the President on diverse activities in science and technology: the Federal Council for Science and Technology and the President's Science Advisory Committee. I serve as Chairman of both groups and the OST provides their staff.

The Federal Council for Science and Technology is composed of senior policy officials in the executive agencies who are responsible for research and development activities. The Executive order establishing the Council in 1959 directs it to provide more effective planning and administration of Federal science and technology, to identify research needs, to achieve better use of facilities, and to further international cooperation. Though it is an advisory body, the Council provides the central forum for discussion of common problems, technical problems in general, by Federal officials. It is the channel through which views and information are exchanged and through which a coordinating structure for Federal programs is established.

One of the most significant areas of activity of the Council has been to identify emerging areas of science and technology relevant to a large number of Federal agencies and to establish interagency committees to deal effectively with issues and opportunities presented by common experience and concern for a single area of science and technology. Thus far, the Council has established 11 committees for this purpose, the Interagency Committee on Oceanography being one of them. To a greater degree than was originally expected, these committees have increased the efficiency of Federal science and technology programs by improving communications among the agencies, by identifying issues for resolution, avoiding undesirable duplication, promoting complementary efforts, and facilitating more efficient and effective use of resources.

Some of the other interagency committees of the Federal Council which function similarly to the ICO are committees on atmospheric sciences, water resources, high energy physics, behavioral sciences, natural resources, scientific and technical information, and materials.

To give you some idea of the magnitude of several of these programs, the President's fiscal 1966 budget for water resources research was \$100 million; for high energy physics, \$137 million; for atmospheric sciences, \$200 million; and, as you know, for oceanography, was \$142 million.

When Dr. Morse testifies, he will explain the operation of the Interagency Committee on Oceanography in some detail, but I should like to remark briefly on the accomplishments of this organization. It has in my judgment performed well. The committee has provided the means whereby we have accumulated data relating to the total Federal activities in oceanography.

The Committee provides a mechanism through which each agency can know and does know what other agencies are doing and planning to do in oceanography. It has organized and presented data in a way which provides the Executive Office of the President, and in my judgment the Congress also, with a comprehensive view of the Federal activities in this field. And importantly, the Committee has set forth national goals for oceanography which have been endorsed

by the executive branch and transmitted to the Congress in the long-range plan for oceanography. The general goal stated in the plan is:

To comprehend the world ocean, its boundaries, its properties, and its processes, and to exploit this comprehension in the national interest, in enhancement of our security, our culture, our international posture, and our economic growth.

We proceed toward this goal by strengthening basic science, improving national defense, managing ocean resources, protecting life and property, and insuring the safety of operations at sea—through a concerted national effort in oceanography. The long-range plan can be viewed as an outline of requirements over a decade, in which context annual plans can be prepared according to needs, opportunities, and a desirable balance between capital investments and operating programs.

Programs and issues developed by the ICO are reviewed by the Federal Council and appropriate recommendations are made. Thus, the advice of the ICO is available directly to me as Chairman of the Federal Council and as Director of the Office of Science and Technology. This means that oceanography can be and is presented and discussed as a single Federal program in the Executive Office of the President.

To the extent that a consensus can be reached among the participating agencies involving new budgetary or policy matters, the Federal Council's recommendations are implemented directly by agency action. Otherwise, its recommendations are implemented within the agencies by persuasion from the Office of Science and Technology, in concert with the Bureau of the Budget.

The other important Committee, besides the Federal Council, that exists to give advice to the President on activities in science and technology, is the President's Science Advisory Committee. The PSAC, as it is called, is composed of distinguished scientists and engineers selected from outside of Government on the basis of personal scientific and technical achievements of the highest order. The Committee's purpose is to make available to the President the very best scientific and technical advice in this country on such policies and programs as he might select. In addition, it is the Committee's function to recommend broad programs and policies and to anticipate problems which may face the President and the country in the future.

In this regard there are now important scientific and technical questions relating to the oceanographic program, and a panel of the President's Science Advisory Committee, the Panel on Oceanography, has been formed to study such questions. Over the course of the next 9 months the Panel will study the needs and opportunities and current activities in oceanography in order to recommend an improved program in terms of scientific merit, technological application, scientific and engineering leadership, and means whereby industrial, academic, and Federal resources can be jointly and effectively employed in this program.

The Panel's Chairman is Dr. Gordon MacDonald, a member of the President's Science Advisory Committee, a distinguished scientist who is currently the Deputy Director of the Institute of Geophysics and Planetary Physics of the University of California. The Panel is composed of 10 other prominent scientists and engineers from universities, private institutions, and industry, who have taken an active part in

public affairs and have a working knowledge and understanding of the Federal Government and its operations.

I have dwelled at some length on the organization of the Executive Office for Scientific and Technical Affairs because, in my judgment, the organization is sound and has resulted in substantial progress in the last 5 years. I should interpolate that I also think it could be improved.

Now I should like to turn to the various bills before this subcommittee.

First, H.R. 2218, by the chairman of the subcommittee, Mr. Lennon, and identical bills by Mr. Pelly, a member of the subcommittee, and Mr. Bonner, chairman of the committee, to provide for a comprehensive, long-range, and coordinated national program in oceanography. This bill is identical to H.R. 6994, introduced by Mr. Lennon in the 1st session of the 88th Congress, which was strongly supported in a letter from my predecessor, Dr. Wiesner, to Chairman Bonner in June 1963, and which subsequently passed the House in 1963.

In my judgment this bill continues to represent the best approach to Federal management of oceanographic affairs. It clearly establishes a national policy for oceanography, effectively fixes responsibility for achieving national goals, and provides for substantial controls in the program through annual reports to the Congress. I spoke favorably of the bill before this subcommittee a little over a year ago. I commented favorably on H.R. 2218 in a letter to Chairman Bonner in February of this year. And I continue to support this bill which establishes prudent policies and procedures for achieving a comprehensive, yet coordinated, long-range program in oceanography. I can suggest no essential improvements to this excellent bill.

Second, H.R. 921, by Mr. Wilson, to establish a National Oceanographic Agency. This bill would create an independent agency, to which functions relating to oceanography would be transferred from a large number of existing agencies. I do not believe this bill provides a satisfactory solution, because it would centralize in a single agency many aspects of oceanography which must and should be carried on by many agencies of the Federal Government if they are to discharge their statutory responsibilities.

An arbitrary divorce of oceanography from the agencies would break an essential intellectual link the program now has with other Federal programs, which, in the long run, would tend to cause oceanography to be less responsive and less efficient in supporting the programs and purposes of the Federal Government. I believe that retention of the major base for oceanography in the programs of the various agencies is sound and should continue. It would be a mistake in principle to attempt to centralize in a single agency the great bulk of the work which is carried on most effectively and most properly in alliance with the missions of the several agencies involved.

Third, H.R. 5654, by Mr. Fascell, and identical bills by Mr. Fulton, Mr. Hanna, and Mr. Huot, to provide for expanded research in the oceans and the Great Lakes and to establish a National Oceanographic Council. As I noted earlier, the President has had available since 1959, through the Federal Council for Science and Technology, a means of coordinating and planning Government-wide activities relating to oceanography. The functions of the proposed National Ocean-

ographic Council would largely duplicate those of the Federal Council and the ICO with respect to oceanography, and whether they could be performed more effectively by the proposed council is not clear. The proposed Council would supersede the effective linkage of oceanography with the Federal Council structure.

Moreover, this bill raises a general question relating to the structure of the executive branch for dealing with questions of science policy. Whereas, the Office of Science and Technology was created with the concurrence of the Congress to advise the President on matters relating to science and technology and to coordinate the activities of the Federal agencies, this bill raises in principle the desirability of establishing a series of national councils which report directly to the President.

This means of organizing to deal with problems of science and technology would pose complicated problems for both the President and the agencies themselves. For these reasons, I cannot recommend enactment of the bill.

Fourth, H.R. 6457, by Mr. Ashley, to provide for a comprehensive, long-range, and coordinated program in oceanography. In many respects this bill is similar to the one discussed above, except that the National Oceanographic Council would be placed administratively in the Office of Science and Technology. From an organizational viewpoint, this would create an impractical arrangement—a council within an office the heads of which both report directly to the President, and a staff within a staff in the Office of Science and Technology.

In addition to these deficiencies rooted in basic concepts, it would be clearly undesirable to have a representative of the Office of Science and Technology, with general policy responsibilities, serve as a member of a national council which is to advise the President as an advocate of a single specialized area of science and technology.

Fifth, H.R. 5884, by Mr. Rivers, and an identical bill by Mr. Keith, to provide a program of marine exploration and development of the resources of the Continental Shelf and to establish a Marine Exploration and Development Commission. As I pointed out at the Maryland Governor's Conference about 1 year ago, the Continental Shelves, which are most accessible to exploration, have not yet been mapped geologically, which would be important from the viewpoint of the economic development of marine resources envisioned in this bill.

We have begun, however, to explore the Continental Shelf systematically in terms of its oceanographic characteristics and natural resources. During fiscal year 1965, about 20 percent of the total Federal effort in oceanography was devoted to Continental Shelf studies. A systematic survey of the geological and geophysical characteristics of the east coast Continental Shelf and slope, supported by the U.S. Geological Survey, is now roughly 70 percent complete.

I would not like to give the impression that we feel we are doing everything just right; however, with two agencies—Commerce and Interior—with responsibility for marine surveys and resource management, respectively, I expect a more concerted effort will be made to prepare for the economic development of these offshore areas.

With respect to the bill itself, I have several reservations: First, that it would be premature to enact such a bill at this time when the extent of legal problems related to resource recovery from this area

has not been clarified. Secondly, there is a question also whether the provision of funds to industry, as provided for by the bill, is a necessary or proper function of the Federal Government at this time.

Finally, owing to the large number of existing committees, commissions, and councils, if any of the functions proposed in the bill are established in law, serious consideration should be given to placing them under the general jurisdiction of a major agency or department, which is already performing similar or identical functions.

Sixth, H.R. 7849, by Mr. Teague, to provide for the economic development of the Continental Shelf and to establish a National Oceanographic Council. This bill is essentially a combination of the definition, objectives, policy, and functional features of H.R. 5654 and the features of H.R. 5884. For the reasons outlined in my previous remarks on these bills, I cannot recommend enactment of H.R. 7849.

Seventh, H.R. 9064, by Mr. Rogers, a member of this subcommittee, and identical bills by Mr. Reinecke, Mr. Hanna, and Mr. Downing, to establish a National Commission on Oceanography. The objective of the Commission, to make a comprehensive investigation and study of all aspects of oceanography in order to recommend an overall plan for an adequate national oceanographic program that will meet the present and future national needs is clearly an important one. It is essentially the same, however, as that of the President's Science Advisory Committee's Panel on Oceanography that I mentioned earlier.

Owing to the similar purposes of the two study groups, I cannot recommend enactment of H.R. 9064 at this time. Nevertheless, I recognize the possibility that there might be a need for a commission on oceanography at a later date.

I have asked the Panel on Oceanography to report to the President's Science Advisory Committee in the spring of 1966—and, I might say, to present interim reports in the meantime—at which time a more informed and reliable judgment can be made on this point and on the composition and mission of any commission which might be established.

Eighth, H.R. 5175, by Chairman Lennon, to provide for the study of legal problems relating to the management, use, and control of natural resources of the oceans and ocean beds. Although I am not personally familiar with specific legal problems in connection with the management of marine resources, I believe there are unresolved legal questions relating to ownership rights of these resources. If a legal study such as proposed by the bill were to be initiated, in view of the mission of the Department of the Interior for resource management, it would seem more appropriate that the study be sponsored by that department.

In summary, let me say that my reservations concerning these bills relate not to purposes, in general, that seek to establish a vigorous and efficient oceanographic program in the national interest. I am in accord with these purposes. The central issue is how these purposes can best be accomplished.

It seems to me there is no practical alternative to the administration of oceanography by interagency cooperation. Except for the National Science Foundation and the Smithsonian Institution, the Federal agencies are not interested in oceanography as a science, except as it supports their mission. They need the varied kinds of information

provided by the activities encompassed in the word "oceanography" to accomplish their practical purposes. In fact, this link to the missions of the agencies makes the oceanographic program productive and viable and responsive to the national needs.

On the other hand, several agencies frequently need the same information, in which case only one of the agencies needs to obtain it. The information collected by a single agency must thus be made available to all agencies and to the scientific community and to industry, as well. In the final analysis, it is the variety of goals and activities that generates the need for coordination. All changes in organizational structure that I have ever encountered only change the interfaces across which coordination must occur.

For reasons mentioned earlier, your bill, Mr. Chairman, H.R. 2218, in my opinion, represents the best general approach to the complex problem of coordination of oceanography—an area of science and technology of significance to the economic, military, and social progress of this country. I would like to recommend its enactment. Thank you very much, and I will be pleased to answer whatever questions I can.

MR. LENNON. Thank you, Doctor. Mr. Casey?

MR. CASEY. Doctor, I would like to try to get oriented in my own mind on the various offices and agencies that we have here and how they coordinate. If one is tops, which one, and so forth.

Now, we start out with what now, the Federal Council for Science and Technology?

DR. HORNIG. I do not think it is as complicated as it often sounds. There is the Office of Science and Technology, which is responsible to the President.

On the one hand, it has the Federal Council of Science and Technology, which is the arm that reaches into the Government departments and agencies as an advisory mechanism for the President.

On the other hand, there is the President's Science Advisory Committee, which reaches out into the scientific and technical community to get advice from outside the Government.

So, from the two sides these funnel through OST, which provides the staff responsible to the President.

MR. CASEY. Now OST is appointed by the President, is that correct?

DR. HORNIG. No, the Office of Science and Technology is an Executive Office, which was established by the Reorganization Act No. 2 of 1962.

MR. CASEY. You are the Director of that?

DR. HORNIG. I am the Director of that.

MR. CASEY. And you are appointed by the President?

DR. HORNIG. I am appointed by the President.

MR. CASEY. Do you have a staff to assist you, and your prime purpose is to advise the President on the programs and so forth based on the information you get from these other two, is that correct?

DR. HORNIG. I have an independent responsibility to advise and assist the President on matters affected by or pertaining to science and technology, and I utilize these other two mechanisms to discharge that responsibility.

MR. CASEY. Now, is ICO an arm of OST?

DR. HORNIG. There are 11 members on the Council.

The Federal Council was established by Executive order in 1959 and it is composed of the top ranking person who is concerned with scientific and technical matters in each of the agencies.

Mr. CASEY. How many are on that Council now?

Dr. HORNIG. There are 11 members on the Council.

Mr. CASEY. There are how many, sir?

Dr. HORNIG. Eleven.

Mr. CASEY. Is that number set by statute or who determines who belongs to the Council?

Do you know? I do not.

Dr. HORNIG. The Federal Council was established by Executive order and not by statute, and the number was prescribed at that time.

Mr. CASEY. Does the President appoint the members of this Council?

Dr. HORNIG. No, the members of the Council are appointed by each of the agencies represented.

Mr. CASEY. Who determines which agency shall be represented? Is that determined by that Executive order? Do you recall?

Dr. HORNIG. Let me recount the agencies for you.

Mr. CASEY. Put that in the record later on, will you, as to the agencies and how the membership on the Council is determined.

(The following material was subsequently supplied for the record:)

The Federal Council for Science and Technology was established by Executive Order 10807 of March 13, 1959, which provides that:

The Council shall be composed of the following designated members: (1) the Special Assistant to the President for Science and Technology, (2) one representative of each of the following named departments, who shall be designated by the Secretary of the department concerned and shall be an official of the department of policy rank; the Departments of Defense, the Interior, Agriculture, Commerce, and Health, Education, and Welfare, (3) the Director of the National Science Foundation, (4) the Administrator of the National Aeronautics and Space Administration, and (5) a representative of the Atomic Energy Commission, who shall be the Chairman of the Commission or another member of the Commission designated by the Chairman. A representative of the Secretary of State designated by the Secretary and a representative of the Director of the Bureau of the Budget designated by the Director may attend meetings of the Council as observers.

Mr. CASEY. You are Chairman of the Council; are you not?

Dr. HORNIG. That is right.

Mr. CASEY. Now then, the President's Science Advisory Committee. Do you recall how it was created?

Dr. HORNIG. Yes; it was created by action of the President.

Mr. CASEY. Now, it, I believe you said, was composed of 10 members?

Dr. HORNIG. No; the President's Science Advisory Committee is composed of 17 members, all appointed by the President.

Mr. CASEY. Excuse me.

Dr. HORNIG. The 10 referred to the number of members of the Panel on Oceanography, which was established by the President's Science Advisory Committee.

Mr. CASEY. Now, the Chairman of that Panel is, you stated, Dr. Gordon MacDonald?

Dr. HORNIG. That is correct.

Mr. CASEY. The Advisory Committee, does it operate its own shop? In other words, it has set up this separate Committee on Oceanography. Are you a member also of this Science Advisory Committee?

Dr. HORNIG. I am Chairman of the Science Advisory Committee.

Mr. CASEY. I see. You are Chairman of it also.

Dr. HORNIG. Yes.

Mr. CASEY. Yes.

Now, are there—of these 17 that are on the Advisory Committee, besides yourself, are they all outside of Government, or are there some others like you who are both inside the Government and outside?

Dr. HORNIG. They are all outside of the Government except myself.

Mr. CASEY. Do you have the list of the 10 men that are on this Committee chaired by Dr. MacDonald?

Dr. HORNIG. Yes, I do. Would you like me to read that?

Mr. CASEY. Yes; I think it would be interesting.

Dr. HORNIG. Besides Dr. MacDonald, there is Dr. Douglas Brooks from the Travelers Research Center; Dr. Robert Charpie from the Union Carbide Corp.; Dr. Robert Fleagle from the Department of Atmospheric Sciences, University of Washington; Dr. Finn J. Larsen, director of engineering, Minneapolis Honeywell, Inc.; Dr. William D. McElroy, chairman, Department of Biology of Johns Hopkins University; Dr. John Meyer, Department of Economics, Harvard University; Dr. Walter Munk, Scripps Institution of Oceanography, University of California; Dr. Jack P. Ruina, Institute for Defense Analyses; Dr. Henry Stommel, Woods Hole's Oceanographic Institution; and Dr. Gerald B. Whitham, chairman of the Department of Applied Mathematics, California Institute of Technology. And they are assisted by these two gentlemen from my staff.

Mr. CASEY. How often does this panel meet? Do you have any idea? First, how often do they have regular meetings of the Science Advisory Committee?

Dr. HORNIG. The Science Advisory Committee is one of the hardest working groups in the Government. It has regular meetings 2 days a month. Most of its members normally spend 2 or 3 more days per month working with one or more of the panels on selected topics.

I think on the average that members of the Science Advisory Committee spend 45 to 50 days a year in the service of the President.

Mr. CASEY. Now, the 10 members on this Oceanography Committee, they are also members of the Committee—the Science Advisory Committee? Is that correct?

Dr. HORNIG. Only the Chairman, Dr. MacDonald and Dr. McElroy are members of the President's Science Advisory Committee.

Mr. CASEY. In other words, they creat a chairman, and does he select people to work with him?

Dr. HORNIG. The Committee membership is normally determined through consultation between myself and the Chairman, yes.

Mr. CASEY. Well, I am just curious. What interest does Travelers have in oceanography?

Dr. HORNIG. We normally select people not for what they represent, either by field or by institution. We try to avoid a conflict of interest, but we select people for their personal capabilities, and Dr. Brooks is a very able man who has been involved over a period of years with oceanographic programs.

Mr. CASEY. In other words, it just happens he is with Travelers?

Dr. HORNIG. That is correct.

Mr. CASEY. And he is capable in this field?

Dr. HORNIG. Yes. I should point out that this is a normal method of operation of the Science Advisory Committee. Its function is to

advise and assist the President on major national programs and issues. Among 17 members there can be reasonable dispersion, and there is, of expertise. But it cannot pretend to be expert on all topics, so that as it becomes deeply interested in programs which it thinks are important, the normal procedure has been to appoint a working panel of people selected to bring appropriate expertise into the area of concern.

Mr. CASEY. Now, then the Interagency Committee on Oceanography, how was that established?

Dr. HORNIG. The Interagency Committee on Oceanography was established at about the same time as the Federal Council, because oceanography was considered to be one of the very important areas for coordination. That was in 1959.

Mr. CASEY. That was established by the Federal Council and it is responsible to the Federal Council, is that right?

Dr. HORNIG. It is responsible to the Federal Council, that is correct, and its members are appointed by the agencies which are involved in the oceanographic program.

Mr. CASEY. How many members of that Committee?

Dr. HORNIG. There are nine members of the ICO.

Mr. CASEY. Nine members. Do they also serve on the Council, or are these separate? They serve on the Federal Council?

Dr. HORNIG. No; none of them are members of the Federal Council.

Mr. CASEY. They are from nine different agencies, is that correct?

Dr. HORNIG. Yes, sir—they are from Defense, Commerce, Interior, Atomic Energy Commission, the National Science Foundation, the Treasury, Smithsonian Institution, and State.

Mr. CASEY. Are these same agencies represented on the Council?

Dr. HORNIG. Substantially. There are some on the Council that are not represented here.

Mr. CASEY. I understand that, because you only have nine members. But I want to know if those nine agencies on the interagency committee are also represented on the Council.

Dr. HORNIG. Treasury has no member on the Council, nor does the Smithsonian Institution.

Mr. CASEY. This ICO being a creature of the Federal Council, do they work independently or do they work on problems at the direction of the Council, or just what is their system? Do they have a system?

Dr. HORNIG. I would suggest that since I am being followed by Secretary Morse, who is Chairman of the Council, he can describe its operation somewhat better than I can.

Mr. CASEY. I will wait for him then.

Are you satisfied with the information you get from ICO? Let me ask you that.

Dr. HORNIG. I think the ICO has done an excellent job, particularly in assembling information, in transferring information between agencies, and in coordinating the programs of agencies. I might say, though, it has the problem which is inherent in all interagency committees, that it is very difficult for an interagency committee to develop any strong critical faculty as regards the activities of any of its members.

Mr. CASEY. Well, frankly, is ICO nothing more or less than a review committee and reporting committee to the Federal Council? They cannot make any plans or formulate any programs, can they?

Dr. HORNIG. Oh, yes. They have done very substantive things. For instance, they have coordinated the ship operating schedules of all of the agencies that operate oceanographic vessels, so that everyone knows whose ship is going where and when. In that way both from within and without the Government, people can secure berths on those ships when they have measurements to make, when another agency's ships might be appropriate, or when outside people wish to utilize our Government's ships.

Mr. CASEY. What I mean is, ICO could not come up and say, "Well now, we think the next thing we should do * * *" and pin a particular project that has not been initiated. Let us say there is one—and say, "All right, we want so much money for this." Can they do that or do they do that?

Dr. HORNIG. The ICO assembles each year—I will be glad to give you a copy—a booklet, in which they assemble the plans and budgetary programs of all of the agencies. In the process of doing that, they also describe the substance of the oceanographic programs.

Mr. CASEY. It is a reporting proposition, but what I mean, is it a planning agency? Is it one that does say what the National Aeronautics and Space Administration says?

Now, we are going to plan and suggest or request or demand that certain agencies include something in their program, or do they just operate as a reporting and coordinating agency for ships' operations?

Dr. HORNIG. Again, I think Secretary Morse can spell this out in more detail, but they have prepared a series of reports which make recommendations. They are just in the process of completing one on underseas vehicles for oceanography which will make recommendations with regard to the program for deep submersibles.

Mr. CASEY. They will make recommendations to whom? The Federal Council?

Dr. HORNIG. Their reports will be publicly available, and it will be available to me and to the Congress.

Mr. CASEY. I know, but making a report. I am talking about how will it get started? Does the ICO start it, or do they make this report public? That is true, but is the Congress supposed to take that report and grab it, or is someone supposed to put that particular item in their budget?

Dr. HORNIG. The report must be implemented in the budget. In some cases, once the agencies have been involved in developing the recommendations, they are easily included in the agency programs. In other cases, this requires some persuasion on my part.

Mr. CASEY. Then if the agency gets to the authorization committee or the Appropriations Committee and they have to cut down on their funds, why then they are in trouble, are they not?

Dr. HORNIG. Yes, sir.

Mr. CASEY. If, say, the Defense Department—and you have something the Armed Services Committee or the armed services section of the Armed Services Committee deems more important, they are out?

Dr. HORNIG. That is right. I might also point out that this happens in Space. There are not nearly as many agencies involved, but the NASA has one authorization committee and the Department of Defense another, for example.

Mr. CASEY. Yes; I am on the Space Committee.

Dr. HORNIG. Yes. So, the difference is not so much in principles. Here there are four or five major agencies involved in the program.

Mr. CASEY. Now, you listed some of the accomplishments in the past 5 years and I agree with you there. We want to see some more, if we can, and we are trying to be helpful.

Incidentally, what is the budget of the ICO?

Dr. HORNIG. The ICO has no independent budget of its own. It operates with staff members provided by the agencies.

Mr. CASEY. One item you listed, laboratories built for underwater living, for divers to perform useful work on the sea floor for prolonged periods of time at great depth.

How many such laboratories do we have?

Dr. HORNIG. Sea Lab 1 has been built, and the second is just now nearly operational. The answer is two.

Mr. CASEY. I beg your pardon.

Dr. HORNIG. One has been in operation and the second is entering operation now, so there are two.

Mr. CASEY. Where is one operating?

Dr. HORNIG. The first one operated off Bermuda, and the second will operate off Scripps in California.

Mr. CASEY. How long has one been in operation?

Dr. HORNIG. The first one operated for about a week.

Mr. CASEY. You mean 1 week's operation is all we have had on this No. 1 Sea Lab; is that correct?

Dr. HORNIG. Dr. Morse, can I turn to you on Sea Lab, this being a Navy program.

Dr. MORSE. I think the week really refers to the length of time the people were—the swimmers were actually in the lab. Of course, the program continued over a long period. In fact, the program is continuing.

The Sea Lab 2, the length of time that the aquanauts will be down will hopefully be as long as a month. That is, this is limited by essentially projected endurance of people and the objectives of the program. But the program as a whole is a continuing program.

Mr. CASEY. The 1 week that is referred to is the longest period that they have stayed down during—

Dr. MORSE. That the swimmers did stay down.

Mr. CASEY. To what depth?

Dr. MORSE. That was about 193 feet for No. 1, and Scripps, I think, is 215.

The temperature of the water is considerably colder at Scripps, so I think the demands on the swimmers are much greater than it was off Bermuda.

Mr. CASEY. Are these both 1 and 2 now, being operated by the Navy?

Dr. MORSE. They both are Navy operations, yes.

Mr. CASEY. Well now, are the data that are being acquired for defense purposes, or is it supposed to be for all types of experiments?

Dr. MORSE. No, sir. In fact, many of the participants in the program are from a great many of the other agencies and from organizations such as the Scripps Institution, it is all unclassified. In fact, the report will be a public report. There is already a preliminary report on Sea Lab 1, and it is unclassified.

Mr. CASEY. Have there been any Madison Avenue "new approach" in letting the public know about this? Is there a movie on this?

Dr. MORSE. Yes, sir. There has been a movie. We try our best to publicize it. There was a dedication of the Sea Lab 2 early in July. In fact, I participated in it at Long Beach. We have tried to—and I think there was a good deal of press attention. I think I saw something last night in the Washington paper about the program.

Mr. CASEY. Does any other country have a similar operation?

Dr. MORSE. Not that I know of, sir.

Mr. CASEY. Is that not kind of a first for us?

Dr. MORSE. I agree.

I am sorry. I think that Cousteau had similar kinds of operations where people have worked and lived for some time in underwater plants.

Mr. CASEY. Was this all Government financed?

Dr. MORSE. Yes, sir.

Mr. CASEY. Was it Navy built?

Dr. MORSE. Yes, sir; it was built at the Long Beach Naval Shipyard, but the actual container, which is of course a nonpropelled large cylindrical chamber where as many as, I believe, 15 people can live and maintain themselves in gaseous atmosphere at that depth and then emerge to do work and swim.

There will be doctors down there, there is a whole series of biological—that is, first experiments dealing with swimmers and then experiments outside, the nature of the activities that they will be undergoing while they are there.

The Scripps Institution is also testing out equipment. I think there are a great many organizations testing out equipment, both for swimmers and for work under the water using the Sea Lab 2 as a mechanism for evaluating this equipment.

Mr. CASEY. Well, Mr. Chairman, I do not want to take any more time and let somebody else have an opportunity now.

Mr. LENNON. Thank you, Mr. Casey.

Mr. Mosher?

Mr. MOSHER. Mr. Chairman, at this time I do not think I have any significant questions. It seems to me that Dr. Hornig has made his position crystal clear concerning the legislation before us and I assume he speaks for the President in this matter.

Is that right. Are these the Presidential recommendations, Dr. Hornig?

Dr. HORNIG. They are the recommendation of the administration.

Mr. MOSHER. That is all, Mr. Chairman.

Mr. LENNON. Mr. Rogers?

Mr. ROGER. Thank you, Mr. Chairman.

Doctor, your testimony has been helpful and I do think we have made some progress. I think the ICO has done a good job. I think your office has. But I have a feeling that we still have not approached oceanography with the urgency which so many of us in Congress are feeling and have felt for the last number of years, particularly since this committee passed the bill, as you reported your predecessor had supported.

I am concerned about the whole approach and this feeling that we must adhere to the present setup rather than being, I think, more

open minded and starting out on a new approach that we have used in other fields. I do not know that it is the one, but I think probably we do not know and we need a good study made now.

Now, I notice some of your testimony before the Senate. One of your statements in your testimony there was about these Federal agencies and these are your words: "Each of these Federal agencies is not interested in oceanography as such, or for the sake of oceanography itself, but rather for little specific missions they may have."

This causes me concern. That we have so splintered, in your own words, this effort, that we really have not centered the emphasis on oceanography itself in advancing this program. And you point out in your testimony there, as I think you have here, that one of the problems is that we have all these Federal agencies, that each has a specific mission that they want to accomplish, and they are the ones that put in the budgetary requests, just as you brought out in the discussion with Mr. Casey. That the Secretary of Commerce puts in his budget, and if it has to be cut, why he has to decide whether he is going to cut oceanography, because he does not have a primary interest in oceanography, just as you have said. And this is understandable.

So we shift it over to the ICO. Well, what is the ICO but the representative of the man that appointed him and so, to a certain extent, is it not true tht he has to reflect the views of his department?

Dr. HORNIG. I think this is one of the major problems in the ICO—that individuals plainly must represent the views of their department. This is why we turn to the outside for some dispassionate criticism of our programs.

Mr. ROGERS. Yes. From the ICO it then goes to your two committees, I presume, and there you have an in-house group look at it and an outside group look at it, as I understand it.

Now then, who actually makes the decision? Is it going to be you or the department head or who will it be, or the Budget?

Dr. HORNIG. I would like to, if I may, say a few words of general philosophy, because these problems are not peculiar to oceanography. There is no unitary area of effort we can call oceanography, so what we talk about as splintering occurs in every one of the major scientific areas because the Government is organized to serve major public purposes.

For example, the Department of the Interior has a general responsibility for the development of our resources.

Mr. ROGERS. That is right, and they undoubtedly may say, "I would rather built roads." Then what do you say? The ICO said, "We want some research done on fisheries. We are getting behind in our fisheries problem."

Dr. HORNIG. In that case, we discuss the problem with the agency involved and the Bureau of the Budget.

Mr. ROGERS. Does the Secretary still have the right not to include it in his request?

Dr. HORNIG. Yes. The initiative in the end comes from the Secretary.

Mr. ROGERS. Why, of course, so this makes a problem for you and I can understand your problem, and I think you have done a magnificent job so far, but these are some of the problems we are trying to get

at in these hearings, and I am hesitant to go too far, but I do think that we have not used enough imagination yet from the agency dealing with this problem, or even from the Office of Science and Technology.

Not particularly you, but the whole approach. I realize you have many other problems that you have to devote your time to than just oceanography. What would you say is the percentage of time you can devote to this program?

Dr. HORNIG. Only a small percentage.

Mr. ROGERS. Certainly. I can understand that.

You have a staff of how many? Twenty?

Dr. HORNIG. I have a staff of 20 professionals.

Mr. ROGERS. How many of those devote their full time to oceanography? Two?

Dr. HORNIG. The two we have here. Only one of them is permanent, however.

Mr. ROGERS. So we have one man devoting his full time for the President, really, to coordinate all of this activity. It essentially has to come to this one man to advise you on whether you have to go to the Secretary or the Bureau of the Budget on what you want to do. He has to screen this for you, does he not, this one man?

Dr. HORNIG. This is correct. I should also point out, however, that this problem recurs in many areas.

Mr. ROGERS. I do not know we are doing so well in a lot of other areas. I will not get into that. I am not going to excuse what we are not doing in oceanography, because we may not be doing something in another area.

I do not think that is what you meant, but I do not think that should be used as an argument.

Dr. HORNIG. I did not mean that, but the problem I was getting at exists in each area. There is the question of the value of one particular part of the program, such as oceanography in relation to the rest of what we do. I think there is a valid question as to what the balance should be between the pursuit of undersea resources and land resources.

I asked the Geological Survey once how much gold there was in the crust under the continental United States within the depth of mining, and the answer was "several trillions of dollars." But, of course, this does not do us any good. Most of it is not economically available.

So, a balance must be achieved both within oceanography and with respect to the rest of our Federal programs and our national needs.

I would be the first, though, to agree that we must do more, and we can do it better. This is why we are currently pushing hard in this area.

Mr. ROGERS. I realize that is your position.

Dr. HORNIG. I would like to say that I do not think the central problem at the moment is as much organizational, as trying to define clearly what our purposes and goals are, what the substance of the national effort should be.

Mr. ROGERS. How are we going to come to that determination?

Dr. HORNIG. This is the problem I have asked the PSAC Panel to concentrate on, and they are working hard at this moment. They are visiting many of the sites and trying to get a clear picture of what is worthwhile and what is possible in the country.

Mr. ROGERS. Do you not think it would actually be advisable to put this on a level where we have a national commission, appointed by the President, to give it great stature and great acceptance by the public, by the Congress and the executive branch rather than doing, in effect, an in-house study?

Do you now think it would be helpful to you in setting some national goals to give a greater impact on the Congress and people to move into this now, not that you should not go ahead with the study you are doing, but to actually set up a commission to have the wide range to set national goals and to go into all of the problems?

Why would this not be a good thing to do now? Why wait until spring of 1966? We know it has to be done. Do you have any real objections to it?

Dr. HORNIG. No, I did not offer any real objections to the commission. I think this is a matter of judgment. I think my own position is that at this time I can get more concentrated effort out of this Panel than from a commission, but this is a matter of judgment.

Mr. ROGERS. Now, let me ask you about this Panel just a little.

What is its charter?

Dr. HORNIG. Its terms of reference are not substantially different from those of the proposed commission.

Mr. ROGERS. Have you written it down? Is it written down? Could you quote it for us, give us its charter?

Dr. HORNIG. I can give you the initial terms of reference. We normally give any such Panel a free hand to develop its investigation as it sees the problems more clearly.

Mr. ROGERS. Yes.

Dr. HORNIG. But I would be glad to read it to you.

Mr. ROGERS. If it is not too long, then you could put it in the record. Just summarize the major points that you put in that charter.

Dr. HORNIG. As I said, it is a rather informal charter, but the Panel will address itself to the following general issues:

1. What are reasonable goals of an oceanography program?
2. Are the current and planned programs in oceanography scientifically and technically sound, adequate in scope, sound in concept, and adequately funded and organized to achieve these goals?
3. Between these programs and the goals what are the outstanding opportunities for research, exploration, and practical accomplishment of oceanography during the next 5 years?
4. How can the scientific and engineering leadership in oceanography be improved?

Within the context of these general questions, particular attention should be devoted to the following:

1. The internal consistency of the fiscal 1967 oceanographic program in terms of objectives, programs, priorities, available resources, quality, and future plans.

2. The need for substantive, new scientific and technological programs and priorities to progress toward established goals.

3. The optimum balance between capital investment and research and exploration programs during the next 5 years.

4. The need and priority for new facilities, including ships, submarines, platforms, buoys, systems, shore facilities and data-handling facilities during the next 5 years.

5. The optimum balance among Government, university, and industry participation in the oceanographic program.

6. The relative emphasis on Continental Shelf and oceanwide surveys.

7. The availability of scientists and engineers to plan and conduct a program of high quality.

I remind the committee that one of the biggest problems has been the development of scientific manpower in oceanography.

8. The compatibility of the Federal agencies' requirements for deep sea research vehicles and an oceanographic forecasting system.

9. The degree to which oceanographic programs of the several Federal agencies are, in fact, mutually supportive.

This is, as I said, the basis from which they started. As they proceed, they may identify items which are not included and broaden their scope. They may, in fact, find special problems. They may establish special ad hoc subcommittees to investigate particular problems for them.

Mr. ROGERS. As I understand it, they will meet for 9 months?

Dr. HORNIG. Well, they will meet during the course of 9 months; yes.

Mr. ROGERS. I understand, but this is the period they are to make this study.

Dr. HORNIG. I have asked for a report by the spring of 1966.

Mr. ROGERS. Spring of 1966. How often do they actually meet, once a month?

Dr. HORNIG. They were constituted in May. They have had one 2-day meeting. They will have another 2-day meeting in Woods Hole in August.

Mr. ROGERS. Is this about once a month?

Dr. HORNIG. I think about once a month is the normal schedule; yes.

Mr. ROGERS. So, over the period of time maybe they will have had how many meetings, would you say? Once a month? Well, they have only had two to date, or one to date?

Dr. HORNIG. I would expect their total time is likely to amount to about 2 to 4 days a month for 9 months, until the report. Whether they continue after that depends upon the nature of the report. I, myself, am not enthusiastic about continuing committees.

Mr. ROGERS. I understand. I agree with you.

Now, what about their staff? What staff do they have?

Dr. HORNIG. Their staff is provided by my office, and we will recruit whatever additional staff they need.

Mr. ROGERS. What is that now?

Dr. HORNIG. At the moment that is two men.

Mr. ROGERS. They have two men?

Dr. HORNIG. Yes.

Mr. ROGERS. And who are those men?

Dr. HORNIG. They also have the assistance of the ICO.

Mr. ROGERS. How many men does that provide?

Dr. HORNIG. The ICO does not provide a permanent staff to them, but the data-handling and staff capabilities of the ICO are available to them.

Mr. ROGERS. I presume the whole Government is available to them, not just ICO?

Dr. HORNIG. That is correct.

Mr. ROGERS. I am talking about personnel. You have two men. Who are the two men?

Dr. HORNIG. Dr. Menard and Mr. Fry.

Mr. ROGERS. But there is no permanent staffman that works with them all the time? I presume you have some of the work done by these gentlemen working with ICO, with the governmental departments on their programs?

Dr. HORNIG. No; Dr. Menard came to the office from Scripps to work on this particular problem.

Mr. ROGERS. Well, does he devote all of his time to it?

Dr. HORNIG. Yes.

Mr. ROGERS. Nothing else?

Dr. HORNIG. Nothing else.

Mr. ROGERS. Well now, who is going to advise you on the ICO programs when he is devoting all of his time to this panel study?

Dr. HORNIG. I have great confidence in Secretary Morse.

Mr. ROGERS. Well, I am sure of that. I do, too, but then—have other duties been assigned the ICO and the Navy—in the Navy, as I understand it, is that true?

Dr. HORNIG. I do not think there has been any great problem in getting recommendations from the ICO into my office.

Mr. ROGERS. I am talking about a conflict. Do you have time to go into the details of the program? I presume that is what you have your assistant for, where there is a conflict between agencies as to what they want to do, about what the Budget feels, and I would think you have to go into some detail and make a scientific evaluation. I presume that is so.

Dr. HORNIG. Dr. Menard has come to spend the year on the national oceanographic program and this, in fact, includes the ICO as well as the panel. I should have stated this more correctly.

Mr. ROGERS. He is going to do both then?

Dr. HORNIG. He is going to do both.

Mr. ROGERS. Then, we do not have any staffman full time for the study?

Dr. HORNIG. That is correct.

Mr. ROGERS. I am not trying to be embarrassing. I am trying to point up why I think it is necessary for use to have a full commission with a full staff to do this study.

Now, let me ask you this. In looking over the personnel of your commission, your study group or panel, I notice that it is dominated by university people pretty much. In fact, I do not even see a lawyer on here, and I feel that we have some legal problems involved in this whole program.

Are we going to make a study on that at all? Is that to be included?

Dr. HORNIG. You are absolutely correct that there are legal problems and I do not think the panel is either competent to study or was it planned that they study the legal problems.

Mr. ROGERS. So we are leaving that out of your study?

Dr. HORNIG. My study has for the moment excluded the legal problems.

Mr. ROGERS. It seems to me this is something we need to do. I am just trying to point up what is needed in a national commission to be helpful to you as the President's scientific adviser.

Now, let me ask this. I do not even see really any representative of Government on here, on your panel at all.

Dr. HORNIG. That is correct. The panel is drawn completely from outside of the Government so that it can comment objectively on the Government programs.

Mr. ROGERS. Does it include a study of industry, industry's capability and how it should be tied into the governmental view, or is this just to look at Government?

Dr. HORNIG. No, this is a study of industrial and academic capabilities as well as those of Government. The Government viewpoint is represented by ICO and the panel does not operate in isolation.

Mr. ROGERS. You mean, you do not think the Government, who is now spending what—\$140-some-odd million, probably the major contributor to research in oceanographic matters, should not even be represented on the panel that is going to formulate the national program?

Dr. HORNIG. We have this in the ICO.

Mr. ROGERS. Now, I realize that. I am not talking about the ICO, I am talking about the study that you say is going to take the place of a national commission. And they do not even have a representative of Government. We are the major one participant and yet we are not even having an advisor on there as how to direct the program or what we should do.

Now, this seems to me to be a major omission. Would you not agree? For an overall study?

Dr. HORNIG. No, sir; I do not think I would agree, because in trying to evolve goals, this committee will work very closely with the ICO in reaching a conclusion. The Government will be very well represented although it may not be formally represented on the committee.

Mr. ROGERS. Well, I learned in Congress long enough if you are not on the committee, your discussions often do not get very far. Have you found that in Government?

Dr. HORNIG. I would not disagree with you.

Mr. ROGERS. Well, I will not pursue that point.

Dr. HORNIG. I think it might be helpful for you to address the same question to Dr. Morse, to see if he feels the Government will not be adequately represented.

Mr. ROGERS. I do not think it is just a question of whether it is not adequate, it is just a fact that they are not on the panel that you having to study his problem, and we are probably the major activist in this whole field and for me, this is a very great oversight. So, I would hope that you could review with your assistants your position on the national commission and would encourage the President, as I certainly intend to do, and I hope the Congress will, and as I believe it will, the Senate has already passed the bill, as you know, including a commission and I hope that we can do it to set some goals and to get moving on oceanography and not to divide it among the Government, where, as you say, none of the departments have a real, sincere interest in oceanography as a major portion of that program.

I do think under the present setup you are doing a very fine job, Dr. Hornig, I am not trying to belittle your efforts in any way, or of the going group. I think ICO has been doing a fine job. I think it is time for us to get a commission to study the whole setup and to set some national goals with a wide range and not a specific little outside

group—I am sure all are fine men, but dominated by university people, Union Carbide, Minneapolis-Honeywell represented, but we need a broader representation and I think we definitely need it for Government to put forth what we should do and can be, and what the overall program should be.

Thank you, Dr. Hornig. Thank you very much.

MR. LENNON. Mr. Keith?

MR. KEITH. I share a great many of the sentiments that appear to have motivated Mr. Rogers. Just to take as an example, the absence of the veto authority on the panel.

You say on page 14 of your testimony with reference to my bill:

With respect to the bill itself, I have several reservations; first, that it would be premature to enact such a bill at this time when the extent of legal problems related to resource recovery from this area has not been clarified.

Secondly, there is a question also whether the provision of funds to industry, as provided for by the bill, is a necessary or proper function of the Federal Government at this time.

Finally, owing to the large number of existing committees, commissions, and councils, if any of the functions proposed in the bill are established in law, serious consideration should be given to placing them under the general jurisdiction of a major agency or department, which is already performing similar or identical functions.

There are, as you have recognized in your response to his questions, tremendous needs with reference to legal authority as to our exploitation of these resources. To have a continuing and informative or informed talent on the panel would be of help to you, I would think, in reaching conclusions as to how we are going to exploit these resources.

DR. HORNIG. I should mention, Mr. Keith, that at the last panel meeting the panel itself worried seriously about this problem, and we will certainly take the comments made here most seriously.

MR. KEITH. With reference to the membership of the governmental representatives on the panel, inasmuch as the Government will be called upon to implement many of the conclusions that are reached, it would be helpful to have someone on the Government payroll that we could from time to time call upon, someone who would have a continuing interest in the panel.

We do not want a continuing committee, but we do not want to have these reports just filed away, gathering dust. We want someone who knows from the Government point of view what our responsibilities are.

I was a little surprised on this matter of public relations, as Mr. Casey pointed out, that you had really been aware of Cousteau's efforts and success in publicizing the French talent in this respect. I think that we have to get a little bit—my wife does not like to have me use this word—of “sex appeal” into this program in order to sell it. You made a statement that there were several trillions of dollars, I think you said, worth of gold in the ocean. You did not know just where it was, or how easily it could be captured and used and exploited. But everybody, historically, is interested in gold—particularly at this time. You just sort of passed over that casually.

If there is any chance of getting any gold out of “them there” departments, we certainly should have a mission with that as a primary purpose, it seems to me.

I was also interested in the semantics when Mr. Rogers asked you about the mission or the charter of your panel. You did not want to exactly adopt his terms, you wanted to use the term "termographics," which is not as imaginative, or as motivating as "roles and missions," for example.

We have to get things done. It has been my understanding that we have had this kind of panel for the past 3 years with almost similar responsibilities assigned to it; is that not so?

Dr. HORNIG. I should answer that the President's Science Advisory Committee has been strongly interested in oceanography since the moment of its inception in 1957, and it has been one of the principal advocates of the early development of the oceanographic program.

In the preceding 2 years we have had panels with a somewhat narrower objective of working with the ICO in reviewing the Federal programs. This panel now is meant to be much more imaginative, to accomplish a much broader examination than the previous panels.

Mr. KEITH. Well, I hope it is more fruitful.

In the charge that you gave to this panel I did not notice a great deal of attention to the question of economic return for industrial missions. You smile, I guess maybe you have a good answer on this one.

Dr. HORNIG. I appointed an economist to the panel with that very much in mind.

Mr. KEITH. Well, my bill calls for a very significant role on the part of private enterprise and some determination of the responsibility of Federal Government to help them in their initial efforts to exploit these resources and I would hope that we would make every effort to think of this in terms of economics.

Dr. HORNIG. I would like to make clear that the possibility of economic return is to me one of the very central and major questions. In the one area in which there has been substantial economic return—oil and gas—from subsurface deposits, we have actually had a larger investment by private industry than is involved in the total oceanographic program, and I feel that if we can identify really valuable mineral deposits, we will find a considerable private involvement.

Mr. KEITH. I have only been on this committee a short time, but I have attended hearings earlier inasmuch as I was interested because of Woods Hole being located in my district, and it seems to be something of the same old record year after year of our plans but really not much resolution of the discussions and how they can best be implemented.

As Mr. Rogers pointed out, I do not want to repeat this to any great length, but it seems to be a collection of thoughts of your agencies with reference to oceanography rather than an exploitation of what we have possibly uncovered, and I would hope soon we could get into something closer to the operational phase.

With reference to your staff, it was my understanding that Mr. Fry is really a Navy officer, a line officer rather than primarily an oceanographer.

Is that not so?

Dr. HORNIG. That is correct.

Mr. KEITH. He is a commander in the Navy.

Dr. HORNIG. That is correct.

Mr. KEITH. That is where his salary comes from.

Dr. HORNIG. He came to work in my office in order that we could accelerate our activities prior to the time Dr. Menard could join us; we did not want to wait.

Mr. Fry has been trained as an oceanographer and he has worked in the naval oceanographic program.

Mr. KEITH. He has had extensive training in oceanography?

Dr. HORNIG. He has a master's degree in oceanography.

Mr. KEITH. I appreciate that, but I do not necessarily buy that that makes him an oceanographer.

Dr. HORNIG. Could he describe for you his oceanographic experience?

Mr. KEITH. What are your qualifications?

Mr. FRY. I was at the Scripps Institution of Oceanography in 1951 and 1952, and obtained a master's degree in oceanography at that time; subsequently, I served in a naval oceanographic ship involved in oceanographic surveys and research for a period of 2 years.

I was at the Underwater Sound Laboratory where I was concerned as a project officer from 1957 to 1959 with the interrelationship of oceanography and underwater acoustics. I returned to the Scripps Institution of Oceanography in the Navy's advanced science program for one year, 1959 through 1960, and did research under Dr. Raitt there on some problems involving the interrelationship of oceanography and underwater acoustics.

Following that assignment I was with an operational destroyer flotilla of the Navy and then transferred to Washington on the staff of the Oceanographer of the Navy, where I served for 2 years.

Mr. KEITH. I think that is a good background and I trust the Navy is going to be smart enough to keep you in an area of activity where you can use this to the Navy's advantage because I would hate to discover, as I often times do, people with a great deal of experience in southeast Asia being sent to Europe, when we need them over there, and I would hope we need oceanographers in the Navy that you would stay in that field.

Mr. FRY. Thank you.

Mr. KEITH. Have you read by chance the new book "The New Priesthood"?

Dr. HORNIG. No, sir; I am afraid I have not.

Mr. KEITH. Have any of your staff, by chance?

Dr. HORNIG. No.

Mr. KEITH. It is reviewed in the current issue of the New York Times and it talks about—the review by the way is entitled "Is the New Mumbo-Jumbo Something To Feel?"

Dr. HORNIG. Is this Dr. Lapp's book?

Mr. KEITH. Yes, it is and he says with reference to the Presidential Office of Science and Technology that it still suffers from excessive secrecy and thus lacks public responsibility and accountability.

And I wondered if you would have any comment to make on that with reference to the questions that have been submitted to your Office or your Office sent to the ICO the so-called privileged but unclassified questions and answers which the ICO research had for your Office for the recent Woods Hole advisory meeting?

Are you familiar with those questions and answers?

Dr. HORNIG. I do not think I would call our Office excessively secret.

I have not counted, but I think this is the 15th time this year that I have testified before various committees of the Congress about our activities. It is perfectly true that at times in trying to formulate points of view one conducts some discussions internally.

Mr. KEITH. That is understandable.

One final comment.

You spoke with very glowing terms about the accomplishments of our Government in the field of oceanography and said that no other nation could compare with ours. Have you been briefed on what other nations have been doing in this area?

Dr. HORNIG. Yes, sir; I have gone into this very carefully.

Mr. KEITH. And you feel we are way ahead of the Russians insofar as oceanography is concerned?

Dr. HORNIG. I think we have better equipment and a better program.

Mr. KEITH. And better personnel?

Dr. HORNIG. And better personnel.

Mr. KEITH. Considerably better?

Dr. HORNIG. When you say, "considerably," I think one has to define that somewhat.

Mr. KEITH. Well, there is no oceanography gap?

Dr. HORNIG. No, sir; I think we have a big job to do, but I do not think that closing an oceanography gap is part of it. I think this is an area in which we have a good program, and I mentioned these points because I wanted to make it clear that we have a good program. The problem we face is how to do much better, but we are leading the way right now.

For example, no other nation to my knowledge has an oceanwide survey program.

Mr. KEITH. I have to go to an executive session of another committee and I regret that I cannot stay and listen to further testimony from you or from Mr. Morse, but I do not think the Congress is quite as comfortable, as complacent or as satisfied with our relative status, vis-a-vis, the Communists in this area, as you are, and I think the testimony that has been offered, the questioning of the committee and the wide public interest as indicated by the large number of people who are attending these hearings that were held over in the caucus room indicates we have to go much farther much faster.

Thank you, Mr. Chairman.

Mr. CASEY (presiding). Mr. Reinecke?

Mr. REINECKE. Thank you, Mr. Chairman.

I would like to thank you, Dr. Hornig, for a very fine statement. It certainly has clarified a great many misconceptions I had.

You list accomplishments. Are these all results of a Federal program or some of them based on industrial research?

Dr. HORNIG. Some of them are industrial.

Mr. REINECKE. It sounded to me that these were experiments on the part of oil companies and other concerns that were not related to the Federal program.

Dr. HORNIG. Yes, sir, but almost all of what I mentioned is derived from the Federal program.

Mr. REINECKE. Over on the last page, you read the information collected by a single agency must thus be available to all agencies.

Now, your text said—I wonder if this is sort of a Freudian slip, you thought it was not being properly distributed but should be.

Dr. HORNIG. It was not a Freudian slip; I meant to emphasize the point in my text.

Mr. REINECKE. You feel there is adequate intercommunication?

Dr. HORNIG. Yes, I think there is excellent intercommunication. I think our problems exist not so much now in the areas of communication and formal coordination as in the definition and setting of goals.

Mr. REINECKE. You mentioned also in the text that you felt the advisory panel could be improved.

Just what did you mean by that?

Dr. HORNIG. That was in reference to the ICO. The ICO has itself done a great deal of soul searching, but it experiences the difficulties of any interagency coordinating group.

Mr. REINECKE. What I meant was, do you have any specific proposals or recommendations on how it could be improved. Obviously you recognize there is a need there, but how would you suggest that it be done?

Dr. HORNIG. I do not at the moment. The ICO itself has performed an evaluation and I have been waiting for their report before going over it with them.

Mr. REINECKE. My overall impression of all of this, and as I say it has certainly clarified a great deal, it is that everybody is studying everybody else; we have a lot of advice but very little authority.

Do you not feel this is what is really needed in the program—some sort of either single or combined authority which will put a single emphasis, so we do not find ourselves with a program headed by eight or nine different Secretaries?

Dr. HORNIG. This is an issue which has been discussed in connection with many different programs. When you consider the activities of the program there is considerable validity in it.

The difficulty arises from the fact that the program has no single set of goals. It must serve many national purposes. For example, whether or not we had a single agency, the Navy would retain its responsibility to insure that it had the data it needed; for instance, for its submarine operations.

In other words, there is a considerable area in which the scope and size of the program ought to be determined not by its relation to the oceanographic program, but in this case to the needs of national defense.

In connection with fisheries, for example, the effort that ought to be devoted to research might not seem terribly important from the viewpoint of the oceanographic program as a whole.

I would suggest that it should be determined in relation to the needs of our fisheries industry and our need for protein, rather than to oceanography conceived as a unified field.

Mr. REINECKE. Do you not feel, though, I am sure you do, that no Federal program moves that is not properly funded and in this case the oceanography seems to be on the tag end of all of the funds and budgets throughout some eight or nine different agencies?

Would it make sense to you to have a single office that would represent the \$142 million that we speak of, and that then those moneys could in turn be transferred, if necessary, to the other agencies as it is needed.

It seems to me we are not getting anywhere until we get somebody who is trying to get some money for this program.

Dr. HORNIG. The funding of the program has, in fact, risen rapidly in the last 5 years. I think I would tend to ask now, "What important purposes are not currently being served?"

This is what we are trying to do.

Mr. REINECKE. Do you feel that the funding is adequate down on a separate agency basis? Recognizing, as Mr. Rogers pointed out, that none of these Secretaries seem to have much of a real interest.

Dr. HORNIG. There are undoubtedly problems connected with the dispersion of the program, but these are also related to the fact that the Secretaries are responsible for achieving major national goals.

I think that the central problem does not derive from the division of the funding, but from an inadequately clear definition of what it is we want to do.

Mr. REINECKE. And who is working on that?

Dr. HORNIG. We are working on it.

Mr. REINECKE. No further questions, Mr. Chairman.

Mr. LENNON (presiding). Doctor, as the Director of the Office of Science and Technology, and also Chairman of the Federal Council for Science and Technology, do you have a counterpart in one of the other major agencies of the Federal Government or departments of the Federal Government?

Dr. HORNIG. I do not suppose there is any precise counterpart; there is, of course, the Director of Defense Research and Engineering whose duties within DOD bear some resemblance to mine.

In the Army, Navy, and Air Force there are assistant secretaries for research and development who have some of the same functions. There are science advisers in Interior and Agriculture. In the Department of Commerce there is the Assistant Secretary for Science and Technology.

Mr. REINECKE. That is the one I was coming to.

Mr. LENNON. So you actually have at the Assistant Secretary level in the Department of Commerce, an Assistant Secretary for Science and Technology. What is the position in the Department of Commerce if there is not a comparable justification in the Department of the Interior and in the Department of Health, Education, and Welfare, not to mention a number of other agencies which participate in various facets of oceanography, whatever that relationship may be, and how diffused it may be?

Dr. HORNIG. Mr. Chairman, I think there is ample justification for a role similar to mine in each of the Government departments. There were no science advisers in any of the departments prior to the inception of the President's Science Advisory Committee, which was one of the earliest advocates of a diffusion of the responsibilities which were inherent in my office, and we have consistently urged the establishment of assistant secretarial positions for this purpose in other departments.

Mr. REINECKE. Now, it is just in the last 3 years that you had established in the Department of Commerce, the Office of Science and Technology; and that, too, was done under the reorganization plan, was it not?

I see heads being shaken in the negative.

Dr. HORNIG. I will have to check, I am not sure just how the assistant secretaryship was established.

Mr. LENNON. By statute.

I do not doubt your word at all, but I would like for counsel to check that.

So, that being so, there was a recognition on the part of Congress for the necessity of the establishment, assuming it is a statutory creation that there was a recognition in the past 3 years, I do not recall that legislation, but I assume it is true, then there was a recognition of the Department of Commerce and the executive branch of the Government for the establishment in a central agency, like the Department of Commerce, for the Office of Science and Technology, to accomplish—at least for that Department to focus, if you please, of using the language of the Assistant Secretary, to focus the needs in the fields of science and technology that particularly related to oceanography.

Were you here when he testified on the other day?

Dr. HORNIG. No, sir; I am sorry I was not able to be present.

Mr. LENNON. It was most interesting and helpful to some of us, and he described—if I recall—the areas in which oceanography could be defined.

He said he meant by that the description and prediction of the physical properties of the agency. He said if other agencies could be designated for the years to come, in the field, I believe, as has been done in the field of meteorology; undoubtedly in the field of geodetic survey, that was probably the justification for the establishment in the Department of Commerce for that office.

Since that office was established they have moved into the study of the Continental Shelf, and his testimony was last week to the effect that a contract had been signed for that express purpose.

Let us assume that the Congress had not, by statute, moved that far; then I think we would all have to wonder and somewhat doubt if the Department of Commerce, through the Assistant Secretary for that particular characterization, would have moved in the direction of making a study of the Continental Shelf and its resources.

I think you would find it very interesting to have him send you, Doctor, since he is in a sense a counterpart, though not in the Office of the President, and read his statement and we asked him some rather—not sharp questions, but probing questions and sought his advice as to whether or not by statute we ought to take these steps that he indicated, and he conceded that there might be a need for them.

I cannot put my finger on the exact language that he used but I know that he referred to it specifically and categorically in his general statement and then under questioning by the Chair he was rather frank and it was refreshing to hear him say that there was a need in his judgment for statutory legislation that would fix the focus of attention on the two categories that he defined.

Now let us talk about S. 944 just for a minute.

It is my recollection from checking your testimony that you appeared there on February 19 of this year. I believe it was before the Committee on Commerce in the Senate, with the chairman of the full committee presiding, the Senator from Washington, Senator Magnuson.

I notice that he made the statement before your testimony that he had the vote and the Senate in his judgment would have no trouble passing his bill, S. 944.

He laid the premises before you were even permitted to testify, they were going to pass that bill, they had the votes to do it. It turns out he did; they just passed it.

You recall in addressing yourselves to that bill, not specifically but in reading your testimony which was rather short and sort of summarized.

I do not think you said anything different in your statement today that you did not make before the Senate committee on February 19 of this year. But my recollection is that S.944 at that time when you were before the committee only provided for a national council which I believe was your top echelon in the various agencies in the Federal Government and then they were enumerated.

Before the bill I think was finally reported out by the Senate Committee on Commerce, it did include an advisory commission; is that your recollection?

Dr. HORNIG. I think so.

Mr. LENNON. There are four bills pending before this committee—H.R. 5654, by the gentleman from Florida, Mr. Fascell; H.R. 6512, Mr. Fulton, of Pennsylvania; H.R. 7301 by Mr. Hanna, of California; and H.R. 7998, by Mr. Huot and Mr. Hanna.

My recollection is these bills are identical with the original draft of S. 944 that was being considered in the Senate committee at the time you testified.

Have you changed, varied, or modified your position with respect to that bill since your testimony before the Senate in mid-February of this year?

Dr. HORNIG. No, sir; I do not think so. I think there are many excellent features in S. 944 in common with many of the bills here. The declared policies and purposes are valid national objectives, and I think the functions of the President's Science Advisory Board are sound and essential.

My main concern is whether a national council is the optimum organization to perform these functions; in particular it raises in principle, the need for a whole series of national councils for each technological area.

In some ways H.R. 2218 is a stronger bill because it enables the President to use such advisory arrangements as he might choose. I think my position is essentially unchanged.

Mr. LENNON. Now, who represents the Department of Commerce on the ICO? Do you recall?

Dr. HORNIG. Admiral Karo.

Mr. LENNON. How often does the ICO now meet, Doctor?

Dr. HORNIG. I will have to turn to its Chairman.

Mr. MORSE. Approximately once a month.

Mr. LENNON. Could you be more specific. Everything seems to be on approximate basis.

Dr. HORNIG. It has met 11 times in the last year. Of course, it has numerous panels that Dr. Morse will describe, which meet to resolve particular problems.

Mr. LENNON. On your staff you have approximately 20 persons?

Dr. HORNIG. That is right.

Mr. LENNON. When you appeared before the Senate Commerce Committee on February 19 you did not have a person on that staff of

20 who was in the oceanographic field or had a background in oceanography, did you?

Dr. HORNIG. That is correct. There was a gap between the time that Mr. Wenk, who is now in the Legislative Reference Service, left and Mr. Fry came aboard.

Mr. LENNON. Now, who was his predecessor on your staff who was an experienced oceanographer? On your staff I am talking about.

Dr. HORNIG. Mr. Edward Wenk.

Mr. REINECKE. He left when?

Dr. HORNIG. He let in the late fall of 1964.

Mr. LENNON. Last year?

Dr. HORNIG. That is right.

Mr. LENNON. And now the gentleman has just come aboard?

Dr. HORNIG. Mr. Fry joined my staff on May 10.

Mr. LENNON. And he will devote, I believe I heard you say, sir, all of his time to the oceanographic program as it may be related to the different agencies represented on the ICO?

Dr. HORNIG. That is correct, sir.

Mr. LENNON. That will be his full-time job?

Dr. HORNIG. That is correct, that has been his full-time job.

Mr. LENNON. Doctor, as the editor of this magazine which gets out, I do not know whether you would call it a poop sheet or whatever it is, anyhow, I do not subscribe to it but I get it and I do read it.

The editor of the Ocean Science News. Does he have any marine science background?

Dr. HORNIG. The editor of which magazine?

Mr. LENNON. The editor of the Ocean Science News, the world's first business letter devoted exclusively to the ocean.

Dr. HORNIG. I do not know either his name or his background, I am sorry to say.

Mr. LENNON. Maybe you do not get his letter. Maybe you ought to read it.

Anyhow, I am going to read from it. [Laughter.]

Because it is so frequently quoted both as a news item and so frequently incorporated in the editorials that people send to me and the other members of the committee.

I am reading now from a quote from an editorial of August 2, let's see if I can find it.

Here it is.

Apropos of nothing in particular except one man's frustration, we quote the following outburst as pertinent to the proliferation of committees, panels, societies, study groups, et cetera, that tout themselves as the answer—all to the woes and aspirations of oceanography:

"Oceanography in the United States is becoming one vast bureaucratic bowl of noodles. The only way to get anything done is to push one of the noodles and hope that the same one comes out at the other end."

Now, people who know, and I do not know, I am a layman, but people in the field of oceanography, whether it is industry or Government, or the intellectual university level, they might understand that, but when the public reads it they say, well, I understand the Federal Government is spending \$150-million-plus, annually.

I understand the Federal Government spent by fiscal 1966 three-quarters of a billion dollars in the last 5 years in oceanography; those are your figures I recall from your testimony in the Senate.

They say, yet, what is being done up there? Whose fault is it that we have the situation described by this so-called editorial—right or wrong, I do not know.

I think this legislation that has been introduced both on the Senate side and on the House side is motivated by a public interest suddenly awakened by various and sundry things.

You are colorful in describing the objectives you have obtained and the success we have had and the significant acceleration of the program in the last 5 years and I do agree with you, but apparently that is not enough.

There is some gentleman down on Pennsylvania Avenue who said, "Come, let us reason together. Let's see if we cannot reach a consensus on some of these bills because my guess is Congress is going to pass some bill." I do not know whether it will be on a voice vote as it did in the Senate just a day or two ago.

You may have a bill whether you like it or not, it may not be signed, but my guess is it will be under all the circumstances.

I am asking you now, sir, to confer with Dr. Hollomon, because he did make suggestions that to me made sense.

I do not agree that we could centralize in a single agency the whole realm of science, meteorology, fisheries, and these other things, because it simply cannot be done, in my judgment, but I do believe you are going to have to do as Dr. Hollomon suggested that we, by statute, centralize in at least two of these agencies the focus in those two areas that he defined and described in oceanography.

That is the reason I want you to not only read his statement, and particularly the answers to the questions that were propounded to him by the members on the subcommittee, including myself and counsel, and our expert staff member, but I want you to talk to him, too.

I am a great believer in that.

You recall when our bill had a pocket veto, you were not here, but we sat down together, the Bureau of the Budget and all the others, and they gave, and we gave, and we finally reached a judgment that we had a bill that I wish could have been passed 2 years ago, and then we could have now reviewed the activity and accomplishments under that bill, and if we determined that it had not been sufficient then we could move to perhaps further than we did, and I think we would.

But that has not been done, and you cannot be held responsible for it, because the Senate decided it would rather not have anything than to have what they considered a meaningless piece of legislation.

But I did not agree with that. I thought it was a good step in the right direction, and you have endorsed it because that was the same bill introduced this time.

But I do not believe the Senate is going to buy that bill, and we may have to buy a piece of legislation comparable to what was sent over here in the form of S. 944, but I still feel there is merit in what Dr. Hollomon said the other day about perhaps putting into the Department of Commerce, through a statute a little wider and broader, and into the Department of the Interior legislative enactment that would widen their scope.

Now, we cannot get into the Department of Defense. I happen to be on that committee, and I just recall about 4 weeks ago they brought up a little piece of legislation, to build an oceanographic vessel for the Navy.

We did not have 3 minutes' discussion of it. Now, if the Department of the Interior, through the Bureau of Fisheries, or HEW or some of these other agencies had gone before their particular legislation authorization committee for construction of an oceanographic vessel, just as meaningful to them as it was to the Department of the Navy, we would have had a truly fully dressed hearing on it.

But, no sir, not when it goes before the Armed Services Committee. They say this is directly or may be in the long future related, well, to the antisubmarine warfare right on out.

Don't add an amendment to it, don't debate it, let it go. And the doctor knows that is so, and that is the way it ought to be, but to my way of thinking, you take in the Department of Commerce for fiscal 1966, Dr. Hollomon was very happy about their ship construction, but we checked the record and found that the Bureau of the Budget did not approve a dime for ships for 1966—ship construction of oceanographic vessels in the Department of Commerce.

Now, if you want to see that, I will show it to you. I do not think he knew it.

Dr. HORNIG. Mr. Chairman, my wife presided at the launching of the OSS-2, which will be commissioned in September.

Mr. LENNON. I am talking about fiscal 1966.

Dr. HORNIG. We have to use those ships as well as build them.

Mr. LENNON. But there is nothing in fiscal 1966 authorization for construction of any additional vessels for oceanography in the environmental sciences that he had jurisdiction of under the Office of Science and Technology in the Department of Commerce.

Mr. Counsel?

Dr. HORNIG. Mr. Chairman, I would like to make clear before I leave that I have read Dr. Hollomon's testimony with very great care and I have talked with him many times.

Mr. LENNON. You are not too far apart; I see a lot of similarity in your testimony, particularly in certain areas, but you did not read the answers he gave to our questions.

Dr. HORNIG. Unfortunately not.

Mr. LENNON. I doubt if you have seen him to talk to him since then; that is what I want you to read.

Thank you. Go ahead, Mr. Counsel.

Mr. DREWRY. Dr. Hornig, after the listing of accomplishments of the program that you referred to during the past 5 years, you later said that they were almost inspired federally or promoted programs; that there were a few from industry.

What have you done in your PSAC or otherwise to find out what industry is presently doing and to find out what their needs might be—where advice and assistance can be given to them?

Where are the areas that the Federal Government is better able to make a contribution at the beginning which industry may use?

On your Oceanography Panel I believe you mentioned 12 members who at least drew their salary from industry, the gentleman from Traveler's Insurance Co. and the gentleman from Union Carbide.

There is another one I did not recognize, the Institute for Defense Analysis.

In those cases you stated they were chosen because of their scientific excellence rather than because of the place they presently happened to be employed.

Now, to bring a long question down to a short one: Have you, either through that Panel or through any plans that you may have in mind, considered the matter of determining what industry is, in fact, presently doing and what more might be done to assist?

Dr. HORNIG. I have personally talked to members of industry; I have talked with members of the NSIA, and others; and on September 18 my Panel will listen to a presentation by the NSIA and discuss the problem of industry's role in the national oceanographic effort with them.

So we are very conscious of this question.

Mr. DREWRY. When was this—it will be September 18?

Dr. HORNIG. September 18; yes.

Mr. DREWRY. It has not been done yet.

Dr. HORNIG. I have personally talked to the members, but the presentation to the Panel has not yet been given.

Mr. DREWRY. So there has been no procedural input into program planning?

Dr. HORNIG. I must make this clear again—this Panel is not a program planning group, but rather a group to lay the foundation for the national program.

It is an advisory committee; it has no jurisdiction.

Mr. DREWRY. They make recommendations.

Dr. HORNIG. They make recommendations.

Mr. DREWRY. In discussing Mr. Rivers' bill you called attention to the statement you made over in Annapolis last summer about the inadequacy of the mapping of the Continental Shelf.

Then you went on to point out further, though, that you felt that it would be premature to do anything about a bill such as that at this time because of legal problems related to resource recovery which have not yet been clarified.

What are you doing to clarify the legal problems?

Dr. HORNIG. I want to make clear that I am most anxious that we proceed with the Continental Shelf program and we are.

Mr. DREWRY. The last paragraph on page 14.

Dr. HORNIG. One must distinguish, I believe, between mapping programs on the Continental Shelf and more general programs of operation on the shelf. I did question whether it was proper to set up a program in detail as proposed in the bill until some of the legal questions had been clarified.

Mr. DREWRY. Is it really premature to begin that which is related to these things now? Recapture of the resources perhaps is involved with legal problems but should they not be studied right now in parallel with the efforts to map the bottom topography?

Dr. HORNIG. Let me make two points.

One is that, of course, we are going ahead with the survey of the Continental Shelf.

I think the legal questions are important. I would simply say that I am not really competent to comment on them.

Mr. DREWRY. What is the status of the bottom topography mapping?

Dr. HORNIG. All of our costs have been mapped in a general way, but the east coast is now being mapped for the Geological Survey. This is what I refer to in my testimony.

Mr. DREWRY. I think you said it was 70 percent of the east coast.

Mr. HORNIG. Yes.

Mr. DREWRY. What does that embrace? Does that embrace an analysis of the conformation of the subsoil or contours of it?

Dr. HORNIG. Perhaps Dr. Menard can tell you in detail.

Dr. MENARD. The sediments have been sampled along fairly closely spaced lines, and in addition certain tools have been used to illustrate the structure of the subbottom. Lines have been run from the coast-line to the edge of the Continental Shelf, from Florida to Maine, so the subbottom structure is known.

In addition, there has recently been a drilling program to confirm and relate some of the subbottom information with other data.

Mr. DREWRY. Who is performing this? The Coast and Geodetic Survey?

Dr. MENARD. The Geological Survey has an arrangement with Dr. K. O. Emery at the Woods Hole Oceanographic Institution.

Mr. DREWRY. Who is providing ships? Woods Hole?

Dr. MENARD. Woods Hole is providing the ships.

Mr. DREWRY. What is the Coast and Geodetic Survey?

Dr. MENARD. For 30 years in my memory, they have been mapping our continental shelves; that is why we have maps.

Mr. DREWRY. Are the maps up to date?

Dr. MENARD. I believe Assistant Secretary Hollomon's testimony indicated that the boat sheets may be 2 years ahead of the final printed maps.

Mr. DREWRY. Well, coming back to the Coast and Geodetic Survey. I do not know whether they did not ask for them or whether they were not approved by the Bureau of the Budget, for ships this year. But is it not important that we have just about as complete knowledge and actual charts of the Continental Shelf more than ever at this time?

Dr. HORNIG. I think that is correct. I am not aware, though, of a shortage of ships at the present time. At the time we reviewed the program last spring, it seemed to me the more serious problem was to provide funds, to meet the operating expenses of the ships already commissioned.

Now, perhaps Secretary Morse can amplify that, but I believe the statement is correct.

The problem of keeping our ships returning from the Indian Ocean in operation was a more serious problem than that of constructing new ships.

Mr. DREWRY. That is a serious problem?

Dr. HORNIG. Yes, but I am not aware of an overt shortage of ships at the present time.

Mr. DREWRY. Would you be able to compare our knowledge of the Atlantic Continental Shelf with the knowledge which the Russians or others have gained, or is this a field in which we are satisfied we know more about it than they do.

Dr. HORNIG. We are not satisfied with anything we do; that is the first answer.

Second, I am afraid I cannot provide any detailed information as to how well the Russians have explored our Continental Shelf.

Mr. DREWRY. When we took a trip up to Woods Hole a number of years ago we were shown a beautiful atlas which the Germans had prepared before World War II that gave us tremendous information on our own shelves which we did not have up to that time.

That is all, Mr. Chairman.

Mr. LENNON. Gentlemen, may we go off the record.

(Discussion off the record.)

Mr. LENNON. Back on the record.

I apologize to all of you who expected to testify today, but we have not been able to reach you.

We want to spend as much time as necessary.

We will look for you tomorrow.

We will reconvene tomorrow at 10 a.m.

(Whereupon, at 12:55 p.m., the hearing was recessed, to reconvene at 10 a.m., Wednesday, Aug. 11, 1965.)

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

WEDNESDAY, AUGUST 11, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY
OF THE COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will come to order and resume its hearings.

Doctor, will you come back to the witness stand, please?

We assured you that we would convene at 10 o'clock. That is what we are going to do and let you get out of here no later than 10:30.

STATEMENT OF DONALD F. HORNIG, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY, ACCOMPANIED BY JOHN C. FRY AND HENRY W. MENARD—Resumed

Mr. LENNON. Dr. Hornig, last week Dr. Hollomon, Assistant Secretary of Commerce for Science and Technology, in his statement to the committee and prior to interrogation, made this statement, which is found on page 3 in the fourth line of the second paragraph of that page:

Oceanography, of course, is not a unitarian concept. Speaking very generally, it emphasizes two broad areas: As the description and prediction of oceanographic conditions and the exploitation and utilization of ocean resources.

Subsequently, on questioning I quoted that part of his statement to Dr. Hollomon and questioned him, and those questions are found on page 221 of the reporter's transcript.

Mr. LENNON. Let me ask you this, please, sir: In what agency should there be lodged statutory authority to provide a focus for the activity in the prediction and description of oceanic conditions?

He said that description and prediction was included or emphasized in one of the two areas. And he indicated, too, that there ought to be, in a definite agency of the Federal Government something that would focus attention on that particular aspect, that is, description and prediction of oceanic conditions.

He answered that immediately and did not qualify it:

In ESSA in the Department of Commerce.

Then I repeated the question:

Mr. LENNON. The focus should be placed there? That is on the prediction and description of oceanic conditions through statutory authority?

He says: "Yes, sir."

Then I said:

Now, in what agency should the focus come in the exploitation and utilization of the ocean resources?

That is the other broad area.

He answered that: "In the Interior." I said: "In the Department of the Interior?"

He answers:

Now, I also believe, which I did not mention in my testimony, but I think I made it clear in answer to those questions, that the Department of Defense should retain its full responsibility of doing what was necessary in the national defense, the National Science Foundation to retain its responsibility to support broadening the sciences, particularly in the universities.

And then he goes on. Then I questioned him later on:

Dr. Holloman, is there some question in your mind that this focused attention on both of the facets you have described could best be done by statutory authority in the Department of Commerce and in the Department of the Interior rather than through Presidential action pursuant to H.R. 2218? I am not asking you to be critical, but you did say, you indicated it might be done.

Mr. HOLLOMON. I think the two sentences follow each other. I say this might be done through presidential action pursuant to H.R. 2218—

And that is the bill that has been in general consensus with respect to all of the departments—

if enacted or alternatively additional authorization legislation might be desirable. That is to say, your committee might want to take some action there.

Mr. LENNON. Well now, you think it could best be done by Presidential action through enactment of H.R. 2218, or whether or not it could best be done by legislative authority which would place in the Department of Commerce and in the Department of the Interior the two focal points of development or both description and definition and exploration and seeking the other objectives?

Mr. HOLLOMON. I think I could answer the question in this way, Mr. Chairman: That if your committee feels that these responsibilities and appropriate authority for appropriations are not clearly defined, I think you should follow the second course.

If you feel that the time is not right to so define it and you should need some additional studies or advice, I think you should follow the first course.

Then we got into the question of the fact that the Department of Commerce, certainly in the field of oceanography, or through the ESSA, does not have annual legislative authorization, and we got back on the question of the fact that the fiscal 1966 budget did not provide for any additional ships in the Department of Commerce. I called his attention—see, they operate on not an annual basis, but a continuing authorization. There is no legislative committee of the Congress that they can come to for authorization, and for that reason there is no legislative overseeing committee, no central legislative overseeing committee that could bring in the Department of Commerce, the Department of the Interior, the Department of Defense, and all the other spectrums where oceanography and various facets of it is used, so that we could determine, or at least make an exploration, to attempt to determine as to the coordination of the program and if the objectives sought to be obtained were, in fact, attained.

I wanted your comments on Dr. Hollomon's answer to my question based on his flat statement that oceanography was divided into these two broad fields, and then he defined which parts should be into which and finally comes up with the suggestion that it ought to be lodged, that is one facet of it, in the Department of Commerce through the

ESSA, and the other in the—exploration and development of the ocean resources in the Department of the Interior.

Dr. HORNIG. Mr. Chairman, that is a long series of questions, but I will try to give you an orderly exposition of my point of view.

I do not know that I would divide the field in the same way as Secretary Hollomon has.

Let me start by looking at it from several points of view. One can look at the ocean, first, from the point of view of understanding it as a big system, understanding why currents circulate, why fish are where they are. In other words, all of the why questions—the how and why questions about the oceans, and this is the area I would call ocean science. This includes both physical and biological oceanography.

Now, we, in fact, have only three major focuses for ocean science right now, and I think they are each proper focuses. Let me review this for you just briefly.

The National Science Foundation has the basic authority to promote basic sciences in this country including oceanography. Its ocean science budget is approximately \$30 million out of a total oceanographic research budget of, I believe, about \$78 million, so that it is now one of the main focuses for ocean science.

It conducts all of its work out of house by contract with the major oceanographic institutions and with the universities. Its record is exemplary in its ability to enlist the very best talents of this country in the work it undertakes, not only in oceanography, but in science in general.

So, I would feel very loathe to disturb this excellent means by which the Government supports and enlists the services of the entire academic and scientific community of the country.

The other major focus, of what I would call scientific oceanography, is the Navy. Emphasis has been placed in these hearings on the conduct of military oceanography by the Navy, but this is only one aspect of a broad program.

In the first place, the Navy has a big classified oceanography program which we are not discussing at this hearing but which is, in fact, about as big as the whole rest of the oceanography budget, and it is those efforts which are directly concerned with military operations.

I should note, however, that in that part of the program, there is a great deal of hardware, vehicle and systems development, which flows out into the nonclassified sector. The instruments that are developed produced analogs which are helpful to the science and exploration program.

Now, in order to carry on its operational program, the Navy has a deep interest in developing basic knowledge about the oceans in which it has to operate. Thus, through the Office of Naval Research, it should and it does support general oceanographic studies. Many present operational techniques and instruments are based on past ONR programs.

One might ask: Why can this not be done as well for the Navy by another agency? To some extent, this would be possible, but I believe that it is imperative that the Navy maintain direct intellectual links to the scientific oceanographic community, that it remain in contact with the best new ideas, so that both will flow into its program. This

argument comes up in the support of basic research in other areas by the armed services also.

I would note that the Navy program in basic oceanographic science is about the same size as the National Science Foundation program. We thus have these two principal focuses but there is a third focus for a different kind of basic scientific investigation in the Bureau of Commercial Fisheries of the Department of the Interior.

The Bureau of Commercial Fisheries, of course, is primarily interested, as its name implies, in fishing. On the other hand, looking ahead, there are big general questions such as: Why do you find fish where you do? Where will you expect to find fish in the future? What is the effect of the fish catch on the fishery?

Fish are not just a pool which one depletes. After all, every fish lays millions of eggs per year, so that the distribution of fish in the oceans depends on very many other factors. The longrun interest in fish farming of the oceans requires that we understand the oceans and their biological and physical environment.

Thus, the Bureau of Commercial Fisheries also supports a program in basic ocean science.

All of this might conceivably be lumped into a single program. I do not think it would be wise. I have spent considerable time in the Soviet Union looking at their system for administering science, which is a model of block diagrams in which who controls who is abundantly clear. My general observation is that it is far less efficient than our own approach, and if you ask why, it is because they do not allow enough room for independent choices.

When one has a very neat bureaucratic system, what inevitably happens is that, far from eliminating committees, one proliferates committees, because it is always necessary to come up to the top to get decisions made and this usually involves more committees. At least that is what happens in their system.

One of the strengths in American science has been to allow a reasonable number of alternatives, so that competing decisions can be made, so that when one man makes a mistake, someone else is in a position to carry the ball.

I think this applies, incidentally, to our commerce and industry as well as to our science.

In the case of ocean science, the point I want to make is that each of these three agencies does basic science, which properly has a somewhat different flavor and a somewhat different point of view, which must not be lost.

I would not want to see these functions transferred to ESSA. Aside from basic ocean science, there is another problem, which is that embodied in the word "survey," or more generally "exploration."

This is the historical role of the Coast and Geodetic Survey, which is the principal oceanographic component of ESSA, to produce precise maps of the coast and of the ocean bottoms for whatever purposes we need to know them.

This role is being enlarged. The Coast and Geodetic Survey quite properly has, in order to carry out that role, taken an interest in the basic scientific factors because it has extended its survey operations to geophysical surveys as well as simple mapping, and in order to do that well it must also have its roots in the scientific community.

This second function, precise surveys of the Continental Shelf, the coastal areas and the deep waters, is currently divided primarily between the ESSA, and the Navy.

Here one might inquire again whether this should not be consolidated. Again I would make the point that some sequence of priorities for what is surveyed must be established. The naval activities are responsive to a different set of needs, in making those choices, than the Coast and Geodetic Survey.

Therefore, in response to the first half of Dr. Hollomon's suggestion, I believe the ocean science function is properly separated from the function of acquiring that data which is necessary to service our on-going practical activities, which is the central function of the environmental sciences services administration.

This is the same division as in atmospheric sciences, where ESSA is responsible for weather services and backup research, but the basic science is primarily carried on by the National Science Foundation.

Finally, with regard to his other point, it seems to me that the whole area of resources is a separate one, although it is related. Natural resources are the statutory responsibility of the Department of the Interior. I do not think new legislation is needed, but new legislation might focus the responsibility of the Department of the Interior in the marine resources area.

This area of resources has, in fact, been the subject of most of the discussion and most of the concern about expanded oceanographic programs. My own impression is that the first area, the one Hollomon called physical oceanography and which I have broken up into ocean sciences and survey activities, can be improved, but it is in reasonably good shape.

Most of the concern has been on the development of ocean resources and the means to get at them. This is certainly the area on which my panel, which we discussed yesterday, is concentrating. One of the major foci of activities of that panel is to understand the ocean resources problem.

That is the area in which new programs are possible, but I quite concur with Secretary Hollomon that this is the responsibility of the Department of the Interior.

Mr. LENNON. So you can get out of here at 10:30 as promised, counsel has a few questions he would like to get answered in the record, and then very likely there will be other questions submitted to you within a few days that we would like to have your answers for the record, Doctor.

Dr. HORNIG. I will be delighted to provide them.

Mr. LENNON. Counsel, will you proceed, sir?

Mr. DREWRY. Dr. Hornig, there are just a few questions right now, and maybe you can supply for us and then, as we go over the record, I am sure there will be more that will occur.

On page 2 of your statement you said that the oceanographic budget increased by nearly a factor of three. Could you supply us with the amount of Federal spending for "basic" and "applied" research as contrasted with what might be called "development."

How fast has this grown since 1960 and how much faster has oceanography grown than the total?

Dr. HORNIG. Let me get this question straight. You would like the figures for basic research as a whole in all fields as compared with oceanography?

Mr. DREWRY. Yes. And how, going back to 1960, for a point of comparison.

Dr. HORNIG. We will be happy to furnish that.

(The following material was supplied for the record:)

Federal funds expended for research¹ in science and engineering

[In millions of dollars]

Field	Fiscal year 1960	Fiscal year 1965 (estimated)	Increase (percent)
Oceanography ²	27	69	158
Physical sciences ³	563	1,680	190
Mathematical sciences ³	24	113	371
Engineering ³	747	1,743	133
Biological sciences ³	107	247	131

¹ Basic and applied research.

² "National Oceanographic Program, fiscal year 1966. "ICO Publication No. 17; "A Long-Range National Oceanographic Plan, 1962-72," ICO Publication No. 10.

³ "Federal Funds for Research, Development, and Other Scientific Activities," vol. XIII, National Science Foundation, NSF No. 65-13.

Mr. DREWRY. Then you mentioned the number of graduate students has increased by a factor of 3, from 110 in 1960 to 310 in 1964. This is more or less along the same lines of the other questions, to get some comparison of where oceanography stands in relation to other fields of scientific endeavor, both basic and applied.

The total enrollment of graduate students in science and technology, and again a comparison with development.

Dr. HORNIG. I will be happy to supply that.

(The following information was supplied for the record:)

The number of graduate students enrolled in oceanography curriculums during the 1959-60 academic year was 110. A comparison of graduate enrollments in oceanography with other areas of science and engineering for more recent years is shown below:

Curriculums	Academic year		Increase (percent)
	1960-61 ¹	1963-64 ²	
Oceanography.....	159	310	95
Physical sciences.....	25,707	30,959	20
Mathematical subjects.....	11,770	15,974	36
Engineering.....	36,636	48,917	34
Biological sciences.....	14,775	20,639	40

¹ "Enrollment for Advanced Degrees, Fall, 1960"; U.S. Office of Education Circular 674.

² "Students Enrolled for Advanced Degrees, Fall, 1963"; U.S. Office of Education, Rept. OE-54009-63

Mr. DREWRY. Then you mentioned also, on page 2, that there are 3,000 people now engaged professionally in oceanography, which is more than double the number in 1960. I would like to know what the source of your facts is on that, because I understand that manpower studies by the Science Foundation and the National Academy are said to disagree by about a factor of two.

So, could you make the reports available that support that?

Dr. HORNIG. I will make the data available. I should point out now that manpower statistics are a little slippery, because many of the people engaged professionally in oceanography are not labeled as oceanographers. They are physicists, chemists, biologists, and engineers, all working in oceanography, so one has to exercise a certain amount of judgment, but we will certainly supply you with the data. (The following material was supplied for the record:)

Professional staffs in oceanography, science, and engineering

Field	1958	1960	1963	Average annual increase (percent)
Oceanography ¹ -----	1,548	-----	3,207	21
Natural sciences ² -----	-----	335,000	410,000	7
Engineering ² -----	-----	850,000	950,000	4

¹ Vetter, R. C.: "Growth and Support of Oceanography in the United States, From 1958 to 1963"; National Academy of Sciences Committee on Oceanography, July 1964.

² "Profiles of Manpower in Science and Technology"; National Science Foundation, NSF Doc. No. 63-23.

Mr. DREWRY. You have used a flat figure, so I realize it is a slippery one and if you could express it in another way so we could apply some weights of our own to it—

Dr. HORNIG. I will be very happy to.

Mr. DREWRY. On page 5 you mentioned that there are two important committees in existence to provide advice to the President on diverse activities in science and technology: the Federal Council and the President's Science Advisory Committee. You serve as Chairman of both groups.

Since you chair both groups, in your capacity as Special Assistant to the President for Science and Technology and since both groups advise the President with advice which can be shielded by a well-accepted privilege, how can the Congress have assurance of advice or information from either group? This is a problem with which we were confronted in the early discussions during the 6 years we have been studying this subject, when we were told that no legislation was necessary, because the ICO was in existence and because the Council existed. But we got a turndown, I think, from Dr. Wiesner at one point that it would not be proper for him to appear, because he was an arm of the President and not statutory.

So, we still have the same problem with regard to you, to when you want to be here and when you have to be here.

Dr. HORNIG. May I answer that question now?

Mr. DREWRY. Yes.

Dr. HORNIG. As to my ability to shield the President and Congress from facts and judgments, I note of the President's Science Advisory Committee that all of its members are appointed by the President. Although I am the Chairman, they have a clear root directly to the President. Since they are all strongminded people, when they have disagreed with the Chairman, or the Chairman has not acted, they can and have taken their points of view directly to the President, with the cooperation of the Chairman, I might add, although this has been very infrequent.

Thus, I do not believe that their advice can be suppressed. Nor would I have any interest in doing so.

As regards the Federal Council, I would simply note that all of its members are also senior officers, in some cases leaders of agencies, so that the President has many alternative sources of advice. In particular, the agencies can communicate directly with him.

I do not think we ever have tried to suppress information developed in the Federal Council, but I think it would be a very unwise thing to attempt to do. In any case, there are many channels for the advice developed in the Council to flow to the President and to the Congress.

Now, there is, in fact, a conflict in my position as special assistant and as Director of OST. One of the reasons, I think, for establishing OST was to make me accessible to the Congress and I think I have been quite freely accessible to the Congress.

In the process of giving advice to the President, of course, there are privileged matters which may frequently arise, and all I can say is that in practice no serious problems, at least since I have been here, seem to have developed.

I have never found one-half of myself in conflict with the other half, but if this problem should develop, there might be a case at some time in the future for separating the roles of the special assistant and the Director of OST. There are very cogent arguments, however, for bringing these to a focus rather than proliferating the mechanisms for the discussions of these problems.

Mr. DREWRY. Of course, the question was not directed to Dr. Hornig as a principal, but to the principles of the thing—whoever may occupy the chair as Federal Council—

Dr. HORNIG. I would say, generally speaking, as Director of OST, because in the future it may not be one man. As Director of OST and all of its activities, the Director is obligated to report to the Congress. As special assistant he is a White House staff member and, in general, would not testify.

Mr. LENNON. We will go off the record.

(Discussion off the record.)

Mr. LENNON. Back on the record.

Dr. HORNIG. Thank you, Mr. Chairman, I have appreciated the opportunity to talk about these problems with the committee.

Mr. LENNON. The next witness is Dr. Robert W. Morse, Assistant Secretary of the Navy for Research and Development, and Chairman of the Interagency Committee on Oceanography; accompanied by Capt. J. Edward Snyder, Jr., special assistant to Dr. Morse; Capt. T. K. Treadwell, Deputy Oceanographer of the Navy; Rear Adm. John K. Leydon, Chief of Naval Research; Robert Abel, Executive Secretary, ICO, and the Panel Chairman of the ICO.

Would you gentlemen come around, please, and while you are coming around, let me announce that Dr. John W. Clark, of the Research Committee of the Subcommittee on Oceanography of the National Association of Manufacturers, I understand is due here, and from the west coast—and that you asked the committee counsel if you could not be heard this morning.

It so happens that Dr. Morse and his group—this is their third day they have been waiting. We will go off the record a minute.

(Discussion off the record.)

Mr. LENNON. Back on the record.

Dr. Morse, we are delighted to have you and your associates. I see only one of them, but I understand they are here.

STATEMENT OF DR. ROBERT W. MORSE, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH AND DEVELOPMENT; CHAIRMAN, INTERAGENCY COMMITTEE ON OCEANOGRAPHY; ACCOMPANIED BY CAPT. J. EDWARD SNYDER, JR., SPECIAL ASSISTANT TO DR. MORSE; CAPT. T. K. TREADWELL, DEPUTY OCEANOGRAPHER OF THE NAVY; REAR ADM. JOHN K. LEYDON, CHIEF OF NAVAL RESEARCH; ROBERT ABEL, EXECUTIVE SECRETARY, ICO; AND THE PANEL CHAIRMAN OF THE ICO; DR. KEITH KRAUSE, PUBLIC HEALTH SERVICE, HEW

Dr. MORSE. Yes, sir; there are a variety of people here whom we will call up as questions come up.

Mr. LENNON. You have a prepared statement. Do you want to read it, please, sir?

Dr. MORSE. Mr. Chairman, I do have a prepared statement. I will abbreviate it some perhaps, because so much ground has already been covered.

First, I would like to express for the Interagency Committee on Oceanography members our appreciation for this opportunity to discuss the organization of the national oceanographic program. We can appreciate the task which you have set yourselves in reviewing all of the existing proposed legislation concerning oceanography.

Naturally the oceanographic community is heartened by the great interest displayed in our program by the Congress of the United States as evidenced by the numerous bills which have been proposed this session. The fact remains that it is a forbidding task and one which merits our complete cooperation and willingness to participate optimistically and with open minds.

Although this is my first appearance before your committee, I am aware of your strong initiative in bringing the deficiencies of our Nation's program in oceanography in the past several years has been impressive.

We have achieved a considerable buildup of capital fixtures, including laboratories, classrooms, and ship bases. We have doubled the size of our oceanographic fleet and probably quadrupled its total effectiveness. We have achieved substantial improvements in instrumentation of all kinds. College enrollment in oceanography has quadrupled since 1958 and several new institutions have established programs in oceanography.

Mr. Chairman, with your permission, I would like to make a few comments concerning the various bills already proposed and what they may portend for oceanography in the United States generally. Commendably, they are all trying to accomplish the same purpose and that is to utilize the seas around us in the best interest of the peoples of the United States.

The question is, How best to implement this policy? The spectrum of organization proposed in these bills runs from the single agency concept to a continuation of the present confederation which appears loosely knit in the eyes of some, and highly effective in others' view.

I stated to the Senate last February that I was completely new to this business. However, a year's experience as Chairman of the ICO has allowed me to form certain conclusions concerning our organization's effectiveness and the possibilities of improvement thereto.

First of all, the matter of increasing the stature of membership is one which perplexes us considerably. On the one hand, we can readily perceive the advantage of membership by secretarial officers whose recommendations are synonymous with policy. On the other hand, additional demands would be placed directly upon Cabinet officers and agency heads who already have heavy burdens of responsibility.

If a council supplants the Interagency Committee on Oceanography, the limited amount of personal time which the council members could devote to council activities might result in less consideration of oceanography within the executive branch than presently exists. If the Council and the Interagency Committee on Oceanography both exist, there will be, or could be, at least, substantial duplication of efforts and possible conflict of proposed programs.

We think it is better to leave oceanographic planning and coordination in the hands of the policy and operation officials who work with the oceanographic program, serve on the Interagency Committee on Oceanography, and who are thus most qualified to advise the President on its needs. In any case, no matter what is done, a lower level of coordination is required.

It is for these reasons that I cannot support the concept of the National Oceanographic Council as exemplified by Congressman Fascell's bill, H.R. 5654, or Congressman Ashley's bill, H.R. 6457.

Secondly, a characteristic common to almost all the existing bills is their provision for an analytical staff competent to examine oceanographic issues within economic, political, administrative, and technological frameworks. These bills also provide for funds to administer the staff and the organizational needs of the ICO generally.

Thus far the problem of interagency funding has been vexing. Navy underwrites most of the ICO staff needs, via the Office of Naval Research. At the present time, four agencies contribute to staff salaries and eight print our publications. The funds proposed by these bills, although modest, would be most welcome since they would fill an obvious void. Accordingly, I have no quarrel with this aspect of the bills.

A third proposition which has appeared in recent legislation concerns the establishment of a high level commission to examine our national needs in oceanography and to provide counsel to the Government in planning an adequate oceanographic program. I am in accord with the objectives of such a commission and have so stated in the past. In recognizing the desirability of such examination, Dr. Hornig last June convened a special panel of the President's Science Advisory Committee.

Several ICO members and panel chairmen have met with this panel. I am personally satisfied that their proceedings and findings will prove fruitful and capable of being used profitably in the national interest. For this reason, it is my belief that the intent, at least, of Congressman Roger's bill, H.R. 9064, can be met without legislation.

Fourth, the concept of a Marine Exploration and Development Commission and its assignment to conduct a program of exploration and development of our Continental Shelf treats a substantive issue and merits serious consideration. The world family of nations has now ratified a measure spelling out the rights and privileges of each nation regarding exploitation of marine resources.

We have a concomitant obligation to address ourselves to the question, "What do we do about it?" At least eight of the ICO member agencies are doing something about it, as described generally in our national oceanographic program document and more comprehensively in a document in preparation, "Oceanographic Research in the Federal Government."

The ICO decided earlier this year that our interests, that is, the interests of the committee, in ocean engineering must now focus on the Continental Shelf. The ICO believes that H.R. 2218 comes close to providing all the legislative support needed to develop and maintain a Continental Shelf campaign designed for payoff. I would suggest, however, that modification of the bill to provide authorization of funds for general program administration would solve the remaining problem of funding the transagency studies that are a prerequisite to good planning.

This is the basis of my belief that the stronger arrangements specified in H.R. 5584 by Mr. Rivers, H.R. 5884 by Mr. Keith, and H.R. 7849 by Mr. Teague are not needed at this time—that the ICO ought to be given the opportunity to proceed within the authority encompassed by Mr. Lennon's bill.

Fifth, Congressman Wilson has introduced a bill calling for a National Oceanographic Agency. While this would admittedly solve many of the oceanographers' problems, such as gaining the attention of a wholly oriented group in Congress, it would cause serious problems for other agencies. This proposed centralization would excise the useful oceanographic services and products from several Federal agencies which require them in accomplishing their own missions.

Oceanography, as with many other sciences, provides maximum benefits to the Federal agencies when its results are applicable to specific problems within the Government. Many Federal agencies require varied kinds of oceanographic information in order to do their jobs. In fact, this link to the missions of the agencies makes the oceanographic program productive and viable.

Most information is highly specialized and obtained to assist in meeting existing or foreseeable problems. Examples are the kind of information needed by the Navy Department to hunt submarines, to be prepared to launch Polaris missiles, and to conduct amphibious and submarine operations.

Similarly, in the Commerce Department, oceanographic information is required for chartmaking and assisting maritime trade, in the Department of the Interior for exploiting the mineral and food resources of the ocean and increasing U.S. efficiency in fishing, both commercially and as a recreational asset through sport fisheries.

The Public Health Service needs oceanographic information as it affects offshore pollution, and the Atomic Energy Commission as it affects disposal of atomic waste and radioactivity in the oceans. If each of these Federal users must go to a different agency to obtain oceanographic support, both the user and oceanography will suffer. I believe that no central, single oceanographic office could ever adequately fill all these specialized requirements.

There is a continuing need for national coordination and collaboration on projects of mutual interest. Difference agencies often need the same information; and only one agency then need obtain it. The

information collected by a single agency has to be available to all agencies. For example, the broad array of oceanographic activities of the Navy is related to the mission of the Navy, but it should be, and is, available to the civilian agencies.

Sixth, there have been several bills introduced during the past 5 years dealing with one or another substantive issue within the oceanographic program. Such a bill, H.R. 5175, by Congressman Lennon, provides for a study of legal problems relating to the management, use, and control of natural resources of the oceans and ocean beds.

I wholeheartedly endorse this bill in principle, although it seems to me that its implementation is more properly vested in other agencies. This is precisely the type of study which general administrative funding of the sort I have just recommended for the ICO chairman could support.

In summary, Mr. Chairman, I believe a slightly augmented version of your own bill would provide the most favorable climate for execution of a strong national program in the best interest of all concerned. With the provisions I have outlined, I would favor its passage and enactment.

I am certainly free for questions, Mr. Chairman; and I hope that I am free to call on experts as they are needed.

Mr. LENNON. Yes, sir; you certainly are, Doctor.

Mr. Rogers of Florida.

Mr. ROGERS. Thank you, Mr. Chairman. Dr. Morse, we are delighted to have you here and know of your interest and the good work you have done with the Navy and the ICO.

What is the budget division for oceanography as to major departments now? The Navy is for research. The Navy has about—these could just be round figures.

Dr. MORSE. Rather than guess, I think I could supply a rough table. I would say in research—the Navy in research, for example, for 1965, for research is \$32 million. This does not count ship construction, for example.

Mr. ROGERS. I understand. How much in Commerce?

Dr. MORSE. Well, in research, it is about \$650,000.

Mr. ROGERS. \$650,000.

Dr. MORSE. Now, this does not include the Weather Bureau. I am sorry—that is the Coast and Geodetic Survey, and that is what is called “research.” Of course, the survey operation is much larger.

Mr. ROGERS. What is their survey?

Dr. MORSE. \$9.1 million in the survey, and in 1965 there was \$9 million for ship construction.

Mr. ROGERS. How much for ship construction this year?

Dr. MORSE. In 1966 there is no ship construction. The survey operation is \$10.6 million.

Mr. ROGERS. I beg your pardon.

Dr. MORSE. \$10.6 million in 1966 for survey, but none for ship construction in 1966.

Mr. ROGERS. None for construction. All right.

Now, what about Fisheries and Wildlife for research? That is in—I am sorry, I beg your pardon. Let me go back a minute.

The Bureau of Standards for research?

Dr. MORSE. We carry none in our program.

Mr. ROGERS. I see. So, the total for research in the Commerce Department, which is strictly designated as research, is a little over \$650,000?

Dr. MORSE. Yes sir. This is Coast and Geodetic Survey. In our breakdown we show about \$200,000 in 1965 in the Weather Bureau, which shows as almost \$800,000 in 1966, and in the Maritime Administration, it is \$50,000 for research.

Mr. ROGERS. For research?

Dr. MORSE. Yes, I cannot guarantee, of course, that comparing that with, say, the Navy budget necessarily meets the same definitions, but I think we have made an attempt to try and insure what we call research in one agency is equivalent to what it is called in another agency.

Mr. ROGERS. As far as ICO is concerned, this is what is done for research in that agency?

Dr. MORSE. Yes.

Mr. ROGERS. That would be for 1 year approximately how much? I think you gave me a 1965 figure and 1966.

Dr. MORSE. In Commerce?

Mr. ROGERS. Let us take 1 year. Let us take the present year. You have given me the present year for Navy, did you not, for research, the \$32 million?

Dr. MORSE. In the 1966 budget in Commerce it is just over a million dollars—\$1.4 million.

Mr. ROGERS. And it was \$32 million in 1966 for Navy?

Dr. MORSE. I am not sure I gave you the 1966 figure. Let me look again—in 1966 research is \$33.4 million.

Mr. ROGERS. \$33.4 million.

Now, Interior?

Dr. MORSE. In 1966, in research—and this is its Bureau of Commercial Fisheries—it is \$12.6 million, and in—

Mr. ROGERS. And is this for research?

Dr. MORSE. This is research; yes, sir.

Mr. ROGERS. All right.

Dr. MORSE. And another element of the Interior is the Geological Survey, which has \$670,000 for research, and Bureau of Sports Fisheries has about \$700,000 in research, the Bureau of Mines about \$25,000.

Mr. ROGERS. Is this all oriented toward what we call oceanography, or oceanographic programs?

Dr. MORSE. Yes, sir. This is all to be counted in what we submit in the budget as counted toward oceanography; yes.

Mr. ROGERS. And has the approval of ICO?

Dr. MORSE. Yes.

Mr. ROGERS. So that is about almost \$13 or \$14 million?

Dr. MORSE. Yes.

Mr. ROGERS. Would that be right?

Dr. MORSE. Yes, sir.

Mr. ROGERS. Now, the National Science Foundation.

Dr. MORSE. 1966, it shows \$25.1 million for research.

Mr. ROGERS. The Department of Health, Education, and Welfare?

Dr. MORSE. \$2.6 million for research in the Public Health Service and \$390 in the Office of Education.

Mr. ROGERS. Education is also doing research work in oceanography?

Dr. MORSE. This is the sponsoring of academic work.

Mr. ROGERS. Yes.

The Department of Agriculture?

Dr. MORSE. None.

Mr. ROGERS. None?

Dr. MORSE. Correct.

Mr. ROGERS. The Atomic Energy Commission?

Dr. MORSE. In research, the Atomic Energy Commission shows \$4.6 million.

Mr. ROGERS. And NASA?

Dr. MORSE. None—or at least we carry “none” in our budget.

Mr. ROGERS. And Smithsonian?

Dr. MORSE. Smithsonian submitted at least as \$1.7 million.

Mr. ROGERS. Now, what about the Departments of the Army and Air Force?

Dr. MORSE. The Air Force has no oceanographic research. The Army Engineers show \$1.3 million.

Mr. ROGERS. \$1.3 million?

Dr. MORSE. Yes.

Mr. ROGERS. I believe the Department of the Air Force did have a project going. They had five grants, I believe, in 1965; did they not?

Dr. MORSE. The Air Force you are talking about?

Mr. ROGERS. Yes.

Dr. MORSE. We decided not to include those in our program, these are in the Geophysical. We assumed these were related more to geophysics, apparently, than to oceanography.

Mr. ROGERS. I see.

I notice in your testimony you say you think some legislation should be passed.

Dr. MORSE. Yes, sir.

Mr. ROGERS. Some bills—I believe there are only about really—one bill, perhaps two, with the Continental Shelf problem involved, with some change. But you do not approve of a commission because you say it is being done by the panel appointed by Dr. Hornig, in the Office of Science and Technology. Is that correct?

Dr. MORSE. Well, let me put it this way. I feel very strongly that the objectives of a commission are very much needed. I think the whole program very much needs a relook and in the future, particularly if one views the program beyond the narrow scope of oceanographic science, I feel that the question of development of resources of ocean technology, the use of our knowledge about the oceans as it relates to the national welfare is, I think, one of the areas where we need a great deal of definition. We need much more in the way of facts, of specific programs, rather than vague, general tests.

I think this can be done only by a considerable amount of attention by a wide variety of people.

Mr. ROGERS. Now, even if it has to be your personal view, and I would assume you would want to qualify it, rather than a departmental view, do you not think that we really need a national commission that would be broader than the charter of the group that has been set up to study the science implications of oceanography as set up by Dr. Hornig?

Dr. MORSE. My personal view, of course, as I testified, I am confused sometimes whether I am speaking for the Navy, the ICO, or myself.

Mr. ROGERS. Yes.

Dr. MORSE. My personal view, and I certainly have discussed it with Dr. Hornig, is that I think a national commission, whether or not it needs legislation to set it up is another matter, would be a good thing.

Mr. ROGERS. That is encouraging to hear you say that.

Dr. MORSE. If I may add, especially one that goes out of business when it is through.

Mr. ROGERS. Yes, I will agree with that. To go in and make a very thorough study, put some real emphasis on it, and then turn over their findings and get out of the business.

Now, do you think a panel could make an adequate study of all of the ramifications of oceanography, meeting for 18 days in 9 months? In a 9-month period of time?

Dr. MORSE. I think the answer to that is "No."

Mr. ROGERS. Why, certainly, I would agree.

And this is what the panel that has been set up has as its schedule, to study and report back in the 9-month period.

Now, let me ask this. Who sits on the ICO from the Bureau of the Budget?

Dr. MORSE. There is no member of the ICO—there is a Bureau of the Budget observer.

Mr. ROGERS. Who is this person?

Dr. MORSE. Roy Dillon is, and he has been sitting with the committee for quite some time—3 years—and is quite familiar with the programs, and this, I think, has been very much an advantage to us to have someone who has been capable and continuing.

Mr. ROGERS. Is he an oceanographer by his background?

Dr. MORSE. No, sir.

Mr. ROGERS. Do you know what his background is?

Dr. MORSE. I could not say. He is an expert with dollars, I understand.

Mr. ROGERS. With what?

Dr. MORSE. An expert with counting dollars, by profession, I believe he is an economist.

Mr. ROGERS. We need more of those, I am sure.

What I am concerned with is, it seems to me from reading over the various statements that we have had so far from the various governmental departments, that the Bureau of the Budget is exerting more control on the testimony, the departmental testimony, than the departments themselves.

I have some concern about this and I hope we can maybe get the Budget, Mr. Chairman, and go into this a little bit later on.

Is it necessary for you to clear this statement and the position you take with the Bureau of the Budget?

Dr. MORSE. It certainly was cleared with them. I believe it is necessary to do that.

Mr. ROGERS. It is necessary?

Dr. MORSE. Yes, sir.

I realize you do have to go to the Budget. What I am saying is, where you have a difference in departmental view with the Bureau of the Budget, must you accede to the Budget's view?

Dr. MORSE. I do not feel qualified to comment on that. I just have not had enough experience in that. I can say that the statement was written not in the Bureau of the Budget, but by my staff.

As a general policy, I do not think I am the one to say.

Mr. ROGERS. How much time are you able to spend on oceanography, Dr. Morse?

Dr. MORSE. I spend personally—of course, it fluctuates, depending on the time of year. I would say on the average I spend about 10 or 15 percent of my time, which is not based on a 40-hour week.

Mr. ROGERS. Yes; I understand.

Now, should we—there were suggestions that we should create two core departments, perhaps you heard that testimony.

Dr. MORSE. No, sir; I heard the testimony on both occasions.

Mr. ROGERS. That was by the Commerce Department, and I notice that the Commerce Department in the field of research only has about a budget of \$1.4 million, and this is supposed to be one of the core departments as suggested by Commerce in this field, although Navy, spending \$32 million, Interior with about \$14 million, and the National Science Foundation with some \$25 million.

What is your reaction to that suggestion?

Dr. MORSE. Well, I heard Dr. Hollomon's testimony, and I also was here when Dr. Hornig commented on it this morning. I endorse what Dr. Hornig said and I might add to that.

I think it depends very much on what is meant by physical oceanography. I think it is very clear that in terms of research, and much of the research that you have talked about that is in the Navy, particularly within the Office of Naval Research and within the National Science Foundation, to an oceanographer would be physical oceanography—that is, it is directed at making physical studies of the ocean.

I think it would be a mistake to transfer that program either bodily or even by direction, that is by supervision, to the Commerce Department. I say it for certain abstract reasons, which I think Dr. Hornig stated very well, but I also believe in it for pragmatic reasons, because I think these programs are going very well and I think in terms of the overall problems facing the national oceanographic picture, I think that is perhaps the one, that is in physical scientific kinds of oceanography, perhaps the one that is best coordinated. It is the one that is the healthiest. It is not the focus of our outstanding issues today.

However, if in Dr. Hollomon's testimony he really meant by physical oceanography the systematic surveying types of operations—and I do not think this is—which are very essential, not only to the Government's programs, but internationally and certainly to industry, in order to have this information available and have it covering large areas of the ocean, that this activity is one which the Department of Commerce traditionally has great competence in.

Mr. ROGERS. Do you think of surveying as really being research? We already know how to do it, do we not, unless we are out on research missions to find out how to do it differently?

Dr. MORSE. I think it has been one of the areas which I have tried to put a lot of attention to in not only acquainting myself with the national program, but what the ICO's function is. We continually try to get a better understanding of what is meant by oceanographic survey.

I think it is a phrase which is very deceptive, because it is a creation sometimes that is within this phrase. It can be many things with quite different purposes.

Now, one of the recommendations of the National Academy's oceanographic committee of some years ago, which really provided much of the impetus to the present program—was the attention on the necessity for oceanwide surveys.

In their mind, what they did was make recommendations for systematic surveys of the ocean, the ocean bottom and so on, on a world-wide basis. They assumed, and rightly so I believe, that this is the foundation for all activity in oceanography.

This is a survey not directed at a specific purpose, for the same reason you just want charts of the United States or maps and so on, it is a service to everyone. This program, I think, has to be distinguished from the survey activity that an oceanographic laboratory might want or be required to make itself with vessels to obtain a solution to a problem or some specific and special aspect of oceanography it is interested in.

The Navy has surveys which are sometimes much more specific, where the area is determined by some operational need, where the instrumentation or the detail may well be of a classified nature. This Navy effort has to be related to that systematic survey and I think the ICO has tried to provide those answers. These Navy efforts are also called oceanographic surveys.

I believe the area of systematic open literature worldwide surveys is one where we are deficient. I think we have not kept pace with the projections that, say, the National Academy of Science made. And I would certainly be the first to welcome and support greater activity by the Commerce Department in this area. In fact, I am delighted by Dr. Hollomon's testimony, because I look forward to a substantially larger proposition in the 1967 program coming from the Commerce Department than has come from it in the past.

Mr. ROGERS. Now, let me ask two or three questions quickly.

Does the Commerce Department, for instance, make its budget suggestions in the field of oceanography before or after clearing with ICO?

Dr. MORSE. The general sequence by which the program is constructed is that the program does not start in the ICO. It starts in the agency. The initiative for programs—the fundamental initiative, of course—comes from the agencies before the position of the agency is frozen. The ICO has a chance to see it and have an impact on it, but—

Mr. ROGERS. But the final determination is in the agency?

Dr. MORSE. Yes, sir.

Mr. ROGERS. Have you had difficulty with any particular program since your short stay here with the ICO?

Dr. HARRIS. With any particular agency?

Mr. ROGERS. Yes. In other words, where you felt added emphasis should be placed and that the agency itself did not share that feeling of the ICO?

Dr. MORSE. I personally know only of one where the result was the opposite—that is where I think—I am quite sure that the ICO, by calling the attention of the agency and the Federal Council to a certain

problem, namely, the rising costs of managing ships, resulted in the National Science Foundation's budget going up because of our calling attention to this need in their own budget which—

Mr. ROGERS. In the National Science Foundation?

Dr. MORSE. Yes; and their own agency head was most cooperative in understanding this problem and in backing our position within that agency.

Mr. ROGERS. But you had no difficulty along the other direction since you have been here?

Dr. MORSE. I have to say "No." I recall no specific case.

Mr. ROGERS. In making up the national oceanographic program as far as the Government is concerned, there is then no central start given to the program?

Dr. MORSE. It is important to realize, I believe, that the ICO—and the ICO panels which are the operational aspects of the committee—plays a very important role. It is not an initial affair, but a year-by-year affair, so that the effects of the ICO perhaps do not show in the year that it is discussed. In other words, there is a carryover of problems, of course.

If the problem is not really satisfied in 1 year, then this is an issue that certainly gets back to the department, so that I think in that sense, that the continuity of the operation feeds back to the agency which may well stimulate a proposal from that agency back to the ICO, which might have grown out of discussions the previous year.

Mr. ROGERS. Does the Navy fund the Sea Lab?

Dr. MORSE. Yes.

Mr. ROGERS. And as I recall the testimony, there were other agencies, of course, that were participating?

Dr. MORSE. That are participating, yes.

Mr. ROGERS. Is this classified or unclassified?

Dr. MORSE. There is no classified work in Sea Lab.

Mr. ROGERS. Should the Navy do work that is unclassified or should it be confined to classified?

Dr. MORSE. I think very definitely it should do unclassified work.

Mr. ROGERS. Why should it not be in the Commerce Department if it is unclassified—or Interior?

Dr. MORSE. I think, first, by saying that there ought to be such work in the Navy does not say there should not be such work in the Commerce Department as well. I think it is extremely important to the Navy that it participate in the important oceanographic questions.

The ocean is such a basic—it is the basic environment of the Navy. I think the Navy has to know as much or more about it than anybody else if it is to do its job correctly. This means it not only has to have such men in the Navy, such as Commander Fry who described his qualifications yesterday, who are scientifically oriented, but are naval officers.

I think this is important to the Navy and to oceanography. I think it is important that the leading oceanographers work with the Navy, without a third party, say, in between. I think there must be a mutual sharing of responsibility.

Mr. ROGERS. I thought the idea was that the information could be interchanged?

Dr. MORSE. Information is, of course, interchanged, but I think it is an improper or too mechanical a view of science and technology to

view it as an exercise in producing information. It is a much more dynamic thing than that. That is, the people and the ideas are more important in the long run than information.

Mr. ROGERS. Let me say that I think your testimony is very helpful and I am delighted to see that you do think a real panel is necessary to study the program before we branch out into something taking some drastic action perhaps.

Thank you very much.

Mr. LENNON. Mr. Bauer?

Mr. BAUER. With respect to this privileged group of planning agencies that was mentioned this morning under the President's science advisor, that is the Federal Council for Science and Technology, and the so-called PSAC. ICO, as I understand it, organizationally, is a committee of the Federal Council; is that correct?

Dr. MORSE. Yes, sir. Formally we report to that.

Mr. BAUER. Then you are privileged in the sense that the Congress has no responsibility as far as you are concerned, if you do not want to testify you can say, see the President; is that right, under your present organization?

You see, this raises a problem, if an appropriation for administrative purpose is to go to ICO without ICO having formal statutory position so that Congress would have some supervision over the operation, then you recognize the question of the management situation is untenable, it seems to me.

In other words, if ICO is to be funded as you suggested would it not be better then to maybe put the Federal Council of Science and Technology in a body by statute that is responsive for the Congress, than to have it purely a Presidential advisory group?

What is your feeling on that?

Dr. MORSE. I would say, first, I do not feel competent to really comment on the question.

Mr. BAUER. You see the problem?

Dr. MORSE. The Federal Council, though, is itself, you see, a collection of Presidential appointed essentially cabinet people.

Mr. BAUER. It only exists at the President's pleasure?

Dr. MORSE. Yes, sir.

Mr. BAUER. And is to advise him directly.

You have no thoughts, then, as to how this management change could be effected to have ICO have some statutory base?

Dr. MORSE. As I said in my testimony, this is a vexing problem and one I have wrestled with myself. There are several alternatives.

The present one is, of course, what we are doing now, which I think works in a pragmatic sense. But, nevertheless, I think it puts certain burdens on the agencies that we have to solicit help from, not that we do not run into great cooperativeness—we do run into a great cooperativeness.

It does mean that we do not show this activity to a single body of Congress.

Mr. BAUER. Well, ICO basically then is only concerned with Government research; is that correct; not with respect to the whole problem of the study of the marine environment?

Dr. MORSE. Let me just express my thoughts on this, because this is one that I have wrestled with myself greatly this year.

First, it is clear that what we report on in this blue book, say, which we call the national oceanographic program, in a technical sense is a misnomer; it is the Federal oceanographic program.

The national oceanographic program, if one could define such a collection of resources and activity would, of course, have to include industry, the State governments, the private institutions, educational institutions, and so on.

Clearly, the ICO cannot concern itself with that in an action sense. We do not have purview over it. We do, however, do as much as we can to relate our activity, both as a committee and the activity of the agencies which we support to the outside world—that is to industry, the States, and so forth.

We have, ourselves and through our staff, supplied information, suggested channels of approach, cooperated in generating reports with industry, in order to develop information, to call attention to the problems, to call attentions to the programs, to encourage outside groups to engage in oceanographic activities.

This is, though, as I hope I make clear, often done by informal means. There is no legal mechanism.

Mr. BAUER. In other words, it is a planning group, Doctor. There is no intention on the part of the ICO to take planning cognizance over how do we develop the fisheries or how do we develop the geo-physical research or exploration for oil?

Dr. MORSE. No, sir.

Mr. BAUER. And the same thing would apply to the PSAC. It would deal with governmental programs only.

Dr. MORSE. You mean the special panel on oceanography. I would say they are just an information developing group for Dr. Hornig. They certainly cannot tell anybody what to do.

Mr. BAUER. In other words, there is a vacuum as far as any planning with respect to our national overall utilization of the oceans.

There is now no one group that is able to come up with a plan as to how we should best develop the assets of the ocean?

Dr. MORSE. I think it is fair to say there certainly is no one doing it.

If you mean the whole broad concept including fisheries, maritime resources, the development of resources, and so on; there are a great many activities devoted to that question, I think there are groups trying to look at it, but there certainly is no group—it is clear that any group is free to look at it, but it is also clear that there is no group that controls it, and I am not sure there should be.

Mr. BAUER. I am talking about as far as planning is concerned, do you not think that would be important to have planning along those lines?

Dr. MORSE. I would say, sir, that it is important that there be joint planning. I think it is fairly clear that there cannot be centralized planning of that total program because industry is heavily involved.

Many of the industrial programs may or may not be of the concern of the Federal Government, a lot of them are. The State governments have a stake in the development of the oceans. It is also an international problem in the sense that the development of the oceans, though we clearly are concerned first with our national goals, have to be related to the activities of the other nations.

It is an issue that cuts across every segment of society and it is very difficult to see how there could be centralized planning. There certainly has to be joint planning and understanding of the limitations of the various groups involved.

I think it is important that as we look ahead to develop those areas, for example, that the Federal Government could only take the lead in, and I think it is clear what some of them are.

The large scale surveying operations of the oceans is clearly not a function that you can say is the responsibility of industry to take the lead in.

I think the Federal Government has to take the lead here.

Mr. BAUER. I was thinking particularly of the locations of mineral resources on the Continental Shelf.

In view of the fact that the current expenditures of the oil and physical science industries are around \$300 million a year, I was wondering if we were intending to duplicate their work.

Dr. MORSE. I would not feel competent to comment in detail, I do know that Admiral Karo has looked into the type of surveys that the oil companies do, that clearly there is much information that is of use and has to be exchanged but also much of this information is very specific in nature and where the measurement standards are not up to the qualities that you would want to see as basic information on which the whole program should be based.

Mr. BAUER. Thank you, Doctor. There is one last question I have. In Dr. Hornig's testimony on page 300, he says as follows:

Dr. HORNIG. The ICO itself has done a great deal of soul searching, but what I referred to is that it has the difficulties that any interagency coordinating group has, which is that people are a mixture of representatives of someone else and free intellectual agencies.

Could you talk to that? What is this "soul searching"?

Dr. MORSE. I have never yet been on a committee, sir, that did not spend 25 percent of its time justifying itself to itself.

Mr. BAUER. Is it the question of working for an agency and working on a joint planning committee?

Dr. MORSE. I would not say conflict, I would say competition.

The members of the committee are themselves, of course, involved in the oceanographic activity of their own agency and, therefore, have something to say about what goes on in that agency, and rather than talking about someone else's problem, I could mention, say, my own as participating on the committee, because I am also Assistant Secretary of the Navy.

It has become clear to me that in that mixed role that I have myself that I have to perform two judgments in a sense, often on the same question, and I think one has to admit that they may not always come out the same.

That is I am sitting on the ICO where I feel that my duty and obligation is to promote the strongest oceanographic position of the Government, that within the context we are judging issues there, that the desire to pursue a given course or given level of expenditure, say, may be evident, but that when I come back and then deal with that part of the budget of the Navy, say, which has oceanography in competition as it should with other areas in the Navy, then one makes a

separate and perhaps different judgment of what you are comparing the validity with.

I think, though, that on the whole that one's action within the Navy is, therefore, more informed because of knowing what it fits with. If we do not do it we know the impact to the whole program. Nevertheless, I would be the first to admit that sometimes the judgments you make in the agency may not coincide with the judgment you make in the ICO.

Mr. BAUER. Thank you, Doctor, that is all I have.

Mr. LENNON. Dr. Morse, for the record, the Council that Dr. Hornig is Chairman of, he wears a dual hat as the Director of the Office of Science and Technology, but the Federal Council is made up exclusively of governmental representatives and, of course, the ICO is, too.

How many members are there on the ICO?

Dr. MORSE. There are nine members.

Mr. LENNON. You have, of course, three observers.

Dr. MORSE. Yes.

Mr. LENNON. One of whom was an observer of the Bureau of the Budget.

Dr. MORSE. Yes.

Mr. LENNON. You were asked whether the Bureau of the Budget sat in on ICO meetings and I see he is specifically named as an observer in a publication issued by the ICO.

Some mention was made by Mr. Rogers with respect to the research part of the Department of Commerce in the national oceanographic program, I think you mentioned the figure \$35 million.

Dr. MORSE. Yes.

Mr. LENNON. Actually out of the total of the \$141 million for fiscal 1966, the Department of Defense part of that was \$67,099,000, a little bit less than 50 percent of the total national oceanographic budget for fiscal 1966.

You have a ship's panel, I understand, in ICO.

Dr. MORSE. Yes, sir.

Mr. LENNON. They take the recommendations from the several agencies who are interested in new construction. Do you have with you the requests by agency to ship's panel, then to the ICO and then to the Federal Council on the number of ships each agency requested for new construction for fiscal 1966?

Dr. MORSE. For 1966?

Mr. LENNON. Yes, sir.

Dr. MORSE. Here is Captain Treadwell who is the chairman of that.

Mr. LENNON. We will take them in the order of the Department of Defense, Commerce, and on down the list, please, sir.

Dr. MORSE. Do you have the figures?

Captain TREADWELL. I do not have those figures with me, sir, I can provide them.

Mr. LENNON. What I want is the requests from the various agencies to ICO which were then turned over to the ship's panel which then made its recommendation back to the ICO which then made its recommendation to the Federal Council.

Captain TREADWELL. I can provide that for the record; I do not have it with me.

(The information requested follows:)

FUNDING HISTORY OF 1966 OCEANOGRAPHIC SHIP CONSTRUCTION PROGRAM

NAVY

Proposed :

1 large AGS-----	¹ \$13,500,000
1 small AGS-----	¹ 4,600,000
2 AGOR (new design)-----	11,100,000

¹ Not nominated for, nor included in, ICO national program.

DOD BuBUD Review : Small AGS dropped.

ICO recommendation including increment : 2 AGOR-----	11,100,000
FC S. & T. recommendation : 2 AGR-----	11,100,000
President's budget : 2 AGOR-----	11,100,000

Congressional approval : Pending.

COAST GUARD

No proposed program.

NATIONAL SCIENCE FOUNDATION

Proposed :

Wooden trawler (<i>Antarctica</i>)-----	\$700,000
Design study for Arctic barge-----	100,000

No changes.

Congressional approval : Pending.

U.S. COAST AND GEODETIC SURVEY

Proposed :

1 class 1A-----	\$9,600,000
1 <i>Marmar</i> replacement-----	900,000

Commerce Department review : Both ships dropped.

ICO recommendation including increment : 1 class 1A-----	9,000,000
E.C.S. & T. recommendation : ICO recommended class 1A dropped.	
President's budget : No ship construction program.	

BUREAU OF COMMERCIAL FISHERIES

Proposed :

Completion of <i>Kelez</i> conversion-----	\$40,000
Completion of <i>Oregon</i> replacement-----	650,000
2 design studies-----	45,000
<i>Mackinaw</i> replacement-----	645,000

Interior Department review : *Mackinaw* replacement and one \$30,000 study dropped.

BuBUD review : \$15,000 design study dropped.

ICO recommendation including increment :

Completion of <i>Kelez</i> conversion-----	\$40,000
Completion of <i>Oregon</i> replacement-----	650,000
600-ton exploratory fishing vessel-----	2,000,000

F.C.S. & T. recommendation : 600-ton exploratory fishing vessel dropped.

President's budget :

Completion of <i>Kelez</i> conversion-----	\$40,000
Completion of <i>Oregon</i> replacement-----	650,000

Congressional approval : Granted.

MR. LENNON. It just so happens that our ship construction for fiscal 1966 is at the lowest point it has been in a number of years, that is true; and I want to know not what the ICO recommended, but what did various agencies request of ICO, please, sir.

Captain TREADWELL. I understand.

Mr. LENNON. I notice, Doctor, in your statement you commented on H.R. 2218. I quote from page 6 of your statement, down at about line 8:

The ICO believes that H.R. 2218 comes close to providing all the legislative support needed to develop and maintain a Continental Shelf campaign designed for payoff.

Now, how would the passage of 2218 accelerate or set the stage for the development and maintaining of a Continental Shelf campaign designed for payoff?

Dr. MORSE. Yes, sir, I think what I really mean by that remark is that I feel that the present agencies of the Government have within their present charters or objectives the means for doing this.

We have talked earlier, and previous witnesses have mentioned, for example, that the Department of Commerce certainly as well as the Navy to some extent, but certainly the Department of Commerce in the civilian sphere has the authority presently to engage in whatever surveys are needed on that shelf.

Mr. LENNON. With that I agree. The General Counsel, Bob Giles of the Department of Commerce in a letter directed to this committee stated flatly and categorically that ESSA in the Department had the authority to make a study of the Continental Shelf in tota.

We have that in a letter in this compilation reference on the bills. He did that in saying that one of the gentlemen who had introduced a bill calling for a study or authorizing a study, that that was not necessary, they already had the authority.

Now, how would 2218 implement or set the stage to assist in the ESSA in making the proper exploration of the Continental Shelf?

Dr. MORSE. Perhaps I am attributing something to H.R. 2218 that in a sense already exists.

I think certainly——

Mr. LENNON. Let us stop right at that point. It struck me when you included that in your statement, because Dr. Hollomon's testimony was to the effect that while they had the authority they had to depend on the Appropriations Committee and on the recommendation of the President's budget; that they had a continuing authorization and no specific authority.

Well now let us suppose, Doctor, that there is a drag, and they have already let a small contract for an infinitesimal part of the exploration of the Continental Shelf, but that is getting started.

But let us suppose that next year it is not included in the ICO's recommendations, a continuing funding of this.

Then when they go before the Appropriations Committee they are bucking the President's budget, and the Appropriations Committee will not have the support of an authorization committee.

We had this same experience with the Coast Guard which for a period of 16 years, due to a legislative or technical draftsmanship oversight, that the Coast Guard lost its annual authorization and we just restored that a couple of years ago.

So that the Coast Guard did not have the support of the authorization committee. That is the reason that the Members of Congress are generally concerned.

You say, well, the Appropriations Committee can have the legislative oversight, but they do not have the time, because they must ap-

propriate for every facet of the Federal Government, every nickel, and they do not have the time to devote to, well we will not call it legislative oversight, that is a rather harsh name, but a general investigation to determine the progress of a program that the Congress is just as much interested in as is the executive branch of the Government, I assure you.

You say, too, further, that you would suggest, and I read on that same page, on line 14:

I would suggest, however, that modification of the bills to provide authorization of funds for general program administration would solve the remaining problem of funding the transagency studies requisite to good planning.

I do not know when you prepared this statement. When was it prepared, Doctor?

Dr. MORSE. This was first submitted last week, sir.

Mr. LENNON. Last week.

In the report from the Navy, which you represent, as well as the ICO chairman, a letter from the Department of Defense, on July 29, which has not been very long ago, you did not raise this question at all.

You gave carte blanche endorsement to 2218 without any suggestion of a change or modification in it.

I wondered what had happened since the 29th of July and, say, about the fourth day of August when this text of the statement was prepared?

Dr. MORSE. The position I am trying to present to you, sir, on these bills is not the Department of Defense's position, but the ICO position.

Mr. LENNON. The Department of the Navy would not be different from the ICO.

Dr. MORSE. I can pinpoint the Navy's position.

Mr. LENNON. You are chairman of the ICO by reason of the fact you are Assistant Secretary of the Navy.

Dr. MORSE. No, sir; this is a separate appointment that Dr. Hornig makes. The ICO was set up by Jerry Wiesner and Jim Wakelin, who was my predecessor, was the first appointment and when he left Hornig appointed me to this position, but it was a separate—it is a separate decision than being the Assistant Secretary of the Navy.

Mr. LENNON. Let me see if I can find the report on 2218 from Dr. Hornig, I have it here if you would like to see it, this letter that he did not make the suggestion that you just made in your testimony with respect to modification of 2218.

But I am glad to see that there is a little change in thinking, even in the last 10 days.

Now, let us talk about this suggestion, and I do want counsel to give serious consideration to this, that you would suggest that the bill be modified to provide authorization of funds for general program administration.

You say that would solve the problem of funding these agency studies, requisite to good planning.

Do you mean an open-end authorization there, Doctor?

Dr. MORSE. No, sir.

Mr. LENNON. I want to pin that down, it may be a good point we could add to 2218.

Dr. MORSE. What I have in mind is, first, I think it should be very clear that the ICO as a group should not conduct programs; that is, these programs must be conducted by the agencies.

Nevertheless, I think for the planning of substantial programs such as in the areas of surveys or long term continental shelf, interagency activity that there has to be some very solid planning that crosses the boundaries between the agencies.

I think this is an ICO function and that we are very limited at the moment as to the amount of staff we can put on such activities; we are limited in the amount of money that we ourselves can have available for either using outside contractors for such studies or paying for these costs within other agencies.

I think it would be useful to us to have that—that is the ability to make this longer range plan, that I think is a weakness to us, and if one is going to expect rather substantial areas of concern such as the continental shelf and the use of resources on it to be an ICO function, the amount of work just to even understand this program is considerable.

Mr. LENNON. The General Counsel from the Department of Commerce says emphatically and categorically that ESSA in the Department of Commerce has the authority to make the exploration of the total continental shelf on the United States.

Dr. MORSE. I think within the continental shelf, if one is going to develop a program that is comprehensive, that it is inescapable that this go beyond the concern of the Department of Commerce.

It must involve the Department of the Interior in the development of resources and I might say that although the Navy is not itself concerned with the development of the resources as a direct mission, the engineering knowledge which the Navy possesses in similar kinds of areas, and actually from activities in the continental shelf, is considerable. This expertise, knowledge, and so on, must be applied and available, too.

Mr. LENNON. Dr. Hollomon is a member of the Federal Council?

Dr. MORSE. Yes, sir.

Mr. LENNON. Suppose this bill was modified, and I am asking you now as the head of ICO to take a new look at this bill to draft an amendment or a modification that would implement your suggestion in this bill.

I would assume that if such an amendment was adopted and the bill ever became law it would provide x number of dollars on an annual basis which would be used purely administratively by the ICO. Is that what you are talking about?

Dr. MORSE. Yes, sir.

Mr. LENNON. Now, since you are a part of the Federal Council, and the ICO, I would like for the committee files a recommendation, but I want your specific thinking and language and a figure—I never did believe in open end authorization, I think there ought to be a sum certain set, if they want to come back and ask for an amendment, fine.

So, I would like very much to have that.

The bill, 2218, does provide, as you know, for the appointment of an advisory committee by the President for oceanography on representations of scientists selected on the basis of universities, non-Federal universities, agencies and from other interests.

The President is only authorized there. What would you say if there was a directive in the language of that legislation?

Dr. MORSE. I would hesitate to comment on that language.

Mr. LENNON. Every one of the other bills provides for a national council and several of them, Senate bill 944, which has already been passed by the Senate, they adopted an amendment in committee providing for a national advisory commission, they did not authorize, it was a directive, and I am wondering what would be the reaction, I would like you to talk to Dr. Hornig about this, we did not have time this morning, I promised him he could get away by 10:30, that why should not the President appoint?

Dr. MORSE. I can tell you what my recommendation would be now, this is not—

Mr. LENNON. I want it coming from you and I want it coming from Dr. Hornig, from the Federal Council under the President, but I want to know the reason why the President should not appoint a national commission, representative of the university level, the competence in oceanography and industry of, say, 15, not just 7, but 15.

If you had 7 you would have 4 attending at meeting, so if you have 15 you would get 8 or 9, even if it is \$100 per diem. So I want the thinking, sir, on that.

Dr. MORSE. Mr. Lennon, my concept of the organization is that the President should establish this Commission on Marine Sciences to be composed of 15 members appointed by himself and including individuals drawn from industry, universities, and private institutions engaged in marine science and technology.

Mr. LENNON. I think you must recognize, I believe, the Congress is going to pass something this year. I regret that the bill 2218 was not passed 2 years ago so we would now be in a position to see what, if anything, it had accomplished; a lot of people say it would not accomplish anything, I do not know.

But we do not want to have the experience we had before.

You said you would be glad to comment on it as an individual.

Dr. MORSE. Let me suggest this, that I raise this point that you have raised with Dr. Hornig and will submit to you separately a comment on that point.

Mr. LENNON. You are in complete accord with the objectives of the bills stated in the past.

Thank you, Doctor.

(The following letter was subsequently received for inclusion in the record:)

AUGUST 23, 1965.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

MY DEAR MR. CHAIRMAN: As I testified before your subcommittee, a characteristic common to almost all the existing bills is their provision for an analytical staff competent to examine oceanographic issues within economic, political, administrative, and technological frameworks. These bills also provide for funds to administer this staff and the organizational needs of an ICO type of operation generally. Thus far the problem of interagency funding has been vexing. Navy underwrites most of the ICO staff needs, via the Office of Naval Research. At the present time, four agencies contribute to staff salaries and eight print our publications. The funds proposed by these bills, although modest, would be most welcome since they would fill an obvious void. I suggested that modification

of your bill to provide authorization of funds for general program administration would solve the remaining problem of funding the transagency studies requisite to good planning.

You requested that I submit for the record a suggested modification to H.R. 2218 which would incorporate the above thoughts. It is suggested that H.R. 2218 be modified to include a section on authorization which might read as follows:

"AUTHORIZATION

"Sec. 7. There are hereby authorized to be appropriated such sums as may be necessary to carry out this Act, but sums appropriated for any one fiscal year shall not exceed \$1,000,000."

Sincerely yours,

ROBERT W. MORSE,

Chairman, Interagency, Committee on Oceanography.

Mr. DREWRY. Just one question, Dr. Morse, I think the subject has pretty well been covered.

You mentioned there needed to be a lower level of coordination, referring as I understand it to the fact that there should always be an ICO.

You made very clear the ICO function within the Government, but that it cannot function on some of these broader levels.

But as I further understand it the ICO does not get into the picture as coordinator until after the individual recommendations have come from the departments themselves.

Would it not strengthen the function of the ICO if it were in a position as a group of working level personnel who are familiar with the details of these different things, too, in advance, form a little "think factory" and make recommendations which are going to be the subject to veto by the Secretary level any way. They would thus, at least, be in a position initially to recommend and urge. Then when the Secretaries have gotten their thoughts together, either accepting or not accepting, the ICO can appoint, as in the case you mentioned in the case of the National Science Foundation, the funds for the ships.

Again, the Federal Council apparently has veto power, but it seems to me it would strengthen the ICO considerably if it could be a planning or recommending group—recommending to the planners.

What is your thought on that particular point?

Dr. MORSE. I think you repeated my point that quite independently of whether one had a commission or whether one had a high-level advisory group or whether one had a national oceanographic council, quite independently of that I think every one would have to agree that there still has to be a group that performs the ICO functions of coordination since no such high-level group could do it.

That, though, does not answer the question, would such a high-level group assist the ICO in carrying out its jobs?

I think the real area of confusion would come primarily at the Federal Council level and not at the ICO level.

I think the relationships of that group to—let us assume that we are talking about a national oceanographic council which is a very high-level group—I think the conflict with the ICO would not necessarily be as much of a difficulty as the overlap in assignment of responsibility with the Federal Council.

I think Dr. Hornig commented on that and I think it would be of greater concern to his organization which must look and comment on

the total scientific and technological picture. This would create confusion.

You are asking me to comment from ICO's point of view.

Mr. DREWRY. My point was that as I understand it ICO does not get into the picture until after the agency programs have been developed somewhat, as a general proposition.

Dr. MORSE. Yes.

Mr. DREWRY. And my point is that since we are going to need an ICO anyway—it is supposed to be a coordinating outfit, and it is low level—why would it not strengthen the entire picture as it presently stands if the working level group in the Government, the ICO, should have functions in which it could recommend changes after the programs have more or less become hard.

Am I making myself clear?

Dr. MORSE. Yes. We do have a body to which we could recommend. I think as a body we certainly would feel free and have felt free in the past to comment to the Federal Council and to make recommendations to the Federal Council of what we have felt were deficiencies in the programs that have been formulated.

The mechanism for acting on such recommendations exists through the mechanism of the Federal Council and Dr. Hornig bringing influence back on the Department and particularly also, of course, the case that he can make to the Bureau of the Budget.

Now, I think purely from an ICO point of view as to what it does, a very high-level committee, and if you take as the objective of the game to get more money for oceanography—I mean if this is what we want to say is the objective of the game—certainly no high-level oceanographic council can do you much harm.

The worst they can do is not to do anything and, in fact, that might be precisely what they would do because they would be very busy people.

They also would be people that have to make balances and I think from a pragmatic point of view the oceanographic program has always got to be balanced with something else, and I think this is inescapable.

I have not given you a very clear answer. But I just do not think a national council of oceanography would do much good frankly, personally.

Mr. DREWRY. Well, my question was directed to the strengthening of ICO irrespective of what high level group you may have. I had the same thought the chairman had that within H.R. 2218 is the provision for permissive authorization of an advisory committee.

The Advisory Committee, the origin of which was very much along the lines of the Commission that has been discussed—and I think in the earlier form of the legislation it was a directive as well as an authorization—I have a feeling that maybe from your testimony we are coming close to some compromise areas—the one of the funding question if that can be worked out, if the Advisory Committee can be made a mandatory body and perhaps even enlarged, then also someone raised the point that it would be liable to turn rusty if there was no provision for a turnover.

It would be simple enough to provide for alternating terms—have staggered terms—so you could bring new views and direction into it.

For example, you might have an oil man one year, an instrument man another year, and somebody else later on.

But the ICO would in any case be there to work on the Government's part of any overall program.

If the ICO would have the power or made it the practice of sitting together at their various meetings and say, "Fellows, here is something that ought to be done, we will recommend that to the different departments, to the department that ought to ask for it."

Then the department might accept that. It might have been something that department had not thought of from the broad standpoint. Then it gets in their budget and the Federal Council will have a look at it, presumably, and they will have the same veto power they have now, but in the meantime the ICO will be strengthened as I see it by that.

That is all I have, Mr. Chairman.

Mr. LENNON. Doctor, we certainly appreciate your presence here today—

Mr. ASHLEY. Mr. Chairman, could I ask a couple of questions of the witness?

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. LENNON. Back on the record.

All right, Mr. Ashley, you may proceed.

Mr. ASHLEY. Mr. Secretary, I have a not too parochial interest, I hope, in the Great Lakes, which, of course, is the largest body of fresh water in the entire world.

Are the Great Lakes included in our national oceanographic program?

Dr. MORSE. No, sir; we have not presented, except perhaps there may be some peripheral activity, but in general we have not included that in our listing of what we call the national oceanographic program.

Mr. ASHLEY. Well, as you look to the future would you expect there would be additional effort in this area?

Dr. MORSE. Yes, sir. If I might take a moment just to comment.

Mr. ASHLEY. Please.

Dr. MORSE. This is relevant to this. The ICO or the definition of what is called the national oceanographic program is just that, it is a definition, and if you look back in the history of the development of the recent activity in oceanography its generated from an obvious need that, as a science, oceanography in this country was just not getting the attention and support that the subject merited and so it was natural that the activity of the ICO has, in the past, concentrated rather heavily on what one could call traditional oceanography—that is within the science particularly.

One of the issues that we have continually discussed within the ICO and, in fact, we have a meeting of the committee this afternoon, and this is one of our particular items—is that it is becoming evident to us that we must enlarge the area in which we are trying to look at to include activities such as, for example, the area of exploitation or engineering activities in the ocean which we have only recently tried to understand and have set up groups to pull the information out.

The more one expands this way the more one finds activities in other places.

I would say that again the Great Lakes is an area that I think we should include within our purview.

Mr. ASHLEY. To what extent has there been aquatic research going on in the Great Lakes in recent years that are sponsored or supported by the Federal Government?

Dr. MORSE. Well, within the Federal Government, I believe there is activity related to certainly the Public Health Service. I have a representative from the Public Health Service here, perhaps he could comment on their activities in the Great Lakes if he would take a moment.

Mr. ASHLEY. Give me just a general idea of the Federal agencies that are sponsoring or conducting work in the Great Lakes area.

Dr. MORSE. In the Great Lakes region there is work—Public Health Service I mentioned, Bureau of Commercial Fisheries, and the National Science Foundation are the primary other ones. I think there are activities, one that I happen to know about, where the activity in oceanography is leading back to activities that certainly are applicable to the Great Lakes—that is the use, for example, of merchant ships to carry observational packages to make observations.

This program is in ONR and, I believe, is planned to be extended to the Great Lakes to use the freighters on the Great Lakes to make observations as ships of opportunity.

Mr. ASHLEY. Are the Federal activities with respect to the Great Lakes tied together in any organizational way?

Dr. MORSE. Not within our organization. There is within the Federal Government none. There is, of course, at the University of Michigan the Great Lakes Research Institute, and I assume this is a vehicle through which the agencies do—

Mr. ASHLEY. In other words the activities that are going on are autonomous activities with various departments and are not tied together with appropriations from the various agencies and departments; is that right?

Dr. MORSE. Yes.

Mr. ASHLEY. Is there any kind of a center or headquarters for Great Lakes research at the present time?

Dr. MORSE. Not in the Federal Government. The Great Lakes Research Institute of the University of Michigan is one such institution that exists outside.

Mr. ASHLEY. And that is supported?

Dr. MORSE. This is supported by—I believe the Science Foundation supports these activities.

Mr. ASHLEY. Can you give us any idea of what Project Neptune is about?

Dr. MORSE. Well, Project Neptune is that ships of opportunity program which most of which has been devoted to the activities in the oceans and will be applied—extended—to the Great Lakes, although I am not sure that the title “Project Neptune” is appropriate to the Great Lakes. I do not know if Neptune resides there or not.

Mr. ASHLEY. To what extent does the fearful pollution situation that we are all becoming aware of with respect to the Great Lakes play a deterrent role in the activities of the Federal Government as far as the aquatic research is concerned?

Dr. MORSE. I think I would not feel competent to comment on that.

Dr. Krause is here. Could you make a couple of remarks relating to that? He is from the Public Health Service.

Dr. KRAUSE. Mr. Chairman, interest in the Great Lakes certainly that we have from the water pollution control point of view is that of a disposal area and the effects upon the Great Lakes as a disposal area for the residues of man's endeavors and its effects on health, fisheries, navigation, water uses for industry, and any other use—recreation—all of these things are, of course, of paramount importance.

This is a very large body of fresh water, and it is imperative that the knowledge is available to know what the ultimate fate of the materials commonly known as pollutants are when they enter these bodies of water.

For this reason it is necessary to know what the circulation patterns, what the biology and chemistry of the Great Lakes system is, and this, of course, is the reason why a rather substantial program has been inaugurated in an attempt to find out some of this basic information in the Great Lakes system.

Mr. ASHLEY. Mr. Chairman, I have just a final question or two. I believe, Mr. Secretary, that Mr. Abel is seated next to you.

Dr. MORSE. Yes.

Mr. ASHLEY. And I have in front of me a document prepared by Mr. Abel in June of 1963, "Aquatic Sciences in the Great Lakes Area."

The second paragraph in this introduction reads:

Increasing national and regional interest in the Great Lakes as one of our greatest natural resources has brought to the attention of Federal, State, and local authorities the urgency for an upgrading in research programs pertinent to the area.

There is an additional paragraph in which Mr. Abel states it is the purpose of this report to tabulate studies in aquatic sciences being prosecuted under Federal sponsorship for participating in this area.

That was in June of 1963.

I would like to ask Mr. Abel if he can tell us what has happened, particularly with respect to Federal activity in the research area having to do with the Great Lakes since that time.

Mr. ABEL. That particular statement, Mr. Ashley, was taken from a report of the United States-Canadian International Joint Commission.

As you say, that report and the statement is now 2 years old. We have with us the individual reports for this past year of the Bureau of Commercial Fisheries Laboratories, the Public Health Service, and a number of other laboratories who have been engaged in work up in that area sponsored separately by 11 Federal agencies.

In most cases it is recognizable from the reports themselves, and in some cases with the budget figures attached, that there is a considerable increase and effort by these agencies through their in-house laboratories or through privately sponsored university laboratories.

I think Dr. Krause can comment for the Public Health Service with—I think they have increased their own efforts in this area.

Mr. ASHLEY. Is there an increase in this area for coordination?

Dr. MORSE. Not in this sense, we have several instances of cooperation—with the Coast Guard, National Science Foundation, and Office of Naval Research sponsored laboratories have worked together.

Mr. ASHLEY. What is envisioned by Project Neptune? What is sought to be accomplished?

Dr. MORSE. This project tries to take advantage, as I understand it, of the on-going mission of commercial carrier vessels which are making transoceanic trips anyway.

The concept is that we can, by putting small portable oceanographic laboratories and some staffs on board, take advantage of the hulls being in position, so to speak, at any one time and then can take oceanographic measurements free of charge except for the subsistence of the people on board.

This particular committee has had hearings that brought out the project status to that date and some plans for the future.

The first mission was carried out last winter, I believe, on one of the American mail ships carried on with personnel from the Santa Barbara Laboratory, Office of Naval Research, particularly your own staff, Mr. Drewry and Captain Bauer, who entered very much into the work.

Mr. ASHLEY. Where is the evaluation with respect to the Project Neptune carried on?

Dr. MORSE. I believe this is outlined in your hearings conducted January 20, 1965, your serial 89-1, which was in itself an evaluation of the progress made to date by the chief scientist of the laboratory and a number of other participants.

Mr. ASHLEY. Do you foresee the establishment of any kind of headquarters for the Great Lakes where the aquatic scientific effort can be centered?

Dr. MORSE. I do not know of any plans in this direction at this time.

Mr. ASHLEY. Would it appear that this is desirable?

Dr. MORSE. We are always looking for better coordination of all of our activities. I personally am not that closely associated with plans and activities in the Great Lakes area to know whether any of them or any groups of them would benefit by closer ties to the others.

I suspect the easiest way to get at the answer to this is to ask the gentlemen who are concerned, such as Dr. Krause, concerning the nature of the cooperation with other agencies and whether they really believe anything more is indicated.

Mr. ASHLEY. I would like to have you comment on that, Doctor.

Dr. KRAUSE. Yes, there are plans for the development of a regional laboratory to be located at Ann Arbor at the University of Michigan under the Water Pollution Control Act, the purpose of which is to further the studies and to assist in the institutions in the area in their studies of the various facets of, particularly the water supply and water pollution control, as it affects the Great Lakes system. This certainly is in the works.

The aspect of interagency coordination, there has been a considerable degree of interagency coordination primarily through transfer of funds, this sort of thing, under what might be called a contractual relationship or agreements among the agencies to do certain portions of efforts deemed necessary to meet certain definite needs as of the moment.

This is a specific kind of need.

For example, relationships on this basis have been established with the Weather Bureau, with the Corps of Engineers, with the Bureau

of Outdoor Recreation, and a number of the other agencies along these lines, in the course of the studies now going forward in the Great Lakes system under the sponsorship of the Public Health Service at the moment.

Mr. ASHLEY. Mr. Chairman, I appreciate your courtesy and your indulgence.

Mr. LENNON. You go ahead, now, Dr. Clark said he could come back. So if you want to ask questions go ahead.

Mr. ASHLEY. You did mention, Doctor, that this was going to work with respect to the University of Michigan. Do you have any timing on that? What is the general program and the timing of the program?

Dr. KRAUSE. I am not exactly sure of the timing right at the moment. I can provide that for the record if you would like.

Mr. ASHLEY. I would appreciate that.

Dr. KRAUSE. All right, we will do that.

(Information to be furnished follows:)

STATUS OF MIDWEST WATER LABORATORY, PUBLIC HEALTH SERVICE, DIVISION OF WATER SUPPLY AND POLLUTION CONTROL

The Midwest Water Laboratory will be located on the north campus of the University of Michigan, at Ann Arbor. The building will have 50,000 square feet of floor space, and a staff complement of 150 people. The estimated cost of this facility is \$2.5 million.

General Services Administration is expected to advertise for construction bids in October 1965 with construction to begin approximately 2 months later. The laboratory is expected to be completed in May 1967. As of June 30, 1965, two full-time persons were on the staff in Ann Arbor; by July 1966, the Laboratory Director and a small complement of key personnel are expected to be in Ann Arbor and engaged in laboratory program planning.

Mr. ASHLEY. That is all I have, Mr. Chairman. Thank you.

Mr. LENNON. The representative on the ICO from the Department of Health, Education, and Welfare, Public Health Service, is Mr. or Dr. Harry G. Hanson.

Mr. ABEL. Mr. Harry Hansen.

Mr. LENNON. Is he here this morning?

Mr. ABEL. No; he is represented by Dr. Krause.

Mr. LENNON. Doctor, let me direct my question to you, the appropriation for 1965, to HEW for the oceanographic program was \$31½ million; is that right?

Dr. KRAUSE. For oceanographic for 1966?

Mr. LENNON. 1965, actual appropriations.

Dr. KRAUSE. Yes; I believe that is correct.

Mr. LENNON. And your budget request this year, which has been approved, is \$4.4 billion?

Now, Doctor, we are going to exercise a little legislative oversight. I assume that you are in charge of the expenditures of this particular fund appropriated to HEW for a national oceanographic program, right?

Dr. KRAUSE. A portion of that.

Mr. LENNON. I want for this record item by item, and category by category, the expenditures of your agency of this \$31½ million in fiscal 1965.

Now, that is not an unreasonable request. It is part of the oceanographic program. It may be that part of it was used in the Great Lakes area for your contractual relationship with the Corps of Engineers related to pollution, and so forth.

As a matter of fact, we are going to ask every agency before we get through to furnish us for the record an item-by-item, detailed account of the expenditures of the last fiscal year on the basis of their appropriations.

Then our staff can read it and have you gentlemen back next year, and we are going to check again as to how you are getting along on these programs.

Thank you, so much, I do not think that is an unreasonable request, we have the responsibility or are supposed to have it.

Thank you so much.

(Information to be furnished follows:)

PUBLIC HEALTH SERVICE EXPENDITURES FOR OCEANOGRAPHY, FISCAL YEAR 1965

I. OBLIGATIONS BY ACTIVITY

A total of \$3,230,000 was obligated for oceanographic activities by the three Divisions in the Public Health Service having programs in this area. The breakdown by activity and Division is tabulated below.

[Dollars in thousands]

Activity	Divisions			Total
	Environmental Engineering and Food Protection	Radiological Health	Water Supply and Pollution Control	
Research and training.....	\$1,025	\$75	\$1,405	\$2,505
Instrumentation.....	0	45	0	45
Surveys and investigations.....	0	30	650	680
Totals.....	1,025	150	2,055	3,230

II. PROGRAM DESCRIPTION

Programs conducted under these amounts are described below by activity and division involved.

A. Research and Training

1. *Extramural Grants.*—Federal grants-in-aid are used to support appropriate authorities, agencies, institutions and individuals in conducting research and related programs. Public Health Service grants are of four types:

(a) Research grants: Awarded to individuals for the conduct of basic and applied research projects.

(b) Training grants: Awarded to establish or expand training programs at educational institutions.

(c) Demonstration grants: Awarded to support investigations and studies of an applied nature, demonstrate the feasibility of new methods, evaluate application of research findings, and expedite incorporation of new knowledge into routine practice.

(d) Research fellowships: Awarded to individuals for support in specialized scientific training in institutions of their choice.

These grants are made in areas directly related to the agency's missions; some of the grants involve work in oceanography. The types and amounts of grants

in which oceanographic aspects were involved are listed below by Public Health Service Division :

[Dollars in thousands]

Division	Research grants	Training grants	Fellowship grants	Demonstration grants	Totals
Environmental Engineering and Food Protection	\$325				\$325
Radiological Health	75				75
Water Supply and Pollution Control	575	\$85	\$40	\$222	922
Totals	975	85	40	222	1,322

2. *Intramural research.*—A total of \$1,183,000 was obligated for oceanographic research. A description of research activity is indicated below by Public Health Service Division.

(a) Environmental engineering and food protection: A total of \$700,000 was obligated for intramural research by the Division of Environmental Engineering and Food Protection. These funds were spent for the following activities: Public Health Service shellfish sanitation research centers at Dauphin Island, Ala.; Kingston, R. I.; and Purdy, Wash., conducted studies on the fate of pathogenic organisms (including viruses) in estuarine waters and on the accumulation of suspended, colloidal, dissolved and/or radioactive pollutants by shellfish, with emphasis on pesticides and other toxic (to humans) materials and industrial wastes.

(b) Division of Water Supply and Pollution Control: A total of \$483,000 was obligated for intramural research by the Division of Water Supply and Pollution Control. These funds were spent for the following:

(1) Investigation of the characteristics of currents and tidal action and how these movements affect the distribution and fate of pollutants in near-shore waters;

(2) The assessment of how pollution affects water uses, e.g., aquatic life and recreation.

B. Instrumentation

A total of \$45,000 for instrumentation was obligated by the Division of Radiological Health for developing instruments for automatic measurements of water quality and for automatic meters used in estuarine waters.

C. Surveys and investigations

A total of \$680,000 was obligated for surveys by the Division of Water Supply and Pollution Control and the Division of Radiological Health. Activities conducted by these Divisions under surveys are described below.

1. *Division of Radiological Health.*—A total of \$30,000 was obligated for surveys in fiscal year 1965 for the following activities: (1) Sampling and analysis in harbors used by nuclear-powered vessels. These harbors were Cape Kennedy, Pearl Harbor, and San Diego Bay. (2) Evaluation of bottom sediments and suspended materials as indicators of radioactive contaminants in the vicinity of nuclear facilities. Areas surveyed were in the Columbia and Savannah Rivers.

2. *Division of Water Supply and Pollution Control.*—A total of \$650,000 was obligated for surveys and investigations of pollution in coastal and estuarine areas. Activities conducted by the DWSPC in this category are indicated below.

(a) Comprehensive studies: The Federal Water Pollution Control Act authorizes preparation of comprehensive water pollution control programs for river basins in the United States, in cooperation with other Federal agencies, State and interstate water pollution control agencies, municipalities, and industries involved. Comprehensive program development involving oceanographic activities were: Delaware Estuary Comprehensive Project; Chesapeake Bay-Susquehanna River Basins Project; and the Hudson-Champlain and Metropolitan Coastal Comprehensive Water Pollution Control Project. The programs included investigations of the effects of waste disposal on water quality in estuaries and coastal areas, water movements, marine biology, water quality conditions, and other aspects of the environment.

(b) Technical assistance: Technical assistance in the solution of a variety of problems is available to Federal, State, and local interests under authority

provided by the Federal Water Pollution Control Act. Technical assistance is being provided at the request of the Corps of Engineers to evaluate the possible effects on water quality that would result from the diversion of a portion of the Cooper River from the harbor at Charleston, S.C., to prevent excessive silting.

(c) Enforcement: Studies of pollution were made in two marine areas in connection with Federal enforcement activities. These enforcement activities were (1) the Washington State Enforcement Project and (2) the Raritan Bay Project. Oceanographic activities in the Washington State Project consisted of studies on pollution of the navigable waters of Puget Sound, the Strait of Juan de Fuca, and all estuarine waters and waters tributary thereto in the State of Washington. Studies were conducted to determine the dispersion, travel, and persistence of pollutants, the biological and chemical quality of the marine environment and its living organisms, and sources of waste waters discharged into the study area. In the Raritan Bay Project, among other things, water quality data of the bay were collected, industrial wastes characterized, dye releases studied and analyzed, and a report on shellfish as an economic resource prepared.

Mr. LENNON. This is a memorandum handed up to us from Mr. Caldwell of the Army Engineers and I think it relates to some of the questions that were propounded by you, Mr. Ashley, so, Captain, you hand it over to him and if you see anything in there you want to ask questions about.

Mr. ROGERS. Mr. Chairman, while he is reading that, may I say I appreciate the testimony of Dr. Morse, I think that he has been most frank with the committee in giving his personal views, I do think the ICO has been doing a good job under the handicaps they have set up for them, I think the information they have given the committee today has been most helpful and I appreciate it.

Mr. LENNON. Thank you. I do want to repeat, Doctor, that you give us suggested language for modification of H.R. 2218, and also speak to Dr. Hornig with respect to the suggestions, as we call them, because if we are going to encourage the private enterprise system who are engaged in oceanography and our people at the university and college level then it ought to be in an advisory committee because right now, under the reorganization act and under the Executive power of the President to establish in his Office, everything is government.

Is that a fair statement?

Dr. MORSE. Everything is what, sir?

Mr. LENNON. Government.

Dr. MORSE. Well, except for the President's Science Advisory Committee, which reports—which is not part of the Federal Council.

Mr. ASHLEY. I am advised that the U.S. Lake Survey District of the Corps of Engineers has approximately the same mission in the Great Lakes as the Coast and Geodetic Survey has in the ocean and that a lake survey has been established in cooperation with the other Federal agencies operating in the Great Lakes and that the Great Lakes data center has been or is being established.

What does that have reference to, Doctor? Are you familiar with that?

Dr. KRAUSE. Well, certainly——

Mr. LENNON. Will the gentleman yield at this point?

I wonder if you will address your question to the gentleman who passed up that memorandum.

Mr. ASHLEY. Fine, good.

Mr. LENNON. We do not want to hurry you, sir, but that is already the first bell. Come around and identify yourselves and answer the gentleman's question.

Mr. CALDWELL. Joseph Caldwell, I am Chief Technical Adviser of the Research Center of the Corps of Engineers. I passed the memorandum up to the counsel to clarify what was going on, I was not particularly asking to appear before the committee; I have been before the committee; I have been before the committee before and I do not mind coming up today. I wanted to clarify there is a coordination of agencies informally in the Great Lakes that the U.S. Lake Survey District has the responsibility for charting the Great Lakes, keeping up with the hydrology of the Great Lakes and making certain investigations into the limnology I think they would call it rather than the oceanography of the Great Lakes—that the Weather Bureau, the Coast Guard, I think I mentioned the Public Health Service also have a great interest in what is going on and there is quite a lot of cooperation and coordination between these gentlemen.

They have established a Great Lakes data center at Detroit, the Corps of Engineers operates the data center and everybody else pours in what data they have to the center.

In addition to that they have this coordinating agency or group which meets periodically to try to coordinate their efforts in the Great Lakes.

It is not a formal coordinating committee but one that has grown up to meet the need of keeping up with what each is doing.

On top of that we are cooperating with—I may get the name of this organization wrong, but it is the National Maritime and Engineers and Shipbuilders Association.

They are trying to—they want to build bigger tankers in the Great Lakes and the Coast Guard has to approve the bigger tankers, so they need additional data on which to base these things and the Corps of Engineers is obtaining wave data and the Weather Bureau is obtaining wave data and we are trying to work this out as to whether the Coast Guard will allow the larger tankers and other vessels to operate in the Great Lakes.

I thought I would like to add that if that is helpful.

Mr. ASHLEY. That is helpful, Mr. Caldwell, that is of considerable value in clarifying the questions I have with respect to what is going on in the Great Lakes.

Mr. CALDWELL. Yes.

Mr. LENNON. Thank you very much, I appreciate your being here.

We may send for you and give you a chance to appear again.

The committee will stand in recess until tomorrow morning at 10, and we will resume these hearings with regard to the legislation pending before this committee.

We will meet at 10 a.m.

The committee stands adjourned.

(Whereupon, at 12:20 p.m., the hearing was recessed to reconvene at 10 a.m., Thursday, August 12, 1965.)

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

THURSDAY, AUGUST 12, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:10 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Bob Casey, of Texas, presiding.

Mr. CASEY. The committee will be in order.

I am pleased to have our colleague, Congressman Van Deerlin, of California, present, who wants the privilege of introducing some of his fine people from California.

He also has, like most of us, more things than he can do, and he has to get on to another committee meeting, which we well understand. So, Congressman Van Deerlin, we are pleased to recognize you for the introduction of some of your California friends.

STATEMENT OF HON. LIONEL VAN DEERLIN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. VAN DEERLIN. Thank you, Mr. Chairman.

I know that the subject of oceanography is one that knows no bounds and certainly not the bounds of my home community. It just happens that in the hearings that you scheduled this morning you have called generously upon expert opinion from within my community and, therefore, I feel especially privileged to be able in advance of their several appearances this morning to present them on behalf of San Diego, Calif.

The first witness whom you are going to hear is Dr. John Clark, who speaks not for San Diego this morning, but for the National Association of Manufacturers. His firm has been making a study for the NAM in this very vital field.

You are going to hear from the new president of our chamber of commerce, Mr. James Gillean. He actually comes not from the city of San Diego, but from the city of La Mesa, but they regard him so highly they elected him president of the San Diego Chamber of Commerce anyhow.

With him is the chairman of our chamber's oceanography subcommittee, Fin Claudi-Magnussen. And also on the agenda are additional witnesses. One of them is Dr. W. M. Chapman, who speaks for Van Camp today, but who is 18 years a San Diegan.

You are also going to hear from an executive of the Westinghouse Electric Corp., J. H. Clotworthy. The company's studies in this field

have been profound already. Its interests are, therefore, also identified with San Diego, a rising center in the study of oceanography.

I know that San Diego has come to be identified with the development of aeronautics and space. This stems from the fact that we built the plane in which Lindbergh flew to Paris, and we built the missiles that put the first men into space.

I don't want you to be confused by this, to think that our limitations are established in the field. We are preparing also to probe the ocean's depths.

I thank you for making my excuses, Mr. Chairman. Your Texas colleague, Walter Rogers, is probably already wondering where his committee member is, so he can start a hearing on an FPC matter. I thank you for the privilege of appearing and I know you will give rapt attention to these expert witnesses from the community of San Diego.

Mr. CASEY. Thank you, Congressman Van Deerlin. We appreciate your introduction of your friends and constituents. Don't use me as an excuse to Congressman Walter Rogers. It probably will not stand you in good stead.

The first witness we will call this morning is Dr. John W. Clark, of the National Association of Manufacturers' Research Committee, the Subcommittee on Oceanography.

STATEMENT OF DR. JOHN W. CLARK, OCEANOGRAPHY SUBCOMMITTEE, RESEARCH COMMITTEE OF THE NATIONAL ASSOCIATION OF MANUFACTURERS

Dr. CLARK. Mr. Chairman, and members of the subcommittee, it is a real privilege to be here this morning and to present some thoughts on this important subject.

Mr. CASEY. We are pleased to have you, Doctor. We look forward to hearing you this morning. Go right ahead, Doctor.

Dr. CLARK. My name is John W. Clark. I am currently a consultant on ocean engineering in San Diego, as Congressman Van Deerlin has pointed out, and a member of the Oceanography Subcommittee of the Research Committee of the National Association of Manufacturers on whose behalf I am testifying today.

This testimony represents considerable work by this subcommittee. I do not wish to take too much individual credit for it.

For the past 2 years, until very recently, I was ocean engineering coordinator with Battelle Memorial Institute of Columbus, Ohio, and for the previous 8 years I was with the Nucleonics Division of Hughes Aircraft Co., where one of my responsibilities was the design, development, and construction of remote-control systems. One of these has been in use in offshore oilfields of California for almost 5 years.

At this point, Mr. Chairman, I would like your permission to enter the written testimony in the record and would like to simply summarize some of the highlights of this testimony for the members of the committee.

Mr. CASEY. That will be fine, Doctor. We will enter your statement and you can summarize it.

(Document referred to follows:)

STATEMENT OF JOHN W. CLARK OF BEHALF OF THE NATIONAL ASSOCIATION
OF MANUFACTURERS

My name is John W. Clark, currently a consultant on ocean engineering and a member of the Oceanography Subcommittee of the Research Committee of the National Association of Manufacturers on whose behalf I am testifying today.

For the past 2 years, until very recently, I was ocean engineering coordinator with Battelle Memorial Institute of Columbus, Ohio, and for the previous 8 years I was with the Nucleonics Division of Hughes Aircraft Co., where one of my responsibilities was the design, development, and construction of remote-control systems. The Well-Head Manipulator or "Robot," which was developed under my direction for one of the oil companies, is an example of an underwater remote-control system. It has been in use in offshore oilfields for almost 5 years.

My appearance here today is to express the association's views in favor of H.R. 9064 by Representative Paul Rogers and others, which would establish a 15-member study commission, and in opposition to the other bills before this subcommittee. We take this position in spite of our sense of the urgency of developing the ocean's resources. We feel that a greatly expanded effort by both industry and Government is justified; but we do not wish to see this expansion handicapped by premature establishment of a new coordinating or administrative agency. This is particularly true in view of the fact that well over half the current expenditures in the ocean come from private resources. After a study in depth of the nature and direction of future efforts in the ocean, we will be in a position more adequately to judge the type of legislation that will meet our needs.

For a number of years this country has had, and continues to have, an oceanographic program which is planned and coordinated by the President through the Interagency Committee on Oceanography of the Federal Council for Science and Technology. The membership of the committee includes nine Federal Bureau chiefs representing all agencies of the Government with responsibilities in oceanography.

The broad goal of this program is:

"To comprehend the world ocean, its boundaries, properties, and processes, and to exploit this comprehension in the public interest, to enhance our security, culture, international posture, and economic growth."¹

The National Association of Manufacturers Oceanography Subcommittee has been investigating the diverse field of oceanography and its implications for the future benefits to our Nation and mankind. Our concern covers the broad area of what we have termed "ocean-related business"—defined to be any business whose income is directly or indirectly derived from operation in the ocean but exclusive of shipping, operations of the surface Navy, or those concerned with rivers, harbors, or marinas.

We find that, on a cash flow basis, less than 40 percent of the business was derived from Government expenditures and more than 60 percent was commercial in nature during 1963. We estimate that percentage-wise there has been little change since.

In the Government area the largest part is accounted for by the Navy's anti-submarine warfare (research, development, test and evaluation) program and much of the remainder is planned and coordinated through the Interagency Committee on Oceanography. The latter's program is well documented in its annual report.

The commercial business directly concerned with oceanography is heavily concentrated in this country in operations of the oil and gas industry and the fishing and byproduct industry. Only about one-tenth is currently generated through production and research for other minerals and recreational activities.

While the total business generated from oceanographic operations, as defined, is somewhat less than \$2 billion annually and about 40 percent of the total involved in space exploration, its rate of growth—estimated at 15 percent per year—is greater than that of the space program.

It should be pointed out that one strong motivation to develop the ocean is purely economic. The ocean is potentially a source of raw materials: minerals, oil and gas, food products. Increasingly, these will be obtained from oceanic sources at less cost than from land sources. Some of the actions needed before really effective development of the ocean's resources by private enterprise are discussed in the following paragraphs.

¹ ICO pamphlet No. 17, January 1965.

We also find, that despite the increased attention to oceanography, there continue to be various handicaps to greater exploitation and development. There is insufficient exploration and mapping data, even with respect to the Continental Shelf. There is a lack of detailed engineering information with regard to particular areas. As a nation, we have not developed the technical knowledge for site occupation, improvement, or development, nor the skills for the manual operations that will be required. There is inadequate dissemination of the vast amounts of basic oceanographic scientific information which have been collected and developed over the years. Ocean-tested equipment and instrumentation is still largely in the developmental stage and underwater transportation and communication leave much to be desired.

The above-mentioned technical obstacles will be solved, in large measure, through the efforts of industry, Government, and institutional research. However, resolution of the fundamental problems in the legal area will be determined, primarily, through various Government procedures. These problems include the formalization of the limits of U.S. sovereignty and the clarification of State versus Federal rights; mechanisms for obtaining land titles and mineral rights; the status of patents under Government research contracts; and the development of safety standards, insurance coverage and regulation.

These hearings, and the number of bills that have been introduced are ample evidence that Congress also is concerned with the current status and the prospective future progress of our efforts in oceanography. Nevertheless, none of the bills before you provides guidelines for creating the governmental administrative and regulatory structures, now lacking in the legal area, which would facilitate and encourage the development of the ocean's resources.

The fact that the Nation does have a large and growing program, both governmental and private in ocean-related business should be carefully considered. The haste with which we embarked on the governmental space program is not appropriate in oceanography where major efforts are already underway. The vast amounts of capital, research, and manpower that were a necessity before that first giant leap into space could be accomplished are not required in oceanography, where, as new knowledge is gained, we proceed step by step. Further, by contrast with the situation in oceanography, there was practically no economic incentive in space exploration and development; Government provided the capital and direction exclusively for defense and national prestige purposes.

We conclude, therefore, that enactment of H.R. 9064, which provides for a study commission with equal representation from government, industry, and research organizations participating in oceanographic work, is the logical approach to the development of a sound long-range program.

Dr. CLARK. I would like to bring out a few key things that have emerged from this study.

The first point is that ocean-related activities are much bigger than is commonly realized. I believe it is correct that the interests of this committee concern all aspects of the ocean's resources, the development and exploitation of these for the benefit of the country as a whole. And if one defines his interest in this way and attempts to identify business activities in this context, he finds a total of almost \$2 billion annually spent in these activities.

I have made my own definition of what is and what is not included in these figures. This does include the oil industry, the mining industry, the fisheries industry, and a part of the Navy's antisubmarine warfare expenditures, that part concerned with work in the ocean's depths. It also includes the scientific aspects of oceanography.

This figure does not include shipping and the merchant marine, as normally thought of, nor does it include rivers and harbors, and activities of this type.

To put it differently, the topic of my discussion is activities associated with the utilization of the ocean's depths as distinct from the ocean's surface.

As I said, this figure is nearly \$2 billion. It is actually about \$1.7 billion. The major elements of it: A half billion dollars for oil and

gas, four-tenths of a billion dollars for fisheries, about four-tenths billion for the relevant part of antisubmarine warfare, \$140-odd million for the national oceanographic program as we have heard repeatedly in these hearings, and a little under \$100 million for activities relating to minerals. This is hard minerals as distinct from oil and gas, and a few other scattered activities give the total of about \$1.7 billion.

My point is that this is already an activity of considerable magnitude. It is also an activity of rapidly increasing rate. In some sectors the rate of increase is almost 15 percent annually.

One might ask why this rather large activity on the part of business, science, and Government. There are three motives, and this is nothing new, but it needs to be said in the interest of clarity.

The first motive for interest in the oceans is economic. The oceans are a source of raw materials, natural resources of many kinds. And when consideration of cost indicates that it is more effective to develop a given resource from the ocean's depths than to obtain the same resource from the dry land, industry will move into the ocean to get it, and it is that force which is at work already.

The second motive for being interested in the oceans is military. They form our outermost frontier, as is evident to all.

And the third motive is the purely scientific interest in learning more about this 71 percent of the planet.

In my discussion this morning I would like to emphasize the economic motive, not with any lack of recognition of the importance of the other two, but speaking on behalf of the National Association of Manufacturers it is natural that our interests are directed primarily toward economic motivation and economically oriented activities.

With this in mind, we find that there are three distinctly different sorts of things needed to encourage private investment and private enterprise to move into the oceans even more actively than they are already doing.

These three activities are distinctly different in kind and I would like to identify them below:

The first is legal. This has been mentioned briefly in the earlier hearings, but it needs to be looked at very carefully. In this context we are referring to the administrative and the regulatory aspects of legislation. We need clearcut guidelines to put it simply. To whom does one go to drill a hole in the ocean if he wants to do so? To what county courthouse does he turn to stake his claim to a certain area?

It is most important that in developing one resource, one does not inadvertently handicap the development of another. A clear administrative structure is needed above and beyond the excellent steps which are already in progress.

In parallel with this is a need for regulatory action to control the safety of personnel, the assurance of the ownership of patents and many other aspects of ocean operations.

The map on the stand at the side of the committee room dramatically demonstrates the magnitude of what we are talking about. The bold red outlines which indicate the Continental Shelves indicate about a million square miles of territory which contains some riches already

known in terms particularly of oil and gas, and of manganese, other riches which one can only conjecture.

The Geneva Convention of 1958 granted to the United States the privilege and the duty of developing this area. One of the prerequisites to the development of any area is a structure which permits the orderly and well-planned development of this by private industry, since insofar as we are talking of the discovery, the development and the utilization of natural resources, this is done in very large part by private industry.

The area is even larger than the map indicates, since the Geneva Convention also states that the sovereign nations have the right and the duty to develop resources beyond their adjacent Continental Shelf to any depth at which they are technologically capable of operating, and this at present is a limit not too well defined, but certainly extending far beyond the 200 meters water depth indicated on the chart.

The second area in which additional effort is needed is in development of ocean engineering data. It is useful to make a distinction between engineering data and scientific data, in spite of the fact that the borderline is somewhat cloudy.

Engineering data needed to perform useful work in the ocean. They cover such matters, for example, as the nature of the soil on the bottom. It is vital to know whether a particular spot is soft and silty or hard and rocky, to give a very simple example, before one can even contemplate exploiting it in any detailed way.

One needs to know a great deal about methods of working in and near the ocean floor, because it becomes more and more clear that a great deal of the actual development of the ocean's resources will be done in the ocean itself rather than from vessels which float on its surface.

The data needed are collectively referred to as engineering data since their motivation is to enable the performance of useful, economically productive work. The obtaining of the data may be technically extremely demanding, and they do not in and of themselves come out of scientific studies.

A great deal of the engineering data and knowledge required are already being generated by those private concerns which are active in the ocean. But on careful study one can find a few examples of engineering problems whose scope is so great or whose complexities so diffuse that it is more appropriate to seek a governmental rather than an industrial source for them.

Most importantly, while there is considerable activity in ocean engineering, there is at present almost no central focus for it, and it is rather difficult and time consuming to discover what is known and what is not known.

The third leg of this triangle is the scientific knowledge of the ocean. It is to this point that the earlier testimony has primarily been directed before this subcommittee. It is vital to any corporation or any individual who contemplates a business venture in the ocean that he have good scientific data about its properties and its performance. He does not always want the same data that a scientist wants, and this has given rise to some problems on occasion.

The point which is being brought out here is that these three needs—the legal, the engineering, and the scientific—are all equal. One must

have all of these. One must be careful not to let one outweigh the other in the attention and the quality of work devoted to it.

For these reasons, and as a result of careful consideration of the activities in the ocean currently and of the numerous legislative proposals that are under consideration, we of the National Association of Manufacturers Subcommittee on Oceanography support Representative Rogers' bill, H.R. 9064, because of the need to bring the three aspects of oceanic development—the legal, the engineering, and the scientific—into perspective, and to make sure that all are being properly developed and to make sure that the present and the probable potential needs of the business community, the scientific community and of the Government, are all properly considered.

The membership of this proposed Commission, to be drawn equally from Government, from academic circles, and from business, should accomplish these ends.

That completes my remarks, Mr. Chairman, and again I thank you for the privilege.

Mr. CASEY. Thank you, Doctor.

Mr. Chairman, do you have any questions of the Doctor.

Mr. LENNON (presiding). Doctor, I note your prepared statement, in the third paragraph thereof, where you say:

We feel that a greatly expanded effort by both industry and Government is justified; but we do not wish to see this expansion handicapped by premature establishment of a new coordinating or administrative agency.

Now, there is only one of these bills that is before the committee, and that is the bill from the gentleman, Bob Wilson of California, that would actually establish by statute an administrative agency comparable to NASA.

Dr. CLARK. That is correct.

Mr. LENNON. Do you think any of the other bills, other than the four bills that you support—including the one from the gentleman from Florida, Mr. Rogers; Mr. Downing introduced a comparable bill; Mr. Reinecke, I believe, did; and one other member.

Now, other than those five bills, do you think there is anything in these others that would handicap or would result in the premature establishment of a new coordinating agency?

Dr. CLARK. No, sir.

Mr. LENNON. That is exactly what I did not understand by your general statement, that we do not wish to see this expansion handicapped by a premature establishment of a new coordinating or administrative agency.

So, your opposition then, as I understand it, would be related to the bill introduced by the gentleman from California, Mr. Wilson, that would establish the administrative agency?

Dr. CLARK. Right.

Mr. LENNON. Referring again to your statement, on page 4, in the second paragraph thereof, and I shall not quote you verbatim, but summarize. You say that these hearings and the number of bills that have been introduced are ample evidence that Congress is also concerned with the current status with respect to the progress of our efforts in oceanography.

The part that follows I will quote :

Nevertheless, none of the bills before you—
meaning the committee—

provides guidelines for creating the governmental administrative and regulatory structures, now lacking in the legal area, which would facilitate and encourage the development of the ocean's resources.

In other words, none of these bills, and I think there are about 17 of them, in your judgment would provide the guidelines for making the governmental structure now lacking. Is that your sentiment?

Dr. CLARK. That is correct.

Mr. LENNON. All right, sir. Do you think that we should have legislation that would provide the guidelines for creating the governmental, administrative, and regulatory structure that would facilitate and encourage the development of ocean resources? Do you think we should have legislation that would obtain that objective?

Dr. CLARK. This moves a little out of my personal field of knowledge as I do not presume to tell you gentlemen what should be legislation and what should be otherwise.

Mr. LENNON. I appreciate that, but I would not resent it at all if you said, "In my judgment, here is a work draft of a piece of legislation that, as a scientist and an engineer speaking for the National Association of Manufacturers, which have a great interest in this field," that we think would obtain the objectives that you say ought to be obtained in the language that I have just quoted from your statement, and let us take a look at it.

Now, would such legislation provide for the establishment of an administrative and regulatory agency? That is what you say it should do. Now, how would you go about doing that unless you took something of the nature of the legislation suggested by Mr. Bob Wilson, of California, in his bill?

Dr. CLARK. This was not intended to be implied by these words.

Mr. LENNON. I would like for you to say what you have in mind when you say that none of this legislation would obtain the objectives that you think ought to be obtained.

I guess you are referring to the four bills that are identical with the one introduced by Mr. Rogers. Those, too, would not get the objective you seek, you say. Is that right?

Dr. CLARK. This is correct.

Mr. LENNON. All right. Now, we will use the type of bill you think would. Let us not come up here—"I do not agree with this."

Now, we are talking about the Federal agency, too. We do not agree with this, we do not agree with this, we do not agree with this, we certainly do not agree with that. But you come up with no alternative, no draft legislation that we can analyze and apply our practical judgment to these things.

Now, you take a few minutes now, Doctor. You have given a lot of thought to it, and tell us the type of legislation you think we ought to get and have and get the objectives that you say we must obtain.

Go ahead. We will listen to you now.

Dr. CLARK. This is precisely why we feel that this commission is required. We have spent among the people concerned with this a good deal of time attempting to do exactly what you ask—draw up

draft legislation which could be discussed and criticized and improved.

The problem proved to be far too complex and too difficult for this straightforward approach. One of the objectives of the proposed commission would be to do precisely this task, after weighing with considerable care the conflicting demands of the interests involved.

So, I agree with you completely, sir, that we do not wish to be negative, but we wish to be positive and creative. But we also wish to recognize the magnitude of this task and not proceed prematurely to draft legislation.

Mr. LENNON. In other words, you say in your statement there is no hope through legislation at this time to obtain the objectives that you say are needed, that we are going to have to study this thing for at least a year or two?

Dr. CLARK. This is correct.

Mr. LENNON. Through a commission established by legislation. Then let that commission analyze the findings of their subpanels and committees and then come up with a recommendation.

Dr. CLARK. Right.

Mr. LENNON. What do you think of the method that is now being used by the Federal Council, and then down through the ICO, Doctor?

Dr. CLARK. Well, first, I want to add my compliments to those of others to the work of the ICO itself, to Dr. Abel and his people.

Mr. LENNON. The ICO you are talking about?

Dr. CLARK. Right, in turning out very valuable information to those of us who work with the oceans.

Mr. LENNON. But you say in your statement, as I read it, that none of this information is available. You complain that the data and the information secured is not available.

Now, I was under the impression that we did have a data center.

Dr. CLARK. Right.

Mr. LENNON. That is a center from which oceanographic information which certainly from the Government was funneled into—which did not have a national security connotation, which was available to the industry and to the public, too.

Dr. CLARK. Right; this is scientific data. And my complaint is concerned with the engineering data which are simply not under the assignment of the ICO and its associated organizations.

Mr. LENNON. Now, what agencies of the Federal Government are engaged in or concerned with the engineering data? The Corps of Engineers is, for one, I would think.

Dr. CLARK. Right.

Mr. LENNON. Now, what other agencies? How about the Coast and Geodetic Survey?

Dr. CLARK. Very much so.

Mr. LENNON. They are?

Dr. CLARK. They are concerned; so is the Bureau of Mines.

Mr. LENNON. Is that data available?

Dr. CLARK. Their data are available insofar as they are funded to obtain them.

Mr. LENNON. I am sorry.

Dr. CLARK. Their data are available insofar as they are funded to obtain them—engineering-oriented information.

Mr. LENNON. Well, now, let us assume that established in the Department of Commerce, the environmental sciences under Dr. Hollomon, and they have now let a contract, relatively small, for a survey of the Continental Shelf.

Will not that data be available to industry?

Dr. CLARK. Yes, sir, available and useful.

Mr. LENNON. And that is related to engineering, that is what we are speaking about now?

Dr. CLARK. Right.

Mr. LENNON. Will not subsequent data secured by ESSA—will not that be available to industry?

Dr. CLARK. Right. Yes, sir.

Mr. LENNON. How would you propose, then, that engineering data obtained by an agency of the Federal Government be handled other than the way it is now being handled?

Dr. CLARK. The NODC, in particular, the National Oceanographic Data Center, is extremely effective.

Mr. LENNON. Is what?

Dr. CLARK. Is extremely effective.

Mr. LENNON. You say it is?

Dr. CLARK. Right. But what has been lacking, and I exaggerate just a little to make my point—

Mr. LENNON. Yes, please.

Dr. CLARK (continuing). Is a clear mistake, a charter, that data which are needed for engineering purposes as distinct from scientific amassment of knowledge, is a proper concern of these Government agencies.

Mr. LENNON. Well, do you not think when there was established in the office of the Department of Commerce, the Department of Science and Technology, that that was an objective step in the direction that we seek, sir?

Dr. CLARK. Yes, sir.

Mr. LENNON. I think it has been delayed—I am sorry, it has just been started, but nevertheless it is there.

Now, in the Department of the Interior they have a little different mission. I am talking about outside of the Marine Fisheries, Commercial, and Sport Fisheries. They are interested in also the Continental Shelf and the resources of the sea bottoms.

Is not the information that they secure available—engineering and otherwise—to the public at large unless it is related to matters concerning national defense?

Dr. CLARK. Yes, sir, completely.

Mr. LENNON. I would like to see, and I know counsel would like to see, a draft of what you think we ought to do to get the objective you say we have not obtained. You think we cannot do it, you think we have to study it a couple more years.

We have been at this thing now since 1959 and we have been waiting for folks like you to come up and bring this draft legislation that you think, representing industry, would obtain what we all seek to obtain: a broader spectrum of knowledge of scientific and engineering data.

Mr. Mosher?

Mr. MOSHER. Doctor, you testified in favor of the Rogers bill. As I remember Mr. Rogers' bill, it provides for a commission and investigation and study and recommendations.

As you conceive of the work of that commission, how would it differ from and go beyond the work of this committee? How would you distinguish the type of mission that you would assign to that commission and the mission that very obviously this committee feels that it has?

Dr. CLARK. That is a question I must admit I had not thought about. I think one difference is a matter of how much individual time the commission members could devote to amassing data and analytical work.

Mr. MOSHER. I would expect you to say that perhaps the commission could be useful to this committee because it would have more specialized skills represented on it and more time, but its mission would merely augment and be supplementary to the work of this committee.

Dr. CLARK. Precisely, and it would be thought of as an arm of this committee, or very nearly.

Mr. MOSHER. I would have expected Chairman Lennon to ask you what your objection is to the bill that he introduced.

Mr. LENNON. Will the gentleman yield to me?

Mr. MOSHER. Yes.

Mr. LENNON. I was taking too much time, but I will come back to it.

Mr. MOSHER. I will defer to the chairman.

Mr. LENNON. You go ahead and finish, and I will come back.

Mr. MOSHER. I will just ask him then, that is the only question I had in mind. What are your objections to the Lennon bill?

Dr. CLARK. I have no strong objection to any bills other than this monolithic agency-type of bill. More especially, I favor a bill to undertake the broad gage study and analysis.

Mr. LENNON. Now, will the gentleman yield to me at that point?

Mr. MOSHER. Yes; but I wanted to suggest that on the first page of his prepared testimony, you say you appear in opposition to Mr. Lennon's bill. I just wondered what the opposition is? I do yield, sir.

Mr. LENNON. Doctor, do you know the chronological history of the hearings of this committee and the legislation it has reported out relating to oceanography?

Dr. CLARK. Not in detail.

Mr. LENNON. And the inability, even after we reached a consensus, with all of the agencies of the Federal Government, after a pocket veto of the bill, then the Senate did not act.

Now the bills that the gentleman just referred to, 2218, 3310, and 3352, by members of the committee. Those bills are identical. They do have the support of every agency of the Federal Government from the Executive Office of the President on down.

Now, having unqualifiedly endorsed the bill, 9064, and its companion bills introduced by Mr. Reinecke, Mr. Hanna, and Mr. Downing—I know you are familiar with these—I wonder if it would not be possible to amend section 4 of the bill 2218, referred to sometimes as the "bill I introduced," and make it conform with the provisions of the Rogers bill, 9064, which would, in fact, create a commission and would direct—not authorize—the President to appoint a committee, as my

bill does, consisting of not less than seven members, but directing the President to appoint a commission of 15 members, 5 representing Government, 5 representing industry, and 5 representing—I believe Mr. Rogers—the university laboratory level, and let them, independent of the provisions—the other provisions of 2218—make the study and make the recommendation?

Now, I see the necessity if we are going to get any legislation in this session, either in the earlier months of the next session, that there is going to have to be a give-and-take. If the Senate insists on the passage of its bill, 944, my judgment is we will wind up perhaps with another pocket veto.

So, I am seeking here—I am disappointed that we did not get our bill through 2 years ago, and then take a look to see what has been accomplished. I am just tired of studying this thing and studying it.

Dr. CLARK. Right.

Mr. LENNON. What would you say about that? If we could take a combination of the bill introduced by Mr. Rogers and the others, a combination of the bill introduced by Mr. Pelly of this subcommittee and Mr. Bonner of the full committee, and myself.

Now whether or not we would then run into the objections of the Executive, I do not know. That is something we will have to determine at a later date. How do you feel about such a legislation as that?

Dr. CLARK. I would be very much in favor of it.

Mr. LENNON. Do you basically disagree that the fundamental authority respecting oceanography at least for the next year or two ought not to be lodged in the Executive Office of the President?

Dr. CLARK. I do not understand your question, sir.

Mr. LENNON. I said, do you object to the philosophy as it is now, for the basic tenants of oceanography to be lodged in the Office of the President, through the Federal Council?

Dr. CLARK. No.

Mr. LENNON. You do not?

Dr. CLARK. No.

Mr. LENNON. Then you think you can agree with what I have in mind?

Dr. CLARK. Yes; I can agree.

Mr. LENNON. Mr. Rogers?

Mr. ROGERS. Thank you very much, Mr. Chairman.

I do not see that there is anything wrong with what the chairman is saying. I do not see any conflict between the Commission and the bill that you have introduced. I think it might be a very good solution.

I have been impressed by the fact that the testimony we have heard to date shows a very definite need for a study to be made, as you have endorsed in your statement.

For instance, the Commerce representative came up and said he wants two corps created in Government to do it. Then the Navy came up and said, we do not really agree with that. We do not think Commerce should take over in this area. We can do it.

Then Dr. Hornig, the President's Science and Technology Adviser, he says, "No; we need a study and I am doing it myself, and I am not

going to study everything that needs to be studied," so I think it has been pointed up that we really need a study and I am delighted to see your organization come out and say so. But certainly in line with what the chairman had said, there is no reason why the study cannot go along concurrent with the development of the program that the chairman has suggested, so that we have a basic setup and some legislative direction which certainly is needed and has been pointed up, too.

Now, the Senate bill, of course, has, as I recall, reported out a National Council, which the executive department is against, and they have testified, but it also includes a Commission study which I was glad to see.

So I think we are not too far apart in our thinking on what needs to be done. I want to commend you and your organization for bringing to the committee your statement saying that you know that something needs to be done, but before we jump into some big agency or something, we want to know where we are going and what needs to be done.

So, I would say along with the chairman that certainly there is no reason why something cannot be worked out, incorporating the Commission to make the study and also incorporating some legislative language setting up a program and directing it to the committee in Congress which can help the oceanography program.

So I want to commend you and your organization for your very fine statement and the position you have taken and I think we are going to need the help of industry, which you say is now expending about 60 percent of the funds in an effort where the Government is doing only about 40 percent, and I think it is important to the advancement of oceanography that this partnership continue.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Rogers.

Mr. Reinecke?

Mr. REINECKE. Thank you, Mr. Chairman.

I, too, would like to thank Dr. Clark for bringing, I think, several interesting and important points. One Mr. Rogers has just mentioned, that industry has been, in fact, the predominant factor in this to date, and certainly the experience to date has shown that private industry and private enterprise will do more about research than the Government systems a lot faster and less costly.

And I think the hearings we have heard to date have not investigated the need for the ocean engineering aspect of this field, and have not investigated the free enterprise participation.

I am in full accord with what Mr. Rogers has just said. Another point you bring out here about the legal determination, this could very well shape—and I would like to get your comment—it could very well shape the structure of the interadministrative organization, whether it is a NASA-type, a Council or whatever, and we would be hasty to jump at this point and form an organizational body without knowing what the legal ramifications are.

We could do a great deal of disservice, I believe. Does this sound reasonable?

Dr. CLARK. Yes; this is very well put. To restate it again, we are trying not to be negative, we are as eager to see these endless studies terminated as anyone else, but we do not want to see premature decisions made that may shape favorably or unfavorably the whole direction of the ocean's development.

We particularly want to see very careful thought given to legislation which will encourage private industry to move even more aggressively than it already has.

Mr. REINECKE. I thank you, Doctor.

Mr. Chairman, I do not have any further questions.

Mr. LENNON. Thank you, Mr. Reinecke.

Mr. DOWNING. We are delighted to have you because of your great interest in this.

Mr. DOWNING. Thank you, Mr. Chairman.

I want to thank Dr. Clark, too, for his appearance today and his contribution to this legislation.

In your prepared statement you say :

Our concern covers a broad area of what we have determined ocean-related business.

Then you go on to say :

We find that on a cash-flow basis less than 40 percent of the business was derived from Government expenditures and more than 60 percent was commercial in nature during 1963.

Would you mind developing this concern a little further? Are you saying that the Government should spend more and industry less, or what is the point you are getting at there?

Dr. CLARK. I am not actually saying that anyone should do anything at this point. I am simply pointing out the topic of discussion, defining the subject of the discourse.

Mr. DOWNING. In other words, you are not concerned about it. You are just pointing it out?

Dr. CLARK. Right.

Mr. DOWNING. Thank you very much, Dr. Clark.

Mr. LENNON. Mr. Casey?

Mr. CASEY. Doctor, in your studies, of course, there is one thing that you mentioned that is in the Geneva agreement, that is in the process of being ratified.

Dr. CLARK. It has been ratified.

Mr. CASEY. It has, which gives the countries the development of mineral resources. Is that not correct?

Dr. CLARK. Yes, sir.

Mr. CASEY. And as far as they are able to operate, whatever depth limit? Have you made any study of what Russia—whether Russia is contemplating a project similar to our project?

Dr. CLARK. As far as has been published, I have access to only open literature data concerning the activities of the Russians, there is no project comparable to our project contemplated by these people.

Mr. CASEY. Have you heard of a possible program, say, in the Black Sea? I think that they are contemplating that. That might be in that category—may not be as deep a water, but in that category.

Dr. CLARK. No, sir.

Mr. CASEY. You have not?

Dr. CLARK. No, sir.

Mr. CASEY. Thank you.

Mr. LENNON. Mr. Counsel?

Mr. DREWRY. Dr. Clark, when we first heard from Mr. Trussell of the interest of the National Association of Manufacturers in appearing, it came at least to me, as a surprise that the NAM had a committee on oceanography. How long has that been in being?

Dr. CLARK. Just over a year.

Mr. DREWRY. A little over a year.

In your statement—even as you are calling for a new study—you indicate that you have done quite a bit of studying and have put your finger on a large number of areas, specific areas that need to be treated, which would indicate to me that the National Association of Manufacturers is pretty deeply into this subject and possibly will continue to be.

What I am getting at is, with this developing interest in industry on an organized basis that in your own way, as a very effective organization, you will be doing just what you are asking that there be done already, and you certainly have no slowness about coming to Congress to express your views.

I really just wanted to make that observation, because I think that in the short time—only a year—you have been with the association, your presence would indicate that the association is bearing down on this subject. So maybe this desirable natural program can be conducted with a more lively, active, continuing interest in tandem with a commission type study while that special group looks into further range aspects of the big problem.

Dr. CLARK. This is certainly true.

Mr. REINECKE. Mr. Chairman?

Mr. DREWRY. Yes, sir.

Mr. REINECKE. Perhaps this is a good example of where they will act far faster than the planned economy of the Government. I would like to subscribe to your remarks along with that.

Mr. DREWRY. That is all, Mr. Chairman. I simply wanted to express that thought.

Mr. LENNON. Dr. Clark, I want to express my appreciation to you and your organization for the responsive interest the industry is showing in this overall problem.

Thank you for your statement.

Our next witness is the vice president of the Westinghouse Defense & Space Center, and general manager, underseas division, J. H. Clotworthy.

Is that Dr. Clotworthy?

Mr. CLOTWORTHY. No, sir.

Mr. LENNON. It generally is at that level.

You may go right ahead. Anyone accompanying you whom you would like to have sitting with you?

Mr. CLOTWORTHY. I do not believe so, sir.

Mr. LENNON. Thank you, go right ahead.

**STATEMENT OF JOHN H. CLOTWORTHY, GENERAL MANAGER,
UNDERSEAS DIVISION, VICE PRESIDENT, DEFENSE AND SPACE
CENTER, WESTINGHOUSE ELECTRIC CO.**

Mr. CLOTWORTHY. Mr. Chairman and members of the subcommittee, I am John H. Clotworthy, vice president of the Westinghouse Defense & Space Center in Baltimore, Md., and general manager of its underseas division.

Westinghouse has long experience in the development and manufacture of underseas weaponry and electronics equipment and is a major contractor to the Navy for the Polaris program. In recent years, Westinghouse has embarked on a far-ranging ocean engineering program that includes a family of manned submersibles—the first of which will soon be commissioned—oceanographic sensing equipment, advanced underwater breathing equipment, bottom-scanning sonar, and commercial fishing systems.

Westinghouse Electric Corp. is also a major builder of desalinization plants throughout the world. I appreciate this opportunity to appear before your subcommittee and to discuss a national ocean program and its importance to industry and the Nation.

I am speaking today not as a scientist, but as an engineer and a businessman. My oceanographic affiliations consist of being a founding member and currently chairman of the financial committee of the Marine Technology Society. I have for 5 years been a member of the National Security Industrial Association's Anti submarine Warfare Advisory Committee, and was chairman of the ad hoc committee of NSIA which last year prepared a study and a recommended program titled "A National Ocean Program." This was March 1964, and copies of this report were distributed to the Congress.

Several vital factors must weigh heavily in determining the Federal role in a national ocean program. And each of these factors must, in the end, support our national goals. World politics, the national economy and public attitudes are prime considerations, but each and all of these factors hinge upon our scientific and technical effort in the ocean.

No nation holds guaranteed dominion over the seas. Yesterday it was Great Britain, today the United States, and tomorrow perhaps someone else, unless we are ever vigilant of our commitment to progress. The advent of Polaris and accelerated antisubmarine warfare efforts have clearly marked the sea as an area of utmost strategic importance and, because of shifting world politics, perhaps our only long-term deterrent stronghold. But other nations are challenging our leadership.

As noted by Representative Rogers several weeks ago, the development of new unmanned merchant marine vessels by the Soviets and their supremacy over domestic fisheries offers lucid evidence of that challenge. Our commitment to assist other nations in building general technological competence further binds us to maintaining a role of leadership.

The economic benefits of a national ocean program have been well documented. For example, a recent report of the National Academy of Sciences entitled "Economic Benefits From Oceanographic Research" presents a detailed schedule of beneficial projects and their

attendant costs. And, I might add, they are presented in a manner that is very attractive from the businessman's point of view.

A major thrust into the ocean could be expected to become a recognizable element in our gross national product and help to satisfy the future need for new employment opportunities in both the professional and labor markets.

The national economy has become increasingly dependent on imports from sensitive areas of the world because of a depletion of certain of our domestic resources. And the implications here—in an era of possible major conflict—must not be understated. In short, the revitalization of our resource recovery industries should be a national goal of the highest priority and can be accomplished by opening the frontiers of the sea to their use.

The frontiers of earth—and now of space—have long inspired Americans to greatness and to progress. All Americans flew with John Glenn in his historic flight beyond the frontier of our atmosphere—and this was not far removed from childhood remembrances of the exploits of Buck Rogers. The adventure of undersea exploration fancifully related in the fiction of Jules Verne now offers another real and worthwhile adventure for man beyond his early horizons.

Recent public showings of Captain Cousteau's film "World Without Sun" have eliminated imaginative speculation and plunged many Americans into serious thinking about man's ability to live and work in the new environment of inner space. To the public, a major thrust into the world ocean has come to seem a natural and reasonable part of the technological revolution.

Science and technology have opened the way beyond this undersea frontier by virtue of our military experience in submarine and missile technology and as a result of private investment by oil, mining, and fisheries interests, power companies, and private explorers. The Navy's Sea Lab II program off California this year and Captain Cousteau's Conshelf will establish that man can live and do useful work in the shallow oceans, at least to the limits of the Continental Shelves.

But these and similar achievements have propelled our undersea technology to a level beyond that of our oceanographic science. Indeed, our scientific knowledge of the sea is so limited that beyond certain elementary assumptions, we cannot forecast the scientific problems, much less define them adequately, with certainty. This much, however, is certain: Unless we achieve a much better understanding of the ocean, further development of ocean technology will be stifled.

In short, all the motivations for an effective national ocean program are present, but we lack the broad base of scientific knowledge needed to proceed with this major endeavor. I think this is the first case, at least to my knowledge, where the technology is actually advanced beyond the science, and the technology is, in fact, pushing the science.

Now, to gain this scientific competence is not something that industry or the academic community can achieve for itself. The job is too big for private investment or endowment. More significantly, it is too closely linked to the formation of public policy to be entrusted to private direction. In brief, the problems faced by the ocean sciences are outside the ability or sphere of any private group. It is traditionally and most appropriately a major effort which requires action and coordination on the Federal level.

It is my belief that the primary need to be considered by members of this committee and the Congress is the attainment of a solid foundation of knowledge of physical oceanography, marine biology, marine geology, geography, and geophysics, and all of the other segments of this advanced field of scientific endeavor which we label "oceanography."

In a few brief examples I would like to try to tie the knot between scientific inquiry and application in an effort to show how an improvement or a gain in technology is tied to a much broadened base of scientific knowledge. This will be quite superficial, of course.

The varying salinity in the oceans affects transmission of sound in water and therefore is important in the development of sonar and other underwater electronic techniques.

At the same time, salinity may be a critical factor in supporting certain marine life. This same marine life could also be affected by variances in water temperature, another basic variable in the sea. These factors may determine breeding grounds and could be vital in any ocean conservation program.

Why are certain species found in one area only? Why do they migrate? How often do they reproduce? The answers are difficult to find, but are obviously valuable to the commercial fishing fleets.

The waves and currents born off the Aleutian Islands could be the source of the ocean forces eroding the coast of California. What causes these currents? And following that answer—how can we take advantage of our knowledge to effectively combat shoreline erosion?

Knowledge of currents and waves and storms could save lives and money by permitting better routing of ships. The first attempts at this have already been made. Studies of sea ice may permit development of polar sea routes for the future's freight-carrying submarines.

The meteorologist knows little of the currents and deep stirring of the great oceans which affects the atmosphere above and which may strongly influence the climates of the world.

The mining engineer works with the handicap of limited knowledge of the ocean floor, its mountains, ridges, valleys, shelves, and covering sediments—knowledge of all of this is crucial to devising methods for finding and extracting mineral resources.

Much more must be learned about the dissolved minerals and gases in the ocean before the chemical resources of the seas can be exploited. But to sum up and from a broader and more important viewpoint, the scientist lacks a comprehensive and thorough knowledge of the relationships between all of these scientific disciplines. He does not know precisely or is he able to predict how the known variables of the sea operate. In addition, there are other variables that are at work in the sea that have not been defined and that have a tangible force in the ocean.

A well-coordinated effort will begin to answer these problems and provide the impetus needed by the scientific and industrial communities to complete this necessary initial work. Government legislation need not be of the inclusive nature of the enabling legislation that established the National Aeronautics and Space Administration, because we have already a sufficient investment for a beginning and the nucleus of a scientific community which is capable of growth.

But ocean science does require a greater effort by the Federal Government than is now being exerted. I advocate a strong interagency body with executive powers to stimulate and direct a national ocean science effort that will open the way for the natural forces in the economy to move ahead with the creation of a comprehensive ocean technology.

That these forces will cause the economy to move ahead is self-evident, considering that there is already a large commitment based on unsettled scientific grounds.

The organization established by the Congress should be prepared to support existing scientific investigations taking place at our leading oceanographic institutions. It should analyze the gaps in the existing program and initiate programs to fill these gaps. When industry is unwilling or incapable, it should be prepared to perform limited application engineering when this is a clear requirement.

That the translation of effort from Federal scientific program to working industrial technology would be a rapid one seems obvious to those of us in industry who are prepared to make major investments. We are already well along and show a clear pattern of growth in ocean technology.

Federal action of the nature I have suggested would unlock the safe and multiply the degree of industrial involvement in and commitment to the world ocean and its resources as a principal economic activity in the United States.

Mr. LENNON. Thank you, Mr. Clotworthy.

Mr. Casey?

Mr. CASEY. Mr. Clotworthy, you state that you do not believe we need an organization such as NASA.

What do you advocate? Do you think we need any legislation at all? Do you propose a further Federal effort?

Mr. CLOTWORTHY. Yes, sir; I believe we do need legislation.

Let me try to frame this answer from a businessman's point of view for lack of a better definition at this time. If we wish to accomplish a particular goal, the general course of the events is to establish an organization which has a clear charter, which has the executive authority, and which has the competent people to guide it.

We tell them what we want to accomplish and they proceed with the task. There are certain factors associated with the accomplishment of goals that are so basic a part of the equation and so basic a determining factor in success that they cannot be argued, and I think most simply they are stated as responsibility and authority met within the organization.

I believe there is a need for Federal legislation which provides an executive body that has both the responsibility and the authority to accomplish the goals.

I feel that the present method of operation through the ICO, while it has been effective for many years, and is doing a superlative job, is not capable of mounting the effort, taking the steps to achieve specific national goals.

I think we have a general understanding of the direction in which we should go, what our national goals should be, though maybe they have not been codified; but I do believe that a coordinating agency as opposed to an executive agency is not the way to get there.

I do not believe that a group of men sitting around the table representing the interests of many agencies of the Government, as highly motivated as they may be to achieve certain national goals, can sufficiently disassociate themselves from the problems of their parent agency to act in the executive manner necessary to accomplish the task.

Moreover, they do not generally have the power, because the appropriations that support each of the agencies are an independent matter. They come before Congress through a number of committees and generally the oceanographic part of the work of each of these agencies is never looked at in terms of the potential accomplishment on the whole for the country.

Undoubtedly, the support of the present agencies is needed, and I am not advocating that we scrap the mechanism for working through the present agencies. What I am advocating, though, is a stronger role and a boss.

Mr. CASEY. Well, it sounds to me like you are talking for something like NASA, because you have voiced what a lot of us voice here, that you have this interagency operation and you have much more major problems in their agency other than oceanography, and if they get in a budget behind oceanography, for it naturally is one of those that suffers, and if the primary objective is defense, they will build a few planes before they will expand their oceanography. Or, if it is Interior, why, I think one of my colleagues here stated they would be liable to build a few roads in the park before they go more into oceans.

It seems to me you are talking more about something like NASA, where that is its charter, and its primary function is a separate and distinct agency with that objective. Now, am I wrong, and if I am wrong, what is in between something like NASA or the interagency setup?

Mr. CLOTWORTHY. Take first things first. I am not advocating, as I said in the prepared remarks, a NASA-type organization. I will try to draw the distinction between a NASA-type organization and the type of organization I am advocating.

I think there is a marked difference if you stand well back from the problem and analyze the need for a sudden thrust into space and the current need for an acceleration of our national oceanographic program.

The thrust into space had to be built up to a high level in a very short time. In addition to this, there were very few facilities available. There was no bodies of scientific people available, or a true comprehension in any breadth of organization in the Government of how to get from here to here—whether it be the moon or just to get a bigger booster.

This dictated, I think, much of the framework in which NASA had to be established if it was to succeed. It said that the agency must go out and establish facilities of its own, it must have the power to operate, react very rapidly, to implement goals that it had established.

We are not in that condition where the oceans are concerned. We have many fine scientific institutions in the United States that have been working very successfully, though inadequately funded, for many years. There is a basic cadre of competent scientific people at work. There is a basic organizational structure within universities that treats the discipline of the sea.

There is a basis on which to build, so I do not think we need the crash effort, if you will, that was present in the days of NASA, but I do think that many of the administrative elements that were present in NASA, that is, the ability to establish goals and to take action necessary to achieve their accomplishment, must be present in any agency or council or whatever you wish to call it, that deals with the national ocean program. But the most significant thing is that the type of body selected work through the existing organizations, wherever it is possible, and set out on its own only when an existing organization or the industrial community is incapable or unwilling to do it themselves.

Mr. CASEY. You are not going to get any of the present existing agencies or departments to admit that they are not doing what they should be doing. That is why we are holding these hearings and why we have these bills. We are not satisfied with the efforts and that is why you are here: You are not satisfied with the efforts.

Mr. CLOWORTHY. Yes. I suspect that these agencies would be very pleased, though, if that part of their annual budget dealing with the oceans was decided for them. But the individual agency basis is not the proper way to establish goals for the coming year or defend them. These goals should be established and depended by a body which is responsible to the Congress and answerable in gains made in oceanography.

At the present time, quite a number of the agencies have oceanography way down on the list of priorities, as you have recognized. I think if they would be relieved of the problem of defending a non-mainstream element of their operation, relieved of this responsibility by an agency above them, they would be quite willing to proceed and to continue doing the fine work that they are doing now with what I consider to be an administrative inhibition on their effectiveness.

Mr. CASEY. I do not know whether we are getting anywhere on this other than the plea or the argument we have heard in the last few days was that the Office of Science and Technology feel that they are handling this properly and giving it a pretty good push and that they are studying further and trying to develop better goals, but I think the real effort and real interest is being lost in the—for a better description—Rube Goldberg manner in which they go around punching buttons, which in turn punches this committee, and the next committee, which finally gets back to the man who headed the first committee.

We have one of them wearing three or four hats and he admits he does not have time—

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. LENNON. On the record.

You may proceed.

Mr. CASEY. And I think the gentleman is Director of the Office of Science and Technology. He just has his hands full, so that we do not believe it is given sufficient attention, and he admits that he spends very little time on oceanography.

He has one man on his staff that is supposed to be assigned to oceanography, but also that man has other things to do, so I think I understand what you mean is that we do not need to go in an all-out effort

such as NASA did, because we have technical knowledge, we have trained personnel and trained people, both in industry and in Government, which you did not have. But I think structurally we have to have something like NASA if we are going to focus the attention and the effort that should be focused and the effort that should be made in oceanography.

As you are talking about the budget, we are trying to get their budget nulled out so it would have specific attention. We tried that once before. In fact we passed a bill and it was pocket-vetoeed.

Do you think now the bills that we have before us that we make a study, or should we try to set up a separate agency or separate head who has nothing but this, or do you think we ought to just try to improve on the system that we have?

Mr. CLOTWORTHY. No; I think something new is needed. As you have observed just now, even with a body of people eminently qualified to study the problem, it still turns out that it is a part-time job.

I think that is the sickness that the program had from its inception. With the exception of the small staff, Mr. Abel has in the ICO, there is no body of people working on a full-time basis on a national ocean program. It is part time for everybody and I think it is this factor more than anything else that dictates an agency or a council-type of approach—a body with executive ability working full time to establish goals and implement their achievement.

Mr. CASEY. I do not think anyone on this committee criticizes the ability of the people that are in the various agencies, the Interagency Committee on Oceanography, or on the science and technology staff, or a member of the Council, but we are critical of the mechanics of it. We are critical of the amount of time that they are permitted to devote to it, and I dare say if we could take these men that have appeared before us from the various agencies on oceanography and take them off everything else and put them on just oceanography, we would have a program we could really be proud of.

Mr. CLOTWORTHY. Indeed you would.

Mr. CASEY. Then, specifically, you are not recommending any particular bill, as I take it, that is before this committee, but you are here in support of us doing something to bring it together and to give it better direction. Is that correct? Does that summarize your position?

Mr. CLOTWORTHY. Yes, sir.

Mr. CASEY. Thank you.

Mr. LENNON. Mr. Reinecke?

Mr. REINECKE. How many people are involved in the division in your company with respect to undersea investigation?

Mr. CLOTWORTHY. Something in excess of a thousand. There are several divisions of the company which have a major role in undersea efforts.

The division I head in Baltimore, the Underseas Division, is involved in undersea weaponry, sonar, oceanographic instruments, and small manned submersibles of the research variety. There is something in excess of a thousand people involved there.

We have a division in Sunnyvale, Calif., which is the lead division on the Polaris program. Now, there are many thousands of people involved in that division.

The Atomic Divisions of Westinghouse in the Pittsburgh area, of course, have been supplying nuclear reactors for submarines for many,

many years, and the division in Philadelphia has provided propulsion gear for subsurface vehicles for many years.

So I represent only one part of the total Westinghouse effort where underseas is concerned. The division I head does have the responsibility for providing the leadership in the corporation for the future efforts in underseas work.

Mr. REINECKE. Your listing of the various activities there indicated that almost all of your effort is with respect to military or Government work. Is that right?

Mr. CLOTWORTHY. A major percentage of it is.

Mr. REINECKE. Is there any appreciable program having to do with private investigation for private industry?

Mr. CLOTWORTHY. Yes. There is obviously a great area between pure military and pure industrial. We have a program with the Coast and Geodetic Survey. We have had several programs with universities, particularly the University of California. Our most significant program with an industrial element in it is the current effort to devise new methods for catching fish by applying the fruits of some modern technology to the age-old problem of how to locate and catch fish.

In addition, we have had an extensive cooperative program, how to build small man submersibles, both for research as well as for exploitation.

Mr. REINECKE. The reason I asked that is, frankly, your statement is you feel that further development of the ocean technology will be stifled unless—what I feel you saying is, unless the Government spends more money, it is too big for private investment and to have private direction.

Further, you say, when industry is unwilling or incapable, it should be prepared to perform limited applications.

Do you really feel this is so much a Federal role that we should put industrial participation at a second-class level?

Mr. CLOTWORTHY. No. Let me clarify that.

In my prepared statement I have tried to draw a clear distinction between the science and the technology. The technology is the applier of science.

I feel that the private sector of our economy is amply motivated to exploit the ocean, to apply the science, to develop the technology, and that the natural forces at work in the economy are quite satisfactory and will provide impetus where impetus is needed.

The thing that I am advocating is a much stronger support and a well-directed support of the basic science, the gathering of basic scientific data about the ocean, upon which a technology can be founded.

I am saying, in effect, that technology has moved ahead quite rapidly on the basis of unsettled scientific ground, and what I feel is necessary in order to prevent a stifling of this already considerable movement in the private sector of the economy is now a bolstering of our effort in the pure science.

Mr. REINECKE. Do you not feel that private industry will, when necessary, make its own investigations into the realm of pure science that would either encourage or help this particular technology?

Mr. CLOTWORTHY. There is no "Yes" or "No" answer to that question. We are currently involved every day in the fringes of pure scientific investigation. One must be, because the application of the

knowledge requires a very great comprehension of the scientific basis from which it evolved, but what I feel is lacking is a comprehensive understanding, a comprehensive body of scientific data about the ocean, a complete understanding of the ocean and its mechanisms.

Now, the utilization of this data, the body of scientific data, is equally applicable, whether it is in a military role, perhaps in a geopolitical situation, or in a straight industrial situation. It is information that is of value to anyone who has any tangential interest in the ocean.

I am saying that industry or the scientific community alone cannot accumulate this body of knowledge. It is too big a job. More importantly the priorities must be set, because you cannot do everything today, and I think the setting of objectives is a matter of national importance and should not be directed by the private sector.

Mr. REINECKE. Thank you. I just wanted to clarify that point, because I feel very strongly that our best interests here are going to come from private industry.

Thank you.

Mr. LENNON. Mr. Rogers?

Mr. ROGERS. Thank you, Mr. Chairman.

Mr. Clotworthy, I think you have made the point very well and your technology is pushing science and what we need to do is move ahead very quickly on our research. I presume something like NIH, the National Institutes of Health, where we do supposedly do research and it is applied by the technicians all over the country for the benefits of our Nation.

I wonder if you have in mind—you say you do not want NASA, but you want some direction. Would it be your idea that it might be helpful for us to consider legislation or encourage the setting up of oceanography in the President's setup somewhere, like in the Office of Science and Technology, where the President appoints this man to bring together all of the various budgets to look over to see if we are making the effort to present an overall program of the planning before it goes to the various departments, have some say-so there?

Is that what you have in mind?

Mr. CLOTWORTHY. Yes, I would advocate something on that order. It must be high enough in the Government to attract the proper respect and attention to the goals and the means for reaching them.

Mr. ROGERS. Well, the President has appointed a Special Assistant for Poverty, he has an Assistant for Consumer Affairs, he has one, I see, on crime now. So maybe we could give some thought to this.

I think if we can perhaps come out with some legislation directing full attention, and I think the commission will do this in studying the problem, put some real emphasis, then I think the President is going to be very much in favor of something, because I think this will bring it to his attention properly, and there will not be many fields left for him to act in anyhow next year; unless he has some good field to go forward in, I am afraid—so much has been done this year, that I think he will grasp this with great vigor and probably move forward.

Thank you.

Thank you, Mr. Chairman.

Mr. LENNON. Mr. Downing, do you have anything?

Mr. DOWNING. No questions, than you.

Mr. LENNON. You state on page 6 in paragraph 3: "I advocate a strong interagency body with executive powers."

Now when you say an interagency body, you mean a body representing the various agencies of the Federal Government that have an interest in varying degrees in the wide scope of oceanography?

Mr. CLOTWORTHY. That is correct, Mr. Chairman.

Mr. LENNON. I know you are familiar with the Federal Council for Science and Technology.

Mr. CLOTWORTHY. Yes, sir.

Mr. LENNON. Headed by Dr. Hornig, the Chairman.

Now, on this Council you have each of the agencies of the Federal Government, or at least all those who have a direct interest in oceanography, someone at almost the highest level of that particular agency.

Could you get an interagency at a higher level representing the various agencies in the Federal Council of Science and Technology than we have now?

Mr. CLOTWORTHY. No, sir. In fact, you could not, but I believe that you could get people from the agencies for whom the oceanographic program was their full-time job.

Mr. LENNON. Now, of course, the Interagency Committee on Oceanography is a creature of the Federal Council for Science and Technology, established at the instance of the Federal Council, and its Chairman is appointed by Dr. Hornig, the Chairman of the Federal Council for Science and Technology.

Now, that is not too far afield, but what you are complaining about, as I understand it, is that the Interagency Committee on Oceanography gets down to the level in the agency where it can not speak with authority for the agency?

Mr. CLOTWORTHY. Yes, sir.

Mr. LENNON. Is that the complaint?

Mr. CLOTWORTHY. And the Interagency Council is a coordinating body. They are doing a marvelous job of preventing duplication of efforts, one agency to another, but—

Mr. LENNON. But what? What is the inherent weakness of the Interagency Committee on Oceanography since it is the creature of the Federal Council and since it has in its composite membership a person designated by the head of that particular agency for membership on the ICO?

Mr. CLOTWORTHY. If there were some means of closing the loop between Dr. Hornig down through the chain into the various agencies that are members of ICO, through the various committees of Congress, who take a look at the budgets of the member committees, back to Dr. Hornig again, and if there was a generator of some impetus—

Mr. LENNON. The function of the ICO, as it was related to us in the past, was that it was to voice the feelings and the objectives of the various agencies through the composite organization of ICO and their respective lesser panels, them that was to go back to the Federal Council for Science and Technology.

Is that not being done?

Mr. CLOTWORTHY. I am not sure I get the distinction.

Mr. LENNON. I said the ICO being a creature of the Federal Council for Science and Technology was to make these studies and its recommendations to the various agencies as relating to oceanography, and

then it was to make its recommendations to the Federal Council, which is in the highest level that you can get in the Executive Office of the President.

Mr. CLOTWORTHY. Certainly.

Mr. LENNON. Now, on paper it looks pretty good. There is no faraway chain of command in this setup, it is a direction where the Director of the Office of Science and Technology, of course, wears two hats. He is Chairman of the Federal Council in the President's Office.

I just do not know how you could, by legislation, create what you propose here in your statement as a strong—a stronger agency with Executive powers in attempting to stimulate oceanography, than you have now.

And I want you to tell me how the Congress could draft legislation that would beef up the powers of the ICO.

Mr. CLOTWORTHY. Unless I am ill informed on the subject, the Federal Council has no muscle when it comes to setting budgetary levels in the agencies whose recommendations come to it through the ICO. They do a lot of other things, too, which dilute the total activity of the Federal Council—oceanography is just one of the elements of it.

The member agencies, at least as I understand it, establish their budgets through normal agency procedures and they first recommend and then defend these budgets in many parts of the Congress.

The loop back to the Federal Council is never closed, the means for putting the screws on the committee of Congress who must approve the budgets of any one agency is not there. The means to say to that agency that the oceanographic portion of its budget is sacrosanct, you cannot tamper with it—that is not there.

I feel that the total expenditure for a national oceanographic effort must be set at the highest levels, must be defended in a body at the highest levels, and that the Congress look at progress in oceanography with a broader perspective.

What is it accomplishing? What will it accomplish for the Nation? And, in turn, be able to hold the agency accountable for success.

I do not believe that the Federal Council has that kind of mechanism in its structure.

Mr. LENNON. You do not feel that the Federal Council has the mechanism in its structure to review and to have oversight over the various agencies who get funds from their particular budget? Is that the basic complaint here?

Mr. CLOTWORTHY. It has the ability to review and recommend, but there it stops. And it can only recommend downward into the agency. The agency still must carry the ball when it comes time for the preparation of the budget.

Mr. LENNON. Well, the President got out this year on March 2 his special message and attached thereto was the national oceanographic program and a line item on each agency and each department and each function and each mission in oceanography.

And I dare say that both the legislative committees and the Appropriations Committee has by this time approved it in toto. I am sure that everything that was requested has been authorized and appropriated.

Now, there are some areas in which you do not have an annual authorization, such as the Department of Commerce that we talked

about yesterday, with the ESSA program. We are seeking information, sir, and I appreciate your—I have been very greatly impressed by the sincerity of your statement and your general knowledge with the subject.

If you can help us, we want help.

Now, Mr. Counsel?

Mr. DREWRY. Mr. Clotworthy—

Mr. LENNON. Before you start, could we go off the record?

(Discussion off the record.)

Mr. LENNON. Back on the record. Thank you very much.

Mr. DREWRY. Mr. Clotworthy, I am interested in your problem about “closing the loop” and about “providing muscle.”

Have you given any thought to whether the NACA concept would be adaptable in this situation? That is, a step short of NASA. I think actually it was out of NACA that a lot of the early space and aeronautics effort was made and probably out of NACA that NASA developed.

I am not too familiar in detail with the group, so I am a little hesitant in advancing the thought.

NACA was a Government agency, at that time without appropriations, and yet it was a little offbeat for a Government agency to cope with special problems in fields where both industry was concerned and where Government was concerned. I recall that NACA had non-Government members as well as Government members.

Are you familiar enough with that to have any thoughts as to whether that might be a focal point. It is not—of course—true in one sense to say there is nobody working full time on oceanography. There are a great many people doing it in Government—in Westinghouse—and many other industrial organizations and institutions.

But there has been a problem for some time to find a focus. That is the thing we are groping for. And the focus is not needed for surface items, because they are being done. The focus we need is of a coordinating nature—of how to make various disciplines work into a program.

The program problem comes into certain areas where there seems to be nothing being done and yet where perhaps the Federal Government should be doing it.

Would an agency of that sort, such as NACA, offer any possible solution to close the gap or produce the muscles?

Mr. CLOTWORTHY. The NACA approach was considered at length when the NSIA ad hoc committee on the national ocean program had its deliberations.

The NACA approach represents what to us appeared to be a very reasonable means for moving ahead. I am not completely familiar with all of its ramifications, but from what I do know, it is a very satisfactory approach.

Mr. DREWRY. And may at least as an interim measure lead ultimately to a single agency?

Mr. CLOTWORTHY. Yes, sir.

Mr. DREWRY. Just one further question. You mentioned NSIA, and you mentioned your affiliation with it.

Are you in a sense representing their views here today?

Mr. CLOTWORTHY. No, sir. My own views.

Mr. DREWRY. Westinghouse and your own?

Mr. CLOTWORTHY. Yes, sir.

Mr. DREWRY. Thank you very much, Mr. Chairman.

Mr. LENNON. Before you leave, sir, do you know who the President's Science Advisory Committee's Panel on Oceanography is by individuals or by business relationship or scientific connection?

Mr. CLOTWORTHY. I know some of the people who have served and are serving on that Committee.

Mr. LENNON. Mr. Counsel, would you obtain the names and identification by location and profession of the job assignments of the President's Science Advisory Committee on Oceanography, who Dr. Hornig says is making a study of the very things that are proposed by the several commissions that are proposed in the bill?

Thank you very much, sir. We do appreciate your appearance here.

Now, Mr. Clark, we can accommodate you. We want to do so.

Mr. DOWNING. Mr. Chairman, may I say here that Mr. Clark is a graduate of that great educational institution of VMI, and he and I were in school together there and also at the University of Virginia, so he is a highly qualified person.

Mr. CLARK. Thank you, Mr. Downing.

Mr. LENNON. Mr. Clark, as an individual and as a friend and former classmate of one of our most distinguished members, we want to welcome you here before the committee.

Do you have a prepared statement?

Mr. CLARK. Yes, I do, sir, and it has been filed with the committee yesterday.

Mr. LENNON. Off the record.

(Discussion off the record.)

Mr. LENNON. On the record.

STATEMENT OF DURLAND E. CLARK, JR., THE WESTERN OIL & GAS ASSOCIATION AND THE AMERICAN PETROLEUM INSTITUTE

Mr. CLARK. I am Durland E. Clark, Jr., and I am appearing today on behalf of the Western Oil & Gas Association and the American Petroleum Institute. Since this statement was filed with your committee yesterday, the Mid-Continent Oil & Gas Association has asked to be named as a party to it.

We appreciate your invitation for us to appear here today and in the interest of brevity we have not attempted to analyze each of the several bills and make recommendations to you on them.

However, we would refer to certain segments of a number of the bills with which we cannot fully agree. We refer to the various sections providing for Federal participation in the exploration for, and economic development of, physical resources of the Continental Shelf, either directly or through grants to private industry.

We are opposed to this concept and believe that its retention in any legislation reported by your committee could ultimately put various agencies of the Federal Government in the offshore oil business as a direct competitor with private enterprise unless the petroleum industry is excluded.

We have attached hereto as addendum an illustration of certain language that might be attached to H.R. 7849, which would result in this exclusion.

We believe that the unintended result of some of this legislation would be detrimental to the continued activities of the American petroleum industry on the Continental Shelf. Of course, we are referring to the vast offshore explorations carried on by the petroleum industry in the offshore exploration, not only in the gulf and Pacific coasts, but in the Great Lakes and Alaska.

Last year these produced 153 million barrels of oil, worth about \$361 million, and I might add this production is on a sharp increase. This activity with its attendant risks has been conducted by private capital and the estimated investment in State and Federal submerged lands is in excess of \$3.5 billion.

In addition, more than \$250 million has been spent on pure research of an oceanographic nature such as wave studies, meteorological studies and equipment research and development.

As a direct consequence, the United States alone in the last decade has received \$1.2 billion from lease mineral bonuses on Outer Continental Shelf offerings, \$14 million in rentals and an estimated \$16 million a year in royalties. Sums paid to individual State governments would, of course, be in addition to this figure. For example, the State of Louisiana has received in excess of \$700 million from industry offshore operations.

This oil and gas activity by the petroleum industry is unique in the sense that of man's historic uses of the sea, this is by far the most recent and complex, being measured timewise only in decades and is exceeded by no other industry in terms of the amount of capital required to conduct its operations.

No other industry would be directly threatened to the degree that is possible under certain provisions of the bills before you. The sections providing for direct Government participation in, or financing of, offshore mineral exploration and development could operate to force withdrawal of private investment from this activity.

We, therefore, recommend that the specific field of exploration for, and production of, oil, gas and sulfur on the Continental Shelf and other submerged lands to which U.S. jurisdiction might attach, be specifically excluded from the provisions of any bill which this subcommittee may recommend.

We noted with interest the passage of Senate bill 944 and have quoted in our statement certain segments there which pick up the point that we are making, namely, that private investment occupies a unique role in this field.

We have also attached to this statement, which is being filed for the record with you, suggested modifications of S. 944 to achieve the results we are after.

Our recommendation is not a plea for permission to operate on the Outer Continental Shelf under other than existing conditions. You are aware that the petroleum industry's activities there are regulated and supervised by a number of Federal agencies. Among these are the Bureau of Land Management, U.S. Geological Survey, U.S. Army Corps of Engineers, Coast Guard, Department of Defense, and Federal Aviation Agency. We would anticipate no basic changes in the roles of these various agencies whose efforts have made possible the accomodation of both petroleum activities and other necessary uses of offshore waters.

In conclusion, we would add that the provisions of the various bills regarding the administration of oceanographic matters, be it by a Cabinet-level department, Federal council or commission, is a matter which can best be decided by the Congress and has not been specifically studied by us.

We do appreciate the opportunity to have appeared here before you, Mr. Chairman.

Mr. LENNON. Mr. Clark, we are delighted to have your statement and, of course, it will be included in the record in its entirety. (Mr. Clark's statement follows:)

STATEMENT OF DURLAND E. CLARK, JR., ON BEHALF OF THE WESTERN OIL & GAS ASSOCIATION AND THE AMERICAN PETROLEUM INSTITUTE

Mr. Chairman and members of the subcommittee, my name is Durland E. Clark, Jr., and I am appearing today on behalf of the Western Oil & Gas Association and the American Petroleum Institute. The Western Oil & Gas Association is a trade association whose members produce, refine, and market more than 90 percent of the crude oil and associated hydrocarbon products in the six Western States of Alaska, Washington, Oregon, California, Nevada, and Arizona. The American Petroleum Institute is a nationwide trade association representing all sections of the petroleum industry.

We appreciate the invitation of your chairman for interested parties to appear at these hearings, and trust that our comments will be helpful. We have been aware of the growing attention being paid to the subject of oceanography. It was with great interest, therefore, that we examined the several bills before you on this subject.

In the interest of brevity, we will not attempt at this time to offer specific comment on each of the many bills under consideration. Instead, we will make an observation and recommendation on a provision common to many of these bills. We refer to the various sections providing for Federal participation in the exploration for, and economic development of, physical resources of the Continental Shelf, either directly or through grants to private industry. We are opposed to this concept and believe that its retention in any legislation reported by your committee could ultimately put various agencies of the Federal Government in the offshore oil business as a direct competitor with private enterprise unless the petroleum industry is excluded.

Using H.R. 7849 as an example, we would like you to note the relatively minor language changes needed to exclude the offshore petroleum industry from this bill's provisions. This language is shown in the addendum attached to this statement.

If these or similar changes are not made in H.R. 7849 and other bills before you, we believe that the unintended result will be detrimental to the continued activities of the American petroleum industry on the Continental Shelf.

We are, of course, referring to the vast offshore explorations carried on by the petroleum industry not only on the Gulf and Pacific coasts of the United States, but in the Great Lakes and in Alaskan waters. These activities encompass exploration, development drilling and extensive production facilities necessary to bring oil and gas production onshore. Last year 153 million barrels of oil were produced from these offshore areas. This production generated \$361 million of new wealth. This activity, with its attendant risks, has been conducted by private capital and the estimated investment in State and Federal submerged lands is in excess of \$3.5 billion. In addition, more than \$250 million has been spent on pure research of an oceanographic nature, such as wave studies, meteorological studies and equipment research and development.

As a direct consequence, the United States alone in the last decade has received \$1.2 billion from lease mineral bonuses on Outer Continental Shelf offerings, \$14 million in rentals, and an estimated \$16 million a year in royalties. Sums paid to individual State governments would, of course, be in addition to this figure. For example, the State of Louisiana has received in excess of \$700 million from industry offshore operations.

The offshore oil and gas activity of the petroleum industry is unique in the sense that of man's historic uses of the sea, this is by far the most recent and complex, being measured timewise only in decades and is exceeded by no other industry in terms of the amount of capital required to conduct its operations.

No other industry would be directly threatened to the degree that is possible under certain provisions of the bills before you. The sections providing for direct Government participation in, or financing of, offshore mineral exploration and development could operate to force withdrawal of private investment from this activity.

We therefore recommend that the specific field of exploration for, and production of oil, gas, and sulfur, on the Continental Shelf and other submerged lands to which U.S. jurisdiction might attach, be specifically excluded from the provisions of any bill which this subcommittee may recommend.

S. 944, the proposed Marine Resources and Engineering Development Act of 1965, recently passed by the Senate, has as one of its expressed purposes: "encouragement of private investment enterprise in exploration, technological development, marine commerce and economic utilization of the resources of the marine environment." (Sec. 2(3).) With this stated purpose we agree.

We also note with satisfaction that the report which accompanied S. 944 (S. Rept. 528) stresses the importance of private enterprise in the development of marine resources. To quote from that report.

"While there are important areas involving marine science activity which properly fall within the scope of the Federal Government, the real potential for use and development of marine resources must be brought to fruition by American private enterprise."

We applaud those words and firmly believe that, insofar as the petroleum industry is concerned, they should be spelled out in whatever legislation you may recommend.

Attached to our statement is a second addendum suggesting language which could accomplish this.

Our recommendation is not a plea for permission to operate on the Outer Continental Shelf under other than existing conditions. You are aware that the petroleum industry's activities there are regulated and supervised by a number of Federal agencies. Among these are the Bureau of Land Management, U.S. Geological Survey, U.S. Army Corps of Engineers, Coast Guard, Department of Defense, and Federal Aviation Agency. We should anticipate no basic changes in the roles of these various agencies whose efforts have made possible the accommodation of both petroleum activities and other necessary uses of offshore waters.

In conclusion, we would add that the provisions of the various bills regarding the administration of oceanographic matters, be it by a Cabinet-level department, Federal council or commission, is a matter which can best be decided by the Congress and has not been specifically studied by us.

We appreciate the opportunity you have afforded us to submit our views and make a recommendation. Please be aware of our extreme interest in these proceedings and of our continued desire to be helpful in your efforts to develop acceptable legislation from the various proposals before you.

ADDENDUM

SUGGESTED AMENDMENTS TO H.R. 7849

On page 2, insert the word "marine" before the word "resources" in lines 3, 5, and 15.

On page 4, add to line 5 the following definition:

"(5) The term 'marine resources' means all physical, chemical, geological and biological resources other than sulfur, crude oil, natural gas, condensate, tar sands, shale and associated hydrocarbons."

On page 13, in lines 10 and 11, delete the words "physical, chemical, geological and biological" and substitute the words "the marine".

On page 13, in line 16, add the words "marine resources of the" before the words "Continental Shelf".

On page 13, in line 19, after the word "development" add "of the marine resources of the Continental Shelf".

SUGGESTED AMENDMENTS TO S. 944

In section 2(1) strike the period after the word "environment", insert a comma and add the words "other than sulfur, crude oil, natural gas, condensate, tar sands, shale and associated hydrocarbons."

In section 3(f) (2) after the word "environment" insert the following: "other than sulfur, crude oil, natural gas, condensate, tar sands, shale and associated hydrocarbons,".

In section 3(f) (3) after the word "environment" insert the following: "other than sulfur, crude oil, natural gas, condensate, tar sands, shale and associated hydrocarbons."

In section 8(a) after the word "disciplines" insert the following: "other than those relating to the exploration, development, production and exploration of sulfur, crude oil, natural gas, condensate, tar sands, shale and associated hydrocarbons."

Mr. LENNON. Mr. Casey, any questions?

Mr. CASEY. Mr. Clark, I note you do not take any position on the bills here, but with reference to the chairman's bill stating that we ought to start doing some study about the legal aspects of the control, undevelopment or what have you of the development of the deeper waters, do you think your segment of industry would probably be in favor of that that should be looked at now before it gets to be a problem?

Mr. CLARK. If I understand your question, sir, we are expecting some legislation in this field and we feel that it is most worthy of a number of national objectives. I thought the previous witness developed quite well a specific area here; namely, that science and technology might very well be separated here.

I regret that there was not time to reach a full industry position and study on the mechanics of doing this, which are the nature of the questions which you gentlemen have been asking this morning and where we would like to be as helpful as we could.

We do not have such a position, but I think I might reflect something to you that has been common to all of our discussions; namely, that you are somewhat in an area where you walk before you run and there seems to be merit in certain of the bills, I believe Mr. Rogers' and a companion bill introduced by Mr. Downing, which calls for a complete study and specification of areas of need with a definite time to come back and report, I believe in section 4(f) of Mr. Rogers' bill, with a recommendation for an organization and budget as to how this might be accomplished.

Mr. CASEY. Well, in addition to the bills with reference to organization, our committee chairman here, Mr. Lennon, has a bill to set up a study of the legal aspects. Right now there are no laws governing, and we do not exercise—nor is there any contemplation that I know of about exercising sovereignty beyond the Continental Shelf, but as the technology grows and we get beyond the Continental Shelf, there is going to have to be some international laws probably or international regulations, and I just wondered if the oil industry, in particular, might not feel that that was the course we could have.

Mr. CLARK. Yes, sir; but we believe it exists to a large degree today. I believe U.S. jurisdiction attached not only to the Continental Shelf, but to adjacent areas to which engineering and exploitation might attach.

Several years ago, in some of our early discussions with the Bureau of Land Management, this subject came out very clearly. They did not want to offer leases, for example, off the west coast beyond the Continental Shelf, and this map, of course, will show that sometimes within half a mile of shore you can be in excess of 200 meters water depth, so this obviously had to be accommodated.

They asked us where we thought we should be able to go. We can only have one answer to that; namely, as far as we can be protected.

We believe that existing international law, which provides for us to move outward from the Continental Shelf, should pertain.

Mr. CASEY. That is true if it is something that comes from the floor of the ocean?

Mr. CLARK. Yes, sir.

Mr. CASEY. But we have no agreement with reference to extraction of minerals from sea water or from anything above that ocean floor.

Mr. CLARK. In that aspect, sir, there would be merit in this, but I hope you realize that my interest here is parochial to the extent of the industry that I am representing, and when we look at the entire problem, of course, this becomes very clear.

Mr. CASEY. You have some members of the American Petroleum Institute that are doing more than just drilling for oil, as you well know.

Mr. CLARK. That is correct, sir.

Mr. CASEY. And they are interested—some of them, you know—they are interested in all forms of energy. When you start talking about energy, you get a lot of energy out of ocean waves as far as that is concerned.

Mr. CLARK. Yes, sir.

Mr. CASEY. Thank you, sir.

Mr. LENNON. Before we proceed any further, I want the record to show that we again today have the pleasure of having with us—and I think we have at all of our hearings—Mr. Dan Markel, the technical consultant to the Senate Committee on Commerce, who is interested in this whole subject. We appreciate very much, Mr. Markel, your being here.

Mr. Downing?

Mr. DOWNING. Thank you very much, Mr. Chairman.

Mr. Clark, as I gather, you would like for the petroleum aspects of oceanography to be excluded from this legislation?

Mr. CLARK. Yes, sir; some aspects of it. That is correct.

Mr. DOWNING. And it is your fear and that of your industry that the Federal Government would possibly become a competitor of private industry in this field?

Mr. CLARK. That is correct.

Mr. DOWNING. Thank you very much, sir.

Mr. LENNON. Mr. Clark, did I understand you to say while you were representing the API—the American Petroleum Institute—as well as the Western Oil & Gas, that the total industry has not developed a position on this?

Mr. CLARK. That is correct, sir.

Mr. LENNON. How long would it take to develop one for the total industry?

Mr. CLARK. Well, sir, if I could give—if you will forgive an observation, they say a camel was a horse designed by a committee. I think it might take a little time. If it is something you desire, we could certainly tackle it.

Mr. LENNON. It has been suggested to me by counsel it would be well if the record reflected the total interest, if we could on this matter—if such can be obtained. Give me some projected time, months, weeks, or what.

Mr. CLARK. Sir, I think within 30 days we could do this.

Mr. LENNON. If we have not reported this legislation by that time, it would be well for this committee to have that information.

MR. CLARK. Yes, sir.

(The following letter was subsequently submitted for inclusion in the record:)

AMERICAN PETROLEUM INSTITUTE,
New York, N.Y., September 2, 1965.

HON. ALTON LENNON,
House of Representatives,
Washington, D.C.

DEAR CONGRESSMAN: The petroleum industry welcomes the opportunity to present its views on the broad subject of oceanography. Our economic stake in the marine environment gives us a vital interest in legislation dealing with the oceans. The petroleum industry has been very active in many phases of this science for many years and the American Petroleum Institute, also, has done research in this area for 35 years.

As a result of your request to Mr. D. E. Clark, who appeared before your committee on August 12, we assembled a group of petroleum experts who reviewed the various bills on oceanography which are currently before Congress.

Several of the proposed bills contain provisions for the centralizing of all oceanographic activities in one agency in the Federal Government. We do not believe that creation of such an agency would be for the best interest of the country. Oceanography is a name that can be applied to any branch of science if it happens to have application in a marine environment. As has been brought out in your hearings, there are a great number of Government agencies that must use one or more phases of oceanography. To attempt to remove these activities and centralize them in one group would be like trying to take all the activities in physics away from those agencies that apply physics in pursuit of their missions and centralize them in a single group. You will recall that some time ago there was an attempt to set up a U.S. Department of Science. Objections were raised to this idea since science is used by most departments and agencies of the Government and, therefore, to strip these groups of their scientific activities would cripple their ability to undertake some of the missions for which they have a primary responsibility. We believe the same reasoning argues against the creation of a single department to handle oceanographic activities.

Some of the proposed bills, including S. 944 as passed by the Senate, would create a new organization to try to coordinate all of the oceanographic activity in the Federal Government. While improved coordination is undoubtedly desirable, we think a new organization would only duplicate or replace the present coordinating committee and activity which is currently being handled by the President's Office of Science and Technology.

Our industry favors actions designed to provide basic information about the oceans in the belief that such knowledge will be highly useful to many segments of the national economy. If your committee, however, wishes to propose legislation bearing more directly upon specific oceanographic programs and their administrative direction, we think it important that the science of oceanography be clearly distinguished from the technology employed in its application. This basic science for example could involve the complex relationships of ocean currents, marine biology, temperature and salinity variables, meteorology, etc., and is properly a sphere for Federal programs. On the other hand, technological developments in this environment, and most specifically commercial exploitation of mineral and other resources, have been and should remain an important field for private investment. We would encourage increased Federal programs in oceanography focused on scientific inquiry. It would be expected that the obtained data would be utilized by industry and other agencies in the development of the needed technology.

You are aware of the substantial investment of the petroleum industry in the exploitation of subsea mineral resources. Future years hold every prospect for continuation and expansion of these efforts not only in oil, gas, and sulphur production but to an enlarged list of minerals and chemicals. This enlarged search will not be, of course, exclusive to our industry. It will be based, however, upon the continuation of economic incentives and protection of proprietary rights in discovery and development in an ever increasing geographic area. We believe that a constant review of Federal law in this field is desirable and would

expect such to be part of the studies of the Public Land Law Review Commission. International law and agreements in this field will be of increasing importance.

The American Petroleum Institute heartily subscribes to the proposition that the Federal Government's role in oceanography is important and necessary. The question that follows is how can this role properly be played. We regard the existing framework as adequate to meet the current needs. The President's Office of Science and Technology appears to us as the most appropriate vehicle for initiating comprehensive programs and coordinating the vast numbers of programs and missions in oceanography underway in various agencies of the U.S. Government.

For example, within this Office is the ICO which was established specifically for the purpose of coordination. Its endeavors should be permitted to continue by strengthening its staff and providing proper funding.

We believe that the bill proposed by you, H.R. 2218, would strengthen the current activity of the President's Office of Science and Technology, and will insure that the country's activities in this important field are better guided and coordinated, and will obtain surveillance at the highest level. Also, we like the provision which calls for annual reporting of the status of the oceanography program to Congress. We would recommend, however, that the definition of oceanography contained in section 6 be modified as follows:

"SEC. 6. As used in this Act the term 'oceanography' is defined as the acquisition, assembling, processing, and dissemination of all scientific and technological marine and related environmental data, including, but not limited to, physical, chemical, geological, biological, fisheries, hydrographic and coastal survey, meteorological, climatological, and geophysical data with the object of comprehending the world ocean, its boundaries, its properties, and its processes, and of encouraging the use of this comprehension in the national interest, in the enhancement of our security, our culture, our international posture, and our economic growth."

Our definition places stress upon the Federal Government's encouraging and participating in the development of basic research for dissemination to the private sector. By dissemination of basic data to the public at large, the Government is contributing to the advancement of science, and its application for useful purposes. Applying this basic research data is a job for which the private sector is admirably fitted and given the opportunity it can do so as history amply indicates.

In the development of both marine science and technology, there will be numerous areas of joint interest in Federal and industry programs, especially relating to matters of national defense. The petroleum industry would expect to cooperate fully with governmental departments having need of any special expertise in marine operations or equipment, and in particular, we would be happy to be represented on the Advisory Committee provided in your bill H.R. 2218 or on the Commission provided in S. 944. Similarly, these skills may be made available in assisting research in specific Federal programs such as the Mohole project.

We greatly appreciate the opportunity to explain further the petroleum industry's ideas concerning oceanography.

If we can be of further assistance, we hope you will call on us.

Sincerely,

FRANK N. IKARD.

Mr. LENNON. Counsel?

Mr. DREWRY. Of all the people engaged in oceanography in the sense that we are trying to lead to, the oil industry is paramount. It is doing more and has done more, spent more money at it, and is making more money out of it than anybody else. The interest and the knowledge of the oil industry, if it could be brought to bear and give the Congress the benefit of its experience and knowledge that they have developed, I think could be very helpful to us in any concept of a national program of oceanography.

It would seem to me that the oil and gas industry should be definitely a participant in it if anybody is, and that was the thought behind my suggestion to the chairman that he ask you whether you could get a broader position and a more detailed position than the slightly negative one that you presented today.

Mr. CLARK. Yes; I appreciate that.

Mr. DREWRY. Thank you, Mr. Chairman.

Mr. LENNON. Captain Bauer?

Captain BAUER. Mr. Clark, would it be all right to include in your thinking other minerals such as some of the oil companies owning or leasing gold right and so on and so forth on the Continental Shelf off Alaska.

Just petroleum products, it seems to me, might be too narrow. We might include all minerals?

Mr. CLARK. Yes, sir; there should be a general exclusion, I believe, in those areas of technology in which companies operating today and are investing money.

This is true; there have been gold applications in lakes. In fact, on a worldwide basis one of the companies was interested in diamonds off South Africa. There have been phosphate leases off California.

There are other things involved; yes, sir. So this could be expanded. The reason that point was not picked up is, we did not feel that was exclusive to us and we were pointing at our prime area of emphasis. We thought others would possibly pick that point up.

Captain BAUER. That is all I have, Mr. Chairman.

Mr. LENNON. Thank you. I want to again express our appreciation for the attendance of so many people here today.

Mr. Reinecke, I believe you said you pass?

Mr. REINECKE. Yes, sir.

Mr. LENNON. And say to you, Mr. Gillean and Mr. Chapman, that I cannot be here tomorrow, but the committee will meet tomorrow morning at 10 o'clock in this room.

The committee is now adjourned.

(Whereupon, at 12:10 p.m., the hearing was recessed, to reconvene at 10 a.m., Friday, August 13, 1965.)

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

FRIDAY, AUGUST 13, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10 a.m., in room 1334 Longworth House Office Building, Hon. Bob Casey, presiding.

Mr. DOWNING. The committee will come to order.

Our first witness this morning will be Mr. James M. Gillean, president, San Diego Chamber of Commerce. He is accompanied by Mr. Finn Claudi-Magnussen, chairman, Oceanographic Committee, San Diego Chamber of Commerce.

Gentlemen, we are pleased to have you here this morning.

I presume you have a prepared statement?

STATEMENT OF JAMES M. GILLEAN, PRESIDENT, SAN DIEGO CHAMBER OF COMMERCE; ACCOMPANIED BY FINN CLAUDI-MAGNUSSEN, CHAIRMAN, OCEANOGRAPHIC COMMITTEE, SAN DIEGO CHAMBER OF COMMERCE

Mr. GILLEAN. Yes, I have, Mr. Chairman.

Thank you very much, Mr. Chairman, and distinguished committee members.

First let me say it is a pleasure for us to appear here and we appreciate very much the opportunity you have afforded us to attend. I do have a prepared statement which I should like to read.

Mr. DOWNING. We appreciate your taking the time to come here and make this contribution, and it is a very valuable contribution.

Mr. GILLEAN. Thank you, sir.

Mr. DOWNING. If you will go ahead.

Mr. GILLEAN. First I should like to very briefly trace the history of the interests of the San Diego Chamber of Commerce in oceanography. The San Diego Chamber first became interested in oceanography some 60 years ago, in 1905, when it spearheaded a drive to raise funds for the purpose of constructing the original building to house the then Marine Biological Sciences Institute which became absorbed as part of the University of California in 1912, known today, of course, as the famous Scripps Institution of Oceanography.

Some 2 years ago the San Diego Chamber of Commerce organized its oceanographic committee which uses the title "Oceanographic" in the popular sense but directs its attention to all aspects of marine science and development, particularly as they relate to San Diego.

Because of the community's preeminence in this great new field of exploration and activity we were able to attract to the committee men of great capability, nationally and internationally recognized as experts in all facets of oceanographic research, development, and production. I thought it would be interesting for the members of your committee to know who these men are and I am providing each member with a roster of that particular committee, which, incidentally, numbers almost 50 persons of preeminence in this field. That appears in the brochures which we have distributed.

The first task which our committee assumed was to identify and catalog all educational, governmental, research and development, military, commercial and industrial agencies and firms in the San Diego area working in the marine field. Of the more than 50 identified, in excess of 30 are engaged in developing and building components, instruments, and hardware for scientific, military, and commercial uses.

The committee has published a brochure, *Oceanography in San Diego, Calif.*, which we believe is the first produced by any community in the United States. It describes pictorially and editorially San Diego's ocean environment, its natural resources, its technical, educational, research, library, and support facilities, its firms with experience, its human resources—in short, San Diego's present inventory and potential capacity in the oceanographic field.

The committee has also cooperated with the famous Scripps Institution of Oceanography of the University of California and the Navy Electronics Laboratory in identifying San Diego as an oceanographic center of worldwide interest and prestige.

The Naval Electronics Laboratory was first established in 1906. The present name, of course, is derived from its activities much, much better than that.

Oceanographic enterprises are growing rapidly in San Diego. Recent additions include Sealab (the Navy's underwater living experiment) and the Navy's Deep Sea Submergence Group, General Dynamics Marine Technology Center, Lockheed's Ocean Science Center, Kennecott Copper Co.'s Special Projects Office, the Westinghouse Deep Star oceanographic submarine, and Marine Science International.

Add these to the list which appears in the brochure we are providing for the members of the committee and I feel certain that you will know why we felt impelled to come to Washington to share with you in these hearings our thoughts on the kind of Federal legislation we think would best implement the national oceanographic program.

Rather than address ourselves to the details of the specific bills which are under study, we present to you our recommendations for the principles we feel should influence the nature of the legislation to be adopted and for the type of organization which could best implement the most effective national program.

Here to present the recommendation of the San Diego Chamber of Commerce Oceanographic Committee is its chairman, Mr. Finn Claudi-Magnussen, director, planning and marketing, Whittaker Corp., Narmco Research & Development Division. Mr. Claudi-Magnussen and his company are currently designing and building structures for deep sea use.

Mr. CASEY. Proceed, Mr. Claudi-Magnussen.

Mr. CLAUDI-MAGNUSSEN. Gentlemen, I am here representing the chamber of commerce as chairman of its oceanographic development committee.

I would like to add my appreciation for this opportunity of bringing to you some recommendations which we hope will guide you in your very important work in surveying our national oceanographic program.

With your permission, Mr. Chairman, I would like to proceed to read these five points for the record.

Mr. CASEY. Proceed.

Mr. CLAUDI-MAGNUSSEN. 1. The ocean sciences are undergoing a significant change from what many have known as oceanography toward full utilization of the vast resources in and under the oceans. The change is accompanied by increased emphasis on and capability in ocean engineering designed to develop, occupy, and use these resources. Any legislation adopted should recognize this fact and should lead to maximum development of our national capabilities for ocean utilization in the scientific, engineering, industrial, and governmental fields.

2. It would appear that the strategic military power on the seas between the free world and the Sino-Soviet bloc has reached the point where neither side has a clear-cut advantage. Under the circumstances, control of the ocean resources may well become a decisive factor. Adequate legislation should therefore make provision for U.S. occupation, use, and development of strategic ocean resources and for an expanded role for the U.S. Navy in providing support for such activities.

3. At present, the national oceanographic activities are divided among a large number of bureaus and agencies, with each assigned a relatively minor proportion of responsibility and limited funds. A project which would require financial support of a magnitude exceeding the capability of any of these bureaus or agencies, or which would require participation by more than one of them would currently present great difficulties in funding, coordination, and management and would seriously impair national developments in this vital field. Legislation should be designed to correct this situation.

4. An appropriate organization should be established within the executive branch of the Federal Government with advisory and operational responsibility, also with the capacity to financially support national oceanographic programs and to coordinate and assist in implementing through existing agencies and bureaus an adequate and balanced national program of oceanography.

5. The membership of such an organization should be composed of representatives of Government, business and industry, and the academic community.

This completes my prepared statement. I shall be happy to attempt to answer questions and provide clarification on any point.

Mr. CASEY. Thank you, gentlemen, for a very interesting presentation.

I want to compliment you on your originality shown in this folder. It is very informative and I think this gives a very graphic display of what San Diego is doing. I wish my city could show this same progress.

Mr. Downing?

Mr. DOWNING. Thank you, Mr. Chairman. I go along with the chairman on this interesting approach to a very challenging subject.

I also would like to say that this is a novel presentation. I was so much impressed that I sent the entire package down to my own chamber of commerce with the suggestion we get into this field, too.

Mr. GILLEAN. Thank you.

Mr. DOWNING. I want to commend you and your chamber for this contribution to this subject.

Mr. GILLEAN. Thank you, Mr. Downing.

Mr. DOWNING. In your statement, Mr. Claudi-Magnussen, in paragraph 4, you say:

An appropriate organization should be established within the executive branch of the Federal Government.

Are you familiar with the various bills which are pending before the committee at the present time?

Mr. CLAUDI-MAGNUSSEN. I have reviewed several of the House bills; yes, sir.

Mr. DOWNING. Which of those bills, if any, most nearly meet these objectives?

Mr. CLAUDI-MAGNUSSEN. Mr. Gillean has pointed out we are not here to support or to be opponents of any one bill.

The type of organization which is in recommendation No. 4 which best reflects the consensus of the oceanographic community in San Diego would be one which is located within the area pointed out with a direct line of communication with the Chief Executive, at least as close as possible, with both advisory capacity and the ability to provide certain funds as required.

Perhaps on the second point we can clarify what we have in mind. We are concerned about some of the situations which we have run into described in paragraph 3 where a worthwhile project may be rightfully and logically assigned to a bureau or to an agency but it is of such magnitude that it presents difficulties in undertaking.

At that point we would feel something the equivalent of the Defense Department can direct funds to get the project moving. This is along the lines of coordination. We feel a little money speaks quite loudly in bringing about coordination between the several agencies and groups which have to work together on these various projects.

Mr. DOWNING. Thank you very much.

Mr. CASEY. Mr. Mosher?

Mr. MOSHER. Mr. Claudi-Magnussen, in your first paragraph do I read in there correctly an implication that oceanography perhaps is a term that is too limited, that you are suggesting we begin to use some broader terminology perhaps even in our legislation?

Mr. CLAUDI-MAGNUSSEN. I notice several of the bills before you use the expression "oceanography and related items." Frankly our activities in the chamber of commerce in San Diego has had problems in what to call ourselves. The term "oceanography" is the scientific activity of learning about the ocean. "Ocean engineering" is used quite commonly today and it means generally the ability to implement this knowledge in doing useful work in the ocean. That is a distinction.

Yes, we are pointing out in paragraph 1 that this is a very important aspect of the overall ocean activities, this ocean engineering, this ability to operate in the ocean and harvest its resources.

Mr. MOSHER. Are you suggesting that "ocean engineering" would be a better overall term and it would include oceanography?

Mr. CLAUDI-MAGNUSSEN. No, I am afraid that would not be right because that also delineates a certain segment of the spectrum of ocean activities. It would, strictly speaking, not include the scientific ocean engineering.

Frankly, I am at a loss in that regard. We have had discussions among the experts and they speak of oceanic activities.

Mr. MOSHER. This committee, in writing legislation, might invent a phrase.

Mr. CLAUDI-MAGNUSSEN. It would be well. If there is a term which would describe the broader aspects this is what we are pointing out, that this legislation should take care of what is a growing activity in the overall field of oceanics.

Mr. MOSHER. Oceanography itself is an inadequate term?

Mr. CLAUDI-MAGNUSSEN. For lack of a better term we are using that in its broader encompassing meaning than the strictly scientific meaning.

Mr. MOSHER. Thank you, Mr. Chairman.

Mr. REINECKE I am happy to welcome these two Californians to the committee and compliment you on your fine presentation. I am happy to see the West showing some life in this because I think we are being scooped by the east coast and if we are not careful we will lose some interesting industrial activity.

Mr. CLAUDI-MAGNUSSEN, you mention in your third paragraph that you feel there needs to be a coordination of these various activities. We recognize this and we are looking for suggestions. Do you have any such suggestions?

Mr. CLAUDI-MAGNUSSEN. I would like to refer back to comments I made a moment ago. We do feel that if the organization we advocate in the executive branch has some ability to provide funds as required to get programs moving that this would provide the catalyst, the impetus to get a project going.

In this connection we know from large private industrial companies that it is much easier to achieve coordination, a meeting of the minds, and assignments of responsibilities among different segments if there is the ability to say "Now we want you to work together, we have some money to assist you in getting this program going." We feel some funds would be quite effective.

Mr. REINECKE. Are you familiar with the structure of the ICO at the present time?

Mr. CLAUDI-MAGNUSSEN. Not in detail, but generally.

Mr. REINECKE. Do you feel this is the type of coordinating agency which should be put together?

Mr. CLAUDI-MAGNUSSEN. The ICO is doing a very outstanding job. I would reflect the opinions of the large segment of the oceanographic community in San Diego if I were to say that the more direct line of communication with the Chief Executive than such a group has the more it would please the oceanographic community. In other words, we want as high an authority as possible.

Mr. REINECKE. Do you feel at the present time that the ocean engineering aspect has been played down and put into a secondary position?

Mr. CLAUDI-MAGNUSSEN. I don't think it has been done so by design but I think that that aspect of the oceanographic activities as grown very significantly. Even the Navy in its deep-submergence program, carried on for military purposes, of course, is developing technologies which can be very important to private industry.

As I have pointed out in point 2, we feel that the ability to occupy, if you will, the position they have this can well become a factor of strategic importance because of this balance of very powerful military organizations. It has a neutralizing effect.

Mr. REINECKE. Do you feel that the status, or lack of status, or legal understanding prevents coordination?

Mr. CLAUDI-MAGNUSSEN. From what I gather in talking to several members of our committee in discussing that aspect of it this is a field that has fallen behind. Clarification of the legal aspects needs to be strengthened.

Mr. REINECKE. Private industry would move along faster if they knew exactly where they stood?

Mr. CLAUDI-MAGNUSSEN. Yes. Uncertainties there add to the amount of risk.

Mr. REINECKE. You feel that should be taken care of in this legislation?

Mr. CLAUDI-MAGNUSSEN. Yes.

Mr. REINECKE. Thank you; I have no further questions.

Mr. CASEY. Does counsel have any questions?

Mr. DREWRY. In your statement you bring out some broad guidelines. You do not indicate any preference from this wide selection. Are there any particular bills which you favor more than others?

Mr. CLAUDI-MAGNUSSEN. I do not recall the specific approaches relative to the authors of the bill and their numbers, but as I recall several of them reflect this philosophy of the executive branch being more active and active in an advisory capacity.

Mr. DREWRY. It would not necessarily have to be a separate agency?

Mr. CLAUDI-MAGNUSSEN. No.

Mr. DREWRY. If there is to be a coordinating agency then it should have not only the function of coordinating but some operational function.

Mr. CLAUDI-MAGNUSSEN. That is what we reflect here, not in any sense usurping the responsibilities of financial capabilities of the established bureaus and agencies but rather to act with reserve funds so they can put these into effect when deemed necessary to bring about coordination in getting the job done, or perhaps to augment the existing financial capabilities of whatever agency or bureau has this job assigned to it.

Mr. DREWRY. You gave an example of a project which would require financial support.

Mr. CLAUDI-MAGNUSSEN. Yes, I would be very pleased to give an example. I do not know all the details of the situation, but in San Diego the National Steel & Shipbuilding Co. is low bidder on the Project Mohole, \$4.5 million lower than the next lowest bidder. However, their bid exceeded the ability to fund for this by the National Science Foundation.

I understand that the problem in such a situation always exists, but in the case of the National Science Foundation it is of more

concern to that agency to start on a program assuming that in the next fiscal year there will be further moneys allocated to complete it which perhaps might be in excess in other agencies.

There is a situation where we would hope that some additional moneys could be provided to the National Science Foundation to get this job going.

This is an example of how one would use such reserve funds, director's funds, or funds resting with this group in the executive branch.

Mr. DREWRY. In the Mohole project we have an example of a single project under a single directorship where they have had no problem in getting to the Appropriations Committee. I do not see how it would necessarily be any different if it were any other agency unless there was provision to have large amounts of completely unspecified or un earmarked moneys.

Mr. CLAUDI-MAGNUSSEN. Many programs are undertaken with partial funding. You have to get started.

Mr. DREWRY. I see what you mean.

Mr. CLAUDI-MAGNUSSEN. The point is that if there is financial capability to fund 80 percent of the task, perhaps this is a problem. If the cognizant bureau or agency is able to allocate 100 percent of the funds for the project this would be an example of a situation where perhaps the additional support could be provided to get the job done.

Mr. DREWRY. That is all, Mr. Chairman.

Mr. CASEY. Mr. Bauer?

Mr. BAUER. I have just two questions, more or less hypothetical. Is it usual for industry to mix management functions with staff functions?

Mr. CLAUDI-MAGNUSSEN. Sir, I did not understand.

Mr. BAUER. Is it usual for industry to mix line operative functions and staff functions in the same group, the line operators being the people who do basic—

Mr. CLAUDI-MAGNUSSEN. It is often done. In most of the situations I am aware of the line function as being one of augmenting and supporting rather than being a prime responsibility for a function. In our company we have a staff assistant to the president for certain functions, but he is not only advisory to the president, he also has some financial capabilities to allocate some moneys to augment, support, and stimulate activities within his area of responsibility.

Mr. BAUER. Outside of that area it is not an operating authority?

Mr. CLAUDI-MAGNUSSEN. That is right.

Mr. BAUER. Is it usual to give responsibility to one group and authority to another group? In other words, can you split up authority and responsibility and have a successful industry?

Mr. CLAUDI-MAGNUSSEN. Again, under the circumstances for which I gave an example, the segment of the organization which receives additional support has the major line of responsibility for the execution of the program.

Mr. BAUER. So in any one box the authority and responsibility coexist in that one box.

That is all I have, Mr. Chairman.

Mr. CASEY. On the Mohole project it is my understanding that the National Science Foundation has appropriations for this project.

The limitation was that the Bureau of the Budget had to approve these projects. Of course, there is no line item in their appropriation for Mohole.

Is that correct, Counsel?

Mr. DREWRY. Frankly, I do not know, Mr. Chairman.

Mr. CASEY. My recollection is that their appropriation is for a lump sum for all of their functions, Mohole being one specific project.

Of course, they have various grants which are made and other studies they undertake.

Gentlemen, I again want to compliment you on your presentation. I think you have certainly reflected a great credit on San Diego and San Diego should be very proud of its chamber of commerce and the knowledgeable men they have interested in this particular subject.

Mr. GILLEAN. Thank you very much again for your time, gentlemen.

Mr. CLAUDI-MAGNUSSEN. Thank you.

Mr. CASEY. We will next hear from Dr. W. M. Chapman, director, Division of Resources, Van Camp Sea Food Co.

Doctor, it is a pleasure to have you again.

I understand you are not going to endeavor to read all of this statement this morning, but that you will give us the benefit of a summary of your statement and the benefit of your wealthy knowledge in this field.

STATEMENT OF DR. W. M. CHAPMAN, DIRECTOR, DIVISION OF RESOURCES, VAN CAMP SEA FOOD CO.

Dr. CHAPMAN. Thank you, Mr. Chairman.

If I may be permitted to do so, I have two statements, one in respect to H.R. 5175, the law of the sea matter, a bill which I favor, and one more generally on the general ocean policy.

I would like to file those for the record and speak extemporaneously and submit to questioning.

Mr. CASEY. Without objection that will be done.

(The statements referred to follow:)

STATEMENT OF W. M. CHAPMAN RESPECTING H.R. 5175, THE LAW OF THE SEA AND PUBLIC POLICY

My name is Wilbert McLeod Chapman. I am director, Division of Resources, Van Camp Sea Food Co. In appearing before you this morning, however, I am testifying in my personal capacity. I have been asked to speak as an expert on the subjects of the law of the sea and public policy related thereto. Such expertise as I have on the subject arises from having been special assistant to the Under Secretary of State for Fisheries and Wildlife for 3 years beginning in mid-1948, and from that time until the conclusion of the second United Nations Geneva Conference on the Law of the Sea in the spring of 1960 having participated in most of the fishery negotiations in which the United States engaged with various nations, international conferences called on this subject under the aegis of the Organization of American States and the United Nations, and sessions of the International Law Commission and the General Assembly of the United Nations devoted to this subject.

LAW OF THE SEA

The law governing activities upon the ocean is quite different than the law governing activities on the land both in basis and in substance. The essential difference stems from the type of ownership.

Substantially all of the dry land in the world (comprising about 29 percent of the earth's surface) is the property of some group of people organized into a

sovereign nation. There are presently about 115 such sovereign organizations. Within the territory of each such organization, or nation, the laws it has devised for the governance of its own citizens are supreme excepting as it has agreed to their modification in specific instances by treaty among it and other sovereign nations. Infringements of any these several bodies of law are punishable by the sovereign of that territory and by no other.

On the other hand substantially all of the world ocean (which, with its communicating seas and gulfs, covers a little more than 71 percent of the earth's surface), is the commonly owned property of all of the sovereign nations of the world. Individual persons do not, and cannot, own any part of this great expanse of territory. It is governed under international law. Individual citizens of any country can be, and are, the objects of international law but only sovereigns are its subjects. The essence of sovereignty is independence of other sovereigns.

The activity of any person or entity upon the ocean, so long as it affects only other persons or entities subject to the same sovereignty, falls within the purview of the law of the sovereign of that person or entity, and infractions are punishable only by it. In the United States (and many other countries) a separate body of law called admiralty law, covers the bulk of such activities. This law is at the Federal Government level. There is also much other law at the Federal level bearing upon such activities growing out of various Federal laws adopted to implement agreements made among the United States and other sovereign governments, the Submerged Lands Act, the Outer Continental Shelf Act, etc.

Within the U.S. system of sovereignty certain important segments of this sort of law have been delegated to the purview of the law of the several State governments of the Union. Among these are the regulation of fishing and of the harvesting of resources of the Continental Shelf in certain definite areas defined by the Submerged Lands Act and the Outer Continental Shelf Act. Thus there are 50 separate bodies of law governing these sorts of activities under, in, and on the ocean by U.S. citizens.

When, however, actions of a person or entity on the international common of the high seas affects, or comes in conflict with, the activities of a person or entity pertaining to another sovereign these effects or conflicts are governed under international law. This is the law which governs sovereigns and not their subjects. It is with this sort of law which the present statement is primarily concerned.

Much of the comment which has given rise to H.R. 5175, and similar proposed legislation, suggests that there is no regularized public order of the ocean. To the contrary the public order of the ocean is highly regularized, most of it has been rather recently codified in four conventions arising from the 1958 Geneva International Conference on the Law of the Sea, and there are a number of excellent and comprehensive reviews of the status of this law in most prominent languages, and particularly in the English language.

Most of the present ferment over the law of the sea in the United States is not due to lack of law, or uncertainty about it, but to the impossibility of the U.S. Congress legislating effectively in respect of it so as to keep it abreast of desired public policy in the United States, and to the very slow and cumbersome methods by which the U.S. Government can obtain modification of this body of international law to comport with its views of proper public order and policy.

Within the United States there are bodies of citizens who want some aspect of the law of the sea modified in one direction and others who want the same aspect of it modified in another or opposite direction. This conflict is reflected in representations by both sides of the controversy to the legislative branch of the U.S. Government. In most conflicts of interest like this among groups of its citizens the United States resolves the problem by a legislative action in the Congress, and appropriate action in the executive branch of the Government, all subject to review by the judicial branch in the light of the Federal Constitution, other law, general public interest, etc. In the case of such conflict of interest over the law of the sea, however, the legislative branch cannot initiate this sequence because it is without power to legislate effectively in this field. Other sovereigns are not required to take cognizance of any of its actions as affecting their own citizens.

The only way the matter can be moved is for the executive branch of the U.S. Government, as the sovereign in international relations, to reach agreement on the change in international law with the other affected sovereigns.

If the subject in conflict affects only one or a few sovereigns the United States is often able to obtain such agreement rather readily but the agreement is with-

out effect in respect of sovereigns not party to the agreement, or in respect of their citizens. If it is desired to change a basic part of international law there must be general agreement amongst the nations. Even then the agreement is not binding upon any sovereign (or its citizens) not a party to the agreement. Amongst those sovereigns who have agreed to accept the jurisdiction of the International Court of Justice recourse to that body may be had in case of conflict under recognized international law, but by no means all sovereigns have accepted that jurisdiction. The U.S. Government is one sovereign which has not fully accepted that court's jurisdiction.

THE PROBLEM

The primary problem with which we are here engaged, it appears to me, is not a knowledge of the law of the sea, or a lack of the law of the sea, but a most frustrating inability to quickly change the law of the sea to conform either to our ideas of how it should be construed, or to keep it abreast of new demands brought about by new sorts of uses capable of being made of the sea arising from the application of advances in science and technology. The new problems arising out of the burgeoning increase in knowledge and understanding of the ocean, and of new technologies capable of utilizing this new knowledge and understanding, are thrusting themselves at us in an intemperate and uncontrollable rush; at the same time we do not have several of the old problems yet resolved.

In my view what is wanted is not just a study of the law of the sea. Many fine studies of this nature are on the shelves of the Library of Congress. What is wanted, instead, is an examination of what these new and old problems respecting the use of the sea are, and are likely to become; how they impinge upon the existing law of the sea; and what should be the public policy of the United States in respect of these problems, jointly and severally, which would best serve the general and long-term interest of the United States.

The term jointly and severally is used advisedly and not as a term of art. Our experience over these past 20 years is that it is enormously difficult, if indeed it is possible, to open up for modification one aspect of the law of the sea, and get that attended to according to our satisfaction, without at the same time having other sovereigns open up for modification other aspects of the law of the sea whose adoption would adversely affect our interests in a major manner. It may be instructive to consider one example, that arising from new knowledge and technologies making possible the harvesting of petroleum resources from beneath the sea.

PETROLEUM RESOURCES

During the last World War, and shortly before, it was discovered that large resources of petroleum underlay the land under the sea bordering the continents and technologies were developed which made it practical to harvest these newly found resources under deeper and deeper water, farther and farther offshore.

Much accumulated knowledge arising from harvesting such resources under dry land indicated that there required to be a governing of the means of harvest so that the individual and the public interest would be best served. Furthermore, the tax revenues that could be expected from such harvesting, as well as the possible profits, were very large. U.S. law was not clear in all cases as to whether these resources fell within the purview of the Federal Government or of the several State governments. Great political and legal turmoil ensued within the United States over these questions which was finally resolved by judgments of the Supreme Court and new acts of the Congress. These aspects of the problem were solely within the purview of the United States as long as they were confined to area within the territorial limits of the United States which were then, as now, considered to reach out seaward by 3 marine miles from the dry land of the United States, with the possible exception of some areas facing on the Gulf of Mexico.

The trouble was that these petroleum resources extended out to sea more than 3 miles, and more than 12 miles in some instances, and were harvestable in these more remote locations as well. Their harvesting in these more remote areas of the Continental Shelf required governing just as it did elsewhere, and for substantially the same reasons. But the resources on the Outer Continental Shelf did not belong to the United States, or to any other single country, under international law, and they were in the international domain. To clarify this problem a change in international law was required.

Toward the end of the war the Department of State undertook inquiries among the principal maritime nations aimed at finding out whether or not there would be agreement to changing international law so that the resources of the subsoil of the Continental Shelf would appertain to the adjacent coastal country so long as the character of the superjacent water as high seas was not altered. It discovered that there was almost uniform agreement among these nations to such a change.

It is important to note, in reading what follows, that neither then nor since has there been any substantial disagreement amongst nations respecting this change in international law.

Accordingly President Truman, in September 1945, issued a proclamation declaring the subsoil of the Continental Shelf and its resources adjacent to the United States as appertaining to the United States, and specifically stating that this claim did not purport to change the character of the superjacent water as high seas. All of this was agreeable among the nations and led in the direction of settling the internal squabble amongst the States and Federal Government in the United States as to which owned and would govern, and collect taxes from, the harvesting of these resources.

Also President Truman's proclamation opened a Pandora's box of claims by other sovereign nations seeking to alter other aspects of the law of the sea in manners critically disadvantageous to U.S. desire and interest. It took 15 years of very serious diplomatic activity by the United States and its allies to bring these other claims under control, and all of them have not yet been extinguished.

The reasons for this included:

(1) Informal diplomatic notes are not binding in general in international law. There requires to be a treaty which is signed and ratified by each sovereign to which it applies.

(2) If the matter is of general interest, as is a change in the law of the sea, a conference of plenipotentiaries is required to which all nations affected may come. Decisions of substance at such conferences require a two-thirds majority vote.

(3) Other sovereigns, while agreeable to the change the United States had in mind, had other changes in the law of the sea which they wanted made. Several of these would have been severely damaging to U.S. interest if adopted. These other sovereigns did not wish to vote for the ideas of the United States in the ensuing conferences held on this subject if the United States would not vote for their ideas.

To start this action off, Mexico in October 1945 indicated its intention of claiming as its sovereign territory the sea, as well as the Continental Shelf, adjacent to its coast to such a distance as it felt from time to time to be appropriate. Argentina in October 1946 claimed as its sovereign territory both the Continental Shelf off its coast (several hundred miles wide in some places) and the sea above it. Chile in June 1947, having a very narrow Continental Shelf but not wishing to be left out, claimed sovereignty to the sea and the land under it to a minimum distance of 200 miles offshore. Peru in August 1947 followed with a similar claim. Other claims of varying nature by other sovereign nations followed.

In Latin America these claims became politically active in the Organization of American States and its specialized organs. By 1954 there was a general sentiment in Latin America that the proper breadth of the territorial sea for Latin America was a minimum distance of 200 miles. Those nations sought to adopt that policy as international law for the Latin American region. This was impossible to do under international law because—

(1) twenty-one nations in one region of the international commons cannot legislate away the rights of the other 94 nations in that region by their own unilateral action, and

(2) it is impractical to legislate for one sector of the high seas without legislating at the same time for the rest of it.

These conflicting and extravagant claims in Latin America could not be lived with by the United States as a principle maritime power. Mercantile and military policy, quite aside from resource harvesting policy, absolutely forbid becoming subject to such claims. The same was true of other maritime nations.

Accordingly the United States stimulated the United Nations and its specialized agencies to become active in this subject, as a means of getting this by now flaming controversy into an arena where it could be brought under control.

The International Law Commission began a study of this subject at its first meeting (in 1947) and brought out reasonably comprehensive reports and recommendations in time for consideration by the 1954 General Assembly.

At the 1954 General Assembly the Department of State felt confident that it could get agreement on the key change it wanted in the law of the sea—that the Continental Shelf and its contained resources would appertain to the adjacent coastal country without changing the character of the superjacent waters as high seas. In this aspiration it was sadly disappointed because at this point it ran headlong into the fishery problem which it did not then, and still scarcely does, think to be of much consequence.

THE FISHERY PROBLEM

The fishery problem is exceedingly complex. It has been considered in detail by other authors and I will treat it in an oversimplified manner here expecting that the serious student will go to the extensive literature for more intense inquiry. In the context of the conditions of 1954 the following aspects of this complicated problem were politically active:

(1) Iceland lived from the ocean. Well over 90 percent of its gross national products came from the ocean. It sold this product primarily in Europe, whose fishermen also came to fish in the Icelandic sea area. Iceland wished to exclude these European fishermen from these grounds in order to improve both the fishing opportunities of its own fishermen there, and their market opportunities in Europe.

Under ordinary conditions such a position would have appeared to be impossible of attainment but the mid-1950's were not ordinary times. The cold war struggle was at its peak. Keflavik Airport in Iceland was then absolutely required for the quick transport of fighter planes (and other airborne material) from the arsenal of North America to the possible theater of war in Europe. The fjords of Iceland were ideal as bases for submarines to be used in interdicting surface commerce between North America and Europe if that were desired. Accordingly in the mid-1950's Iceland had an extremely valuable bargaining position between Eastern Europe and the NATO allies on its aspect of the fishery problems. It set out to exploit this bargaining position with great skill and force.

(2) Japan was just then coming back in the good graces of the comity of nations under the strong tutelage and sponsorship of the United States. The United States required, at that stage of history, a strong bastion on the eastern side of the Communist land mass (Japan) just as eagerly as it did on the western side of it (Western Europe). At that stage of history Japan was almost as dependent upon the sea fisheries as was Iceland. The difference between these two key allies, was, however, diametric. Iceland wanted everybody else to stop fishing in her sea area; Japan wished to fish in all sea areas.

(3) The key Latin American countries in this imbroglio at this stage of history did not have considerable fishing industries but wanted them in order to improve their economies. They conceived that if they could attain sovereignty over the fishing grounds in the high seas off their coasts they could—

(a) Derive taxes from the fisheries by other nations off their coast; and

(b) By a judicious use of the taxing and other powers inherent in sovereignty, induce the rapid development of fishing industries in their countries by capture if not by other means.

(4) Aside from being caught in severe diplomatic squeezes amongst its allies in these controversies, the Department of State found itself in just as tight, and just as violent, domestic political difficulties. The Pacific Northwest salmon and halibut fisheries wished to keep Japanese from fishing salmon and halibut on the high seas, and especially in the eastern Pacific. The California tuna fishermen made substantially all of their catches in the high seas off western Latin America and wished to continue doing so. The gulf coast shrimp fishermen made a considerable part of their catches off Latin America and wished to continue doing so. The New England fishermen were being squeezed out of their own market by imports of Icelandic fish and were then fishing the Grand Banks and Nova Scotia banks off Canada. They did not wish to assist Iceland further in the market and they did not wish to give Canada excuses to exclude them from the Continental Shelf fisheries off the Maritime Provinces and Newfoundland (which had recently become a part of Canada).

All four of these groups were vigorously active politically in the United

States and they represented the same schism of policy internally with which the Department of State was faced externally on this aspect of the problem of the law of the sea.

The immediate effect of these conflicts on the 1954 General Assembly was that Iceland teamed up with Latin America and other like-minded minor powers to prevent a solution of the Continental Shelf (petroleum) problem until the fishing limits problem was solved at the same time. The preparatory research and diplomatic activity respecting the fishery problem had not been done by the International Law Commission which had requested that a conference of experts be convened to advise it on the technical aspects of the fishery problem. In a brilliant tour de force the Icelandic representatives caused—

(a) The whole problem to be referred back to ILC for further study as a whole, and

(b) An International Conference on the Conservation of the Living Resources of the Sea to be called under the United Nations.

The United States required to support this move because—

(a) It could not get this problem out of the OAS system, where it faced certain and disastrous defeat, except by transferring the action to the U.N. system, and

(b) It could not use the U.N. system unless it would consider the fishery limit and the Continental Shelf issues together as one unitary problem.

ABSTENTION ISSUE

Under these pressures the Department of State moved surefootedly and vigorously. The four internal political forces (salmon, tuna, shrimp, New England ground fish) found that they had to form a temporary truce internally in order to give the Department of State strength to operate externally or none of their positions would have a chance to prevail. Accommodation of their interests were found in this internal formula:

(1) The shrimp, tuna, and New England people would not oppose an attempt by the Department of State to seek adoption of the principle of abstention into international law if,

(2) The salmon and halibut people would not oppose an attempt by the Department of State to secure international consent to a narrow territorial sea and freedom to fish under appropriate conservation regulations as needed on the high seas.

Roughly speaking the principle of abstention provided that where it can be demonstrated that a stock of fish in the high seas is being fully utilized by the fishermen of one or more nations, and where the fishery in question is under scientific management and regulation designed to provide from that stock of fish the maximum sustainable productivity, the nations whose fishermen have not historically fished on these stocks should agree not to fish upon them so long as the nations fishing them continue to carry out necessary conservation measures and to fully utilize the stocks. Fishing in the same areas for other stocks of fish would not be affected.

It will be noted that this gave the Department of State a perfectly schizophrenic position to sell internationally on the fisheries issue by being on the side of freedom of fishing on the one hand while against it on the other. This schizophrenia was conveniently cloaked under the all-covering mantle of conservation—creating conditions which would lead to the obtaining of the maximum sustainable yield of food from the ocean. Indicating the complexity of these issues, this cloak has logical validity.

The shrimp, tuna, and New England people accepted this formulation secure in their belief that no considerable group of nations would agree to such a self-defeating proposition as the so-called principle of abstention and that in the ensuing diplomatic activities the principles of a narrow territorial sea and of freedom to fish on the high seas under appropriate conservation regulations would win out.

This strategy worked with complete success. At the United Nations Conference on the Conservation of the Living Resources of the Sea held at Rome in the spring of 1955 the salmon and halibut advisers on the U.S. delegation, in the last analysis, requested the delegation not to put the principle of abstention to a vote because a precount of possible votes satisfied them that it would be soundly defeated and thus permanently killed. The principles of a narrow territorial sea and freedom to fish on the high seas under appropriate conservation regulations survived this Conference unscathed.

The same situation was repeated at the 1955 session of the International Law Commission in Geneva, held directly after the Rome Conference. As an added attribute of these two conferences the extravagant 200-mile claims to extending sovereignty were overwhelmingly killed.

THE COLD WAR AND THE INTERNATIONAL STRAITS ISSUE

Remember that all of this imbroglio had been brought to the fore by an attempt to regularize the handling of petroleum harvesting rationally on the Continental Shelf by means to which nobody in the international community was strongly opposed, and on which there was almost uniform agreement. By the end of 1955 this problem was no closer to being settled than it had been at the time of Truman's proclamation in 1945, because it had become entangled in other controversial issues surrounding the law of the sea.

There now arose, at the 1956 session of the International Law Commission, a latent separate issue which was quickly to gather more diplomatic strength than all of these other issues combined. This was the issue of the 12-mile limit for the territorial sea and the contingent international strait issue. In the activities at Rome and Geneva in 1955, involving the fishery aspects of this subject, the Russian and United States delegations had acted together as complementarily as if they had had the same instructions, for the reason that their fisheries interests were essentially the same. From 1956 through 1960 these two powers came into violent opposition in the ensuing actions respecting the law of the sea because when the 12-mile issue came into play the world power struggle automatically came to the fore and on this issue the United States and Russia were as far apart in the period 1956-60 as great powers can be without going to war.

Again one must oversimplify the comment because of space restrictions and refer the more serious student to the ample literature on the subject for adequate detail.

Essentially the military problem came down to this issue: Under a 3-mile breadth for the territorial sea a naval power like the United States could bring its power (under late 1950 military technology) quite quickly to bear on any trouble spot in the world and if it could maintain its supply lines to this trouble spot by sea it would have great advantage at war vis-a-vis a land power such as the then existing Communist alliance. Under a 12-mile breadth of the territorial sea an estimated 116 important international straits would fall subject to national sovereignty. Even under a 6-mile rule for the territorial sea 52 of these straits would be so affected. Also high seas areas like the Aegean Sea would become mostly territorial sea over which air flights could not be made without permission of the neighboring sovereigns. Additionally, in many parts of the world ocean the naval task force required by the military technologies of the late 1950's could not be deployed because there would be inadequate sea room for this purpose.

Naturally Russia, under the world power conditions existing in the late 1950's, would have given almost anything to secure international agreement to a 12-mile territorial sea; just as naturally the United States would have given as much to get international agreement to a 3-mile breadth for the territorial sea and thus preserve the status quo. The 12-mile issue was of such overwhelming importance to both these giants, because of the military overtones it bore, that both threw aside their respective fishing interests and concentrated their diplomatic strength on the military-diplomatic issues in the ensuing conferences from the spring of 1956 through 1960.

There was never the remotest chance that in the period 1956-60 Russia could get even a simple majority of nations to agree to a 12-mile limit for the territorial sea. On the other hand if she could prevent the United States and its allies from achieving agreement to a 3-mile limit for the territorial sea she could establish the framework which might permit the establishment of a 12-mile limit at some future and near time. A great number of new nations were due to come into being in 1960 and directly thereafter. How they might vote in a subsequent conference on this issue, if it could be kept open, was moot. Russia felt, and the United States feared, that Russia might win in the course of time if the 3-mile issue were not settled before all of these new nations became independent.

The key to the whole issue was the rules of procedure in international conferences held under the auspices of the United Nations. It requires a two-

two-thirds majority to win on substantive issue; one-third plus one vote can block the adoption of a substantive measure.

Russia, in the period 1956-60, with its captive and allied bloc votes, could not get a blocking one-third of the votes. At this juncture of history, however, came the Suez incident and the rallying of an Arab bloc devoted not necessarily in favor of the Soviets, but against Israel. For reasons too long to go into here the League of Arab States felt that a 12-mile limit for the territorial sea would aid their effort to strangle Israel economically. The Arab bloc plus the Soviet bloc votes added together comprised almost a blocking third for the Conference, Russia required to pick up only another two or three dissident votes and then wait for history to take its course.

THE GENEVA CONFERENCE ON THE LAW OF THE SEA, 1958 AND 1960

Over this issue the two United Nations Conferences on the Law of the Sea of 1958 and 1960 were fought. From the first Conference four excellent treaties emerged which codified almost the whole of the law of the sea. These were: Convention on the High Seas, Convention on the Territorial Sea, Convention on the Continental Shelf, and Convention on Fishing, and Conservation of the Living Resources of the High Seas. They form an admirable framework of international law for administering public order on the ocean, as far as they go. They have been undergoing, since 1958, the time-consuming process of obtaining sufficient ratifications to come into force. The first three treaties had obtained sufficient ratifications for this purpose by 1964 and are in force. The fourth requires four more ratifications to come into force and this should happen during 1965 or early 1966. They can be taken as presently representing the law of the sea.

The Convention on the Continental Shelf, by coming into force in 1964, finally accomplished the U.S. policy on the resources of the subsoil of the Continental Shelf enunciated by President Truman in 1945, and put into domestic law by the Congress in the Submerged Lands Act, and the Outer Continental Shelf Act of 1954. This did not, however, quiet the diplomatic, military, fishing, and domestic political hornet's nest which the original proclamation nearly 20 years ago had stirred up.

The 1958 Conference on the Law of the Sea left two issues unresolved:

(a) The breadth of the territorial sea; and

(b) The limits of control by the coastal State over the fisheries in the high seas off their coast.

These issues were partially resolved. The International Law Commission, in its 1956 session, had said that these limits lay between 3 and 12 miles, that any limit beyond that was outside international law, but that between those two ranges there was no agreed limit binding upon nations. The 1958 Conference was unable to agree on these issues because of conflicts over the fishery problem. The abstention issue and the 200-mile issue had been killed but whether the fishery limit was to be 3 or 12 miles, or somewhere in between, could not get a two-thirds vote at the 1958 Conference any better than could the territorial sea limit, and the latter lost its chance because of the residual conflicts over the former. The only thing that happened on these issues were clear votes overwhelmingly in favor of no limits in either instance beyond 12 marine miles in breadth. Both Russia and the United States were in favor of that.

These two issues could not be resolved in the 1958 General Assembly either and it established the Second Geneva Law of the Sea Conference for 1960 to consider just these two issues.

At this conference the whole of the diplomatic forces of Russia and the United States were opposed to each other headlong. The petroleum-Continental Shelf issue was out of the way; the bulk of the law of the sea was codified, agreed to, and not at issue; the fisheries interest was completely submerged by the supervening military-diplomatic issues in the positions of both the principal combatants. The issue at all times was desperately close as to whether the United States could obtain a two-thirds vote for a narrower territorial sea than 12 miles, or whether Russia and its allies could obtain a blocking third of the votes and prevent any agreement.

In its vigorous and desperate struggle for votes the United States compromised, step by step, until both its fishery and naval interests would have been seriously compromised had the final compromises been acceptable. The United States was prepared to accept a 6-mile limit for the territorial sea in the last analysis in

order to prevent the eventual impact of a 12-mile limit. While the 12-mile limit would have put 116 important international straits under national sovereignty, the 6-mile limit would so reduce 52 such straits and the U.S. naval people would not have considered that much of a victory.

Throughout the whole intense Conference the fishery issue was intractable. There was no way in which a two-thirds vote on anything could be had because there were always enough dissident fishery votes on any formula that was suggested so that the Russian-Arab bloc could make up a blocking third. The United States finally adopted a fishery position likely to be least offensive to its allies, quit compromising on the fishery issue, and sought to drive its combined last compromise position through by sheer diplomatic power.

The result of all this intensive work really came down to this: A simple majority of nations were always, and I think still are, in favor of a 3-mile limit for the territorial sea. These include the principle maritime nations. They never got a chance to indicate this by any vote because there obviously was not a two-third majority in favor of this limit. The reason for this was that allies, some of whom wanted a 3-mile territorial limit strongly, wanted special fishery concessions of one sort or another that other allies would not accept.

In the last analysis the final compromise lost by one vote, and that was on the fishery issue. There was a considerable sigh of relief that it was all over. The principle of the narrow territorial sea had not only won over the Russian principle of a broader territorial sea, but had won by a larger margin of votes than it had done at the 1958 Conferences. Since the compromises suggested by the United States to attain these votes had been defeated the United States could, in good conscience and under international law, revert to its 3-mile limit position, which the chief of the U.S. delegation promptly did at the end of the voting.

But it was a close thing, that none of the participants would like to see repeated.

THE AFTERMATH

At the conclusion of the 1960 Conference on the Law of the Sea the United States publicly reverted to its policy of a 3-mile breadth for the territorial sea and plainly stated that the other positions it had put forward on this subject during these Conferences were compromises designed to reach agreements. Since no agreement had been reached, these compromise suggestions were not to be taken as representing continuing U.S. policy.

Not only has the United States said this publicly but it has backed up this policy by force of arms off Matsu Island and elsewhere in the Orient in the ensuing years, and is doing this now on almost a daily basis in the Gulf of Tonkin. The situation of North Vietnam, the island of Hainan, a carrier task force, and a small war form a precise example of why the United States, a sea-air power, requires a narrow territorial sea in international law and why the Communist land powers favor a broader one.

The number of member nations of the United Nations has increased from about 88 in early 1960 to about 115 in early 1965 but there has been no stampede of the new countries to a 12-mile limit for the territorial sea. As a matter of fact Monday morning quarterbacks looking backward could say that the 1960 Conference should have been postponed to about 1962, because it turned out that the former French colonies since becoming independent nations have mostly held to French guidance in general non-African foreign affairs, and the French position has been solidly in favor of a 3-mile territorial sea.

In the interval also the International Convention for the North Pacific Fisheries, which had in it the only international recognition of the so-called principle of abstention even temporarily in any agreement among nations, has run its initial 10-year period and is under renegotiation. The Japanese have stated flatly that, while they are only too happy to join in on all efforts needed for the conservation of the fisheries of the North Pacific, they will not agree to any new treaty which contains the principle of abstention either in those words or cloaked in other terminology. Accordingly that issue is dead.

Iceland has reached an accommodation with the other European fishing nations under a formula which retains a narrow territorial sea but has a 12-mile limit exclusively for fishery jurisdiction. This issue appears to be quiescent and may even be fully settled.

The extravagant territorial and fishery jurisdictional claims of Latin American countries were firmly killed in 1955 and buried in 1958.

The vast bulk of the law of the sea has been codified and accepted by the nations, and is no longer in issue among them.

Much is heard these days to the effect that the delegations of the United States to these two International Conferences on the law of the sea were ill prepared, poorly led, or incompetent. I served as an adviser to the U.S. delegation to both of these Law of the Sea Conferences, as I have served on many other delegations to other conferences over the past 18 years, including several of which I have been chief of delegation. I can say unequivocally that these two delegations had better and more complete background material prepared and available to it, better diplomatic preparation made for it, was more competently led by a chief of delegation who had superb direct support from the President of the United States, the Secretary of State and a well-rounded delegation of highly competent experts in all pertinent fields, and had the full support of every U.S. mission in every country in the world more quickly and efficiently at the command of the chief of delegation in Geneva, than has been the case of any other delegation of the United States upon which I have served or about which I have heard.

Nevertheless we came very near to losing our shirts. Surely from this experience some useful lessons can be learned, and these should have some pertinence to the present legislation. Some of these lessons are:

(1) Do not attempt to open up for modification any aspect of the law of the sea without a very careful study and estimation of what other aspects will be opened up at the same time by other independent sovereign nations, whether friend or foe.

It is to be noted that during the 20 years of this last hassle we had much more serious trouble from our closest allies we had from our most vigorous foes.

(2) Having ascertained as well as possible what other aspects will be opened up do not get involved in any international conference on any aspect of the subject until all aspects which may be opened up have been examined from the standpoint of the general and long-term interest of the United States. It is necessary that each aspect be examined from the standpoint not only of what the United States will gain from a favorable vote, but what it will lose from an unfavorable vote, and also from the standpoint of what compromise may be necessary during the course of the negotiations.

It needs to be understood that to win a vote and an issue in a United Nations conference it is necessary to get a two-thirds majority vote of those present and voting. On several quite important issues in all four of the conventions resulting from the 1958 conference the U.S. delegation required to modify its desired position materially in order to line up enough votes so as not to lose the issue, which would have been worse. Even then some of the wins came by only a one-vote margin, and the terminal vote at the 1960 conference was lost by only one vote.

(3) Having examined all issues likely to rise at such a conference, and then evaluated what the interest of the United States would be if it lost on any, or a few of those issues, only then is it possible to evaluate whether or not the United States wishes to reopen the law-of-the-sea controversy on any issue, or whether it is not best to get along with what exists and let sleeping dogs lie.

(4) If the decision is to reopen the matter then legal, technological, scientific, political, and diplomatic spadework must be done in depth and detail which the sponsors of H.R. 5175 may not have thoroughly thought through.

Otherwise, on the basis of our full experience of the 20 years from 1945 to 1965, one can wager confidently that the United States will lose more than it will gain from reopening the law of the sea for modification.

THE PRESENT SITUATION

One must keep in mind that almost all aspects of these issues are quite different in 1965 from what they were in 1945, or even in 1955. An incomplete list of these changed conditions may be instructive.

(1) In 1945 the United States was overwhelmingly the dominant military and diplomatic power in the world. In 1955 there was no other prominent divisive power except Russia and the Communist bloc. In 1965 neither the United States nor the Russian alliances are sufficiently tight so that blocks of votes can be much depended upon, and there are several subsidiary centers of diplomatic activity quite competent to act independently only for the purpose of

showing that they are independent and not even necessarily in their own best long-range interest.

(2) In 1945 our knowledge of the ocean and its resources was not markedly different than it was in 1905, and the situation by 1955 was only beginning to change. In the past 10 years we have learned more about the ocean and its resources than we knew totally in 1955, and ocean knowledge and understanding is just now beginning to develop rapidly as the ocean science and technology of the United States, Russia, and many other nations spurts forward.

It seems certain that our knowledge of the ocean and its resources in 1975 will bear only a modest relationship to our present knowledge and understanding of these things. I do not think we can sensibly predict at the moment what the ocean use problems will be in 1975.

(3) The important players in the game in 1965 have quite different rank, status, and objectives than they had in 1955.

In that year Peru was not even considered to be a fishing country; in 1964 it became the biggest fishing country in the world in terms of volume of catch.

In 1955 the geographical position of Iceland was critical to the NATO alliance; in 1965 long-range jet airplanes, nuclear-powered submarines carrying Polaris missiles, and other weapons and logistic systems have rather strikingly changed the military parameters of this problem.

In 1955 France was a lesser factor diplomatically in amongst the other nations of Western Europe, and the United Kingdom was still strong; in 1965 France assumes a quite different diplomatic rank and is not disposed to accept much guidance from the United States, or any other nation.

In 1955 Japan and Germany were still recently defeated nations knitting up the wounds of war, repairing their economies, and being very cautious diplomatically; in 1965 both stand among the rich, powerful, industrial countries and assume steadily the stronger diplomatic posture that goes with these things. In 1955 the United States stood next only to Japan as a fishing nation and Russia was a largely land power; in 1965 the United States stands about fifth in the rank of fishing nations; Russia has double the fishing power the United States has, is still rapidly advancing in that field, and is now setting out with what appears so far to be successful efforts to similarly overtake and pass the United States in the merchant marine field, etc., etc.

(4) The production of fish from the world ocean has doubled in the past 10 years; it has been increasing at the rate of 8 percent per year in the past 5 years; and the rate of increase appears still to be increasing. This has brought a whole new range of conditions.

(5) Mining for oil and gas at sea in 1945 was experimentally possible; in 1955 commercially possible; and in 1965 has become one of the major world industries. The Persian Gulf has about as many oil wells in it as around it; the North Sea and the Baltic Sea are being explored for production as if the water was not there, etc., etc.

(6) People were thinking about scuba diving in 1945 and in 1955 it was beginning to be a sport. Now the ocean has scuba divers in it like it formerly had swimmers on it; men have lived for weeks at 50-fathom depths in undersea houses built for the purpose; it is evident that there are no physical, psychological, or physiological reasons why men cannot work for useful periods to depths of 100 fathoms; and there is no reason to think that men will not be prospecting the whole Continental Shelf as thoroughly as they do the land in a few years, and perhaps more safely than they have done the western deserts and mountains. The wealth of the Continental Shelf is about to be tapped thoroughly.

(7) Vast deposits of highly valuable minerals (manganese, vanadium, cobalt, nickel, etc.) have been found on the deep seabed in such profusion as to stagger the imagination and steps are already afoot to bring them to harvest. Not only are those deposits so large as to be able to provide the whole world industry with its needs for these metals for a thousand years, but some of them appear to be being deposited at a rate greater than total world use at present.

(8) In 1945 we could say stoutly that Asiatics should fish on salmon from Asiatic streams and stay away from our side of the ocean in salmon fishing; in 1965 we know that salmon from Asiatic streams can be caught commercially in the Gulf of Alaska, and salmon from Alaskan streams can be caught similarly off the Asiatic foreshore. Bluefin tuna tagged off Mexico are caught in the Sea of Japan; others tagged off Bermuda are caught off Norway and France; those tagged off Norway are caught in the Mediterranean. Skipjack tuna tagged off

Mexico are caught off Hawaii; albacore tuna tagged off Mexico are caught off Japan.

All of this is new information since 1945, and most of it since 1955. We are just beginning to learn about the movements of the living resources of the sea and the impossibility of fencing them into pens constructed of nice lines diplomats draw on charts at international conferences.

(9) In a million years time, or such a matter, man has learned something of that 29 percent of the earth's surface that is dry land, and learned reasonably well how to bend its resources to his use. Only now is he beginning to earnestly inquire about that other 17 percent of the earth's surface which is the ocean and learn how to bend its resources to his use.

The increase in knowledge and understanding derived from the past 5 years of ocean research with modest resources have been so astounding that one can only say that the major effort now beginning to be directed toward that end is likely to be as important to man's activities and welfare as was the industrial revolution of the 17th and 18th centuries, or the neolithic revolution of the fifth and sixth millenniums B.C.

Whoever can see today what change will be required in the public order of the sea in the next few years is indeed a farsighted person.

SOME QUESTIONS

In the field of public policy respecting the law of the sea one hears a number of questions asked. It may be useful to examine a few of these to see how the law now stands and to see where the interest of the United States may lie.

The 3-mile limit for the territorial sea

(1) The 3-mile limit is outmoded it is said, and the U.S. Department of State should quit acting like an old fogey and get in line with the times. This statement has been said in print repeatedly by one or two proponents and one might ask several questions about it.

If the United States is going to abandon the 3-mile limit for the territorial sea what limit should it adopt? Upon what other limit for the territorial sea could a larger consensus be established? What broader limit for the territorial sea would better serve the general and long-term interests of the United States and the rest of the nations? The International Law Commission has said that there is no case in international law for a limit of more than 12 miles and voted on proposals at the 1958 conference indicate little or no support for a limit beyond 12 miles.

The 3-mile limit never came to a vote in 1958 or 1960. There is no reason to believe that very many who voted for 6 miles plus some formula or other being pushed by Canada or the United States or both to help on the fishery interest, would not have voted as readily for a 3-mile limit. It is certain that a considerable number of countries that voted for a 6-mile limit, plus something, under pressure from the United States in search of a compromise to get a two-thirds vote, left the 3-mile limit most reluctantly. It was my belief then and now that a majority of nations, and certainly the group of nations carrying the bulk of the world's commerce, favored a 3-mile limit then and do now. It was highly doubtful to me then, and is now, that the maneuvering of the United States in 1958 and 1960 to pick up additional votes by going to 6 miles plus something extra for fisheries resulted in adding many votes to its side of the column.

The logic, and the history of the logic, for the 3-mile limit put forward repeatedly by the United States was not successfully met then nor has it been yet. This logic was simply weakened by trying for a 6-mile limit.

The extremely vigorous efforts of Russia to get support for a 12-mile limit in 1958 and 1960 was without success. It was so lacking in success that Russia never brought the 12-mile limit to a vote because it could not get even a blocking one-third on that issue by itself. It also tried various formulations around this limit to attract additional votes. Its attempts in 1960 to do this resulted in less votes for its proposal in that year than it got in 1958. There has been no rush of nations to a 12-mile limit for the territorial sea in the intervening years since 1960 when so many new nations have arisen.

There is not, and there has not been, any enthusiasm for any limit of the breadth of territorial sea between 3 and 12 miles that has, or has had, as many proponents as even has had the 12-mile limit.

The breadth of the territorial sea has never been agreed to among nations and one sees little reason to expect that it ever will be. There will always be nations

who will wish to seek gain from other nations by controls of one sort or another over navigation or other sea use. This has always been the case and it has been always the responsibility of some country or group of countries to keep the sea open for general use by repressing such special interests as long as there has been history. Whenever and wherever ruling sea strength has waned, from the second millennium B.C. to the present decade, piracy has automatically cropped up quickly. It is present now occasionally in the Celebes Sea and the Strait of Malacca.

The rapid growth of sea use in this century, the swift rise in volume of ocean transport that goes with increasing industrialization throughout the world, and the general increased pace of international communication by sea, make a fully free use of the sea more vital to humanity today than ever before.

Certainly the interests of the United States in all aspects are served best by a narrow territorial sea and before any change is sought in the 3-mile policy of this Government the reasons for this, and the gain to be derived from it, should be subjected to the most critical examination.

The 12-mile limit for fisheries

(2) There is much talk in the United States presently about adopting a 12-mile fishery limit as differentiated from a 3-mile limit for the territorial sea. This derives almost entirely from fishery interests and their representatives who are interested in preventing foreign fishermen from competing with them in fisheries in which they are engaged. This has become politically popular in some parts of the country.

From the fishery standpoint the whole matter is rather trivial, as I have discussed at greater length in another connection. The number of fish stocks fished upon by U.S. fishermen that will gain more protection from a 12-mile limit than from a 3-mile limit are not many or very important. On the other hand a 12-mile fishery limit adopted by neighboring countries off which American fishermen fish will hurt some of our fisheries somewhat in special localities but its effect on the whole fish production of the United States would not be very much either.

Additionally there will not likely be any great amount of diplomatic activity grow out of such an action on our part. Canadian fishermen have pressed their Government already to take such action. Mexico already claims 9 miles of territorial sea on the Gulf of Mexico side and would not be adverse to wider limits. The country fishing off our coast most actively, Russia, is the prime exponent of the 12-mile limit and would undoubtedly be pleased by us taking such action. The countries of northern Europe have already become accustomed to such accommodations off Iceland, Norway, Faroe, etc. Japan is slowly edging toward this viewpoint. Accordingly for the United States to accept a 12-mile limit for fishery jurisdiction only would be a matter of acquiescence not generation of a new action.

Since this will not provide the protection desired by the U.S. groups pressing for this action some attention should be paid in consideration of such action, to the grounds upon which it is taken. If it is taken on the basis of protecting our fishermen from foreign competition then one must have some concern about the political consequences of the lack of such protection that it will afford, and the effect of what the next step these groups want will be upon the public policy of the United States respecting the law of the sea.

One must have some concern also for the eroding effect of a 12-mile fishing limit may have upon the 3-mile breadth for the territorial sea, and judge whether this is of consequence to general U.S. interest.

Continental Shelf jurisdiction

(3) Among the interests in the United States, in both fishing and mineral production, some concern is expressed respecting jurisdiction over the Continental Shelf and its resources.

In the case of mineral resources there still are unsolved some questions of what the limit of the territorial sea of the United States is in the Gulf of Mexico.

This affects the relations of the United States with other countries, and particularly with Mexico. It also can hardly escape having an effect on the relations of the United States to the 3-mile limit for the territorial sea and thus this whole field of its military and diplomatic policy. There is no country, to my knowledge, which claims one breadth for the territorial sea off one part of its coast and another off another part of its coast. How the United States could maintain a 3-mile limit off its east and west coasts and its island

possessions and, at the same time, a 9-mile limit in the Gulf of Mexico, is not clear.

On the other hand the Gulf States continue to press for a 12-mile territorial sea not because of any desire to control the superjacent water and its resource, but because the Outer Continental Shelf Act of 1954 gives the States the resources of the Continental Shelf off their coast within the territorial limits of the United States. They want the oil and gas under this extra 9-mile strip of bottom off their coasts, or at least the revenues therefrom.

Aside from this, the jurisdiction over the resources of the subsoil of the Continental Shelf and of at least the upper part of the continental slope appears to be quite clear. All of this under existing international law is subject to the exclusive jurisdiction of the United States vis-a-vis the rest of the world. Inside this jurisdiction that part of the Continental Shelf within the territorial limits of the United States is subject to the governance of the adjacent State of the Union, and that outside those limits is subject to the governance of the Federal Government. In either case a body of law exists for the governance and this does not differ markedly from the way such resource harvesting is done ashore, respectively, under State or Federal law. A person or firm can acquire title to, or can lease, land areas of definite dimensions and have exclusive rights to the harvest of the resources under that land.

This law stems from the Outer Continental Shelf Act of 1954. Although there are little, if any, international implications in it, if a review of the effect of the law of the sea is to be made it may be well to review the effect that these State and Federal laws have had upon the stimulation of the harvesting of these resources, and whether or not modifications in them might be required if it is desired to stimulate a more rapid harvesting of these resources.

The living resources of the high seas over the Continental Shelf, or those that in the harvestable stage are mobile without being in constant physical contact with the seabed or the subsoil, present a quite different, and tremendously complex, series of problems. These support the major present fisheries of the world.

There is a considerable body of thought in the United States and elsewhere in the world that these resources and their harvesting should be under the exclusive jurisdiction of the adjacent nation. Argentina in 1946 clearly claimed sole sovereignty over the Continental Shelf and the epicontinental sea. So have some other countries rather less clearly. This is what Iceland wanted in its international strivings during the 1950's. I think that a clear majority of the citizens of Alaska want just this, and there is much sentiment for such a policy from the coastal fishermen of other coastal States of the Union as fishermen from Asia and Europe increasingly fish off the coast of North America. At the 1958 Geneva Conference on the Law of the Sea voting was very close as to whether bottom fishes should not be considered as resources of the Continental Shelf and thus be subject to the exclusive jurisdiction of the coastal State. It is unlikely that this sentiment has lost ground in the United States or in other countries in the intervening years. On the contrary, should the United States wish to open this question in an international conference it is likely that a simple majority of votes could be had for it although a two-thirds majority vote would perhaps be not possible.

Obviously in a general review of the law of the sea this is one matter that requires major study. The difficulty is that all of the information required for such a study is not available and much of what is available is so scattered through the literature that its collation for study is, in itself, a major task. It is to this task that Senate Joint Resolution 29 and related bills address themselves. That bill is to authorize and direct the Bureau of Commercial Fisheries to conduct a survey of the marine and fresh-water commercial fishery resources of the United States, its territories, and possessions. It gives the Bureau until January 1, 1968, to submit its report and authorizes \$200,000 for the purposes of this study.

It appears to me that Senate Joint Resolution 29 is a necessary counterpart of H.R. 5175 and that both are badly needed. It is impractical to evaluate the legal problems of management, use and control of the natural resources of the oceans and ocean beds unless we have a much better understanding of what those resources are, and how they act, than we presently have.

We have not had a general review of the fishery resources of the United States since 1945 (79th Cong., 1st sess. S. Doc. No. 51, p. 135). That review was much less comprehensive than the one called for by Senate Joint Resolution 29 or than

is needed for present purposes. Since 1945 perhaps as much new knowledge and understanding of the ocean and its resources have been gathered as had been gathered totally up to that time. One simply cannot rationally approach the question of whether it is in the best interest of the United States to attempt to have the living resources over the Continental Shelf appertain to the coastal States until such a study is made.

(4) *What is the Continental Shelf?*

Basic to a determination of what should be the form jurisdiction over the resources of the Continental Shelf or over it, is a definition of the Continental Shelf. The negotiators at Geneva in 1958 found this to be among their most difficult problems. They ended up with the definition: "the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond that limit, *to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.*" [Italic supplied.]

Much is left to be desired about our knowledge of the resources of the seabed and subsoil of the submarine areas adjacent to the coast of the United States to a depth of 200 meters. To authorize and direct the basic research such studies require there are several bills presently before both the Senate and House, and it is highly desirable that an appropriate bill of this nature be passed. Technology has been perfected, or is being perfected, with which the necessary explorations and surveys can be made. As noted previously, there is at present sufficient experience to indicate that man properly equipped can work and live at such depths for extended periods of time. One can be permitted the expectation that within 10 years our knowledge of the resources of the Continental Shelf to a depth of 200 meters will be radically different than it now.

As poor as our knowledge of the Continental Shelf is it is ever so much better than our knowledge of the resources of the continental slope "*to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.*"

Commercial fishing techniques perfected in recent years permit an ever deeper penetration of trawl gear along the continental slope. There are several places where trawling to a depth of 600 meters is commercially practiced and it is said that the Russians are now trawling commercially in the Eastern Bering Sea to depths up to 1,000 meters. Also the general statement can be made that the living resources capable of commercial capture along the continental slope are rich, and in some instances possibly richer than on the adjacent Continental Shelf. The oceanographic reasons for this are not clear, but may be associated with internal waves. In fact not too much is known about these matters to very great depth or in very many places. About the only thing that can be said is that our ideas about the productivity of the continental slope in terms of living resources is undergoing change rather rapidly.

So far as I know our knowledge of the resources of the seabed and subsoil of the continental slope is much more meager than our knowledge of the living resources of the area, which is not very good. We are just coming to the point of developing manned deep sea submergence vehicles that can work conveniently for satisfactory periods of time in adequate depths to explore the continental slope. Instrumentation of all sorts required for exploration at such depths is being perfected steadily and now rather speedily, but it must frankly be stated that our knowledge of the continental slope at present is pretty poor. The exploration of "inner space" is not much less difficult nor will it be much less costly than the exploration of "outer space." Funds have not yet been provided by the Congress for a serious attack on these deeper water problems. Such action by the Congress, however, now appears to be imminent.

(5) *The deep sea bed*

The deep sea bed underlying most of the world ocean (and covering well more than half the earth's surface) lies at depths greater than 2,000 fathoms. We have no information that would lead us to think that there are commercially abundant living resources in such depths. On the other hand there is much information to the effect that there are major, in fact enormous, deposits of valuable minerals on the deep sea bed and that the technology for mining them is on the verge of becoming practicable. This raises all sorts of vexing problems in international law and public policy.

Does the clause "to where a depth of the superjacent waters admits of the exploitation of the natural resources of the said areas" apply to the deep seabed if that is being mined commercially?

The qualifying adjective "adjacent" in the preceding clause of the definition would argue against such a determination, especially in view of the fact that these great deposits are found in midocean far removed from adjacent Continental Shelves, as well as closer to shore. Certainly the negotiators at Geneva had no such interpretation, or development, in mind, as a reading of the pertinent debates clearly shows.

Is it necessary for a property right to be vested in a harvester of such resources in order to encourage him to harvest?

These mineral resources are so vast and cover such enormous areas that it is not at once apparent why a firm would rather have rights of exploitation to one million-acre patch of bottom over that of some hundreds or thousands of other million-acre patches, nor is it apparent what extra inducement to harvesting sole rights of exploitation to a very large piece of ocean bottom would be.

If a property right, or an exclusive harvesting right, is good public policy what governing entity would grant it?

The political turmoil probably attendant to splitting up the ocean bottom as to sovereignty amongst any group of nations, or the whole lot of them seems to me to make this whole approach impracticable, especially while the nations are still making war over sovereignty contests respecting that 29 percent of the earth's surface which is dry land.

It has been seriously proposed by individuals from time to time that ownership in all resources of the high seas and the deep sea bed be vested in the United Nations not only as a means of assuring appropriate governance, but by giving it ability to charge rent for their uses securing the partial financial independence of the United Nations.

Would this be practical? Would it be good public policy for the United States or for other nations? Could the United Nations actually be reshaped to govern 70 percent of the earth's surface even partially? Would it be good public policy for the United Nations to be financially independent? Would such treatment actually speed up making these resources available for the use of mankind?

(6) *The far-ranging fishes*

Fish are perhaps the most vexatious subject with which students and practitioners of the law of the sea have to deal. This has always been the case since there has been what could be called a law of the sea, and it is perhaps more the case today than ever before in a history. Furthermore no easy answers to the fishery problems appear in the horizon. The more we learn about fish, fisheries, and the ocean the more complex and numerous the problems seem to become, and the less tractable the solution.

The effect of changing spawning locations of the herring in the North Sea and Baltic Sea on the composition and strength of the Hanseatic League cities in the 15th and 16th century is well known. The Dutch and English wars of the 17th century over the same general subject have been made much of. But I doubt that there has been a decade since that time when the vessels of one country have not fired on those of another country over a fishery dispute.

The basic difficulty is that commercially important fish of a great many kinds engage in very long migrations which are essential to their life history. Some mention has been made before of the transoceanic migrations of salmon and different kinds of tuna. These are not exceptional. Herring, cod, mackerels, whales, eels, fur seals, halibut, ling-cod, saury, shark, black-cod, and a good many other kinds of fishes are known to regularly migrate over distances of not only hundreds, but of thousands of miles. The more tagging experiments are carried out the more kinds of fish are found to engage in long migrations. These are vital to the life of the species in ways that cannot be successfully modified as yet by man. If the fresh water eel or the penaeid shrimp cannot get out to sea to spawn the species will die; there is no way to kill off a salmon run so quickly and so efficiently as to build a dam across the river so the salmon cannot come out of the sea and go upstream (often a thousand miles upstream) to spawn where it was hatched. These are only glaring and important examples from dozens more that could be cited.

These migrations fall into no regular pattern which would permit a splitting up of the ocean into regions, or even quite big pieces, so that a group or nations could band together and husband all the species well in the area. There is little evidence of much desire by groups of nations to act together in this manner even if it were naturally practical.

There is an International Commission for the North Pacific Fisheries which is one of the most ambitious in area of the intergovernmental fishery commissions

established for this purpose (aside from the whaling commission which has attempted to be worldwide, but which has not worked very well). It only attempts, however, to deal with a few of the commercial species in the area, and these are the boreal, not the subtropical or tropical species.

This treaty grew out of the original thought that if Japanese salmon fishermen stayed out of the eastern Pacific then the United States and Canada could continue to husband and use the salmon which hatched in their rivers. No sooner had the research under the treaty gotten underway than it was found that salmon from North America went normally and abundantly to the western Pacific to feed, that salmon from Asiatic streams came regularly to the eastern Pacific to feed, and that on these feeding migrations they could be readily caught commercially on the high seas. The original basis of thought in the treaty just did not fit the habits of the fish and now the treaty must be rewritten on some other basis, for which a satisfactory rationale is yet to be found.

In the eastern Pacific the tunas are ignored by the International North Pacific Fisheries Commission because they migrate right out of the area into the tropics and on into the Southern Hemisphere. Peru, Chile, and Ecuador have a South Pacific Fisheries Commission which was originally founded to "protect" the sperm whale and tuna from invading foreign fishermen. But the sperm whale ignore the whole thing by wide swinging migrations out of Antarctica, through the area of the South Pacific Fisheries Commission, on out into the central tropical Pacific, and back down to Antarctica, not spending too much of their life in the area of the South Pacific Commission. The yellowfin tuna migrate north out of the area; the skipjack tuna apparently migrate north and west out of the area.

In the North Atlantic there is the International Commission for the Northwest Atlantic to the west and the North-East Atlantic Fisheries Commission to the east. As in the North Pacific neither of these commissions attempt to deal with the Atlantic fisheries of the low latitudes. Bluefin tuna and fresh water eel are known to cross from one area to the other, and other species will probably be found to do so. The Greenland cod make a greater or lesser contribution to the Icelandic cod stocks with the waxing and waning of current strengths in that sea area, the periodicity of which is not yet well understood.

These far-ranging fish simply do not lend themselves to nicely thought-out and compartmentalized governance. The intergovernmental commissions referred to represent preliminary gropings by nations to contend with such problems. Admittedly they are not dealing with these problems satisfactory as yet, but they are the best tools for this work that man has yet been able to devise.

How does one divide the ocean into regions or areas in which the fisheries can be rationally managed and keep the fish in the region or area where they are to be rationally managed?

(7) *The far-ranging fishermen*

Of course fishermen ranged widely under sail. Portuguese fishermen were possibly fishing the Grand Banks when Leif Erickson came by, and certainly shortly thereafter. Rather small sailing vessels from New England discovered many of the islands of the central Pacific in their search for whale, and quite literally fished the whole world ocean. Vitus Bering brought his Aleut sea otter hunters from the Aleutian Islands to Sitka in their paddled kayaks, etc.

But it has been the past 10 years that truly worldwide fisheries have been successfully initiated. It was only 1956 when the first tuna-long liner from Japan came to the Atlantic. Now 170 to 200 long-range long-liners work this ocean out of Japan, and a total of about 700 roam the whole world ocean freely, easily and profitably. Russia has led the way into the world ocean for the European countries and now its vessels fish substantially the whole world ocean. Other European countries are now beginning to expand their fisheries geographically. Taiwan Chinese fish the central Pacific, the Indian Ocean, and occasionally the tropical Atlantic. Norwegian fishermen catch porbeagle shark off New York, land them in Hamburg for transshipment for the Italian market, and are planning to fish tuna in the Gulf of Aden in the off season, etc.

The wide-ranging fishermen are no less a problem for students and practitioners of the law of the sea than are the wide-ranging fish, and for much the same reason. If the fishermen of this type are confined to smaller areas their cost per ton of production goes up, they go broke, and the fishery dies.

Aside from the economic and political stress this would occasion that particular kind of fish would not get fished effectively, and would not produce what it can for the use of man.

(8) *The intergovernmental fisheries commissions*

To solve some of these problems connected with the "rational" management of high seas fisheries governments in different groupings have formed intergovernmental fisheries commissions among themselves so as to jointly govern their fishermen operating fisheries in the same areas of the high seas on the same stocks of fish (as has been mentioned above). Some of these are charged with duties concerning one species of fish in one area (the International Pacific Halibut Fisheries Commission), or all the species in one area (the International Commission for the Northwest Atlantic Fisheries), or a group of species for the whole world (the International Whaling Commission).

Duties of such commissions involve three sorts of problems—

(a) The research required to determine the effect of the fishery upon the fish stock. This always extends to much research on the effect of natural changes in the environment on the fish stocks as well;

(b) The establishment of proper regulations to prevent overfishing of the particular fish stocks; and

(c) The division of the fish resulting from this management activity among the fishermen of the different nations involved.

Generally speaking these commissions have carried out the research function well and much of what we know about the ocean and its living resources has come from their work.

The establishment and implementation of regulations needed to prevent the overfishing which the research has detected, required by the second function, has not yet been worked out on what could be said to be even a reasonably satisfactory basis. The only such commission I know of which establishes an annual quota designed to produce the maximum sustained yield from the fish stock under its purview, does not divide the yield under this quota among national quotas, and successfully stops the fishing by all nations when the quota is taken, is the International Pacific Halibut Fisheries Commission. Only one species of fish and two countries are involved. It has imperfections, and may now be threatened in its structure by the activities of Japanese and Russian fishermen, but for 30 years it has fulfilled its full function adequately and is a long way from dead yet.

The only one of these commissions that I know of which has done the research function well, established and implemented the required regulations well, and divided the fish resulting from the management activity amongst the national fisheries involved to their reasonable satisfaction has been the International Pacific Salmon Fisheries Commission. It deals with two species of salmon coming from one river system (Fraser) fished only by two nations (Canada and the United States). It divides the catches as near to half and half between the national fisheries as it can. It has its problems, but it also has worked for about 30 years with good satisfaction.

The Fur-Seal Commission has also worked excellently and is the oldest of all of these commissions. It works differently. The four nations (Russia, Japan, Canada, United States) involved agreed to stop all killing at sea and to do all the harvesting on the rookeries. This stopped the Canadian and Japanese fisheries completely because they had no rookeries. Russia and the United States do all the harvesting and each gives a certain quota of skins each year to Japan and Canada. In both Russia and the United States the whole operation is Government owned and operated. This treaty put the entire private sealing industry of all four countries out of business. It has had the outstanding merit of having worked satisfactorily for more than 50 years.

The North-West Atlantic and the North-East Atlantic Commissions have introduced mesh-size regulations which have had beneficial effects in some of the trawl fisheries within their purviews. Neither, however, has come to grips with serious overfishing problems as yet. Both have these just over the horizon.

The Inter-American Tropical Tuna Commission has done a beautiful job of research, has discovered one overfishing problem within its purview and framed adequate regulations to prevent it, but has not yet been able to get the fishing nations to agree to implement its recommendations and prevent the overfishing.

The International Whaling Commission so far has failed in all respects. Its research has been inadequate; its regulation recommendations have been consistently late and inadequate; the nations have refused to prevent overfishing of the whales; and the Antarctic whaling business, as well as the whales, is diminishing steadily.

None of these intergovernmental activities aside from the Fur Seal Commission are much more than 30 years old and some are only half that old or less.

Thirty years is not long for the formation and perfection of new human institutions. The entire theory upon which these institutions are formed is less than 60 years old. Our whole knowledge of the ocean and its inhabitants is substantially a thing of this century, and the substantial investigation of the world ocean in a methodical way has only been going on this past 10 years and is still in its infancy.

Accordingly one should not throw very heavy rocks at these struggling new intergovernmental institutions. Instead one requires to study the whole lot of them very carefully as to function, activity, and success or failure—not as their proponents or detractors describe these things, but in the cold, dispassionate light of the competent disinterested scientist.

They represent the original and only attempts that sovereigns have yet made to govern their subjects jointly in the harvesting of the common property resources of the high seas. Since the high seas and its resources are certain to play a rapidly increasing role in the welfare of mankind generally, and at this juncture there is no available means for converting these common property resources into resources controlled uniquely by one sovereign, much less by one firm or person, time is pressing.

One can certainly predict more international trouble arising from these problems. There does not seem to be any easy way to legislate these problems away or otherwise dispose of them by the waving of some magic wand. They are serious and they will get worse. They have prevented the peaceful solution of other law of the sea problems before and will probably do so again. By some means short of war they require to be dealt with. In the past they have been the occasion for war and they can be again quite easily. They are serious, intractable and growing in number and intensity. They deserve our serious attention and study.

CONCLUSION

The purpose of H.R. 5175, and related bills, is to provide for a study of the legal problems of the management, use, and control of the natural resources of the ocean and the ocean beds.

In this short review I have sought to describe briefly and oversimply some of the interactions that there have been among nations in this field over the past 20 years, some of the reasons for this, the way in which these problems have interdigitated with (and interacted upon) each other, something of the complexity and intractableness of the several sorts of problems, how some of them stand at the present day, some of the questions that needed study, and give some idea of their importance to the peace and welfare of mankind generally, and of the United States in particular.

The reason for this exercise has been an attempt to emphasize that the legal problems cannot be settled solely in their legal context. The International Law Commission exercised some of the best international law talent in the world for a period of 8 years in as effective a manner as can be readily imagined on the legal aspects of these problems. It found out that a solution was not available simply in the legal context.

Upon its recommendations the United Nations convened one multination conference to bring the resource aspects of the problem into proper perspective (Rome) and two multination conferences on the law of the sea (Geneva) to add political aspects to the legal and resource aspects of the problems involved. Through these major conferences it accomplished a great deal not only in the codification of the law of the sea but in its progressive development—what passes in international circles for actual legislating. It was a creditable performance but it was by no means fully successful. The full weight of diplomatic effort by 88 nations was unable to fully solve these problems because interaction over the use of the common property living resources of the high seas stood in the way.

The nations, by twos and threes, and by tens, are attempting through the intergovernmental fisheries commissions to solve the problems of jointly handling common property resource harvesting problems of the high seas with only modest success to date. While I have not said so before, the facts are that these international attempts have been just about as successful as have been the unilateral attempts by any one nation to handle problems of the same sort arising among different groups of its own citizens within its own territory.

There does not appear to be any general panacea for such problems available just now. Where there has been some success in dealing with them it has been where adequate and impartial scientific research has clearly demonstrated the relationships among changing ocean conditions, changing fishing pressures, and the changing ability of a fish stock to produce fish.

The theoretical basis of all of this has been pretty well worked out. For every fish stock under every ocean condition there is a point of maximum sustainable productivity beyond which more fishing will produce a less weight of fish, and before which also less weight of fish will be produced by that stock of fish.

The nations agreed, in the 1958 Convention on Fishing and the Conservation of the Living Resources of the High Seas, to require their fishermen to conserve high seas resources, and defined conservation as being "the aggregate of the measures rendering possible the optimum sustainable yield from those resources so as to secure a maximum supply of food and other marine products." They were unable to agree on any other standards such as maximizing the economic yield.

While there are other factors preventing the implementation of this high resolve adequately and in timely fashion, ignorance of the relationships between the ocean, the fish, and the fishery so as to be able to determine when an overfishing problem is developing and what to do about it when it does develop is certainly the most important factor.

No such problem has been solved except when ignorance of these factors has been dispelled. This takes much expensive research and to date the nations have not been prepared to provide adequate funds to conduct it.

While I strongly favor the enactment of H.R. 5175 I wish to make it plain that a study of the legal problems of the management, use, and control of the natural resources of the ocean and the seabed will not be adequate to secure their wise management, use, and control. There require also to be studied the resource, political, diplomatic, sociological, and economic aspects of these problems as well. H.R. 5175 will provide a most useful beginning on this subject; Senate Joint Resolution 29 is also needed. The bodies of law at the State, Federal, and international level will require to be studied together before even the legal aspects of the problem will become clear.

I am very much in hopes that this Congress will act favorably on H.R. 5175 (legal studies), Senate Joint Resolution 29 (resource studies), Senate Joint Resolution 1079 (Continental Shelf research), and some such legislation as S. 944 (organization of ocean activity at the Federal level). With these tools at hand we may be able to move forward more surefootedly in developing the use of the ocean for our own economy and at the same time improve the general lot of man by providing improved access to the great resources of inner space.

STATEMENT OF W. M. CHAPMAN, VAN CAMP SEA FOOD CO.

My name is W. M. Chapman. I am director, Division of Resources, Van Camp Sea Food Co., 840 Van Camp Street, Long Beach, Calif. Our business is the harvesting, processing, distribution, and marketing of the living resources of the sea on a worldwide basis. Our interest in the ocean is as deep and wide as the ocean. This morning I intend, however to speak about the national ocean policy and means with which to implement it, on a much broader basis than our specific interests.

THE NATURE OF THE PROBLEM

What we are engaged in with these hearings is finding the means for opening up a new environment for the occupation and use of our Nation and mankind. This is not a new kind of endeavor for the people of this Nation, nor for mankind generally, but it is useful to recall a few examples in order to evaluate the nature of the problem and the normal way in which we have treated problems of this nature before.

Our ancestors who landed on the eastern seaboard came to an environment not markedly different than the one they had left in Western Europe. It was a forested, well-watered country of the nature which their weapons, tools, ideas, and institutions had been fashioned to fit. This people moved slowly but persistently and successfully through the forests, felling trees, building cabins, making rail fences, digging shallow wells, or getting water from the numerous springs and permanent streams, pushing the natives westward, and fully and successfully settling, occupying, and using the environment.

It needs to be noted that at every stage of this more than 200-year period of settlement activity government was a major partner in all moves, financing the Baltimore and Ohio Canal, the Erie Canal, other avenues of transportation, exploration, surveying, and the necessary warfare, among other things.

When this settlement movement came out of the forested area onto the arid Great Plains the people encountered a new environment in which their weapons,

tools, ideas, and institutions (which had been fashioned for the forested, well-watered environment) did not work successfully at first. For approximately 45 years (from 1840 to 1885 and approximately along the 98° meridian of longitude), the settlement halted close to the edge of the forested area while the new weapons, tools ideas, and institutions required to conquer and make useful the new arid environment were developed.

As a matter of fact the settlement movement made a 2,000-mile jump across the arid area by way of the Oregon Trail to the forested, well-watered environment of the Oregon Territory and, having settled that familiar environment at last, worked back from the West as well as forward from the East when the new weapons, tools, ideas, and institutions required for the conquest of the arid, unforested environment were developed.

There were four major problems that had to be solved before the people could settle and use the arid Great Plains: (1) Transportation, (2) fencing, (3) water, and (4) farming. The transportation problem was breached by the railroads, built with massive subsidy from the Federal Government. The fencing problem was solved by the invention of barbed wire. The water problem called into being great effort by the Federal Government which grew into the Bureau of Reclamation and finally the Department of Interior among other things, and is still with us. The farming problem was attacked in a major way by the Federal Government through subsidies of the land-grant colleges with which to develop new farming methods and for the formation of the Department of Agriculture (Webb, "The Great Plains," 1931).

These movements (and other major developments such as the invention and successful introduction of the Colt six-shooter, agricultural machinery suited to the Great Plains, etc., were initiated during this 45-year pause at the edge of the old environment. Only after these things were successfully initiated did the tide of settlement move forward again into the new environment.

The point is made that subsidy and great exertion by the Federal Government was necessary to make this settlement and use of the new environment possible, and that once the new weapons, tools, ideas, and institutions were developed the conquest and use of the new environment made this Nation the most wealthy and powerful on earth. Basically this was because for the first time in history a numerous people could provide ever-increasing volumes of food with ever-decreasing effort, and food for the Nation and a large part of the rest of the world became no longer the crushing problem of survival.

The development of the heavier-than-air flying machine, first as a weapon of war in World War I, gives another example of this sort. The airplane was the tool which made possible the conquest and use of another new environment, the lower atmosphere. Massive subsidies and assistance were once again given by the Federal Government for approximately a 30-year period (from 1920 to 1950) and by these means a great civilian air industry was formed that has become a major sinew of our economy and a powerful backup force for our defense, the likes of which no other nation has or is close to developing.

The point is made, again, that this revolutionary conquest of a new environment was not likely to have been made without massive governmental aids, or at least not in one lifetime. The point is also made again that, once the environment was conquered, the new industry in the new environment was not only able to pay its own way, but became a major strength of the economy to the extent that President Johnson in his budget message for fiscal 1966 announced, with no great industrial cry, that special user taxes now would be employed so that the civilian industry would itself pay for the services Government still renders to it.

A third example of this sort, the conquest for use of a new environment, is now being conducted almost exclusively by financing from the Federal Government—the conquest for use of nearby space, and the beginning of exploratory probes throughout our planetary system. I say "almost exclusively," because the Comsat worldwide communication system, using satellites, is already being developed as a commercial enterprise of considerable magnitude with major investment of funds in it from the private sector of the economy. In spite of the major costs to Government, now running in excess of \$5 billion per year, of this massive attack on the environment of nearby space in order to render it useful to the Nation and to man, there is very little criticism of the cost and there is enormous public support for the idea of reducing nearby space to our use. Very few doubt that this will be accomplished in the reasonably near future.

In the consideration of the numerous bills presently before the committee dealing with the organization of ocean affairs in the Federal Government, we are once more engaged in the preparatory phases of an attack on a new environment, the ocean, designed to conquer it and render it more useful to the Nation and to man.

Here the possible advantages to the Nation are as enormous as was the conquest of the arid environment of the Great Plains, at least as great as the conquest of the environment of the lower atmosphere, and on the surface of things, at least, more obvious than those that will result from the conquest of nearby space.

Here, again, however we are at the point where we were in 1840 on the move westward. The weapons, tools, ideas, and institutions which we have developed for the successful occupation and use of the continent, the lower atmosphere, and nearby space are not suited to a successful occupation and use of this new environment—the ocean. New weapons, tools, ideas, and institutions require to be developed to insure the successful occupation and use of this new environment.

In our previous examples of this sort massive initial assistance has been required from the Federal Government. I do not think that anyone acquainted with this ocean problem doubts that massive assistance from the Federal Government also will be needed in the initial stages of learning how to occupy and use more fully the ocean. The question we are concerned with is not that, but is how much, in what form, and with what urgency of timing this Government activity should be undertaken. Perhaps the last point might be considered first.

THE STRATEGIC CONSIDERATION

The attitude of the United States toward the ocean has vacillated between wide extremes in our short history, not once but several times. At one extreme, sea power and sea use is the driving objective of Government and citizenry alike; at the other extreme, the ocean and its use is practically ignored.

Whatever the contemporary attitude of government and citizenry the one incontestable fact that stands out in this history, and in our present posture, is that the ocean and its uses control the power position of the United States in the world whether we see this or ignore it at the moment. The control and use of the ocean is the difference between the life and death of our society, our economy, and our way of life. In our control, in neutral control, or in the control of a friendly power, the ocean provides a necessary highway among us and our friends; in enemy or unfriendly control, it forms a wall cutting us off from friends and things necessary for our survival.

These strategic considerations have been well known for a long time and are adequately set down in the writings of Admiral Mahan and others. As a matter of fact, while the geographic parameters have enlarged, the strategic considerations of a seapower versus a landpower were as well set down by Thucydides in the fourth century B.C. as they ever have been since.

The trouble is that we know all this, but when things get peaceful we get busy with other problems and forget it. Our land resources are so great, our economy is so strong, our military prowess is so overwhelming, our progress in space is so stimulating, that it is easy to lose sight of the harsh, cold fact that the ocean connects much of these things together and that the control and use of the ocean is our strength or our weakness.

In the last analysis, however, when the United States is faced with the possibility of the control and use of the ocean falling into unfriendly hands it will fight. It always has done so, and it always must do so. When England sought to control absolutely the maritime commerce of the Colonies, they revolted, became a nation, and fought England again in 1812 when again she attempted to dominate our ocean commerce. In between these two wars the embryonic U.S. Navy was sent to crush the Barbary pirates who were harassing our ocean trade. The issue which finally brought us into World War I was the fear that Germany would win control of the Atlantic shipping lanes. The issue that finally brought us into World War II was again the fear of Germany dominating the Atlantic sealanes, and at last the crushing blow of Japan against our seapower at Pearl Harbor.

Nuclear weapons have in no manner changed this strategic consideration. They have the power only to postpone the final decision and to escalate the final holocaust.

In fact, nuclear weapons, because of this power, have altered this problem in a subtle but major manner which it is easy to overlook but which cannot be ignored.

We have magnificent military power with which to dominate the ocean, the land, the atmosphere, and nearby space. Nuclear strategic weapons to be delivered either by manned bombers, intercontinental missiles from launching pads within our land space, or by Polaris missiles from submersibles or other nuclear-powered craft scattered over or in the whole expanse of the world ocean, give us the absolute power with which to obliterate any nation or section of mankind.

The trouble is that our major power competitor, Russia, has sufficiently close to the same military power that a conflict on this scale between the two would likely obliterate both, and a considerable sector of the rest of mankind as well. Both powers, and the rest of the world (possibly excepting mainland China), understand this strategic situation and thus these weapons and this military power are effectively neutralized until the final Armageddon. Military seapower can only be used by the United States or Russia in brush-type wars in which the other has not a vital interest or in situations which will not bring about a direct confrontation between these two major powers from which one or the other will not retreat (as did Russia in the Cuban missile incident).

Thus the power struggle over the control of the ocean in a general, overall strategic sense has slipped subtly away from the grasp of the military for the time being because nobody will let them pull the strategic trigger. The strategic consideration now increasingly becomes the worry that the occupation, through use, of the ocean in an almost peaceful world could quickly be shifted to its control in a less peaceful world, or that it could quietly and imperceptibly lead to an alteration of the power balance between Russian and us by peaceful economic means that could become a tactic for our slow strangulation under conditions considerably short of major war.

A probably not very accurate analogy might be drawn from our history of the occupation of the central arid portion of our continent where the settlers so often by occupation and use subtly, or not so subtly, pressed the cattle barons, who had the power and the legal rights, off the land and settlers' rights came to dominate wherever settlers could survive by use and occupation of the land.

RUSSIA'S USE OF THE OCEAN

Throughout its entire long history up until after the end of World War II Russia has been almost the epitome of the classical landpower and the very reverse of a seapower. Its ocean frontiers to the north, and seasonally on the northeast and northwest, were icebound. It came late to access to ice-free ports on the Black Sea, and even later to access out into the Mediterranean, through the Dardanelles, and later yet to secure outlet from the Mediterranean into the world ocean.

Russia in recent years has bent every strength to rectifying this situation. Nothing motivated Stalin more strongly in the last phases of World War II than securing ice-free ports on the Siberian coast and rendering secure access from its own ports to the North Atlantic from the Barents Sea and the Baltic. Only NATO support of its stubborn Scandinavian neighbors to the north and its Greek and Turkish neighbors to the south prevented its domination of these peoples to secure access to the world ocean. It now has effectively gained that access through the strategic neutralization of major military power noted above, although it still labors vigorously to additionally safeguard its egress from the Mediterranean through the Red Sea and through Gibraltar with various activities in North Africa and through the Arab world.

Very large efforts in science, technology, and economic activity have been, and are being, engaged in by Russia to move out of its landlocked situation into a position where it can fully use the ocean without the consent of any other power and so that, in case of need, it can interdict the use of the ocean by another power sufficiently to serve the Russian purpose. In these efforts it has been most successful to date.

Heretofore there have been two primary uses of the ocean by man aside from the military use: transportation of things and fishing. Russia was not a major merchant marine operator before the last war, and the United States was.

I am informed that the Russian merchant marine will exceed the carrying tonnage of the U.S. merchant marine in the near future. Their fleet is new and modern; ours is even now using large numbers of World War II vessels.

The Russian merchant marine is alive and vigorously growing; our merchant marine is noted as our sickest industry.

Prior to World War II Russia scarcely fished upon the ocean out of sight of its own land, now its vessels customarily fish throughout the Atlantic, Pacific, Indian, Antarctic, and Arctic Oceans. It is third in rank in the production of fish in the world (not counting mainland China whose statistics are suspect), having long ago surpassed the United States which was until recently the No. 2 fish producer in the world. As a matter of fact in 1964 the United States fell back a little in fish production, and Russia produced more than twice as much fish from the world ocean as did the United States. Russian fishing fleets are modern and increasing in modernity, number, and scope of operation rapidly. U.S. fish production and fishing vessels have been approximately static since the war. Russia has fleets of better vessels fishing off New England, Alaska, and the west coast of the United States than has the United States, and the disparity of fishing competence off our own coast is increasing rather than shrinking.

Recent official visitors from the United States to Russia have reported in a rather patronizing manner on the greater support given ocean research in the United States, the better laboratories and equipment we have for ocean research, and the better our whole oceanographic apparatus and knowledge of the ocean is.

I have not been to Russia and I cannot testify to these things. I do keep reasonably well abreast of the published literature and I do travel around the world a good deal. In the ocean research literature I find no convincing proof that we are leading the Russians in oceanography; in ports all over the world I see convincing proof that they are licking the britches off of us in the application of science and technology to the use of the ocean.

Where the Russians are outshining us brilliantly is in the rapid application of what they learn about the ocean and its resources. I will confine my observations to the fishery field where I am experienced.

Their pattern in this field is clear. Their oceanographic vessels reconnoiter an area of ocean as a strictly research effort as do our research vessels. They are followed the next year, or soon thereafter, by the research vessels of VNIRO, the fishery department of the state planning committee of the U.S.S.R. These vessels do quite competent hydrography of a more detailed nature and at the same time are equipped to do exploratory fishing at least sufficiently to find out what their echo sounders are seeing.

Next come the commercial fishing vessels to explore on a commercial basis. They are also equipped with scientists, and if there is a sizable group of these vessels they are accompanied by a fishery research vessel which aids them as a group to follow the thickest congregations of fish. As the fishery develops and puts strains upon the populations being fished, the population dynamicists are brought into the picture so that overfishing can be detected and prevented. If there is an international fisheries commission in the area being fished that they can join, the Russians join it and wholeheartedly participate in its work.

Back home in Russia the marine architects continue to develop new models of vessels to more effectively fish the areas of new interest, whether they lie in high latitude or are equatorial. The new vessels that are coming along steadily into the fleet are changing shape in accordance with the new designs and experience. Unlike the case of the United States, new fishing vessels and equipment are bought outside the country continuously wherever the best vessels can be had at the best price, whether in Germany, Denmark, England, France, the Netherlands, or Japan. The same sort of development and applications are going on with their gear research and the technology and engineering of fish preservation and processing both ashore and afloat. Great emphasis is given to the automation of all operations at sea and ashore concerned with the catching, dressing, preservation, processing and transportation of fish and fish products. We talk about automating at sea; the Russians do it.

Over the whole operation, as well as its separate parts, trained economists and analysts continually work and rework the resulting data and apply their findings to the most effective patterns of fleet deployment with season, fish availability, weather, market conditions, etc., and to the matters of logistic support of far-flung fleets.

The industrial managers of large fleets of large vessels covering large discrete areas of the world ocean are the headmen under the chairman of the fishery department of the state planning commission. To them the scientists, technologists, engineers, economists, and designers bring their skills for the solution of operational problems.

All of this is backed up by a massive educational activity at secondary and university level particularly created to train the specialists required for ocean harvesting. In this system there are special schools and colleges for training oceanographers, marine biologists, ichthyologists, fishery engineers, fishery technologists, naval architects, fishing masters, fishermen, etc., on a scale not dreamed of in the United States.

The prime purpose of this elaborate apparatus is to catch fish for the nutrition of Russia; I have no reason to suspect that it is not paying its way through this function alone. It performs other valuable functions for Russia as well, because it is integrated into national policies and activities abroad to a degree we do not contemplate in our similar activities.

The tactical defense posture of the United States suffers vis-a-vis Russia because Russia has fishing vessels operating where it needs them for this purpose and the United States does not. Some aspects of this were reported upon by President Johnson in his news conference on April 3.

It is no accident that the fishing base in Cuba is in a good position to interdict commerce headed for the Panama Canal, if need be. The same is true of their fishing developments in the Gulf of Aden and the Red Sea in their relation to transit through Suez; the gift of a merchant marine and navigation academy to Indonesia, which lies athwart the routes of access between the Pacific and Indian Ocean; the undertaking to provide Senegal, whose port of Dakar dominates north-south traffic from Europe to the Cape of Good Hope, with a modern tuna fleet and processing industry; aid in fishing and marketing to Iceland and the Faroe Islands, which lie adjacent to the main commercial artery between North America and Western Europe; the promise to build a fishing harbor for Tanzania at Zanzibar, which lies athwart the East African ocean trade route; or the offer to offload fish at Ceylon and help that country, which lies athwart the Aden-Singapore marine route, develop its fisheries.

Having numerous and large fishing vessels working normally off West Africa makes them handy to keep an eye on what is going on down the Atlantic Missile Range. Experimental fishing vessels off California serve the same purpose on the Pacific Missile Range. Russian fishing vessels turn up wherever the United States is shooting off something interesting over the ocean, and for the most part they are making a living fishing there at the same time. Russian fishing fleets and fishery research vessels constantly send back to home data centers in Moscow oceanographic and meteorological data of prime military value from the whole world ocean, gathered as a normal part of their exploratory and industrial activity. It is paid for by fish.

In a good many parts of the world protein malnutrition is a major problem. Animal protein from fish is perfectly suited for correcting this problem. Diplomatic favor comes to countries which aid these developing countries develop their own fisheries and provide them with fish in the interim (the United States is great for providing wheat, corn, and rice but not animal protein).

The most rapidly increasing domestic fishery in Africa is in Ghana. This has moved with massive and practical help from Russia. In addition, Russia is landing 20,000 tons of fish per year in Ghana from its own vessels' catches off Angola to Senegal, to the great benefit of Ghana and its own profit. Russian vessels at present are landing somewhat more than 2,000 tons of fresh frozen fish per month in Nigeria where the need for animal protein is great. It is planned that their landings will treble to a level of 6,000 tons per month within 18 months. The same thing is going on in Congo (Brazzaville), Liberia, Sierra Leone, and Guinea. The promise to build a tuna fishery in Senegal is in the same category, as is the promise to build a fish harbor in Zanzibar. Russia is building a modern fishing harbor for Egypt at Alexandria on the Mediterranean and another at Ras Banas on the Red Sea. Bulgaria is furnishing the modern trawlers and crews for the Red Sea Development Corp. operations at Massawa, Ethiopia. Russia has offered large fishery development aid projects to India and Ceylon, etc.

I am sure that if the committee consults ONI and CIA it can obtain much information on the role of Russian fishing and merchant marine vessels in furnishing small weapons and the means of subversion in many odd corners of the world.

In summation Russia is applying science and technology to its increased use of the ocean in a much more effective manner than is the United States, this is thoroughly integrated into the diplomatic, military, and political activity of Russia in the outside world in a degree not remotely realized by the United

States, and Russia is rapidly gaining a preponderant position in the use of the ocean in the twin fields of merchant marine and fisheries, while the United States is stagnant or slightly retrogressing in these fields.

When this obvious Russian thrust is considered in relation to the strategic considerations noted above it seems to me to give some impetus for the United States to move somewhat more rapidly in its application of science and technology to its greater use of the sea.

ECONOMIC CONSIDERATIONS

Quite aside from these strategic and diplomatic considerations is the cold, hard dollar value of the merchant marine and fisheries to our domestic economy. Two short quotes from "Economic Benefits From Oceanographic Research" National Academy of Sciences Publication 1228, are pertinent:

(1) "We estimate that with present technology the total freight cost for U.S. ocean trade will be \$5 billion per year by 1975," and

(2) "The value of the U.S. catch to the fishermen in 1962 was \$381 million, which corresponds to something over a billion dollars of the gross national product, since the products approximately triple in value between the producers and the final consumers. From the 50 percent of the total supply provided for by imports, probably another half billion dollars was added to the gross national product by processing and marketing within the United States."

Since the writing of that report the demand for fish in the United States has continued to increase and be met by imports. In 1964 imports of fish (in terms of round weight) represented 62.4 percent of the total supply of fishery products in the United States instead of the 57.7 percent of 1963 or the 50 percent estimated by NASCO above. In 1963 the cost of these fish imports were \$491 million. While the cost statistics for 1964 are not yet finalized I am told by BCF that the value of fish imports last year were close to \$600 million.

There is a widespread feeling here that the use of protein from the ocean in the United States stays about level and does not compete with land-produced protein in the United States. This simply is not true. The supply (market) of fishery products to the United States (in round weight) was 5,641 million pounds in 1948 and it has increased steadily each year to 12,032 million pounds in 1964 (C.A.S. No. 3800, April 1965, Department of the Interior). Thus the market for fish protein in the United States over the past 18 years has more than doubled, and it is presently increasing at a considerably more rapid rate than is the population.

The point made here is that from a strictly economic viewpoint the merchant marine and the fisheries are a not inconsequential part of the national economy. When viewed in relation to the balance-of-payment problem they loom considerably larger. It is pertinent to consider them in this light because freight hauled in foreign bottoms results in dollar drain as does fish that is imported.

The merchant marine can, of course, be built to whatever size is required by the application of appropriate subsidies. Efficiency of maintenance, operation, modernization, and replacement can be induced by appropriate terms of subsidy contracts. In first-class, liner-type cargo vessels sailing established routes the U.S. merchant marine is second only to that of the British in size, and second to none in quality. The 15 leading U.S. lines run their 300 vessels on subsidy contracts which require them to keep their fleets modern. As a result 80 percent of all cargo vessels in the world capable of more than 20 knots fly the U.S. flag (editorial, Life magazine, July 30, 1965).

A judicious use of the "carrot and stick" method, employing Government money where risk is too high to warrant the private sector employing its funds, is a normal way that the U.S. Government has sponsored growth in sections of its economy it wanted to grow since colonial times, conservative views to the contrary notwithstanding.

While I am certain that research itself does not hold the whole answer to the needed improvement of the merchant marine, still it is noted that NASCO ("Economic Benefits" op. cit.) estimates that \$461 million spent on research in this field will yield \$958 million in benefits, which is not a bad cost-yield ratio.

The case of fisheries is even more clear-cut. The Bureau of Commercial Fisheries estimates, on the basis of as yet very incomplete exploratory fishery activities, that the fish stocks in the immediate vicinity of the coasts of the United States are capable of a sustained yield of about 22 billion pounds per year, or nearly double the present rate of national consumption.

There is no natural reason why the United States cannot only produce all of the fish it eats, but be a major net exporter of fish and fish products. If a small part, in terms of value, of the services that the U.S. Government provides for its farmers were provided for its fishermen there would not appear to be any reason why this could not be done economically also.

Thus the merchant marine and the sea fisheries, quite aside from strategic considerations, are of considerable importance to the total economy and both are capable of becoming much more important in it. In terms of tonnage the U.S. merchant marine's share of the U.S. foreign trade has fallen from 50 percent to 9 percent since 1945. In terms of round weight the U.S. fisherman's share of the U.S. market for fishery products has fallen from 80 percent to 38 percent since 1948. Both of these trends are perfectly capable of reversal, and it would not take much of a reversal in them to materially affect the trend in the balance-of-payment problem.

THE CONTINENTAL SHELF

The Convention on the Continental Shelf, resulting from the 1958 conference on the law of the sea, came into effect in 1964 upon the ratification of it by the 22d country. Under it the resources of the Continental Shelf adjacent to its coast became the exclusive property of the coastal nation. Under the convention of the United States gained title to a very large extension in its sovereign territory. The exact size of the new territory is not finite because it is capable of expansion. The definition of the "Continental Shelf" in the convention reads "the seabed and submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas." [Italic supplied.]

The known resources of this new territory are enormously valuable. Under the Tidelands Act of 1953 and the Outer Continental Shelf Act of 1954 right to lease these lands for harvesting was divided between the Federal Government and the governments of the several States. Petroleum, gas, and sulfur are the principal resources for which these lands are now being leased for harvesting. Already the Federal Government and the State government together are getting a greater annual dollar income from the leases of these submerged lands than the total amounts of money being spent by the Federal Government and the State governments on oceanic research and development. The Federal income from this source alone yields upward of \$300 million per year against a cost this year of about \$140 million for the national oceanographic program. While I have no figures, it is certain that less than 1 percent of the total Continental Shelf is presently under lease for these purposes.

Technologies are now available, or within close reach which would make it possible for men to live and work for extended periods of time (weeks) at depths up to 200 meters, the normal depth of the outer edge of the Continental Shelf. Thus it is now on the verge of being possible for a "prospector" with a pick to work over the mineral resources of the Continental Shelf with as great care as can be done on land and with less danger than many prospectors have worked under in the desert regions of the West. Deep-sea submersibles are in the design or construction stage which would give this underwater prospector a dependable "burro" for his use.

There is every reason to expect from existing knowledge that the mineral carrying characteristics of the Continental Shelf are quite similar to that of the adjacent continent except that added to this are deposits of strictly oceanic origin, such as phosphate deposits.

Thus there is major incentive to exploration and development of the resources of the Continental Shelf from the standpoint of net dollar income to the Government that would result from increased leases, and from added benefits that would flow to the gross national product from creating the new extraction industries.

Additionally, there is the "kicker" provided by the definition of the Continental Shelf in the convention. As techniques are developed enabling the exploitation of natural resources in deeper and deeper water, more and more new territory will come within the sovereignty of the nation capable of doing this.

Lastly, there is the precept that the U.S. Government has followed consistently with each new territorial acquisition since President Jefferson sent Lewis and Clark out to explore the Louisiana Purchase 160 years ago. The first thing to do when we get a new piece of territory is to explore it to see what we have gained that may be put to use. Having done this the historic precedent is then for the

Government to give such aids as are required for the development of the use of the properties.

Under the Continental Shelf Convention the United States has made one of its most valuable and extensive territorial acquisitions. We should attend to its exploration and development for use.

THE OCEAN AND THE WEATHER

The advancing science of oceanography and meteorology in these postwar years are demonstrating more clearly each month and year that the relationship between movements in the upper ocean and the lower atmosphere are so intimately coupled that they require to be studied jointly to be understood and predicted. They form a great heat engine in which the power is provided by the sun. The energy from the sun is absorbed in the ocean as in a reservoir, the flowing surface currents of the ocean transport the energy of the sun great distances. It is back radiated into the lower atmosphere and provides the energy which creates the winds, transports the water from place to place, etc.

The complicated nature of this transport and exchange of energy and moisture between air and ocean, its effect on climate and weather, and the understanding required for prediction is still rather vague. One reason for this is that most of the weather observation stations are located on land, whereas the 71 percent of the earth's surface that is ocean receives most of the sun's energy and transports it elsewhere over the earth's surface. Observation stations at sea are still very few, and in the Southern (ocean) Hemisphere almost nonexistent.

If man is to predict or, even in the future, manipulate weather it is obvious that a great many more observation stations will be necessary in the ocean. It was the realization of this that led to President Johnson's Reorganization Plan No. 2 of last month which merged the U.S. Weather Bureau, the U.S. Coast and Geodetic Survey and the Central Radio Propagation Laboratory into a new agency, the environmental Science Services Administration in the Department of Commerce.

While the great effects of weather upon all of man's activities on land, and particularly his food getting, will bring home to one the high desirability of further understanding of circulation in the upper ocean once it is understood that this largely controls the weather of the air, it is not unlikely that the study of ocean circulation for the purpose of predicting ocean climate itself will turn out in the long run to be of greater importance to man.

It is obvious that a knowledge of both air climate and water climate is of high economic importance to those who travel upon the sea because the location and strength of ocean currents, and the location and strength of air storms over the ocean, have such a strong effect not only upon losses at sea through damage, but loss of time getting from one port to another, fuel consumption, etc.

The great rivers of the upper ocean such as the Gulf Stream and the Kuroshio are well known to almost everyone acquainted at all with the ocean because they are such clear cut, strong, and visible features. Less well known are the great currents that are submerged, like the Cromwell Current of the equatorial Pacific, but that vary greatly in strength and velocity. The ocean is not a simple structure. It tends to layer with depth and the currents at the different depths go different directions at different and variable speeds. These things are also beginning to assume importance as man increasingly moves beneath the surface of the ocean, and will do so even more as submersible freighters come into service.

The variation in the ocean currents also have a profound effect upon the abundance of harvestable aggregations of fish, their location in space and time, and the degree of their aggregation and availability. In some places, such as West India, annual changes in the current structure (related to the reversing monsoon system of that area) cause profound changes in the availability of fish to the fishermen in annual cycles, with longer term cycles superimposed on that. These annual changes may bring modest riches in one year or deep deprivation in another. In other cases long-term variations like the el Nino of Peru affect profound changes in the population of the guano birds, their rate of reproduction and guano production, the whole agriculture of the adjacent land, and the production of the fisheries. In other instances, such as the Norwegian herring, much longer term cycles in the ocean climate cause profound changes in the economic structure of the industries based on the local fisheries.

Those who extract the mineral resources of the Continental Shelf are already finding out that their chief problem is not boring into the shelf, or scraping

things off the shelf, but is being able to predict changes in both the air weather and the ocean weather so that they can effectively employ their engineering talents in rational alinement with anticipated changes in the environment. They are learning that the air storm surges at the surface of the ocean are no more important to the effective employment of their tools than are the more difficult to observe and understand changes in the currents, internal waves, and shifting interface between earth and water at the bottom of the sea.

Before prediction must come knowledge and understanding. The fluid ocean is in constant motion at all levels. Every drop of the whole ocean is in constant motion. Every drop and every part of the whole ocean is moving in relation to every other drop and all other parts of the whole ocean. If the westerly winds blow strongly away from the continent, new, cold, nutrient-rich water upwells from below to replace it affecting the strength of all of the related current systems, biological productivity, the aggregation of fishes, the cooling or warming of the local air which induces calms or storms in the lower atmosphere, which affect the climate of the adjacent land and the farming there, etc., in infinite variety and enormous complexity.

If there is anything that is coming out of the rapid advances in oceanography and meteorology since the war it is the knowledge that the whole world ocean and the whole lower atmosphere are a closely coupled apparatus in which changes in one part affect changes in another part on a worldwide basis, and to understand what is happening, or going to happen, in the air weather or ocean weather in a local area, one needs to know what has happened in this heat engine elsewhere beyond the horizon and to understand what that means in relation to what is going to happen locally. Prediction is what is needed to promote economic yield.

The first step in this process is ocean surveys on an oceanwide basis for the purpose of establishing base maps of the distribution in space of ocean properties, just as one does on land. Since the ocean is continuously in motion these maps must be first just of average conditions. Since the ocean movements change in a fairly regular manner with the seasons the next step is the construction of maps showing average conditions by season.

The highly dynamic nature of the ocean leads one then to the need for continuous measurements of parameters so that one can have maps showing deviations of conditions presently from the average conditions of these base maps. Only then will one have the information required to elucidate the changing nature of ocean climate and with which to make the predictions that are required for more economic and successful occupation and use of the ocean.

THE CHARACTER OF THE HIGH SEAS

As when the area of settlement came up against the new environment of the arid Great Plains about 1840, it is necessary not only to construct new weapons and tools with which to deal with the new environment but also new ideas and new institutions.

There are two ideas concerning the high seas which are difficult for landmen to comprehend, and yet which must be taken into account—one is size, the other is the common property nature of the resources.

It is scarcely possible to convey the concept of size of the ocean to a landsman who has not sailed for days over its vast empty stretches in a small vessel. One can only repeat that about 71 percent of the earth's surface is covered with interconnecting salt water, and that what we are talking about is the surface area equivalent to 15 new continents. Several United States could be plunked down in the Pacific without touching edges. A fishing vessel out of San Diego frequently travels 10,000 miles in the course of a 3-month fishing trip. The rivers of the ocean dwarf the flow of the combined Mississippi, Amazon, Congo, Brahmaputra put together, both as to length and volume of transport. The ocean produces all the protein each year that 10 times the present world population of humans could consume, and most of it dies to recycle in the web of life of the ocean unused by man. The energy of the most violent hurricane, dwarfing the power of the largest nuclear weapons, is drawn from a small area of the surface of the ocean, and the subtraction of this enormous mass of energy only reduces the surface temperature of that small area of ocean slightly and temporarily.

Dealing with the ocean is not a two-bit game. We have come about as far as we can in terms of chickenfeed expenditures. If we are to successfully deal with the enormous problems of bending the ocean to our occupation and use the funds for this purpose must be increased by another order of magnitude.

Furthermore little assistance can be expected from the rest of the nations of the world. Only Russia and the United States have adequate scientific, technological, and economic resources with which to mount a meaningful attack on this new environment. As noted above I do not consider it prudent for the United States to rely upon Russia for these purposes.

The other factor of the ocean environment that is exceedingly puzzling to landmen is the common property nature of the ocean and its resources. Most of us are used to owning a piece of property and developing its uses to our satisfaction. Our whole land society, government, and institutions is based predominantly upon the private, or at least the governmental, ownership of area and resources. From this has built the prudent husbanding of property and resources by the individual or government to increase their economic yield or the social satisfaction to be derived from them.

All of this is changed in the ocean. Under existing international law 70 percent of the earth's surface belongs to everybody (or to nobody, whichever way you wish to view it). This applies to the area, to the contained resources, and (as yet) to the bottom.

There is presently a surge of fervor among mining people particularly for the assurance of ownership of resources before investing money in their extraction. This is reflected in a certain fervor in the Congress that the law of the sea should be changed.

The trouble is that the Congress can legislate only in respect of what citizens of the United States may do on the high seas, and not with respect to what the citizens of any other sovereign may do there. The will of the Congress in respect of what others may do on the high seas can be implemented only by force of arms or by persuasion through normal diplomatic channels. The law of the sea, in practice, can be changed only by agreement among all of the 115 sovereign owners of it. Each of these has one vote, exactly as weighty as that of the United States. Experience during the past decade indicates that they have many different concepts as to how the high seas and its resources should be used than does the United States and that all aspects of the law of the sea are interacting as is the ocean. A change one place in the law of the sea which is desired by the United States may well bring a change in another part which could be critical to U.S. interest.

The Congress has not yet brought itself to face realistically the fundamental bearing of this common property nature of the high seas upon the institutional problems we have before us in the successful occupation and use of the ocean. All of the governing activity respecting the high seas has a heavy international component, and most are entirely international. Our governmental institutions have been built to deal with land-oriented, private-property controlled problems. This has been reflected in our organization of international government in the United Nations family, the OAS, and other regional bodies in which we have an interest. These land-oriented institutions simply will not work successfully in the ocean-oriented common property problems which we now have coming before us.

It is not possible for us to handle the governmental problems of the high seas except by international institutions. It is not possible for us to create the required international institutions until our own domestic governmental institutions are adjusted so that we can approach these ocean-oriented problems rationally within our own government.

PROTEIN MALNUTRITION

There is no remaining scourge of humanity so general and having such great social and economic impact in the world as protein malnutrition. Over half of the human population of the world presently gets insufficient daily protein intake in its diet to maintain the human body in normal physical and mental health and vigor. This is the root cause of lassitude, disease, and slowness of development in the nonindustrialized world. It is the largest single killer of preschool children on a world basis. Shipping all the wheat, corn, and rice from the Great Plains and other cornucopia's to these peoples that they can eat will not solve this problem. What must be had is protein, and a sizable component must be animal protein which has the proper proportions of amino acids required to keep the human body in health.

The committee can be provided with irrefutable evidence that the ocean is producing each year more animal protein than a great deal larger than present human population could possibly use but most of it dies and goes to waste back in

the ocean. In many sectors of the world animal protein from the ocean can be produced much more cheaply than animal protein from the land, and it has been this fact which has motivated the vast expansion of the Russian fishing effort, which is being followed now in strong fashion by Bulgaria, Rumania, and Poland, and into which the countries of Western Europe are beginning to move. The production of animal protein from the ocean has more than doubled in the past 10 years, and the rate of increase of the fisheries is still increasing.

It is noted that while the production of animal protein from the ocean is increasing at a much more rapid rate than is the human population most of the increase is going to the feeding of the industrialized countries whose people do not have a protein deficiency in their diet but do have the purchasing power to satisfy their desire to eat better.

It is an anomaly that there are a number of sectors of the world ocean that are particularly productive which lie adjacent to groups of humans who particularly suffer from protein malnutrition. Examples are provided by West Africa, West India, the peninsula of southeast Asia, and the west coast of Central and South America.

The sensible thing to do is to develop indigenous fisheries in these countries so that they can catch the animal protein they need. If they wish to sell part of this abroad for foreign exchange with which to buy other things they need, as is sometimes the case, that is their business, but it is at least sensible to equip them with the skills and means by which they can catch the resources adjacent to their coast that they need, and at the same time to provide them with the means for preventing the overfishing of these renewable resources.

It has been a settled policy in the United States for a long while, and a number of administrations of both parties, that we would do what we could to help the developing countries come to a higher stage of development, and that particularly we would help them learn how to feed their peoples better. When President Johnson says as he did recently (*Newsweek*, Aug. 2) that we are going to make life better and more enjoyable and more significant for all the 3 billion people of the world, he means it, he reflects a large consensus on this point in the country, and he is reiterating policy established and agreed to before he came to office.

Furthermore we are doing a great deal in a number of directions to attack this protein malnutrition problem on a worldwide basis. A brief look at some of the things we are doing will serve to illustrate the need for improving our ocean-oriented establishments and institutions both nationally and internationally.

USAID has done important things in this field. Examples are provided by the fishery harbor at Karachi, the financing of the NAGA expedition in the Gulf of Thailand, the financing of the Guinean Trawl Survey, fellowships, surveys by specialists, etc. It is still doing so.

Special Fund of the United Nations (headquarters, New York) has the United States as a major source of funds. It has become the major supporter on a worldwide basis of fishery predevelopment surveys, the training of fishery scientists and administrators in developing countries, and the supporter of much ocean science in the Atlantic, Pacific, and Indian Ocean.

The Intergovernmental Oceanographic Commission of UNESCO (headquarters, Paris) derives major financial support from the United States. International oceanographic expeditions under its purview are becoming increasingly fishery development oriented because that is what its member countries want, and the same thing is happening in its fellowship and training programs because its member countries want people trained in fishery development not academic oceanography.

The World Meteorological Organization (headquarters, Geneva) until rather recently has had only a modest interest in the ocean. This interest is now increasing sharply and it will have within its purview not only the routine collection of ocean and air observations at sea by ships but the "weather watch" series of unmanned telemetering observation buoys that is hoped for in the near future.

The Food and Agricultural Organization of the United Nations (FAO) (headquarters, Rome) has primary responsibility in the United Nations family for all matters concerning fishery development and other fishery matters. It is the executive agency for Special Fund Fishery Predevelopment Surveys, Fishery Projects in the Expanded Program of Technical Assistance of ECOSOC, has a regular program of its own under its own budget, and has constitutional relationships and responsibilities with the Indo-Pacific Fishery Council, the West

African Regional Fishery Commission, and the Southwest Atlantic Fishery Commission.

The United States is a member of 8 intergovernmental fisheries commissions involving over 20 other governments but outside the United Nations family. These commissions do much ocean research of all sorts. They operate in the North Pacific, the eastern tropical Pacific, the Caribbean, the Great Lakes, the Northwest Atlantic and (in the case of the whaling commission) worldwide.

The International Atomic Energy Agency (headquarters, Vienna; marine laboratory, Monaco) does a good deal of ocean research, particularly in the Mediterranean.

The International Maritime Consultative Organization (headquarters, London) deals with merchant marine matters and has responsibility in the United Nations family respecting certain types of ocean pollution.

The North Atlantic Treaty Organization does much ocean research in the North Atlantic, adjacent seas, Mediterranean, Black Sea, a substantial amount of which is funded by the U.S. Navy's Office of Naval Research.

The Alliance for Progress, largely funded by the United States, makes loans to fishery cooperatives in Latin America and does other things to support fishery development.

The International Bank for Resource Development makes loans for fishery development, fishery harbor development, fishery vessel construction, etc., on a worldwide basis.

The International Council of Scientific Unions has three prime activities dealing with ocean research and/or fishery research:

- (1) The Scientific Committee on Ocean Research, which is the official oceanography advisory body to IOC of UNESCO;
- (2) The Special Committee on Antarctic Research which investigates the ocean and resources of Antarctica, and
- (3) The international biological program, whose marine program is of worldwide scope.

The U.S. Navy Office of Naval Research supports much ocean research in a number of allied countries on pretty much a worldwide basis.

The Bureau of Commercial Fisheries funds supports fishery research in Israel, Poland, and India, acts for USAID from time to time in West Africa and Latin America, has important investigations of its own off Western Latin America, the North Pacific (in relation particularly with Canada, Russia, and Japan), in the Central Pacific (in relation particularly with trust territory government, American Samoa, and southeast Asian countries), in the tropical Atlantic, in the northwest Atlantic, and under contract with FAO in the Caribbean.

The European Economic Community conducts important fishery development activities including ocean research in the West African area particularly and separate countries of Europe have bilateral fishery development and ocean research programs with countries in Africa, Latin America, and Asia.

Aside from these 15 entities or groups of agencies dealing with ocean research or fishery development, most of them substantially supported in one way or another by U.S. funds (and I have probably overlooked several), in the developing world there are others dealing with fishery aspects of the protein malnutrition problem such as the freedom from hunger campaign of FAO, the food for peace program of the White House, the World Health Organization, the United Nations International Childrens Emergency Fund, the Nutrition Division of FAO, the National Institute of Health, the Department of Agriculture, and some others.

The point that is made here is not (although it is true) that there are a great many international agencies dealing with various aspects of ocean and fisheries activities, most of them substantially supported by the United States and without crosslines of communications that hold them together or permit joint planning, but that there is no mechanism within the U.S. Government that provides for a correlation of all, or even most, of these related activities with U.S. objectives either in ocean research, fishery development or protein malnutrition problems. There is little wonder that modest progress is made. Examples could be given the committee of the serious interactions that result among agencies and entities in the prosecution of such work, and the confusion that often results in the country that is the recipient of the "assistance."

THE ORGANIZATION OF OCEAN AFFAIRS IN THE U.S. GOVERNMENT

Leaving aside for the moment the high diversity, and lack of correlation, among agencies in the international field working on the international common of the high seas, let us turn to the organization of ocean affairs in the U.S. Government. I think it goes without saying that the United States cannot bring international aspects of these problems into better relationships with each other until it has reduced its own house to somewhat better order.

In the U.S. Government there are about 22 operating bureaus and offices, located in 5 departments and 3 independent agencies, that conduct ocean activities of greater or lesser nature under their statutory responsibilities. They are accountable to about 32 substantive and appropriations committees and subcommittees of the Congress.

In those two sentences are summed up the prime trouble with our ocean activities and why we have no national ocean strategy, no national ocean program with which to implement it, and no national ocean budget with which to finance it. There is no entity in the executive short of the President which has the responsibility to prepare these things and there is no entity in the Congress to review and approve them if they were prepared.

In the Executive the nearest thing there is to an entity for preparing these things is the Interagency Committee on Oceanography of the Federal Council for Science and Technology. I share with most of the rest of the ocean community in the country the highest admiration for the Chairman of ICO, his staff, and the members of ICO. They are diligent, competent, devoted public servants, who know their business, and work hard at it. ICO has the general reputation of being one of the most energetic and competent interagency committees in the Government. The following comments reflect not at all on the men, but on the incompetence of the institution to deal with the problems given it.

1. The Federal Council for Science and Technology

There is fundamental disagreement that FCST is the proper agency of Government in which to house this ocean use function. FCST and its committees deal primarily with scientific matters. The original membership of FCST were chosen primarily for their ability in the application of science and technology to the weaponry field. Although the membership has been broadened somewhat recently it still retains the original flavor.

If there is anything in this ocean field use in which there is a concensus of opinion in the scientific community, the interested industry, and the executive and legislative branches of the Government it is that the scope of what has been heretofore called federally sponsored oceanography should be broadened to take in all ocean research, exploration, harvesting, and all services and activities connected therewith, sponsored or funded by the Federal Government at all levels of activity within the United States and in the international field.

To develop a national ocean program as outlined above requires participation by the scientific community, industry, the State governments, and a far broader cut of the Federal Government than just its scientific aspects. In the assault upon the ocean designed to reduce this new environment to our occupation and use there will be a very high scientific component but the Russians have showed us that this requires to go hand in hand with application, and have clearly demonstrated that that is where we are falling behind in the race.

The FCST is simply not constituted to be fully competent to this task. The ICO, as a part of FCST, cannot be broadened sufficiently to handle this task adequately because the parent organization has not the required breadth.

2. The level of ICO

None of the members of ICO is the policy head of the Department or Agency in which he works, nor does he represent total departmental policy as the surrogate of its chief officer. Accordingly whatever decision is made by ICO is subject to the independent and individual policy review of the several departmental and agency heads. In each of these departments or agencies ocean activities are a minor part of overall responsibilities.

Accordingly so long as ICO is formed from working level, or middle management, people it cannot originate the policy level decisions required for the formulation of a national ocean policy.

3. Channels to State governments

The individual agencies doing ocean work in the Federal Government each maintains its own liaison as needed with its counterpart in the State govern-

ments. ICO has no such channels of its own so that State ocean use policy and activities can be coordinated with Federal ocean policy and activities.

4. Channels to international and intergovernmental agencies

A substantial part of the total federally supported ocean activity is being undertaken through international and intergovernmental agencies. ICO has no regular channels of its own to these agencies. Accordingly it is unable to coordinate adequately ocean use policy and activities supported by the Federal Government in the international field with what the Federal Government is supporting at the national and the State level. There is no formal reporting at all at the national level of the substantial intercrossing of ocean activities between the State and international levels.

5. Conspicuity

There is solid feeling that ICO is buried down so far in the Government hierarchy that it is not noticed. This applies not only to ICO as an organization but to most of its individual members in their own departments or agencies.

What is needed as much as anything in the conduct of the Federal Government's ocean activities and policies is to get them and their origination out into the open in a conspicuous position.

6. Guidance

FCST is not in a position to provide guidance to ICO because its field of competence and responsibility, in itself, is too narrow to give guidance to a national ocean program. The Congress has given no clear statement of policy as to what it wants done in the ocean field. One of the prime jobs of ICO is the review of current activities and planned programs of individual agencies in the context of the Government's overall long-range effort. But there has never been a statement of what the Government's overall long-range effort in the ocean field should be or should encompass. FCST is not competent to do this fully. There is no other part of the executive designed to do so.

Another part of this problem is that ICO has difficulty in being responsive to the Congress. The Congress hears the Office of Science and Technology and not the Federal Council on Science and Technology. The committees and subcommittees of FCST, of which ICO is one, have no regular way of being in contact with the Congress and the Congress cannot reach them because of executive privilege. The congressional liaison of the ocean function is a very serious part of this whole problem with which ICO can deal only imperfectly.

7. Program

An examination of ICO reports gives no indication that its so-called national oceanographic program, leaving aside the narrowness of its base, is anything more than a compilation and summation of the aspirations and hopes of what the individual bureaus and offices want to do in the coming year. There is little evidence of any sublimation of these individual agency desires into a national program aimed at attaining national goals even in this limited field. There is little indication that the program, as an overall program, has been screened and adapted to fit a set of national priorities; there is every evidence, on the other hand, that it is a simple addition of priorities arising from the 22 different priorities of its member agencies, which are not much related to each other in respect of ocean affairs.

8. Budget

Between the discipline-oriented (basic) science aspects handled by the National Science Foundation and the mission-oriented military aspects as handled by the Navy, the civilian industry aspects of the Federal Government's ocean activities are so fragmented amongst small entities that no single piece is large enough in its ocean-oriented mission to justify the substantial budget items required to service the common ocean requirements of this broad mission-oriented civilian area of needed ocean work.

Because of this fragmentation the budget cannot be considered in a unitary manner in the congressional appropriation apparatus because each fragment goes to a different subcommittee on an appropriation committee and thus the individual pieces cannot be considered in relation to each other or as parts of a national whole by congressional experts in ocean activities and needs.

While this not an absolute necessity in the Bureau of the Budget apparatus, the ocean budget, in actual practice, is also treated there in a fragmented hori-

zontal manner and not in an integrated vertical manner, such as was contemplated briefly early in the Kennedy administration.

There is no way in which ICO can correct or substantially affect this budgetary practice. Therefore there is no necessary relationship between the budget ICO thinks to be appropriate, the summation of individual pieces that reaches the Bureau of the Budget from the agencies and departments, the summation of the different pieces finally imbedded in a scattered fashion through the President's budget message to the Congress, or the summation of the pieces finally agreed to by the different subcommittees of the appropriation committees of the Congress and sent to the President to sign into law.

Thus there is really nothing that can be called a national oceanographic budget, and nobody has ever ventured to ever suggest a national ocean budget at any level of the Government.

9. Staff

The staff of ICO is now provided in a makeshift manner by contribution of people, quarters, and funds in a sort of contribution of kind from member agencies. ICO itself has no staff money. Its staff does not really belong to ICO. As a matter of fact it is one of the contentions of OST that providing an Oceanographic Council within FCST with a staff, including an executive secretary appointed by the President by and with the advice and consent of the Senate, would create a staff within a staff at OST and that it would be difficult, if not impossible, to set forth the respective duties, authorities and responsibilities under such an arrangement.

Yet there is no observation that is made more firmly by informed experts inside and outside ICO than that the ocean function of the U.S. Government, in order to operate more satisfactorily, absolutely required a competent, energetic director at a level requiring Presidential appointment by and with the advice and consent of the Senate more than it needs any other one thing.

It seems unanswerable that the ocean function in Government, to perform better, must have a separate line item in the budget at its disposal for providing adequate staff with experience and capabilities necessary to provide the function with adequate background information and leadership.

10. Operational responsibility

Regardless of any gross shift in policy or activity respecting ocean use, the present ocean function in Government requires to take on some operational functions of joint concern to the whole apparatus, and ICO cannot do this.

The National Oceanographic Data Center is the very heart of the national ocean effort. It now hangs loosely outside of good government structure. It has no line budget item of its own. Structurally it is in the Office of the Naval Oceanographer, but only for housekeeping purposes. Operational policy is set by a committee which is only partially governmental and not necessarily in tune with overall governmental ocean policy.

There is need for an instrumentation center as a service function for the several ocean activities of the Government, and there is no good place to put it.

Project "Mohole" is a large operational undertaking. It is being managed by the National Science Foundation which is not an operational agency, and does not want to be, because there is no better place for it in the Government.

The "Weather Watch" system of unmanned buoys for taking time-series observations of both air weather and ocean weather at sea is going to be a very large undertaking to provide services needed by several agencies. How it is to be operated is one of the barriers to getting it established.

This list of central operational functions needed by the present small ocean program of the Government could be extended. It is hard to see how the ocean function of the Government can grow larger without this ability being given.

The inability to have jointly required operational activities is a reflection of the disadvantages stemming from the fragmented nature of ocean work in the Federal Government in the broad mission-oriented civilian sector lying between the discipline-oriented basic ocean research under NSF and the military mission-oriented ocean activity under the Navy. Not only common service missions for this civilian sector are needed, but some of these require to be larger than any of the present fragments can support budgetwise within their specialized missions.

This list of 10 things that are troublesome with the present lodging of the ocean function in ICO as a part of FCST could be considerably enlarged, but these are sufficient to illustrate the nature of the problem. The ICO is unable to come to bear on these issues effectively.

Governmental structure is sufficiently flexible that 3 or 4 of these things could be fixed up to make the present system work better, but how one could fix up all 10 of these things without a major policy reorientation and restructuring of the system is not readily apparent. Also one has difficulty in seeing how the ocean function in Government can be enlarged or improved without such a fundamental restructuring of the present system.

One must point out at the end of this section, as at the beginning, that none of this reflects whatever on the personalities involved. The system is what needs alteration, not the people. One may look with considerable admiration at what the people involved have accomplished within the system. One could sum this up into the fact that ICO has provided us with much improved facilities, much increased professional manpower, and publications which have been both useful and stimulating. In sum, ICO has done its job so well that we are now ready for something better.

THE CHANGING BUDGET PRACTICES

The changing budget practices of the United States are having a ponderable effect on the organization of ocean use activities in the Government. Cost-effective budgeting has proven sufficiently successful in the Department of Defense that Presidential orders have gone to other departmental and agency heads to adapt it to their budget practices. Some of the ways this affects the organization of ocean affairs in the Federal Government are the following.

Generally speaking there are two approaches to the research sector of research and development programs: discipline-oriented (basic) research, and mission-oriented research.

Discipline-oriented research, the kind normally but rather erroneously called basic research, is the sort where a scientist or a group of scientists inquires into natural processes or phenomena with a view just to finding out how nature works and with no particular practical mission other than that.

There is wide consensus that *x* amount of the Government's total research expenditures should be devoted to this discipline-oriented (basic) research. Current budgetary practice is trending in the direction of this being the mission of the National Science Foundation through which at least the major part (and possibly eventually most) of the Federal Government's budget for this type of research will be handled for all sciences. NSF then, by contracts or grants (very largely to academic institutions), disburses these funds in accordance with the advice of its own staff and of advisory committees established in different fields of science for these purposes, and under the general guidance of the Federal Council for Science and Technology.

In the ocean research field, heretofore, the Office of Naval Research of the U.S. Navy has been the major source of funds for discipline-oriented ocean research and it has maintained this function while the same function has been growing in the National Science Foundation. ONR ocean research funds for these purposes have plateaued in the last few years. The basic reason for this has been the cost-efficiency budgeting system. The Department of Defense budget officers increasingly tend to narrow Navy ocean research funds to the use of the Navy's primary mission, which is military.

While a good many in the ocean research field deplore this trend, a realistic appraisal of the future suggests that increasingly discipline-oriented ocean research funds will fall within the NSF budget, and that the Navy's ocean research funds will increasingly be confined to that required for the conduct of the Navy's military mission.

This change is accompanied by another. Increasingly the Navy's ocean research funds are limited to those of a classified character. This is under the quite logical prodding of the Department of Defense budget people who say that the Navy's mission is military and one keeps information that is of a militarily useful nature classified and out of the hands of a potential enemy. It follows from this logic that projects which are not classified are of questionable military value and should be the mission of some other branch of the Government (if worth while) but not of the Navy.

The result of this trend, despite the very best intentions of Navy personnel involved, is that an increasing amount of Navy ocean research results (which have been the mainstay of the ocean programs of academic and civilian governmental institutions) are classified and do not become available publicly or to the civilian branches of Government for use for months or years after the results are obtained. Long years of tussling with this classification problem indicates that it cannot be solved easily or quickly. The Navy, and the military

generally, has its own practices which are simply not fully compatible with civilian practices and attempts at reforming Navy practices to be compatible in this manner are not practicable. Accordingly less and less of the Navy funded ocean research results are available to the civilian sector of the economy.

In order to get the civilian economy of the United States using the ocean at any considerably improved rate of development substantial funding outlays appear to be necessary from Government to reduce the economic risks of more rapid ocean industry development and to provide added information on economic opportunity for such development. This requires not only additional discipline-oriented (basic) ocean research, but much enhanced applied research, and even much more funds yet for technological and engineering activity—the expensive half of the normal governmental phrase “research and development.”

As a result of the changing budget practices noted above any large new funds for ocean research development must be provided for in the civilian (nonbasic and nonmilitary) segment of the budget. This must be oriented to concrete statutory missions which are demonstrably capable of reasonably successful issue.

In the broad area of ocean activity useful to the civilian ocean industry, between the discipline-oriented (basic) science mission of the National Science Foundation and the applied military mission of the Navy, the organization of the Government's ocean activity is so fragmented into small bureaus and offices (or parts thereof) that the individual missions of the separate fragments are too small to justify adequate sized budget items with which to carry out the sort of programs that are needed for the whole civilian area of ocean research and development.

Accordingly, what is needed is some further coalescing of the missions of these fragments of the civilian center position, between basic science and applied military science, so that large enough missions will result that programs of adequate size to fill the civilian industry ocean research and development needs can be justified in accordance with good budget practice. Presidential Reorganization Order No. 2 of last month was a good step in this direction.

THE SIZE OF PROGRAMS REQUIRED TO RENDER THE OCEAN MORE USEFUL

What we are aiming at is the conquest of a new environment so that industry can be successfully established in it. This is not essentially different than the establishment of industry in the new environment of the lower atmosphere, which was accomplished in the last generation, or the establishment of a whole new kind of industry and society in a new environment, as was done in the arid, nonforested Great Plains area during the last century. It does not, on the surface, seem to be as difficult, complex, or expensive as the attempt now going on in the conquest of nearby space. It is, nevertheless, complex and will be expensive.

We want to modernize and make vigorous two old and somewhat ailing industries—the merchant marine and the fisheries, which are loaded down with institutional handicaps developed over the years. We want to increase the development of one big, new industry in the ocean: petroleum and gas extraction. We want to start out an almost brandnew industry in the ocean—mineral extraction (first on the Continental Shelf and then on the deep sea bed). We wish to markedly improve long-range weather forecasting (not only air-weather but also ocean-weather in the ocean) to aid these purposes and the whole of the rest of the national economy, the national defense, and the national diplomatic posture. We wish to accelerate the development of recreational opportunities in the near shore environment, and aside from its social implications this is already a good sized industry and has a great scope for major increase as an industry. We want to better the public health and welfare aspects of the near shore environment (disposal of waste, elimination of transmission of communicable disease through the aquatic medium, etc.). We wish to enhance our posture with the rest of the world by helping it with its protein malnutrition problems, by being able to transport our own goods in our own bottoms, by the prestige of great accomplishments in ocean research and development (as in space), and by transferring these skills to our allies in the developing world so that, in time, they can do these things in the ocean for themselves. Lastly (or perhaps, more properly, firstly) we seek from ocean research and development better means of protecting ourselves and our friends from possible enemies in this troubled world.

This is a mixed bag of desires. What holds together all of these old and new industries and desires is just the environment—the ocean. It is very different from the land environment which has dominated our whole racial history. It is very different from the air environment in which we can now move around fairly freely. It is quite different from the space environment in which we are taking our first faltering step.

It is a new environment to us when we get below the surface. Pressure is a key problem as in space. Whereas in space lack of pressure must be dealt with, in the ocean depths great pressures must be coped with. To conquer and make this useful to us as an environment is not going to be much cheaper than doing the same with nearby space. Certainly one part of the great hesitancy shown in the Bureau of the Budget toward any substantial reorganization of ocean affairs in the Federal Government is the knowledge there that once the United States embarks seriously on a meaningful program of conquering the ocean environment and putting it to use we will be embarked on a very costly enterprise that will involve in the long run some billions of dollars of expense before it is on a paying basis.

They have adopted, with much merit, the position of the prudent head of a large corporation in the same position and said to give them a concrete project, or a group of concrete projects, with a schedule of costs and probable payouts. While we are not in a position to do this completely at the moment, we have made several solid starts on this:

(1) Upon informal request from the Navy in 1963 the National Security Industrial Association established an ad hoc committee on ocean science and technology to develop, with costs and justifications, a national ocean program. This was completed by the NSIA and published as a 72-page report "A National Ocean Program" in March 1964. So far as I know this is the only such broad study that has been published by a group with industrial competence. The gist of the report was:

(a) Creation in the Federal Government of a National Ocean Science and Technology Agency; and

(b) Budget provisions for the Agency of \$900 million in 1965 rising to \$3,100 million in 1970.

(2) The National Academy of Sciences published a report of its Committee on Oceanography in late 1964 entitled "Economic Benefits From Oceanographic Research," NAS publication 1228. These quotes from its introduction are pertinent to our present purpose:

"Our purpose is threefold:

"(1) To obtain some idea of how much the expenditures planned for the national oceanographic program can contribute to the economic well-being of the United States;

"(2) To provide a very rough basis for comparing the anticipated economic results from oceanographic research with those that might be obtained through other expenditures of the same funds; and

"(3) To suggest a conceptual and computational framework for estimating the usefulness of investment of public funds in this field, which could be employed by other interested persons who might make quite different judgments about the numerical values we have used.

"Our estimates indicate that a continuing national investment in oceanography of approximately \$165 million a year (not counting the part for national defense) will be an essential component in bringing about savings of nearly \$3 billion a year, plus added annual production worth almost as much. Ten to fifteen years will be needed to achieve these gains, and other expenditures in addition to those for marine research will be required if they are to be realized * * *."

(3) Last spring the Department of Defense asked a prominent aerospace firm to assist it in preparing an overall 5-year program on how oceanography/ocean engineering could contribute to the peacetime economy of the United States. This study was to be prepared under the following ground rules:

(a) During the 5-year period there would be adequate qualified personnel to manage and support such a program.

(b) Such a program would contribute to the national and international goals of the United States.

(c) Such a program would be beneficial to the peacetime economy of the United States.

(d) Money would not be a limitation providing the above three ground rules were carried out.

The company solicited advice from a great many users of the ocean. The activity was taken seriously by industry and a great deal of competent work went into the different parts of the study by specialists in ocean science, ocean engineering, and ocean use. Since the whole report has not yet been made public the total suggested budget is not known. The proposed budget for the fishery aspects alone of this study is given in the following table (in millions of dollars) :

Year	Fishery oceanography	Shipyard subsidy	Fishery engineering	Fishery administration	Annual totals
1966	20	5	5	5	35
1967	25	10	7	7	49
1968	30	15	10	10	65
1969	40	20	13	13	86
1970	50	25	25	15	105

(4) At the same time the Department of Defense caused to be made a similar study by a highly competent committee from the academic ocean research and development community under the same ground rules. This second group did not limit itself to "science," however, but recommended a series of projects in what could be called the normal research and development field, thus including applied science, technology, and engineering. Without going into detail it may be said that the total cost of this series of projects over a 2-year period would run a little more than \$2 billion. They are capable of being put into the same sort of cost-benefit ratio formula as in (2) above.

Thus there are now available in the Government four highly competent studies made by four independent groups of specialists as to the approximate size of programs needed by the Federal Government to make a meaningful beginning on the conquest of the ocean environment for use. These will contribute to the peacetime economy of the United States and the programs have favorable cost-benefit ratios. The four studies, budgetwise, are in the same general area.

In the absence of greater publicly available data one can say that to be really meaningful in the accomplishment of the strategic objective, which was the first item considered in this report, a cost of \$500 million per year over a 5-year period, or a total of \$2.5 billion for a 5-year period would be a reasonable estimate.

It is noted that in the past couple of years there has grown up an amazing amount of interest on the part of formerly land-oriented industries in the United States in ocean-oriented activity. This includes a considerable number of the largest firms in the country as well as a welter of small, specialized firms. The Marine Technological Society was organized by a group of these and Government people a little more than a year ago. A meeting of MTS was held in Washington in June of this year. Instead of the 600-700 attendance anticipated, nearly 1,500 paid attendees showed up.

The cynical will say that the reason why such a large segment of U.S. industry is getting so actively interested in ocean exploration, science, and development is that it smells large Government contracts on the way.

My reading of this situation is quite different. I think that industry planners in general have thought that if the Federal Government was going to keep piddling around with ocean science as it has been doing in recent years industry would be in favor of this in a lipservice way, like being in favor of motherhood and against sin.

If, however, the Government is at last getting solidly interested in backing ocean research and development in the larger sense, and if the Government is actually prepared to move in a consequential manner to stimulate the use of the ocean, and by doing so reduce the risks to the pioneers, then there is scope for big and successful industrial enterprise on and in the ocean, for the engaging in which they can justify the investment of important amounts of their shareholder's capital.

GREAT DREAMS AND EXPECTATIONS

Man does not live by bread alone, the Book says. As a matter of fact when the material welfare of a numerous people has come to the general level that it has presently reached in U.S. society the drives to economic betterment slack off some. This general euphoria stretches as well to the military field, in spite of Vietnam and Asia, and our people are not afraid. The generality feels that we can lick anybody for money, marbles, or chalk if we have to, and we don't want to have to.

I do not say that our economic or military posture is as good as all that, I only say that the need for things, and the fear that others might take away from us what we have, are not the driving forces of our society that they once were.

What drives us all still, as vigorously as it did when our ancestors came to this continent, and during the long period we spent working our way across it and reducing it to our use, are great dreams and vague expectations.

This year we will spend upward of \$5 billion out of the Federal purse for exploring space and learning how to move around and live in nearby space. Excepting for the war-excited years of 1918, 1919, and 1920 this represents more money than the Federal Government spent for all purposes in any year prior to 1934. Substantially speaking one hears no complaints about this from the taxpayers.

I don't really believe we feel that what we learn in space is of sufficient military value to spend that much money on. The chance of economic spinoff from this venture commensurate with its cost is so thin that NASA spends much time thinking up what these might possibly be. Its thoughts on this subject really have little bearing on what Congress and the people think when providing the funds. Of course we have the drive of beating the Russians, or at least catching up with them, and this not only adds zest to the enterprise but has quite valuable public relations fallout in the diplomatic field. But I don't believe, really, that many of us, many people in the outside world, or many people in Russia, ever doubted that we could beat the Russians in this field if we wanted to devote sufficient time and money to that purpose.

As a matter of fact the only major and valid argument that arises against the expenditures for the space program is the rather vague guilt feeling we have that if we devoted the same time and money to fixing up the food and welfare situation of that greater half of the world that still has to worry seriously about its daily bread we could pretty well do it with not much more money and effort than we are spending on these shiny space toys.

Yet I took time off the other morning from an overcrowded schedule to watch the boys fire off Gemini 4 and I noticed on the television that President Johnson did too. I expect that most other Americans within reach of a television set did the same thing.

The rationale for this interest is a little hard to lay down coldly on paper because I think it is essentially emotional and irrational. It flows from the great dreams and expectations that all of us, from the most clumsy clod to the genius and from the poorest orphan to the richest financier, constantly harbor secretly within ourselves.

We are all adventurers in spirit and White and McDivitt were our surrogates out exploring a new environment, new areas, and new things where we had never been before. We all knew that each of us could have done the job as well as they did if we had had the time, but at least we had chipped in a few bucks apiece to make it possible, so we had some piece of the action. We are all glad that we did it, and if you have any more schemes to titillate our thirst for great dreams and expectations, trot them out and let us look them over.

Also you can't really tell. The crazy way things go these days the whole thing might pay off in the long run. Columbus' trip across the ocean didn't look to King Ferdinand to be a good risk at the time. Buying up the Louisiana Territory and sending off Lewis and Clark to look it over at the expense of the public purse did not look particularly prudent to the Congress when Jefferson did it. Letting the Czar sucker us into paying good money for Alaska looked to be particularly stupid at the time. Putting millions into developing the ideas of an immigrant, German scientist fiddler player who had some mathematical formulas under his uncut hair that could be made into a superpower source and explosive just wouldn't have held water had it been exposed to the public gaze during the last war. Yet these, and a hundred other wild things you can think of, have paid off in recent years, and that is why we are rich enough to afford the exploration of the planetary system and the conquest for use of nearby space.

But it is the great dreams and expectations—the irrational—that drive us on and make us willing to pay the bill.

The great dream of conquering the sea and bending it to our use, and the great expectations of the benefits that would certainly flow to all mankind, and particularly to the United States, from this has been a sufficient goal for me to drive for these many years, and so it has been with most of my scientific colleagues. Simply the venture of the unknown, riddling out how natural things work, and seeing things and processes nobody before had seen or understood is

goal enough for me and my ilk. What the man said about Mount Everest, that it had to be climbed just because it was there, is about as sensible as you can make this basically irrational drive.

But I do recognize the need of others for a more clear-cut crutch upon which to lean their emotional drives, and with which to excuse themselves privately and publicly. Accordingly it may be necessary, for public relations reasons, to establish such a clear-cut goal, as is the race to put a man on the Moon, in order to get us off dead center on the ocean use program. Utility will not do it. Nobody can tell you, coherently, what is useful about putting a man on the Moon ahead of the Russians—or ever.

As a matter of fact I think it to be a positive handicap in establishing such far-out goals for an ocean program that there is almost nothing outlandish you can think of doing with, or in, or under the ocean that is not likely to prove to be very useful to us, and rather quickly.

You can't get much further out in this business than going out to sea and boring a hole through the Earth's crust under the deep ocean to see whether what is underneath is hot and bubbly or not. But Operation Mohole is already pedestrian, and financed, and nearly forgotten by the public before it is done. It wasn't hard enough to do. Already it is about to pay off big dividends in improved drilling techniques, and the National Science Foundation is not only financing this, but at the same time financing a whole swatch of drill holes in shallower water out on the Continental Shelf.

The man-in-the-sea program, as presently contemplated (putting folks down on the Continental Shelf to live and work in a hundred fathoms of water for a week or two at a time) is also a little on the humdrum side now. Costeau, Link, and their ilk have this problem so well in hand that it is not difficult enough any longer, in this age, with which to excite great dreams and great expectations.

There is one goal, however, that would be just about as difficult as putting a man on the Moon, yet within the realm of possibilities.

That goal would be the occupation of a section of the deep sea bed on behalf of the United States.

You can't readily think of anything more prestigious or beneficial from the standpoint of the posture of the United States than to do this. The capability of occupying a piece of the deep sea bed would be so beneficial as to make the placement of colonies on Antarctica, or even on the Moon, pale by comparison. Once you could do that the whole power position of the world would be changed again until the Russians, or somebody else, could do it also. It would be a clear signal to all hands that you had conquered this last environment and it was yours to use.

While this is not an impossible goal, it is unnecessarily visionary and difficult for the beginning purpose of getting our national ocean program off dead center. The lesser, but still enormous prestigious and useful, goal (and within reasonable reach) would be to put a man or two down on one of the higher spots of the Atlantic Ridge long enough to claim that spot as a piece of sovereign U.S. territory. That, even, would take a little of the shine off of the Moon adventure.

A big advantage of this midgoal (aside from the sunken Atlantic myth that would carry a good ways) is that if you could start at a depth of about 500 fathoms on this great adventure, you could work your way gradually downhill to the ultimate goal of occupying the deep sea floor. There will be found fabulous mineral riches beyond compare.

THE PRESENT SITUATION

A considerable disadvantage in considering the present series of bills is the need for differentiating clearly between science in the academic, discipline-oriented sense, and ocean-use activities, which includes such science as a vitally necessary ingredient but goes much further.

The genesis of this most recent enthusiasm over ocean activity in the United States was initiated when, on August 9, 1956, Rear Adm. Rawson Bennett, acting for the office of Naval Research and three other Federal agencies, requested President Detlev Bronk, National Academy of Sciences, to appoint a committee representing the scientific community to provide advice and guidance on needs and opportunities of oceanographic research. NASCO, the Academy's Committee on Oceanography, was established in the following year (November 1957), issued the summary of its 12-volume report 2 years later (Feb. 15, 1959), upon which the House Committee on Merchant Marine and Fisheries and the

Senate Committee on Commerce almost immediately began hearings on bills, mostly originated by their members, aimed at implementing the NASCO recommendations.

In these intervening years the budget for ocean research has increased from about \$25 million to about \$140 million per year and this has been accompanied by a substantial increase in our knowledge and understanding of the ocean environment. This increase has now become so large that we are now confident that this environment is capable of occupation and use to the enormous benefit of the Nation and mankind generally.

We are even in a position to glimpse roughly how this should be done. It will take a lot more science of both the discipline-oriented and the mission-oriented kinds. It will take a lot of technological and engineering application of what already is known and what will be learned as we expand our ocean activities further. It will take pilot-plant scale operations in some instances (such as Operation Mohole, and the "man-in-the-sea" programs) to work out the practical bugs of getting industry and people into the ocean. In other instances, such as petroleum extraction, industry can move, and is moving, so fast that the Government and academic scientists will never catch up with them again. These latter people, as well as the old users of the ocean environment (merchant marine—fisheries and Navy) and the prospective new users (miners of the Continental Shelf and deep-sea bed, submersible merchant marine, etc.) require the expanded normal governmental services of climate and weather predictions, not only in the lower atmosphere, but in the ocean itself.

Now we are talking about a new subject—the role of the Federal Government in the occupation and use of the new environment—the ocean. But we are still hamstrung in our thinking by the excellent public relations job the academic scientists did, we are still using the old term "oceanography" to describe what we are talking about, and we are considering legislation drafted to enhance the ability of the Federal Government to properly handle its role of expanding the scientific aspects of ocean activity.

The old job of expanding ocean research and arranging its proper coordination in the Federal Government, stimulated by NASCO, has not yet been properly done. But before this has been accomplished a whole new need has descended upon us—the expansion of the whole (not just scientific) ocean use role of the Federal Government and not only the proper coordination of activities in the legislative and executive branches of the Government to this end, but the establishment of a framework within which all appropriate forces available to this Nation can be bent, in the appropriate role of each, to this expanded task of occupying and using the ocean. These forces do not only include the bureaus and offices of the Federal Government, but the academic institutions, the State governments, the international agencies in which we are involved, and in a whole new measure the skills, aptitudes, and drives of our complex and enormously powerful private industry.

This is a task of much greater size and complexity than was in mind when most of the bills before us were thought through and drafted.

Some parts of this job do not have any enormous urgency attached to them. The academic community is doing its part reasonably satisfactorily and might continue so to do under reasonably normal budgetary increase. The petroleum people are off and running, and only need odds and ends of Government help to keep going.

In the first sections of this report, however, I have attempted to point out the strategic connotations of the general occupation and use of the ocean, in its bearing on possible control of the ocean, and the much greater progress Russia is making in this application, which lends a degree of urgency to moving more rapidly in this new field of ocean use (including ocean science).

NECESSARY COMPONENTS OF A NATIONAL OCEAN FUNCTION

Having looked at some of the problems involved in this area it may be useful to look at the components required in a governmental system better suited for bringing them to solution. These might include the following:

(1) *Planning and coordination*

The ocean is vital to our defense, critical to the conduct of our foreign affairs, of substantial and growing importance to an ever-widening area of our economy, and of more than nominal importance to our general public welfare.

There requires to be in the Executive an entity which is able to view all aspects of U.S. activities in respect of the ocean, as well as all possible effects

of the ocean upon U.S. activities, and derive from this viewing a national ocean strategy, a national ocean program with which to implement it, and a national ocean budget with which to finance the program, taking into account the total interest of the United States as well as the particular interests of the several States, and all ocean activities of the United States whether industrial, scientific, or governmental in nature and whether at a State, National, or international level.

The planning for this could be appropriately initiated by a temporary commission as proposed by the Rogers bill and included in the version of the Magnuson (S. 944) bill as passed by the Senate. Undoubtedly it would be useful to have such a temporary high-level commission take a first run at this problem if doing so did not merely result in a 2-year further delay in getting the Federal Government moving effectively on this ocean use activity field and if the report of the commission did not result in a program too inflexible to be bent to the continuing needs of this rapidly moving field of effort.

If such a temporary commission is established alone for this purpose (as envisioned by the Rogers bill) it must be viewed only as an expedient in the knowledge that it will need to be replaced by a permanent entity having a continuing function of this same nature in the normal apparatus of the Government.

It is difficult to see how a permanent entity of this sort can be handled at less than a Cabinet level. The ICO certainly cannot handle this task because it does not have sufficient breadth of responsibility nor can this be given to it without a major disruption of the whole philosophy of the Federal Council for Science and Technology. This is not desirable because the FCST as presently organized and operated is too valuable in other activities to disturb for these purposes.

Accordingly the Lennon bill, and related ones, as valuable as they would be for the improvement of our organization for ocean science, are not appropriate to the present task. We have already moved beyond the need for which they would provide to a higher and broader level of need.

The normal way of handling the sort of problem with which we are presently dealing in the U.S. Government is to form a council consisting of the heads of the appropriate departments and independent agencies. This is frowned upon as being a burden upon Cabinet-level people. This objection is normally circumvented by providing for an alternate who can serve with the Secretary's power for this particular purpose. Despite some Executive objection to this with respect to ocean matters at this time, I see no really adequate alternative, and note the recent formation of the National Water Council to perform a similar function in another field.

The two components (council and temporary commission) noted above as useful and necessary for the planning, coordination, and conduct of a national oceanographic program are provided for in good fashion and at a proper level in government by the amended S. 944 as it passed the Senate. This bill would mark a giant's step ahead in this field and if this committee reports that bill out exactly as it is and the House passes it, we will be not only much ahead of where we now are, but will have taken a preliminary step that has to be taken in any event before we go forward to the broader field of occupation and use of the ocean environment.

It is probably unrealistic to expect this Congress to go further than this in the present session. Nevertheless S. 944 does not purport to treat of some of the other needs we have in this ocean use field and its passage will do nothing to reduce those needs. Accordingly this Congress will have these added matters before it in its next session, and they are partially included in some of the bills before the committee today. Accordingly it is useful to look at some of these other aspects.

(2) Operations

In a permanent solution to these problems I do not believe it practical to do without a council at Cabinet level to coordinate ocean activities of the United States as proposed in S. 944 because it is quite impractical to put all of the operational aspects of the Government in respect of the ocean in one agency or department.

The Department of State is not really an operational entity in this context. It depends on the other aspects of the Government doing normal operations while its function is the relation of the output of these other aspects of the Government into the fields of foreign policy and foreign relations. But there is such a high

foreign policy and foreign relation component to almost every aspect of ocean activity that the Department of State must have its own specialists in these particular aspects and it must be involved in the planning and coordination of the national ocean program wherever that may affect foreign policy or foreign relations, and those points are legion.

The Department of the Navy could not conceivably give up its own military-mission oriented research and development activities respecting the ocean to another agency because this is vital to its total mission. It is with the greatest reluctance that the Navy will admit that it should not continue to bear a primary mission of discipline-oriented research respecting the ocean plus much non-military mission-oriented research and development for the purpose of aiding aspects of the civilian economy (a role that it has long held and cherished respecting the sea). Furthermore this view is held by many outside the Navy who regret that cost-effective budget practices are pressing in this direction.

The National Science Foundation could not give up its support of discipline-oriented research in the ocean field because this would leave too broad and deep a gap in its primary mission of advancing science as science.

It is probable that the Atomic Energy Commission also would find it very difficult to depend upon another agency for its needs in the ocean field.

In most other parts of the Government, however, there would not be any great difficulty involved in a considerable consolidation of ocean activities into an agency for that purpose. The way to this has been pointed out in the recent Presidential Reorganization Plan No. 2 which consolidated the U.S. Weather Bureau, the U.S. Coast and Geodetic Survey, and the Central Radio Propagation Laboratory into the Environmental Sciences Service Administration in the Department of Commerce.

As noted above, cost-effective budget practices as they are applied throughout the Government, if no other thing, will press for further consolidation of this nature in the civilian sector of the Government in order to obtain missions large enough to justify the budget requests needed for services jointly required by several small segments of the ocean community in the Government.

The Muskie bill (S. 2251) meets this problem in a straightforward fashion by calling for the formation of a new Department of Marine and Atmospheric Affairs.

This bill recognizes that you cannot practically separate ocean research from ocean statutory responsibilities of an office or bureau. It consolidates whole offices and bureaus, as practicable, into the new department with all of their functions. In this way the new Department of Marine and Atmospheric Affairs would be composed of the U.S. Maritime Administration, U.C. Coast Guard, U.S. Weather Bureau, the National Oceanographic Data Center, the Coastal Engineering Research Center, the Sea-Air Interaction Laboratory, the Central Radio-Propagation Laboratory, the functions of the Bureau of Commercial Fisheries, and Bureau of Sport Fisheries and Wildlife related to marine and anadromous fish, and the mineral resources functions of the Department of the Interior related to submarine production, as well as other such governmental functions as the President considered to be in the national interest. This would form a department somewhat larger than the Department of Labor, and somewhat smaller than the National Astronautics and Space Administration.

Such merit attaches to its proposal and I, for one, do not see how we are going to make any sharp step ahead in the operational aspects of the conquest and use of the marine environment until some such major consolidation of ocean activities into a single operational arm of the Federal Government is made. Whether this is termed a department as Senator Muskie and his colleagues plan, or an administration, or a commission, is of lesser importance.

(3) *Integration and stimulation of industry into the national ocean program*

Even S. 944 is framed almost in toto in the context of activity by the Government and academic institutions in science, technology, and engineering of the ocean. It does not attempt to tap the vast resources of private industry as has been done previously with subsidies, grants, and aids when we approached the occupation and use of a new environment. Obviously this is intended only to be a first step in this activity in the hopes that the council and commission established under it will move in this further direction by recommendation for further legislation. It is not positively clear that the terms of reference in S. 944 are broad enough for this.

In any event this issue has been met squarely in the Muskie bill (S. 2251) and similar bills introduced in the House (as well as in the preceding Teague and

Bartlett bills respecting the Continental Shelf), by provision for a marine exploration fund and a marine and atmospheric research and development fund from which loans and grants can be made for specific purposes and under specific criteria.

It is obvious that some such apparatus and source of funds will be required before we are able to make any substantial advance in actually reducing the ocean environment to our substantial use. The need, as it always has been in such situations in the past, is for the Government to accept a sufficient share of the risk of pioneering to induce pioneers into the desired activity. Furthermore, the \$600 million authorized for these purposes by the Muskie bill appears to be in the right order of magnitude for what will be required at the beginning.

(4) *Facilities, service, and advice available*

At such time as the Congress considers and adopts a wide-ranging proposal as the Muskie bill the director, or secretary, or administrator of the resulting operational ocean entity of the Government should:

(a) Be authorized to form standing or ad hoc advisory committees for particular functions as it finds the need for from time to time, composed of persons acting in their capacity as independent experts drawn from science, government, or industry in such mixes as the entity found to be appropriate for the purpose at hand, and within the form and regulations applying to such purposes elsewhere in the Government; and

(b) Have available for its use, by contract or grants, any and all facilities and services in this field available to the Federal Government. Given a certain task it should be able to tackle it by the most appropriate of any of the following methods, or any combination thereof:

- (1) By contract to an existing agency of the Government;
- (2) By contract to an existing agency of a State government;
- (3) By contract to an existing international or intergovernmental agency;
- (4) By contract to an academic institution in this country or abroad;
- (5) By contract to an industrial firm; or
- (6) By means of its own staff and operations.

(5) *Organizational aspects of ocean affairs in the Congress*

While the fragmentation of ocean activities into 22 bureaus and offices of the executive branch of the Government represents such an institutional burden on the conduct of ocean affairs in the Nation that one can see little chance of improving that conduct until this fragmentation is substantially reduced and the remainder better coordinated, this is not in any way a worse institutional barrier to our development and use of the ocean environment than is the fragmentation of these affairs in the Congress, where 32 subcommittees and committees are involved.

None of the bills so far brought forward have attacked this major problem in a straightforward fashion except the Muskie bill (S. 2251). It provides for the establishment of a Joint Committee of the Congress for Marine and Atmospheric Affairs on which there would be representation from the principal substantive committees of both the House and Senate affected by these issues.

While the Muskie bill has other excellent attributes this is a major one. If this step can be taken by the Congress at an early stage it will do more than almost any other one thing in setting our feet securely on the path we need to take in fashioning the weapons, tools, ideas, and institutions that will be required to settle and use this enormous, varied, and bountiful new environment, the ocean.

SUMMARY AND CONCLUSIONS

The subjects that have been discussed above can be summarized as follows:

1. We are about at the stage in our efforts to occupy and use the ocean where we were in 1840 with respect to the arid environment of the Great Plains. We have come to a new environment where the weapons, tools, ideas, and institutions we have developed in the conquest of other environments will not work successfully. Just as in the case of the successful assault on the arid, forestless Great Plains environment, the later successful attack on the new environment of the lower atmosphere, and the present effort on making the new environment of nearby space useful to us, we require to develop new weapons, tools, ideas, and institutions that will enable us to conquer and render useful to us this new environment of the ocean. Just as in the case of the new environments of

the arid, unforested Great Plains, the lower atmosphere, and of nearby space, the successful conquest of this new oceanic environment will require massive assistance from, and major restructuring of, the Federal Government.

2. The United States cannot tolerate control of the ocean being in other than its own, certainly neutral, or friendly hands because the ocean is the avenue that holds our power posture together if thus controlled, or provides a wall between us and out friends and supplies if in control of others. In the last analysis the United States always has, and always will, fight to prevent control of the ocean falling into unfriendly, or uncertainly friendly, hands. Nuclear weapons have not changed this basic strategic consideration in any manner. They only have the ability to postpone the final decision and to escalate the final holocaust.

Because of the balance of military power presently existing in the world between Russia and the United States neither can use military power to control the ocean except in local areas where the other has not a vital interest, or in confrontations where one is reasonably certain the other will back down. Accordingly military power for this purpose is neutralized until the final Armageddon.

3. The customary uses of the ocean to his point in history, aside from the military, have been the merchant marine and the fisheries. Russia is successfully becoming a naval power, but more important to the present issue is brilliantly cultivating the merchant marine and fisheries uses of the ocean. Russia's merchant marine fleet is modern, new, and will surpass the carrying capacity tonnage of the U.S. merchant marine in the near future. Russia passed the United States in fish production several years ago and produced approximately twice as much fish from the ocean last year as did the United States. Its fleets fish the Atlantic, Pacific, Indian, Arctic, and Antarctic oceans on a worldwide basis and their fleets fishing off both the Atlantic and Pacific coasts of the United States are better than our own in the same area. These operations perform their normal economic function and are, at the same time, fully integrated into the military and diplomatic aspects of Russian power posture with an effectiveness which we have not begun to contemplate in our own situation.

Accordingly Russia is rapidly gaining a preponderant worldwide position, vis-a-vis the United States, in the traditional uses of the ocean—the merchant marine and the fisheries. This lends an urgency to the U.S. attack upon the new environment of the ocean because of the strategic implications of the very successful actions of Russia in applying science and technology to ocean use.

4. In these two traditional civilian uses of the ocean the United States has done poorly since the war. In terms of tonnage the U.S. merchant marine's share of U.S. foreign trade has fallen from 50 percent to 9 percent since 1945. In terms of round weight the U.S. fishermen's share of the U.S. market for fishery products has fallen from 80 percent to 38 percent since 1948. Both of these trends are perfectly capable of reversal, and it would not take much of a reversal in them to affect materially the trend in the balance-of-payments problem. Known fishery resources immediately off the coast of the United States are adequate to make the United States a major exporter rather than a major importer of fishery products, a change that could have substantial diplomatic connotations in respect of the protein malnutrition problem in the developing world if accomplished, as well as on the balance-of-payments problem and the general economy.

5. The resources of 850,000 square miles of the Continental Shelf off the United States became our sovereign property newly under international law last year when the Convention on the Territorial Sea came into force. The revenue to Government already from leases on such submerged lands, chiefly for petroleum and gas extraction, exceeds the total expenditures of the United States in ocean activities designed to accelerate our occupation and use of the ocean. Other very large resources are known to be available in the Continental Shelf despite the lack of detailed exploration and mapping. Techniques not only for the extraction of such resources but designed to enable men to work under water for extended periods (weeks) of time in depths sufficient to occupy the traditional Continental Shelf are in an advanced stage of development and require only some sharing of the pioneer risk by Government to be put into practical pilot-plant stage of operation.

The Convention on the Continental Shelf enlarges the traditional concept of the Continental Shelf by defining it as land covered by not more than 200 meters depth of water but, additionally, "to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas (submarine areas adjacent to the coast)."

Although explored in only a superficial manner the deep sea bed is known to have upon it vast resources of manganese, nickel, copper, iron, cobalt, molybdenum, vanadium, and some other minerals now used as essential ingredients in industry and not overly abundant on land in commercial deposits. There is suspicion of substantial pools of fossil fuels. Shipboard drilling techniques capable of operating in depths of water up to 2,000 fathoms have been developed and actually successfully used in waters over 1,000 fathoms deep. Commercial-style dredging techniques for the deep-sea environment are being developed.

What is needed to get at and use these valuable deposits, and obtain sovereignty through occupation and use of these submerged lands in all depths, is accelerated governmental support.

6. The rapidly advancing sciences of meteorology and oceanography have demonstrated conclusively in the last few years the intimate coupling of air weather and ocean weather, and the controlling nature of ocean climate (in the upper ocean) on the land climate by reason of the fact that most of the energy driving the winds of the lower atmosphere, and condensing and transporting water from the ocean to the land, derives from the reservoir of solar heat in the upper ocean. This realization was behind the recent Presidential Reorganization Order No. 2 combining the Weather Bureau, Coast and Geodetic Survey, and Central Radio Propagation Laboratory into the new Environmental Science Services Administration last month.

The ability to predict long- and short-range climate both over the land and ocean and in the ocean is fundamental to the economy of the land and the ability to occupy and use the ocean. We are far short of this ability, and it cannot come without substantial increases in our knowledge and understanding of the fluid ocean and the processes by which solar and other energy, as well as water, is transformed and transported in the ocean, in the atmosphere, and between the two.

This enhanced knowledge and understanding of sea and air climate and weather, and the ability to predict from it, is the single most necessary ingredient we require with which to speed up the occupation and use of the new oceanic environment. While the techniques for doing so are available this is one service that private industry must depend upon the Government for, as in all other environments, and the techniques are being developed and used by the Government too slowly to allow the occupation and use of the ocean by U.S. industry as rapidly as the strategic and diplomatic conditions require.

7. Under present international law 70 percent of the area of the earth's surface, the world ocean, is an international common owned equally by all nations. This includes the fluid ocean of the high seas, deep sea bed, and the resources contained in both. Aside from use of bottom resources as noted in (5) above, no change can be affected in this regime of law except by force of arms (prohibitively costly) or diplomatic effort. The history of diplomatic effort on this question from 1945 to 1960 indicates that all parts of the law of the sea are intimately connected together and that great risk attends opening of one sector of it for change, because another country may open another sector for a change inimical to U.S. welfare or even survival. The danger lies in the United States having only one vote in these issues among 115, and other countries having different aspirations and needs respecting the ocean than does the United States.

Accordingly no change in existing international law should be sought through diplomatic channels until a careful study of issues and probable pro and con votes is made. Successful issue is more likely to arise from occupation and actual use than any other factor and the posture of the United States is not relatively good on these issues presently, whereas it could be much better in 10 years' time if ocean activities by the United States are improved with vigor.

8. For reasons noted above almost all facets of ocean activity have a very high international component. For instance a government can regulate the conduct of its own citizens on the high seas but cannot regulate the conduct of citizens of other sovereigns there except under international law (a right seldom given) or by international agreement between the sovereigns.

Most institutions of international government (United Nations family, OAS, European Economic Community), as with most institutions of national governments, have been developed to deal with land-oriented problems. As in our own Government these institutions of land-oriented origin are very imperfectly suited for dealing successfully with ocean-oriented problems. Accordingly the governance of the high seas languishes while the problems multiply.

The United States pays a larger share of the total expense of international government than does any other country. It has been unable to beneficially co-

ordinate international governmental activities related to ocean use for the reason that its own national governmental institutions are also land oriented, with the ocean function fragmented among 22 bureaus and offices in 5 departments and 3 independent agencies at home. Accordingly the proliferation of bureaus, offices, and agencies ineffectively dealing with ocean problems in the international community is worse, if anything, than it is in the U.S. Government.

This problem is perhaps most strongly exemplified by the protein malnutrition problem in the developing world. There is no more urgent or serious health, social, economic or diplomatic problem than this in the world. The United States has a great many bureaus and offices involved in its worldwide solution, beginning with the Food for Peace Office in the White House, and running through USAID, the National Institute of Health, Department of Agriculture, etc., etc.

The ocean is producing annually the amount of protein required to keep 10 times the present human population of the world in health and vigor. In several instances this production is heaviest off coasts where the most serious and urgent protein malnutrition problems exist. The techniques of getting this protein out of the ocean to the people that need it are known. The institutions of international and domestic government are so poorly suited to applying science and technology to the successful use of these ocean resources that most of the protein dies and goes back in the web of life in the ocean each year unused by man.

The United States spends very large sums of money annually through over 20 international institutions working on aspects of this ocean-oriented problem. Not only is there little correlation of this considerable effort internationally, but there is the most modest and imperfect correlating of expenditures by the United States through its own institutions on the same problems in the same areas of the world.

The essential reason is the organizational mess of ocean-oriented activities in the U.S. Government, and the international mess cannot be put in better order until the domestic mess is tidied up.

9. Ocean-oriented activities are conducted in the U.S. Government by 22 bureaus and offices located in 5 departments and 3 independent agencies. They report to about 32 substantive and appropriations subcommittees and committees of the Congress.

That is the crux of the reason why we are not developing the weapons, tools, ideas, and institutions that would enable us successfully to occupy and use the new environment of the ocean with sufficient rapidity to meet our strategic needs. We cannot do the latter until this organizational mess of ocean activities in the United States is tidied up considerably.

In the executive branch such correlation as exists is through the Interagency Committee on Oceanography of the Federal Council for Science and Technology of the White House. This apparatus does not have a broad enough statutory base to handle the ocean-use problems successfully and it is not desirable to alter that statutory base so it could because that apparatus, as it is, is too valuable for its own primary responsibility, the policy supervision of research and development.

A new institution is required in the executive with which to handle these ocean-use problems. For reasons noted below it is impractical to put these functions all within one entity, at least at the present state of development or such as can be foreseen in the near future.

The normal institutional way to handle such a problem in the U.S. Government is to form a council at Cabinet level among the concerned departments and independent agencies. Examples are provided by the National Security Council, the National Aeronautics and Space Council, and the National Water Council. Such a National Ocean Council is urgently needed as a first step in improving our posture in respect of the conquest for use of the ocean environment.

The institutional disarray on this problem is no worse, and no more in need of correction, in the executive than it is in the legislative branch of the Government. The normal way of handling such a problem in the legislative branch of the U.S. Government is to establish a joint congressional committee for that particular subject composed of members from the principally affected substantive committees of both Houses. Examples are numerous and include the Joint Committee on Atomic Energy, the Joint Committee on Immigration and Nationality Policy, the Joint Committee on Defense Production, etc. A Joint Congressional Committee on National Ocean Policy is badly and quickly needed.

10. The change in budget practices to cost-effective accounting in the U.S. Government is having a ponderable effect on our ability to successfully occupy

and use the ocean, and our institutions require to be modified to take account of this. The effect is coming in the following manner. The Navy's research and development activities are being increasingly restricted to the accomplishment of its military mission more effectively, thus withdrawing gradually much support from the civilian-use missions of the rest of the economy which heretofore have depended heavily upon side effects from Navy research and development in the ocean. Discipline-oriented (basic) research funding is increasingly becoming the primary mission in Government of the National Science Foundation for ocean science as well as other science.

These twin moves appear to be inevitable as cost-effective accounting spreads through the Federal Government, and their effects are irreversible. The civilian ocean research and development function, lying in the center between these two primary basic and military functions, is fragmented among about 20 bureaus and offices resting in departments and independent agencies whose primary missions are land oriented.

Accordingly the mission of each of these fragments is so small, both absolutely and relative to other missions of the department or agency in which each resides, that it cannot form the justifiable basis for a budget item large enough to attack ocean occupation and use problems in a meaningful manner. The result is that the ocean activity of the United States useful to the successful occupation and use of the ocean by the civilian sector does not move with sufficient speed to accomplish the strategic desiderata noted above.

There is no practical way in which this situation can be corrected by normal increments in budget for these individual fragments as the economy grows because in order to develop the weapons, tools, ideas, and institutions we need with which to successfully occupy this new oceanic environment, change in order of magnitude of government expenditures for these purposes is required, as was the case when we tackled the new environment of the arid Great Plains, of the lower atmosphere, and of nearby space.

The only practical apparent way around this budgetary problem is to consolidate existing small bureaus and offices primarily concerned with the ocean into a new entity of government in order that a purely ocean-oriented mission will be sufficiently large to justify budget items required especially for services needed jointly by several of them.

This cannot be done by transferring ocean research and development activities out of all bureaus and offices in Government and consolidating it in one new entity for the practical reason that an office, bureau, or administration having statutory ocean use functions cannot tolerate being separated from its particular ocean research and development activities. This is as true of the Bureau of Commercial Fisheries, the Atomic Energy Commission, and the Weather Bureau as it is of the Navy.

Accordingly the practical approach to this problem is the consolidation of bureaus and offices that have primarily ocean-oriented function out of departments and agencies having primary land-oriented functions (such as the Bureau of Commercial Fisheries out of the Department of the Interior) into a new entity having a primary ocean-oriented mission, while leaving other bureaus and offices having ocean-oriented activities that are subordinate but needed by the primary mission of the department or agency where they presently reside (such as the Navy in the Department of Defense).

This necessary process was initiated by Presidential Reorganization Plan No. 2 last month, but must move much further and faster before this problem is successfully solved so that we can go forward in developing at suitable speed the weapons, tools, ideas, and institutions we need to successfully occupy and use the new environment of the ocean.

11. The size of the budget items required for these purposes are not fully documented publicly, but comprehensive studies of this matter, with justifications and cost-benefit ratios, have been made by four different committees of highly competent specialists from both industry and the academic community. They indicate, in rough terms, that our annual expenditures in ocean-oriented activities require to be expanded by an increment in the order of a half billion dollars per year if we are to cope with these ocean-use problems with the timing indicated by the strategic considerations.

12. The ultimate goal of these activities should be the occupation for use of the deep-sea bed. While difficult in the extreme, this is no more impossible than subsisting on the moon, and it is much more practical. Leaving aside the major mineral resources of the deep-sea bed, which can probably be harvested by other means, the occupation of the deep-sea bed would change the power

structure of the world more fundamentally than most things that can be suggested, because it would signal to all hands that we had conquered this environment and could use it. No other power could prudently challenge us until it could do the same.

Intermediate steps to this goal are available, unlike in the case of the moon venture. We are now engaged in learning how to live and work under waters up to 100 fathoms in depth. It is possible, as a next step, to take the goal of occupying a deeper peak than that on the Atlantic ridge (or Emperor Sea Mount south of the Aleutians) and work our way gradually down hill to the deep-sea bed.

13. A principal disadvantage in our dealing with this ocean-use problem is that we began considering it seriously 10 years ago almost exclusively in the context of its scientific aspects. In the intervening 10 years we have learned enough about the ocean to believe that it is practical to attempt its occupation and use. This, however, requires many other skills and activities other than scientific, although still requiring a much expanded scientific activity, both discipline-oriented (basic), and mission oriented. Now we are using the word oceanography to connote this ocean use as well as the ocean science meaning. The word will not stretch that far.

What we now must do is restructure our ideas as well as our institutions so that the total appropriate resources of our society (scientific, engineering, industrial, and governmental) can be brought to bear upon the successful occupation and use of this new environment of the ocean.

14. Most of the bills before the committee have been conceived during the period when we were caught up in the consideration only of the scientific aspects of this problem. Even S. 944, which recently passed the Senate, is concerned mostly with this. Only during this session of the Congress has the new concept of using the total appropriate resources of the country to attack this new environment for occupation and use inspired both the executive and legislative branches and been incorporated into proposed legislation. The most recent, and most broadly based, of these bills has been referred to another committee of the House, the Committee on Government Operations, because it deals broadly with the broad problem.

RECOMMENDATIONS

Nevertheless the old problem of coordination of ocean research and development in the executive, with which most of the bills before the committee are concerned, still exists and urgently needs resolution.

I think that this can be done most appropriately by adopting S. 944 in approximately the form in which it recently passed the Senate—to establish a National Council on Marine Resources at Cabinet level, and a temporary Commission on Marine Resources with which to assist the Council in the initial stages of its work. I believe the purpose of this bill could be affected beneficially by making certain that the Council and Commission, in their planning responsibilities, encompassed the full range of Government activity leading to the successful occupation and use of the ocean environment.

BIOGRAPHIC SKETCH OF W. M. CHAPMAN

1. Born, Kalama, Wash., 1910. Raised in the Columbia River salmon industry.

2. Educated, School of Fisheries, University of Washington; B.S., 1932; M.S., 1933; Ph. D., 1937.

3. Professional work:

(a) Biologist, International Fisheries (Halibut) Commission, 1933-39 (ocean research).

(b) Biologist, Washington State Department of Fisheries, 1939-41 (hering, clam, salmon, Grand Coulee and sardine research).

(c) Biologist, U.S. Fish and Wildlife Service, 1941 (fur seal research).

(d). Biologist, Washington State Department of Fisheries, 1942 (oyster research).

(e) Curator of fishes, California Academy of Sciences, 1942-47 (ichthyology; Steinhart Aquarium).

(f) Fishery development officer, Central and South Pacific theaters of war; Board of Economic Warfare (establishing subsistence fisheries at advanced island bases), 1943-44.

(g) Director, School of Fisheries, University of Washington, 1947-48 (fishery education).

(h) Special assistant to the Under Secretary for Fish and Wildlife, Department of State, 1948-51 (law of the sea; fishery diplomacy; international fishery commissions, and oceanography).

(i) Director of research, American Tunaboat Association, 1951-59 (law of the sea; fishery development; ocean research application).

(j) Director, the resources committee, 1959-61 (application of science and technology to fishery development).

(k) Director, Division of Resources, Van Camp Sea Food Co., 1961 to date (application of science and technology to fishery development on a worldwide basis).

4. Positions currently held on professional boards, commissions, committees, etc.:

(a) Member, Advisory Committee for Marine Resources Research, Food and Agriculture Organization of the United Nations.

(b) Consultant from time to time, Special Fund of the United Nations.

(c) Chairman, Working Party on Fishery Oceanography, Scientific Committee on Oceanic Research, International Council of Scientific Unions.

(d) Chairman, Panel on Law, Use of the Sea and Technology, Committee on Oceanography, National Academy of Sciences.

(e) Member, Committee on Marine Protein Concentrate, National Academy of Sciences.

(f) Member, African Science Board, National Academy of Sciences.

(g) Member, Panel on Marine Resources, Latin American Science Board, National Academy of Sciences.

(h) Member, Study Group on National Fishery Center and Aquarium, Department of the Interior.

(i) Member, Marine Research Committee, California Department of Fish and Game.

(j) Commissioner, Governors' Commission on Ocean Resources, State of California.

(k) Member, Advisory Council, Institute of Marine Resources, University of California.

(l) Member, Advisory Committee, Inter-American Tropical Tuna Commission.

(m) Member, Legislative Committee, American Fishery Research Biologists Institute.

(n) Member, U.S. delegations to international conferences and meetings from time to time in ocean science and law (Intergovernmental Oceanographic Commission; Food and Agriculture Organization of the United Nations; U.N. Law of the Sea; United States-Japan Trade; FAO Working Party on Rational Utilization of Atlantic Tuna; Indo-Pacific Fisheries Council; West African Fisheries Commission, etc.).

5. Professional honors:

(a) Fellow, John Simon Guggenheim, Jr., Foundation.

(b) Fellow, California Academy of Sciences.

(c) President, Van Camp Foundation.

6. Publications: Upward of 200 papers on ichthyology, fishery development, law of the sea, fishery economics, ocean science, and book, "Fishing in Troubled Waters."

Dr. CHAPMAN. I will identify myself first. I am W. M. Chapman, director of the Division of Resources, Van Camp Sea Food Co., 840 Van Camp Street, Long Beach, Calif.

My own headquarters are in San Diego, at 739 Golden Park Avenue, so I am well acquainted with the preceding witnesses and I have worked with them.

Our business is the harvesting, processing, distribution, and marketing of the living resources of the sea on a worldwide basis. Our interest in the ocean is just as deep and wide as the ocean itself.

This morning I will, however, speak much more broadly than our own special interests.

I would like to start out by considering the nature of the problem with which we are dealing here and refer to some of our history with which you are familiar.

What we are here preparing to do is to fix up the mechanism by which we can enter, occupy, and use a new environment.

We have some experience of this in our history. I am sure the chairman is acquainted with the work of Mr. Prescott Webb. This provides an extremely interesting example in describing the activities attendant to the settlement of the Great Plains area. When our people emerged from the forested well-watered area to the Great Plains area, which was unforested and arid, there was required a substantial reorganization and development of new weapons, tools, ideas, and institutions. As a matter of fact, for a period of about 45 years the settlement activity paused along about the 98th meridian while this regrouping and reorganization of ideas and institutions was going on.

It was during that period from 1840 to 1885 that we founded many new institutions in the Government, such as the land-grant colleges for the purpose, among others, of developing new farm procedures for this new environment. That was the time of the development of the Department of Agriculture, development of the bureaus which led to the formation of the Department of the Interior, and so forth.

There was required a substantial restructuring of the Government in order to handle the problems associated with conquest and use of the new environment.

When we came to tackling a new environment again in the lower atmosphere, directly after World War I, we had the tool to do it with—the airplane—but it required a considerable restructuring of Government and the development of new institutions of Government in order to make this tool a means by which we could occupy and use the lower atmosphere.

Upon this experience was founded the civil air industry which was substantially subsidized for a long period of time by the Federal Government, but is now not only paying its own way but it is a substantial strength of the economy and defense.

We are in the process of doing the same thing now with nearby space. This is a new environment on the conquest of which we are embarking. This is being done substantially at Federal expense. It required a restructuring of Government to initiate, formation of new institutions, massive subsidies, and so forth. We are still engaged in this enterprise.

What I propose to you this morning is that what we are now faced with is actually the necessity for doing the same thing again with respect to a new environment, the ocean—the development of the new weapons, tools, ideas, and institutions which will be required for the occupation and use of this new environment.

I point out that the final conquest of the environment of the Great Plains made us the strongest power on earth by providing the food and the agricultural strength of the country.

I am quite sure that a similar successful occupation and use of the ocean will further strengthen our entire economy and posture in the world, and that is the subject to which I address myself.

If I might comment on the question raised a while ago, if in these bills before us the compound word "ocean-use" were substituted for the word "oceanographic" or "oceanography", wherever they occur, you would be closer to what I am talking about, and I think also what almost everybody else is talking about. We are not talking about oceanography as a science in the language of the legislation.

I want to pass on to what I think is the most important aspect of this, and that is the strategic considerations. I will state flatly that the United States will maintain control of the sea, or be certain that that control is in fairly friendly hands, or we will fight. We have done so in every instance in our history where it has been thought that the control of the sea was about to fall into unfriendly hands.

I will state flatly that nuclear weapons make no change whatever in this strategic consideration. We must have control of the ocean to safeguard our entire society.

The only thing nuclear weapons can do is to postpone the final reckoning and escalate the final holocaust.

This is what leads me to the feeling of urgency in the matters with which you are dealing.

I think if we go ahead with the normal 5 or 10 percent increment per year in agency appropriations for the next generation or so we will come eventually to a place where we will be able to effectively occupy and use the ocean. If we lived in a peaceful world that might be the best thing to do, but unfortunately we do not.

There are three traditional uses of the ocean. We are now speaking about some new ones, such as mining, and so forth, but the three traditional uses of the ocean have been military, merchant marine, and fisheries.

I propose to you the consideration that the military aspect of the control of the ocean has been neutralized. We have developed perfectly satisfactorily the military power to obliterate our largest competitors. I have no question about that. However, while we are doing that they are likely to obliterate us. Therefore, from the standpoint of military control of the ocean we are unable to have a confrontation with Russia in any place except of a brush-type war where they do not have a major interest or in a situation where we are pretty sure they will back down, as in the Cuba instance. A straight out confrontation for military control of the ocean we cannot have because of the consequences thereof.

Then one comes down to what does establish control of the ocean. I think one can say quite clearly that occupation and use is what will control the ocean, in the absence of military control.

Discounting the military use as being neutralized we find in the transportation use that the Russians are actually ahead of us now in merchant marine carrying tonnage, new fleets, becoming more highly automated than ours, more efficiently operated, and taking an important role in mercantile commerce.

We find in the fisheries that Russia has exceeded us as of some years ago, and last year produced approximately twice as much tonnage of fish as did the United States. They operated fisheries over the entire world oceans—Indian, Atlantic, Pacific, Arctic, and Antarctic Oceans. They have better fleets of vessels fishing off of our own coasts, off both coasts, than we have, and they operate the same way off Africa and Asia.

I think that here lies the degree of urgency which has not yet been considered in testimony that I have heard before your committee. We need to get up and hustle if we are not going to let the control of the ocean by the subtle means of occupation and use fall into the hands of our greatest competitor, Russia.

My observation of how this is occurring is that they are closely, quickly, and intimately integrating the application of science and technology to their marine strategy whereas we are doing extremely competent oceanographic work without the link of application to industry—to occupation and use.

I will point out, also, that the merchant marine and fisheries have considerable economic impact on our country, as well as strategic, and also that they are capable of having much more economic impact.

There is a feeling in government and in the general public, for instance, that fish are not being increasingly used in the United States. This is simply untrue. The consumption of fish in terms of pounds of round weight in 1948 was about 5 billion pounds in the United States. In 1964 it was a little more than 12 billion pounds. The amount we paid for the extra imports over what we produced in 1964 was in the neighborhood of \$600 million. The Bureau of Commercial Fisheries will be able to provide you with information to the effect that in their estimation, on the basis of their imperfect present knowledge, the fish stocks adjacent to the coasts of the United States are perfectly capable of producing in a sustainable manner in the neighborhood of 22 billion pounds of fish per year. Thus, we have the resources in our coastal waters with which we changed from being the biggest importer of fish in the world to being the biggest exporter of fish in the world.

I point out to you that this could have a major effect on the balance-of-payments problem.

To turn a moment to the Continental Shelf problem. We have just inherited 850,000 square miles of territory, which is a good, big piece of land. For all practical purposes, the mineral composition of the Continental Shelf is similar to that of the adjacent land. The wealth of this 850,000 square miles of territory is thus enormous. As a matter of fact (and I believe your counsel can determine for you these figures, which I have difficulty in digging out of the Presidential budget message) I think I am correct in saying that the Department of the Interior at the present time is making more money per year from the sale of exploitation licenses for the harvesting of the resources of the Outer Continental Shelf (not the Inner Continental Shelf, but only the Outer Continental Shelf), already than the Government is spending per year on the investigation and enhancement of use of the ocean. I think there is a very good possibility that as a strict business venture of making income for the Government, a very substantial investment in investigation, exploration, and enhancement of the use of the Continental Shelf would be a paying proposition for the Treasury of the United States, and everything that is in the record that I can find substantiates that statement.

I point out also that the convention on the territorial shelf, while granting us sovereign jurisdiction over the resources of the Continental Shelf, leaves open the edge of the Continental Shelf by the phraseology—

to where the depth of the superjacent waters admits of the exploitation of the natural resources of such area.

We presently have drilling techniques that are perfectly capable of drilling into the deep seabed at depths of water of 1,000 fathoms.

My information, which I think can be confirmed also from the appropriate agency of the Department of the Interior, is that there is consideration now of the lease of a piece of land in 1,000 fathoms of water for drilling to an oil company.

So, I think we can afford to invest heavily in investigation of the Continental Shelf, and we will also make money by doing so as a government, quite aside from the effect of this on the economy.

I point out another realization that has come to us from working with the science of the sea in the postwar period, that is, the intimate relationship between air and ocean in the formation of climate. Most of the energy which drives the lower atmosphere, which creates the wind which transports waters from the ocean inland for rain comes into the lower atmosphere from the ocean. Most of this energy, while it derives ultimately from the sun, is stored in the energy reservoir of the ocean and transported hither and thither by the ocean and radiates back into the atmosphere to provide the great energies required for the movement of these air masses and moisture.

This has been recognized recently by Presidential Order No. 2 of 1965 setting up the Environmental Science Service Administration in the Department of Commerce. I think this was a tremendously important step, but only a first step, and that further amalgamations of activity of this nature within the Federal Government structure will be required, as I will point out a little further down the line, before we can adequately predict both land and ocean climate.

We require to know the ocean better. We require to understand ocean climate better in order to understand the air climate. In order to know what is going to happen weatherwise in the interior of the continent, we must know what is going on in the South Pacific, and so forth.

I could expand on that to a considerable extent, but will just make the flat statement this morning.

Let us come from the general consideration of the problems down to what we are talking about—the legislation. Do we have an effective apparatus within the executive branch of the Government to improve our posture in these matters? I think the answer is clearly “No,” or we would not be considering such a variety of legislation to attend to this problem. We have our ocean activities split into about 22 bureaus and offices in 5 executive departments and 3 independent agencies. They report by rather roundabout mechanisms to approximately 32 committees and subcommittees of Congress.

I do not think it would be practically possible to devise a worse administrative mess for handling a subject than this, and I have left aside the additional factor that we carry on ocean activities as well through about 25 international agencies in a substantial manner, which are scarcely integrated at all into these agencies to which I have just referred in the executive branch.

We have correlation effectuated, to the extent that it is, by the Interagency Committee on Oceanography. Before saying anything about ICO, I want to state clearly that I am well acquainted with the people involved, from the chairman down, and admire them tremendously. I think we have a group of ocean-acquainted people that cannot be beat, to my knowledge, in the world, and I am acquainted

with this on a worldwide basis. The institution, however, cannot handle this problem of correlation of activity. I have listed in my testimony 10 different reasons why they cannot, and another person could list another 10. I will highlight one or two of them.

I think there is very good reason to argue that the Federal Council on Science and Technology does not have a wide enough purview to handle the ocean use topic we are now considering. Their title is Science and Technology, but as a matter of fact their function is science. Being by profession a scientist, I am not going to knock science, but science in this context is not an end but is a means to an end. The Federal Council on Science and Technology is not equipped by statutory authorization at all, or by organizational background, to tackle the problems of occupation and use of the oceans. They provide extremely important services within the Government, but this one they are not broadly enough oriented to do.

ICO as a portion of FCST, therefore, cannot do what its parent body cannot do. There is no guidance in ocean strategy, ocean program, given to the ICO by its parent body, FCST, because it has no people on it capable of giving such guidance.

So far as I can determine by a close examination of the activities of the U.S. Government in ocean work, we have no national ocean strategy. I think the Russians do have, but I find no sign of any in the U.S. Government. We do not have a body to devise national ocean strategy. We do not have, therefore, any agency able to construct a program to implement a national ocean strategy.

The Bureau of the Budget is the primary controlling element now in the organization and application of funds for this purpose. ICO has substantially no control over the ocean use budget. In the first place, the ICO National Oceanographic budget is not a synthesized budget for tackling the U.S. problems with respect to the ocean. They provide a budget which is substantially an addition of 22 separate budget items coming to them. It is not a synthesis. It is an addition.

ICO does not have a separate line item for a staff for itself. Their staff is primarily provided for them by the Navy.

ICO does not have operational responsibilities. Somebody referred to Operation Mohole a while ago. Operation Mohole originally began operating under the National Academy of Sciences and got into so much political problems, not technical but political problems, that there was a considerable pause in the operation, and its operation was transferred under a new management, the National Science Foundation.

I point out to you that the National Academy of Sciences is the very epitome of a nonoperational organization. They never should have been operating anything to begin with. The National Science Foundation is also not intended to be an operational agency and does not want to be. The reason the National Science Foundation is handling Operation Mohole is that there isn't any other place in the Government for it to go. That is the only reason.

I want to point out the effect of cost-effective budgeting practices upon our ocean activities presently. This is, I think, a basic consideration which will move us inevitably in the direction that I shall point out. Cost-efficiency budgeting practices have worked so successfully

in the Department of Defense that the President has ordered this to be followed as quickly and as soon as possible in the other departments of Government.

How it is working presently is that the discipline-oriented research mission in the Government with respect to all science, and with respect to ocean science as well, is in this form of accounting the mission of the National Science Foundation. The mission of the Navy in this form of accounting is military. I am not saying things that I desire to see happening. I am telling you what I see happening. The effect of this is that the Navy's mission in ocean research is being constricted year by year closer to that of mission-oriented activity, with the mission being strictly military.

This has the following fallout: if it is militarily important it should be classified; if it is militarily unimportant, it should not be in the Navy's budget. That is the difficulty which ONR is having at the present time, and I think it is an inescapable conclusion from this budgeting practice.

This leaves between the military mission of the Navy and the discipline-oriented mission of the National Science Foundation the whole array of civilian science, technology, and engineering, the Federal aspects, split among 20 small missions, fragmented to the point where it is not possible under this system of budgeting to have a large enough single mission to justify a substantial enough budget item to do a thing that is needed for joint service requirements by several of these 20 fragments.

I will state as only one example, the weather watch buoy system, unmanned instrumented buoys. This will cost in the neighborhood of about \$50 million a year over a period of 5 years, a total of about \$250 million. The Weather Bureau, the Coast and Geodetic Survey, the Coast Guard, the Bureau of Commercial Fisheries, the Bureau of Sport Fisheries and Wildlife, and some other entities, need the information that would be so derived, very much. There is none of them that has a large enough mission presently to justify a budget item of that size on top of their other statutory responsibilities.

The consequence of this, I believe, leads us inexorably toward a further consolidation of ocean-oriented offices and bureaus in the Federal Executive structure of the nature that the President has just accomplished in the Department of Commerce, a consolidation of missions so that under cost-efficiency accounting there will emerge mission of adequate size to justify the budget items that are required for us to go forward in the occupation and use of the oceans.

I have talked a little bit longer than I intended to, sir. I will wind up by saying that any one of the bills presently before the committee, if adopted and passed by the House and Senate and signed into law by the President, would improve our present situation. We then come to a consideration of two things: What is the best thing to do, and what is the practical thing that can be done?

Mr. Lennon's bill, H.R. 2118, has the great benefit that it has already substantially in its present form passed the House and passed the Senate in a former session, and has now been fixed up so the Executive likes it. I think it is far short of what is needed, but it would be a major step ahead. If this were put through, we would be well ahead

of where we are; but I think as a practical matter we are able in this session to go somewhat further than that.

I believe that S. 944 as finally passed by the Senate is an improvement on this. It is an escalation of the ideas, actually, that were formerly expressed by the House and Senate.

With a Council, with a commission of temporary nature to aid it with advice, I think this would be an excellent step forward and that this would not be vetoed by the President. I think, in fact, you people shook up Dr. Hornig so badly the other day that a change in thinking is going on in the executive department. I put that in parenthetically. I think if that bill (S. 944) were passed, there would not be much difficulty in getting it signed by the President.

I think there are two improvements which could be made in that. This encompasses really Mr. Rogers' bill, but I like one feature of Mr. Rogers' bill much better than I do S. 944 in its present shape. I think the appointment of the temporary commission should be obligatory and not optional. That is one suggestion which I make for the committee to improve that legislation if it acts upon it.

The second is that "ocean use" be substituted for "oceanography," at least in most places in the bill. Let us get out of the narrow field of strictly ocean science.

I think, however, that we will require to go ahead in the next session, or another session of the Congress, and discuss and consider much wider legislation, and I think somewhat along the lines of the Muskie bill, which would provide for a consolidation of ocean-oriented functions in the Executive so that missions could be developed which would justify the sort of budget items that are needed and, secondly, that would provide also for a simplification of the congressional structure for considering the subject.

Thank you, Mr. Chairman. That is all I have.

Mr. CASEY. Thank you very much, Doctor.

Mr. Downing.

Mr. DOWNING. Dr. Chapman, I have just finished a hurried reading of your prepared testimony, and I cannot tell you how much it has impressed me. It is a scholarly presentation.

Dr. CHAPMAN. Thank you, sir.

Mr. DOWNING. I think it should be the bible for everyone interested in the subject. I hope all members of the subcommittee and the committee will read this presentation carefully. It is an excellent compilation of oceanography and the problems which we shall have to meet. I congratulate you on that.

Dr. CHAPMAN. Thank you, sir.

Mr. DOWING. I have no questions, Mr. Chairman.

Mr. CASEY. Mr. Reinecke.

Mr. REINECKE. You have given us an excellent statement, Dr. Chapman. You seem to want to deemphasize the pure science aspects. Did I interpret that correctly?

Dr. CHAPMAN. No; that is not correct. What I want to do is emphasize both the discipline-oriented and mission-oriented science. Both of those are needed in a very substantially enhanced nature. What I say is that this has to be followed by an integration of, an application of, the results of this science to the use of the ocean.

Mr. REINECKE. Because of your vast experience, I would be interested in hearing what types of commercial uses, other than transportation and fisheries, you feel we can make of the bottom of the ocean within the foreseeable future.

Dr. CHAPMAN. It is not the foreseeable future. We already have mining operations going on the Continental Shelf. The diamond activity in South Africa, you remember, came out of California. Bill Bascombe and his group developed the ship that was used in the South African work, and they are still heavily involved there. This, I point out to you, is of economic benefit to California because what we are doing is exporting skills and getting paid quite well for them.

There is also tin mining going on off the Malay Peninsula, and also Mr. Bascombe's group is again engaged in this. So, there are already some other things than oil and gas being taken from the Continental Shelf. Sulphur, of course, is a considerable one. We have very large phosphate deposits off the coast of southern California which are nearly to the commercial practicability stage of harvesting. There is a wide range of mineral deposits on the Continental Shelf capable of exploitation.

One of the difficulties involved in this is not the legal implications. We know to whom we have to pay rent on the Continental Shelf. There isn't any question of that. One of the problems is our lack of being able to predict the weather in the ocean as well as above the ocean. I am saying that the variations in the crosscurrents and the shifting bottom sediments are a quite considerable nuisance to people operating on the bottom of the Continental Shelf. This is even causing the oil people substantial difficulty, and they would like to have us know more about the environment of the liquid ocean as it affects their operations under the sea.

However, I think aside from the merchant marine, really the most important worldwide aspect of the ocean presently is the protein resources. I point out to you that this is a major socioeconomic problem of the world as a whole. Over 60 percent of the people of the world do not have an adequate protein content in their diet to maintain health, welfare, and energy of the body.

The ocean is annually producing sufficient animal protein to provide the total necessities for protein of a human population of approximately 10 times the size of the present world population. What we need to do is harvest a larger share of this production which now mostly goes to waste.

Mr. REINECKE. Do you see in the foreseeable future any other types of industry, such as undersea farming, which we hear a lot about? Is this within the practical realm, or what type of plant or animal would you be referring to?

Dr. CHAPMAN. One thing we are going to do is get water to southern California. We are going to get water out of the ocean. This is the thing the ocean is most full of and one of the things we need most of in southern California. A thing not often realized is there is an enormous kelp harvest. In California, for instance, this is almost coming now to a farming proposition. We take 140,000 tons of kelp a year off the coast of California presently. This is a form of farming.

Our oyster industry on the west coast is entirely a farming matter. It is still a wild harvest, substantially, on the east coast.

Yes, I think there are going to be numbers of farming ventures established in the ocean in the foreseeable future.

Mr. REINECKE. If this Commission were set up as proposed in Mr. Roger's bill and as proposed in S. 944, would you be willing to serve on it?

Dr. CHAPMAN. Yes. One more commission appointment is what I need about as much as I need another hole in my head. I am fully employed presently. But the answer in this case is "Yes."

Mr. REINECKE. Thank you.

Mr. CASEY. I, too want to express my appreciation for your fine statement, and look forward to reading the prepared text. We are delighted that you did take time from your busy schedule to give us the benefit of your eminent knowledge in this field. We certainly appreciate the enthusiasm with which you support the objectives of this committee. Thank you very much.

Dr. CHAPMAN. Thank you, sir. I remember very well the chairman coming to Geneva one time a few years ago and giving a very discouraged American delegation a great deal of support and encouragement, also.

Mr. CASEY. Thank you very much. It was a very educational experience for me, I assure you.

Our next witness will be Dr. George M. Kavanagh, Deputy Assistant General Manager for Research and Development of the Atomic Energy Commission.

STATEMENT OF DR. GEORGE M. KAVANAGH, DEPUTY ASSISTANT GENERAL MANAGER FOR RESEARCH AND DEVELOPMENT, U.S. ATOMIC ENERGY COMMISSION; ACCOMPANIED BY ARNOLD B. JOSEPH, DIVISION OF BIOLOGY AND MEDICINE; FRANKLIN N. PARKS, OFFICE OF GENERAL COUNSEL; AND DR. JOHN WOLF, AEC MEMBER OF INTERAGENCY COMMITTEE ON OCEANOGRAPHY

Mr. CASEY. Doctor, we are pleased to have you here. Would you care to insert your statement, or would you prefer to read it?

Dr. KAVANAGH. Mr. Chairman, it is a pleasure to be here. I will proceed either way. In view of the time available this morning, you might want me to insert the statement and summarize it.

Mr. CASEY. If you will, Doctor, suppose you insert your full statement in the record, and then give us the benefit of your summary of it and the matters you wish to stress.

(Dr. Kavanagh's statement follows:)

STATEMENT OF GEORGE M. KAVANAGH, DEPUTY ASSISTANT GENERAL MANAGER FOR RESEARCH AND DEVELOPMENT, U.S. ATOMIC ENERGY COMMISSION

Mr. Chairman, it is a pleasure to appear before this committee today to testify concerning legislation on the general subject of oceanography. Accompanying me are Mr. Arnold B. Joseph of the AEC's Division of Biology and Medicine, who is directly involved with our programs in oceanography, and Mr. Franklin N. Parks of our General Counsel's Office, who may have to help me through some of the legal intricacies of the numerous bills before your committee.

Let me begin by saying that the Atomic Energy Commission is thoroughly in agreement with the sentiments that have been expressed in these hearings, and elsewhere with increasing seriousness in recent years, concerning the great importance of the oceans as a field for serious technical study and as a resource

of potential great utility to mankind. We are entirely in accord with the growing feeling that work in this area is deserving of continued and formal emphasis on the part of the Federal Government, and we thus agree with the substantive intent of the legislation under consideration.

Our feelings on the present need for specific legislation derive from our participation with other agencies in the attempts made in recent years to examine oceanographic problems in a coordinated way, but they also derive from the nature and objectives of our own activities related to oceanography. The Atomic Energy Commission supports programs in a limited number of areas related in different ways to that general field. Each of our programs is specifically directed to some atomic energy need, interest, or capability. An understanding of these relationships may be of specific interest to your committee in its investigation of the general problem of pulling together a comprehensive approach to oceanography, and I shall accordingly outline very briefly the nature and objectives of these programs as an introduction to our opinions on coordination and organization of the entire Federal effort.

The first and most direct area of AEC concern with oceanography derives from our responsibility for developing an understanding of the role of radioactivity in the environment. Substantial amounts of radioactivity have been introduced into man's environment over the past years, in largest amount as a result of tests by various nations of nuclear explosive devices, but to some much lesser extent through the operation of plants concerned with the production of special nuclear material and with the application of nuclear processes for useful peaceful purposes. Radioactivity in the environment finds its way to a considerable extent into the oceans.

The oceans are so large that the concentrations of activity are low, and we do not feel that the amounts presently in the oceans constitute a health hazard, but it is essential that we understand the role and fate of such activity. Accordingly, as part of its programs in environmental studies, the AEC supports substantial investigations on the behavior and fate of radioactivity in the oceans and in estuarial waters. These studies include investigations of physical and chemical transport, diffusion, and reactions, and studies of interaction with living organisms. The work includes programs at national laboratories and approximately 50 contracts with universities, research institutions and private industry. It has been carried on at a gradually increasing level for over 10 years, and is yielding a growing understanding of the important relationships between radioactivity and the oceans. This work bears directly on Commission decisions regarding the safety of operations involving radioactivity in the sea. As a byproduct, the tracing of such activity through the ocean yields an increasing knowledge of physical and biological processes in the oceans themselves, and thus contributes to a basic understanding of marine ecology.

It is important, in relating this work to considerations of a national program in oceanography, to emphasize that it was initiated and has been carried forward in response to our own specialized environmental responsibilities and interests. It is funded as a part of the total environmental work, with the levels of funding set in competition with work in other environments, and in more general competition with other nuclear work.

A second area in which our work relates to oceanography is in the newly recognized field of ocean engineering. The AEC in a number of programs is engaged in development efforts whose object is to apply the unique capabilities of nuclear materials and processes to other fields. This has been most dramatic and successful in the production of power through nuclear reactors and through isotopic heat sources. Undersea applications represent a natural field of use for these techniques. We have underway programs that should lead to the provision of auxiliary nuclear power in substantial amounts, for such applications as manned undersea stations or mining, and to the establishment of low-maintenance power sources in remote locations at sea, such as navigation buoys and warning devices for isolated drill rigs. Some demonstration units of the low-maintenance sources are already in operation. Nuclear propulsion deep undersea is a promising field of application in which the AEC has a substantial program, in cooperation with the Navy, under the leadership of Admiral Rickover.

In these remote or undersea applications nuclear power appears to be the only method by which such characteristics as large amounts of power, freedom from maintenance, or long endurance in isolated locations can be combined to meet the requirements for extending the national capability to reach and maintain activities in difficult ocean environments.

In considering this type of engineering and development work, related to but not in itself part of oceanography, we see that the initiative for our participation comes from our specialized capability—the chance of applying nuclear techniques to increase the range and power of conventional methods in use by other people investigating the underseas environment. Our motivation is the responsibility to seek out new and useful applications for nuclear energy. The decisions on establishing and supporting such work are ones that relate the work to the projected needs of the users in oceanography and take account of the ability to support the work in its competition with other applications for nuclear energy in many environments.

A third type of work performed by the AEC relates to the oceans in one way or another but not directly to investigations in oceanography. Thus, our substantial water desalination programs may make it easier to meet man's growing need for water by drawing upon the ocean as a source of supply. Our programs in the application of isotopic irradiation to food preservation include a substantial emphasis on the preservation of food from the sea. Similarly, our programs in ship propulsion, both civilian and Navy, other than the specific deep submergence effort, involve the ocean but are not considered to be directly related to oceanography as such. All of these programs are supported and coordinated in response to motivations and in accordance with resources which do not directly relate to the formulation of a national program in oceanography.

Against this brief description of the nature of our ocean related programs we can consider our methods for managing them and coordinating them with programs under our own and other agency sponsorship. Those most closely related to oceanographic programs in other agencies are the environmental programs in the first area discussed. It is important that they be coordinated to be sure that there is no inadvertent duplication and, in response to a more common problem, to attempt to fit them together with work undertaken by others to be sure that in the national program all promising lines of effort toward understanding the oceans are being followed. Effective coordination started with these programs before there was formal interagency effort, with a recognition by the AEC of the existence of competence in these areas in other agencies of government and in other organizations. In our work we have maintained close working relationships with such groups, and we utilize them in accomplishing our objectives in preference to building up major competencies or facilities in-house. The work of formal coordination has been carried out in recent years, we feel successfully on the whole, through the Interagency Committee on Oceanography.

Such coordination is a process conceptually distinct from the proposition that the total program should be managed from one place, and a consideration of the nature of the work may show that it is reasonably so. This flows from the fact mentioned above that the management decisions consider our work primarily as a part of the total environmental work and as a part of the total program in nuclear energy development, with the coordination being carried out to bring it into consonance with other oceanographic work undertaken for different motivations. Our work is an example of the general type of problem that Dr. Hornig has mentioned earlier in pointing out that a group, however constituted, which attempts to pull together the oceanographic work will of necessity have to deal with the resources available in accordance with judgments of relative priorities. As he has indicated, this basic consideration will influence all efforts to develop a national oceanographic program within the executive branch.

Relations between the AEC and other agencies in the second type of program, the application of nuclear energy to the production of power or other useful ends in relation to the ocean environment, partake primarily of the relationship between the developer and the user. We do coordinate these programs directly with potential users and try to carry on our developments to be consistent with their needs. To some extent this involves pulling together with specific needs of various users, but it is more clearly a problem of fitting together generally stated needs with the capabilities possible within a developing technology. Such capabilities extend across different areas of application; for example, much of the technology which is being developed to provide compact power for the space environment also will be applicable to underseas use. The problem of coordination is not one that is a serious hindrance to the program, and the competition for resources, though taking place in a different area from the environmental work, is similarly one that would have to be faced by any organization attempt-

ing the management of the Nation's oceanographic program. Any management group will have to recognize the mutuality of the technology for different applications and would find it inefficient to divide the activities arbitrarily based solely on their area of use.

The third type of work, that relating to the oceans but not directly to oceanography, is so far from physical or biological oceanography itself that it is only nominally considered in relationship to the oceanography program. It would not be sensible to add work on food irradiation and water desalination to work on field investigations in physical oceanography in describing a national program.

When we look at all these programs and projects, we see, taking our agency as an example, that there is a rather wide spectrum of activities whose relationships to fundamental investigations in oceanography differ in closeness and in nature, and it should become rather clear that the problems of management in this general field are not simple. It is rather easy to look at a table showing work in oceanography to consist of separate efforts in many agencies, and to say that the situation would be improved or rationalized if all of these programs were brought together under single management, but such a simplistic view does not go beyond the table itself and becomes much less clear when one looks into the details and reasons behind the individual programs.

These considerations in the organization, management and support of our ocean-related programs lead us to feel, first, that insofar as our own activities are concerned, the coordination among ongoing programs is being adequately handled by existing mechanisms. The management perhaps could be improved by some further centralization, and we would certainly cooperate in attempts to bring about any possible improvement, but it is not at all clear or evident just how this should be accomplished. A separate administration to handle all oceanographic problems probably does not represent a reasonable approach. Similarly, it is not clear that a Cabinet-level council would represent an appropriate solution.

These and other related topics are under serious study within the executive branch by a panel of the President's Science Advisory Committee. We look forward to guidance from it on improvements that could be made in both coordination and management. It is possible that such guidance may clearly indicate the need for further legislation, and if such need becomes clear, we would support specific action. Pending such further information on how best to proceed in organizing the overall program, this agency does not feel that specific legislation can effectively be devised. In general, we would tend to favor the legislation, H.R. 2218, which encourages the administration to take this important field as seriously as possible, to develop a comprehensive program and to report on status and progress to the Congress, but we would not at this time favor specific bills setting up defined centralized authority.

This concludes my comment on the general approach to legislation on the management of oceanographic programs, but I should like to add a specific comment on the security provisions contained in a number of the bills before the committee. In its detailed comments on H.R. 5654, H.R. 6457, and H.R. 7849, the Atomic Energy Commission has suggested certain changes relating to access to restricted data in the event any of these bills should be considered for passage. The same comments would apply to S. 944, which was passed by the Senate on August 5. All of these bills have provisions patterned on section 304(b) of the National Aeronautics and Space Act under which officers or employees of the Council created by the bill could have access to restricted data relating to oceanography and the marine sciences upon certain determinations made by the Council or its designee. Only two agencies, the Department of Defense and the National Aeronautics and Space Administration have been provided this authority. Both of those agencies have a large complex of employees and contractors who require access to restricted data. We do not visualize that the Council which may be created by the bills mentioned above would have the need for access to the quantity and types of restricted data which the Department of Defense and NASA require, nor would the number of individuals requiring access be large.

The Atomic Energy Act was amended in 1961 to provide a mechanism, not available when NASA was created, for granting access in situations such as that presented by the bills mentioned above. Under that mechanism, the Atomic Energy Commission may accept as the basis for granting access to restricted data an investigation and report on an individual made by another Government agency which conducts personnel security investigations provided

that a security clearance has been granted to the individual by another Government agency based on the investigation and report. Under this procedure, the Commission has been able to authorize the necessary access to restricted data by officers and employees of various agencies such as the State Department, Coast Guard, and the Central Intelligence Agency. In this connection, our comments on the bills mentioned above also suggested providing the Council, if it is created, the authority to arrange with the Federal Bureau of Investigation for the necessary investigation of its officers, employees, and consultants. With this authority, the Council would be in a position to take advantage of the expedited clearance procedures now available under the Atomic Energy Act and which were not available at the time NASA was established.

In this connection, when the Arms Control and Disarmament Agency was created, authority to provide access to restricted data similar to that in the NASA Act and in the bills mentioned above was considered. The Congress rejected that proposal and substituted provisions under which employees of the Arms Control and Disarmament Agency may be cleared for access to restricted data only by the Commission.

The suggestion in our comments on these bills is, therefore, consistent with the most recent action of Congress with respect to providing access to restricted data by agencies other than the Atomic Energy Commission.

Dr. KAVANAGH. Mr. Chairman, it is a pleasure to be here this morning to comment on these bills. I would like to say that accompanying me are Mr. Franklin Parks of our General Counsel's Office, and Mr. Arnold Joseph, of our Division of Biology and Medicine, who is directly involved with our oceanography program. We also have present Dr. John Wolfe, who is our member on the Interagency Committee on Oceanography.

We as an agency would like to make clear that we feel also, as do the other witnesses, that oceanography is a most important field, deserving continued and greater emphasis on the part of the Federal Government.

In talking about our specific interest in the field, I have tried in my prepared statement to go through the nature of the work which we do in oceanography, to show how an agency whose primary mission is elsewhere can have substantial programs in oceanography which relate to our mission and which are directed and funded according to that relation.

We have several different types of work, each of which is related to our nuclear energy activities. That most directly related to oceanography is a series of studies that we carry out on radioactivity in the environment. It is obviously part of the Atomic Energy Commission's concern to see that the radioactivity which has been introduced into the oceans, largely through nuclear device testing in the past in the atmosphere, and the activity which conceivably could come from accidents of different kinds, will not become a hazard to man. So, we have supported for a period of time a growing program, extending back over 10 years, of studies of the transport of radioactivity and the interaction of radioactivity in the ocean with the biological species present.

This is a program which we support directly because of our major mission. We coordinate it through the Interagency Committee on Oceanography in order to see that there is not inadvertent duplication with work by other agencies, and in order to do our part toward the general problem of seeing that all sorts of approaches to oceanographic studies are covered in a general way. The program is not managed through that group, as you people are well aware. It is managed as part of the nuclear energy program.

Another type of work we do directly related to oceanography is a type of effort in which we have growing interest and expect to see greater activity in future years—the general field of ocean engineering. We have found that nuclear energy provides a capability for providing power sources of types which will be very much needed for extensive investigations in the ocean. We have had a program for a number of years in providing small isotopic power sources which can be used to power isolated buoys or isolated stations under the sea, installations which need power that can be reliable over a long period of time and subject to essentially no maintenance once the unit is put in. For larger amounts of power at remote locations, it is quite obvious that nuclear reactors in the future will form a source which is greatly advantageous in comparison with any conventional method.

These programs are supported by us for a different motivation, but it is one that again goes back to our mission in nuclear energy. It is that we are the people who know how to do this and we have a mission to apply nuclear energy wherever it is feasible.

So, as we see that it may be feasible and useful to apply nuclear energy to the ocean, we, in coordination with the people who might use this power, set up programs and fund them to bring about such application. This is part of our mission, and we do the work by allocating some of the resources we have for developing nuclear power to this oceanographic application. We expect to do more of this in the future. It has been relatively small in the past.

There is a third type of work we do which relates to the oceans that is not really part of oceanography. For example, we have substantial programs in water desalination. We will get the water from the ocean, but we do not call that oceanography. Similarly, our food irradiation program concentrates on fish irradiation as a major part of the program, and this may lead to the better utilization of a resource from the sea. Our programs in nuclear ship propulsion, naval and merchant marine, relate to the ocean, but we do not call them oceanography.

In this third area we thus have another group of programs related to different aspects of our overall mission which involve the oceans but which we do not call oceanography.

I have cited these different programs with their different motivations to indicate the complexity of the overall program in oceanography.

I have heard statements that since the programs are spread about in so many agencies, it would be an obvious improvement to bring them all together. Although I am not commenting on this as a general proposition, I would like to point out that from the examples in our agency, you will see that there are activities which normally fit into agencies which would not have a major mission in oceanography.

On the bills, themselves, let me say that we feel that the coordination which has been carried out through the ICO has been good. It has not been management. We feel it may in the future be necessary to consider some more centralized management for some of the large parts of oceanography, although clearly what I have said implies that you should not just pull all the work together into one agency.

We feel that this is a rather complex problem and that our own examples indicate this. There is need for further study. The problem

is being studied in the administration, and the President's Science Advisory Committee has a panel which is looking closely into this field. Our feeling is that we ought to wait and see what they come out with before pushing specific legislation which would set up a detailed arrangement for large studies or for overall management.

Therefore, in our comments on the individual bills we have come to the general position that we support the bill H.R. 2218 which does encourage emphasis on oceanography, that the administration study these problems carefully and report to the Congress. We are not supporting other legislation at this time, although we may find ourselves later on, when some of these studies are completed, being in support of other bills.

These are my comments on the legislation in general.

We have a special problem that we want to present to the committee concerning the security clauses in some of the bills that set up a council. With your permission, I would like to read the testimony on that point.

In its detailed comments on H.R. 5654, H.R. 6457, and H.R. 7849, the Atomic Energy Commission has suggested certain changes relating to access to restricted data in the event any of these bills should be considered for passage. The same comments would apply to S. 944, which was passed by the Senate on August 5. All of these bills have provisions patterned on section 304b of the National Aeronautics and Space Act under which officers or employees of the Council created by the bill could have access to restricted data relating to oceanography and the marine sciences upon certain determinations made by the Council or its designee. Only two agencies, the Department of Defense and the National Aeronautics and Space Administration, have been provided this authority. Both of those agencies have a large complex of employees and contractors who require access to restricted data. We do not visualize that the Council which may be created by the bills mentioned above would have the need for access to the quantity and types of restricted data which the Department of Defense and NASA require, nor would the number of individuals requiring access be large.

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In this connection, when the Arms Control and Disarmament Agency was created, authority to provide access to restricted data similar to that in the National Aeronautics and Space Administration Act and in the bills mentioned above was considered. The Congress rejected that proposal and substituted provisions under which employees of the Arms Control and Disarmament Agency may be cleared for access to restricted data only by the Commission.

The suggestion in our comments on these bills is, therefore, consistent with the most recent action of Congress with respect to providing access to restricted data by agencies other than the Atomic Energy Commission.

We feel it should be applied in this case if you pass any of the bills which have this provision in them.

Mr. Chairman, that concludes my presentation.

Mr. REINECKE. Dr. Kavanagh, your last point is something which has not been mentioned here before, and certainly is something which should not be overlooked. This also gives some merit to the idea of a study commission to take a look at this very carefully before we pass any particular legislation.

I think you understand the problem now and the reason for the anxiety on the Hill over this entire program. It is simply that we feel the executive branch is not working together or is working against each other and has created a can of worms out of the oceanographic program. Perhaps the motion is there, but we do not see it. This is the reason we are anxious and interested to get something moving. I appreciate your remarks and I shall read your prepared statement carefully.

Mr. CASEY. Doctor, I appreciate your appearance here today, and I think the matter of security which you mentioned deserves serious consideration by the committee. The observations you made concerning the last expression of Congress indicates the difficulties involved in opening your data to everyone without a close security check.

I also appreciate the caution with which you oppose any ultimate action on this legislation. I appreciate that because I think your Commission has probably not received enough direction and supervision in your field.

I am also inclined to agree with you that possibly we shall have to define better, if we do create such a separate agency, just what fields it would concentrate in. We have now various agencies. For instance, a part of the national defense is to have sufficient food. We have an Agricultural Department concerned with that. That is not a close analogy, but I think it is a fair one. You cannot just say food is essential to maintaining our Army and the Department of Defense should supervise it, but they do assign to the Agriculture Department certain problems they have related to defense.

The gentleman who preceded you at the stand served during the war in the capacity of obtaining food from the ocean where our troops were stationed. That is a part of our defense aspect.

Dr. KAVANAGH. I think your observation is correct, Mr. Chairman. In fact, even if an agency were set up with rather sweeping powers in this field, we would find we would have to leave some work in these other agencies.

Mr. CASEY. I think that is true. I think some of the gentlemen who have appeared before this committee have the feeling that possibly everything would be taken away from them. I do not think that would be true.

Dr. KAVANAGH. I do not have that feeling. We have had the experience of dealing with other agencies and we find they want us to remain active in parts of their activities which involve nuclear energy.

Mr. CASEY. You are in the water desalination program. The Interior Department is also concerned with that, is it not?

Dr. KAVANAGH. Yes, we work very closely with the Department of the Interior. Our interests are in the possible application of nuclear energy to making large reactors which would provide heat to desalinate water, possibly in combination with the production of electrical power.

Mr. CASEY. Was that particular problem assigned to you by the Interior Department?

Dr. KAVANAGH. No, sir. I would say from what I know of its development that it developed on our initiative, but with discussions and agreement with people in Interior.

Mr. CASEY. By the same token, you do not feel the Interior Department should be excluded, do you?

Dr. KAVANAGH. No, sir, we work together.

Mr. CASEY. Of course, they have a problem to solve and your agency is one that is in the forefront of the new energy field, atomic energy, and you dovetail right into the overall problem we have of trying to get water to the people.

Dr. KAVANAGH. That is right, sir.

Mr. CASEY. Doctor, I think your comments have been very constructive and very helpful.

Dr. KAVANAGH. Could I say one more thing, Mr. Chairman? Since we prepared the statement and made the general comment on the security feature, we have been studying it even more carefully, and we have found two details which I think could be described as flaws in the actual provisions in these bills. As I said, they were taken from the Aeronautics and Space Act of 1958.

Apparently, in copying it something was left out in the first part, one of the first phrases in these new bills. Let me read one. This happens to be S. 944. It says:

The Atomic Energy Commission may authorize any of its employees or employees of any contractor or prospective contractor, licensee or prospective licensee of the Atomic Energy Commission * * * under subsection 145b of the Atomic Energy Act * * *.

There are some words left out between the words "Atomic Energy Commission" and "under subsection 145b." In the Space Act itself, at that point it says "or any other person authorized to have access to restricted data by the Atomic Energy Commission."

The subsection referred to is not the one under which we license people, as would be indicated by the oceanography bills. The omission of those words, in fact, does change the meaning. So, if you do put this in, that ought to be corrected.

The other problem is that the Space Act inserted a statement that people certified under this provision would be able to exchange information with people in the Defense Department, because otherwise they

would not. This also has been copied into this bill, but if you now apply this you would have these people under the Oceanography Council able to exchange information with the Defense Department but not with NASA. So that would have to be changed, too.

I am saying I hope that you do not pass anything with this in it at all but, if you do, would you please consider those matters.

Mr. CASEY. If we followed the wording you had originally in here, would that take care of it?

Dr. KAVANAGH. If you follow the suggestion I made originally, these problems will not arise at all, that is right.

Mr. CASEY. Are there further questions?

Mr. BAUER. I have just one question, Doctor. Let us look at the ocean environment. Your participation in the ocean environment is planned with respect to your mission, is it not?

Dr. KAVANAGH. Yes.

Mr. BAUER. When you plan for exploring part of this environment, how do you go about the planning? Do you have a central planning group which says this problem should be attacked by the Atomic Energy Commission?

Dr. KAVANAGH. The Atomic Energy Commission has been more or less a leader among agencies in attempts to plan our programs. Maybe I am using those words advisedly. We set up an Office of Plans as early as, I believe, about 1958, and since that time we have attempted to plan our entire atomic energy program in a unified way for some years ahead, trying to do this continuously. This is done for each division of the program, and it has worked down into each segment of the work.

So, for each of the separate sections I have talked about, people have tried to plan what they would do over a period extending several years ahead. We have been at it long enough so we know what happens to some of these plans when you run into budgetary considerations year by year. It is a difficult process. We still think it worth doing and still try to do it.

Our plans on the environmental work, I could say, contemplate a gradual increase. Our plans in the ocean engineering work are more in a state of flux because we are now recognizing the increasing emphasis on this, and I think I could say that there is a probability our work will increase substantially in that area in near future years.

Mr. BAUER. Do you think the study of the ocean environment nationally would benefit by some sort of planning group at the top level of the executive department?

Dr. KAVANAGH. Yes, I do, but I also know that the Office of Science and Technology has made attempts to approach the problem of planning overall. It is a problem which is conceptually very difficult.

Mr. BAUER. But yours has worked?

Dr. KAVANAGH. Ours has worked because we have a more unified situation. It becomes more and more difficult as the variety of things you try to compare with each other becomes greater and greater.

Mr. BAUER. Thank you, Mr. Chairman.

Mr. CASEY. Dr. Kavanagh, in one of your statements you say you support the program of ocean biology to determine the effects on marine life of radioactivity, and so forth. How is that supported? Do you conduct studies in your agency?

Dr. KAVANAGH. Mr. Chairman, the Atomic Energy Commission differs from most agencies in that we do very little of our own work in-house. Our major laboratories are run by contractors, and we do a great deal of work with universities and with research groups through contract. So, all of our work is done under contract.

A great deal of this environmental work is done with universities. Some is done by research institutions. Some is actually financed by us in other agencies.

Mr. CASEY. Is there any other agency besides your agency in the same field?

Dr. KAVANAGH. Yes. Our work relates to the general responsibilities of Health, Education, and Welfare in pollution. We deal with them considerably there. Our environmental work also involves cooperative work with the Bureau of Commercial Fisheries, and I think we have work with the Navy, and we have from time to time had projects with the Coast and Geodetic Survey.

Mr. CASEY. Getting back to the specific problem, the Bureau of Commercial Fisheries is interested in the study and the end result. Are you conducting the studies and then passing the information on to them?

Dr. KAVANAGH. In the cases I am talking about, we are asking them or agreeing with them that they should do some work on a problem of interest to us based on funds which we have found we should apply to that problem in the context of our own mission.

Mr. CASEY. Is your particular sphere of the study with reference to the safety with which disposals can be made in the ocean?

Dr. KAVANAGH. This is one of the problems, but in a more general way we want to understand what happens to activity which already has gotten there. In some of the cases, work with these other agencies is jointly supported. We have a program which they may do with joint support.

Mr. CASEY. There has been quite a bit of public reaction to the problem of disposing of radioactive wastes in the ocean. The Joint Committee has looked into that, and I think we have also had hearings on that problem. I know the study was in its first blush stage because no one knew how much was absorbed by small marine life and how much was retained by the larger fish, plankton, and what have you, and in the end result the condition of the fish which finally was put on the table. I think you very wisely slowed them down or stopped them completely until you knew more about it. I am familiar with that one particular thing and how the study was done on it.

Dr. KAVANAGH. This is the type of work we are doing. I don't know about the specific studies to which you referred.

Mr. CASEY. I meant whether it was all being conducted from grants of your agency.

Mr. JOSEPH. We support two projects jointly with the Bureau of Commercial Fisheries, one at North Carolina, their radiobiological laboratory. This deals with the effects on fish and shellfish, and other radiobiological studies. Additional work is done by universities and institutions considering different environmental situations.

Mr. CASEY. How is this financed? Do you finance it completely out of your budget?

Mr. JOSEPH. With the other agencies it works out to be joint support. With the institutions it is completely out of our budget.

Mr. CASEY. Thank you very much, gentlemen, for your help in this matter.

Dr. KAVANAGH. Thank you, Mr. Chairman.

Mr. CASEY. We will next hear from Vice Adm. William D. Shields, Assistant Commandant, U.S. Coast Guard. He is accompanied by Rear Adm. William W. Childress, Chief, Office of Operations, and Lt. Comdr. Eugene A. Delaney, Chief, Oceanographic Branch, Office of Operations.

We welcome you again, Admiral, and we are pleased that you could be here this morning.

You have a very short statement, Admiral. You may do what you desire with it.

STATEMENT OF VICE ADM. WILLIAM D. SHIELDS, ASSISTANT COMMANDANT, U.S. COAST GUARD; ACCOMPANIED BY REAR ADM. WILLIAM W. CHILDRESS, CHIEF, OFFICE OF OPERATIONS; AND LT. COMDR. EUGENE A. DELANEY, CHIEF, OCEANOGRAPHIC BRANCH, OFFICE OF OPERATIONS, U.S. COAST GUARD

Admiral SHIELDS. It is about four pages, sir. I would like to read it at your pleasure.

Mr. CASEY. That is fine.

Admiral SHIELDS. Mr. Chairman, members of the subcommittee, I appreciate this opportunity to appear before you today. Admiral Roland regrets that he was unable to appear during these hearings. He and I are concerned, just as you are, with the development of a sound national oceanographic program.

The Congress has shown, in many ways, its deep interest in the science of oceanography and its sincere belief that this science and the development of ocean resources should be emphasized. For 2 years I was a member of the Interagency Committee on Oceanography. Since 1964, Rear Adm. William W. Childress, Chief, Office of Operations, has served on the committee and has kept me informed of the committee's activities.

The variance among the bills introduced to date certainly indicates many paths which could be followed toward the development of the sound and energetic oceanographic program which we all desire to achieve. But they are also indicative that the ultimate administrative organization required to achieve our aims cannot be wisely determined at this point.

As you are aware, the Treasury Department favors enactment of H.R. 2218, introduced by the chairman. This bill would authorize the establishment of a permanent Presidential Advisory Committee for Oceanography and would require the President to declare national goals, to designate and fix responsibility for the direction of Federal activities and to resolve differences among the Federal agencies engaged in oceanography.

It is my conviction that this approach is the wisest at this moment in our oceanographic growth. It will result in the delineation of specific goals. I am confident that it will also result in the development of specific agency responsibilities for the various phases of oceanographic investigation, survey, and exploitation. To a certain extent, certain agencies are recognized, by virtue of their missions and capa-

bilities, as having preeminence in specific areas. For over 40 years the Coast Guard has conducted time-series oceanography in the Northwest Atlantic Ocean. Now we are applying the knowledge and experience gained in that local area to the establishment of time-series and synoptic descriptive oceanographic programs in the North Atlantic and North Pacific Oceans. I might add that the blending of oceanography with the professional engineering and seamanship capabilities on board our larger ships has gone extremely well. The program is flourishing and we have been able to retain a high level of data quality. Incidentally our program is designed to serve the needs of all oceanographers in the Federal agencies and the academic community who are interested in the temporal variations of the oceans.

To return to my earlier point regarding agency leadership in specific areas, I can also note that the Coast and Geodetic Survey has established itself as a leader in the exploratory surveys of the oceans and the Fish and Wildlife Service is certainly the acknowledged leader in fisheries oceanography. So one cannot say with candor that the present Federal oceanographic activities are completely lacking in direction. Nor has there been any evidence of unplanned duplication.

Final Federal programs often appear to be fractionated or truncated. While this sometimes results from Executive action on individual agency budgets, it also is a result of congressional action by some 32 committees and subcommittees on budgets of the individual agencies which contribute to the Federal program. Within the ICO a need has been suggested for a chairman's fund established by agency contributions which would be used to finance the staff and thus remove their agency identification. I cannot agree with critics who suggest that the activities and studies of the ICO staff are colored by loyalty to their parent agency, but this step would remove such criticism. The fund could also be used to finance management studies by a disinterested consultant or research organization. While this fund has not been established, I mention this as one example of the type of management proposals considered by the ICO.

Another point regarding Federal progress to date should be considered. The emphasis which has been placed on procurement of the tools; that is, ships, instrumentation, and shore facilities, is now being shifted to production. The Coast Guard's experience in this regard would be an excellent example. During the 3 fiscal years 1964 through 1966, we have budgeted \$2,725,000 for outfitting of our ships. In the same time frame we have identified only \$1,825,000 for ocean survey work. But, in the 3-year period commencing in fiscal year 1967, our survey effort will total over \$4 million. Put another way, the production of Coast Guard oceanography will be doubled in the next 3 years within approximately the same level of expenditures as a result of the tooling-up process we have just completed.

To review, I recommend enactment of H.R. 2218 as the immediate step toward achieving the comprehensive program toward which we all are striving.

This is the logical step toward an orderly growth in our Nation's effort. As many commentators on the future of oceanography have mentioned, we are still largely in the exploratory stage. Some definitive surveys have been conducted but this phase is far from completion. It would be premature to establish an organization to exploit our re-

sources and manage all possible oceanographic services and investigations before we have assessed the requirements for the services and the economic availability of the newly found resources.

I have directed my statement toward the basic issue being considered by the committee. However, I should also like, for a moment, to comment on H.R. 5175, which was also introduced by the chairman.

It would direct the Coast Guard to conduct a study of the legal problems arising from the management and use of the ocean's natural resources. We certainly have no objection to this bill. However, I suggest that the committee, by amendment, authorize the conduct of this study by the Department of the Interior. The Department of the Interior, concerned as it is with both fish and mineral resources, could certainly give the best direction to such a study.

Thank you, Mr. Chairman.

Mr. CASEY. Thank you, Admiral.

On page 3 you refer to the chairman's fund established by contributions of member agencies of the ICO?

Admiral SHIELDS. That is right.

Mr. CASEY. To be used to finance the staff.

Admiral SHIELDS. There is a connotation of possible agency loyalty. We expect the chance of criticism would be removed by the use of a chairman's fund.

Mr. CASEY. The various agencies who are members of this committee are not bound by the recommendations of the ICO, are they?

Admiral SHIELDS. No, sir. It is a central point for ideas and coordination, to be sure there is no duplication and that each agency knows what the other agency is doing.

Mr. CASEY. The report they put out is more or less a report of past performances and the one they put out here does not say too much about what they propose to do in the future. That is my recollection.

As far as past performance is concerned it is pretty general and not specific.

As far as being a good sales pitch to the Congress I do not think it is good enough in that respect because it does not say what needs to be done next year. It should contain more of a sales pitch to Congress. In other words, taking the National Aeronautics and Space Administration report, this lists chronologically all they have done and what they expect to do in the future, the funding, and everything from the various missiles which have been fired, flights made, up to the sales pitch. I wonder if the agency has thought about dressing this up somewhat more rather than making such a cold report.

Admiral SHIELDS. May I refer that to Admiral Childress? He has had more recent contacts with the committee than I have.

Admiral CHILDRESS. The ICO reports to the Federal council and shows the programs that the various agencies plan to carry out in the areas of oceanography.

The Federal council criticizes these programs and gives evidence to those programs which they feel should be carried out and areas where greater work should be done.

However, each agency which has responsibility in these respective areas, then try to get this in their program. As a result of the budgetary process sometimes it is included and sometimes it is not included.

The ICO criticizes our plans generally. We have working groups

within the ICO which takes each agency's plans in this area and indicates where they feel the agency should do more and sets some goals on what they believe the agencies can do with the hardware the agency has or the technical manpower that they have available, so we do criticize our own programs. However, in order to implement them it becomes a budgetary process and sometimes they fall out, but we are also criticized by the Federal council which has direct contact with the President.

Mr. CASEY. After the ICO meets and they decide you are not duplicating and they decide which agency is going to take on what particular activity, then these agencies have to go back with their regular budget to try to get sufficient money for that?

Admiral CHILDRESS. That is right.

Mr. CASEY. In this report on page 27 it talks about the new undersea vehicle for oceanography. One of the things we feel, and I think I speak for most of the committee, which generates these bills, is the new projects which need to be undertaken, the new studies, and so forth, which are lost in the overall agency budget.

I think the wording of this particular report points that up, because the report states the member agencies of the ICO are eager to operate URV's in research and engineering projects. They are, however, reluctant in fiscal year 1966 to embark upon costly programs of development.

Well, it will be a costly program.

Admiral CHILDRESS. That is right.

Mr. CASEY. Who is going to have nerve enough among these agencies to say "Well, which one of you have nerve enough to put it in your budget and see it through?"

Admiral CHILDRESS. That is right.

Mr. CASEY. If you take the Defense Department, the Navy Department might say "We will take it on but we need another aircraft. We certainly can't take it on with the situation we have now in Vietnam. We are charged not with more research in this new field but we are charged more with defense entirely at the moment. We cannot put in any new programs or items."

Admiral CHILDRESS. You are correct. That is the situation.

Mr. CASEY. We have no criticism of the dedication of the men on the ICO or their ability, but we are critical of the mechanics by which these programs are outlined. It is a good coordinating agency to see that the taxpayers' money is not wasted through duplication, and it is a good coordinating agency in other ways, to see that there is an exchange of data and ideas.

What we recognize, and more people are recognizing all the time, is that we are just concerned with slow development of necessary functions, each agency's necessary functions in the field of oceanography. We want to see more impetus on expansion, overall expansion, development, and use of the ocean resources.

As I gather, you gentlemen are not here to be critical particularly of the objectives of the bill, but you do not feel we are quite ready for some of these bills at this time. Is that correct?

Admiral CHILDRESS. We are in favor of H.R. 2218.

Mr. CASEY. Yes.

Admiral CHILDRESS. We feel this would give executive direction to these good projects, such as the one you pointed out, and if approved will go in with the President's budget.

Mr. CASEY. These bills have to pass both bodies of the Congress. The Senate passed S. 944. That may be an indication to us that this is it, or some version of it, or again you get nothing.

Are you opposed to S. 944?

Admiral SHIELDS. We think 2218, the present bill before this committee, is better right now for the oceanographic program. It will not solve all the problems but it gives us a start in that direction and gives us a chance to study and see a little better in what direction we should finally go.

Mr. CASEY. Right now you are not saying we should never have it?

Admiral SHIELDS. No, sir.

Mr. CASEY. Thank you, Admiral.

Does counsel have questions?

Mr. DREWRY. On page 2 you refer to the series of studies conducted in the northwest Atlantic, the time series studies.

Would you enlarge on what you mean by the academic community? Does that mean you have civilian scientists on board in your ice patrol, for instance, and is this available to civilian institutions?

Admiral SHIELDS. Perhaps Commander Delaney can give you more details there. We refer primarily to the ocean station program and we are training some of our own technicians, not scientists, to take these readings on the ocean station vessels.

We also have room and usually supply space on our icebreakers whenever they take on an operation so that these people are carried in those particular cases.

All our construction and everything else is pointed to trying to get more room on all our vessels of size which can accommodate these people, give more room for scientific work and gathering of data.

Mr. DREWRY. Do your new ships include space for laboratories and technicians?

Admiral SHIELDS. They do, yes, sir. The high-endurance cutters do, yes.

As you know, we are planning a feasibility study now on icebreakers and later on we will ask for funds for design of icebreakers. We certainly plan to have quite a bit more space for scientific work, a laboratory, and data-gathering facilities on the new type of icebreaker we might design. We are looking in that direction.

Mr. DREWRY. In that connection you can perhaps dispense with a good bit of the armament you have been carrying on the icebreakers in the past.

Admiral SHIELDS. That is a concept we will certainly consider; yes, sir.

Mr. DREWRY. That is all, Mr. Chairman.

Mr. CASEY. Mr. Bauer?

Mr. BAUER. I would like to just ask one or two questions of Admiral Childress.

Admiral, you stated that the ICO presented the annual programs to the Federal Council. Is that correct?

Admiral CHILDRESS. Yes, sir.

Mr. BAUER. In the 1966 program did the Federal Council consider the ICO program?

Admiral CHILDRESS. I don't believe I know.

Mr. BAUER. Dr. Hornig, in answer to a question before the Senate Committee on Commerce regarding S. 944, specifically said that the ICO proposed the augmentation of some programs and the initiation of others. This is on page 24 of the Senate hearings.

He said: "At an incremental cost of \$50 million."

Apparently the Federal Council took no action on this request so it was decided by the Bureau of the Budget and Dr. Hornig.

Admiral CHILDRESS. I remember the item.

Mr. BAUER. In other words, does the Federal Council of Science and Technology review and act on the programs? This apparently says they do not. Is that true for 1966?

Admiral CHILDRESS. These specifics you just read would indicate to me he looked at this report.

Mr. BAUER. Dr. Hornig did?

Admiral CHILDRESS. That is right.

Mr. BAUER. That is all I have.

Mr. CASEY. Thank you, Admiral. We certainly appreciate your being with us this morning.

Admiral SHIELDS. Thank you, sir.

Mr. CASEY. The committee will meet again on Tuesday morning at 10 o'clock.

(Whereupon the subcommittee adjourned to reconvene at 10 a.m., Tuesday, August 17, 1965.)

The first part of the report deals with the general situation of the country and the progress of the war.

The second part of the report deals with the financial situation of the country and the progress of the war.

The third part of the report deals with the military situation of the country and the progress of the war.

The fourth part of the report deals with the political situation of the country and the progress of the war.

The fifth part of the report deals with the social situation of the country and the progress of the war.

The sixth part of the report deals with the economic situation of the country and the progress of the war.

The seventh part of the report deals with the cultural situation of the country and the progress of the war.

The eighth part of the report deals with the international situation of the country and the progress of the war.

The ninth part of the report deals with the domestic situation of the country and the progress of the war.

The tenth part of the report deals with the future of the country and the progress of the war.

The eleventh part of the report deals with the conclusion of the report and the progress of the war.

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

TUESDAY, AUGUST 17, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE OF MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:10 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Alton Lennon (chairman of the subcommittee) presiding.

Mr. LENNON. The subcommittee will resume its hearings.

For our first witness this morning, I would like to call the distinguished gentleman from Hawaii, the Honorable Spark Matsunaga.

STATEMENT OF HON. SPARK M. MATSUNAGA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF HAWAII

Mr. MATSUNAGA. Mr. Chairman and members of the subcommittee, I thank you for this opportunity of appearing before you and expressing my views with respect to H.R. 10432, the Marine Resources and Engineering Development Act of 1965, which, along with other substantially similar bills, is now under consideration by this subcommittee.

My deep and abiding interest in the ocean and its treasures comes no doubt from my island background. As a boy on my native island of Kauai, fourth largest in the Hawaiian group, I was never very far from the ocean, which I grew to love and respect. Like countless other boys, I often wondered about the mysteries which are locked in the depths of the ocean. Lord Byron's "Ode to the Sea" became one of my favorite poems in high school, for it so well expressed the seeming invincibility of the sea.

Oceanography, the science that deals with the ocean and its phenomena, is probably less known and understood today than our space program, which has made giant strides in recent years and captured the imagination of not only Americans, but also of the peoples of the world. The development of our oceanic resources through research has been a field of increasing importance in my own State. As manifestations of this, we have the Geophysics Institute, which is located on the campus of the University of Hawaii, the sponsoring of international scientific conferences on tsunami research, the recent appointment of Prof. Henry M. Stommel, one of the Nation's foremost authorities on oceanography and presently a member of the faculty at Massachusetts Institute of Technology, to fill the newly established Capt. James Cook chair in oceanography at the University of Hawaii, and the National Science Foundation's Mohole project which is designed to

find out more about the earth's core through undersea drilling techniques. All of these programs are indicative of our continuing efforts to add to our meager store of oceanographic knowledge.

The situation in Hawaii probably could be duplicated in many other States which border the Pacific, the Atlantic, the Great Lakes, and the Gulf of Mexico. In these and other States there are at present various governmental and private agencies which are fully cognizant of the need to know more about the treasures to be found in ocean depths. But these agencies do not represent a concerted national effort, nor are they necessarily striving to achieve a common goal. There is in fact an urgent need to coordinate their efforts and to enlarge and accelerate the present ocean research and development program on a national basis.

The best and most effective vehicle to accomplish this would be to establish in the executive department an office such as the National Council on Marine Resources and Engineering Development which is proposed in H.R. 10432. The proposed Council would concern itself with all marine science activities embracing not only oceanography, but also engineering, technology, and other related activities. The Council would be authorized to go beyond the scope of pure scientific consideration of marine matters and include within the sphere of its concern the exploration, development, and use of all the resources of the sea. It would interest and encourage private industry in the development of hitherto little known marine resources, as well as give renewed vigor and vitality to our declining American fishing industry.

In connection with the development by private industry of the untapped resources of the sea, I am convinced that the oceans of the world are limitless sources of protein suitable for human consumption and able to maintain in vigorous health a world population several times its present size. Further, there are indications that vast deposits of metal ores, including manganese, nickel, cobalt, zinc, iron, and aluminum, are lying at the bottom of the sea in quantities greater than the present human population could ever use.

Mr. Chairman, H.R. 10432 and its companion bills would provide the governmental structure which would best achieve the rapid, efficient, and orderly accomplishment of the exploitation of our oceans in cooperation with industry and our scientific community.

I therefore strongly urge that the measure be reported favorably by this subcommittee.

Thank you very much.

Mr. LENNON. Thank you, sir, for giving such a fine statement.

Next I want to call our colleague from the State of Pennsylvania.

STATEMENT OF HON. JAMES G. FULTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF PENNSYLVANIA

Mr. FULTON. Thank you for the opportunity to present my statement this morning. I would first like to compliment Mr. Fascell for introducing his bill, H.R. 5654 to provide for expanded research in the oceans and the Great Lakes; to establish a National Oceanographic Council; and for other worthwhile purposes. I feel so strongly about the legislation that I have likewise introduced an identical bill, and I hope it will be considered along with the Fascell bill.

Our past experience has demonstrated that our U.S. national welfare depends upon the quality, scope, and vigor of our scientific achievements. As a member of the Science and Astronautics Committee of the House of Representatives, I see the real need of substantial support for a sound oceanography program as it is now so small in comparison to our U.S. space achievements through the National Aeronautics and Space Administration and the U.S. Air Force. There is a tremendous need for a far-reaching U.S. national scientific effort, conquest of the ocean, the last remaining frontier of our planet, and our biggest earth challenge yet. Here are discoveries that wait which we can't imagine, and wealth and higher living standards for all the world's peoples. Food, metals, minerals, and all the earth's treasures in great abundance await man in our oceans and seas.

The oceanographic research budget for fiscal year 1966 of \$78,031,000 is really dwarfed in relation to the currently authorized NASA budget of \$5,190,396,200. We must make a sound start in exploring the phenomena of our oceans and Great Lakes.

Because I feel the modification, control, and exploitation of the ocean environment to meet our growing human needs will require a control organization, I am supporting strongly the proposed Oceanographic Council. The Council will be composed of the Vice President, certain Cabinet members, including the Secretary of the Interior, and certain other heads of agencies, including the Director of the Office of Science and Technology.

The function of the Council is to advise and to assist the President in the field of oceanography and marine sciences and to survey all significant oceanographic and marine science activities. The Council would develop a comprehensive program of activities that would be administered by the departments and agencies of the Federal Government.

Of great importance to our Nation is the strategic importance of the ocean. The cloak of concealment that is virtually opaque to all forms of energy (except sound) is of immense military significance. The Polaris deterrent, antisubmarine and mine countermeasure forces, aircraft carriers, and amphibious forces, all depend for safe effective operation on accurate knowledge of the ocean environment. Therefore for purposes of U.S. national defense and free world security, it is essential that the oceans and seas be observed and studied from surface to its floor.

I am particularly interested in presenting a sound oceanography bill to Congress to assist in meeting the ever present problem of world population explosion. In the underdeveloped areas of the world, the ocean with its huge and inefficiently exploited food resources is of tremendous importance to the peoples of all nations. The supply of mineral resources on land is limited, while the ocean contains at least 65 basic elements and already provides substantial quantities of magnesium, bromine, and salt. Many scientists believe that additional untold resources await oceanographic research.

The problem of ocean pollution from industrial wastes carried by the river of inland States such as Pennsylvania is one for our country's consideration. Information is needed concerning the capacity of the ocean to eliminate harmful pollution effects and at the same time protect marine organisms. The fishing, shipping, mining, and petroleum

industries, as well as our scientific minded city of Pittsburgh, part of which I have the honor to represent are among those for whom the ocean has a special significance.

For these reasons—and many others—I feel that the bill introduced by the gentleman from Florida, Mr. Fascell, and cosponsored by others, including myself, will give a realistic approach and substantial assistance to the national oceanographic program.

Mr. LENNON. The subcommittee thanks you for an excellent statement, Congressman.

We are delighted and honored to have next this morning, Dr. Harold Seidman, the Assistant Director for Management and Organization of the Bureau of the Budget.

After several false starts, Doctor, we finally have the honor of having you here.

Mr. SEIDMAN. I am delighted to be here, Mr. Chairman.

Mr. LENNON. If we may go off the record.

(Discussion off the record.)

Mr. LENNON. Back on the record.

Now, Doctor, will you proceed, sir.

**STATEMENT OF DR. HAROLD SEIDMAN, ASSISTANT DIRECTOR FOR
MANAGEMENT AND ORGANIZATION, BUREAU OF THE BUDGET;
ACCOMPANIED BY CLIFFORD L. BERG, OFFICE OF MANAGEMENT
AND ORGANIZATION, BUREAU OF THE BUDGET**

Mr. SEIDMAN. Mr. Chairman, before I proceed with my formal statement, I thought it might be helpful to the committee to give some technical clarifications relating to Dr. Hollomon's testimony with respect to the reorganization plan.

Mr. LENNON. Dr. Hollomon, of the Department of Commerce?

Mr. SEIDMAN. Yes, sir.

You recall he talked about the role of the Environmental Science Services Administration, and I wanted to point out that the President's message transmitting the Reorganization Plan No. 2, as in the case of all messages transmitting reorganization plans, has somewhat of a different legal status than the normal Presidential message.

The plan and the message have to be looked at as a whole; in fact, the message is printed together with the plan in the United States Code.

As Dr. Hollomon pointed out, the President's message says that the new Administration will provide a single national focus for our efforts to describe, understand, and predict the state of the oceans, the state of lower and upper atmosphere, and the size and shape of the earth.

So, the approval of the reorganization plan also in effect is approval of this particular provision of the message which states as one of the roles of the Environmental Science Service Administration, to provide a single national focus for our efforts to describe, understand, and predict the state of the oceans.

Mr. LENNON. Thank you, Doctor. You know you and I discussed that the other day and I am very happy to have that explanation included as part of the hearing record.

Thank you, very much.

Mr. SEIDMAN. Now, with your permission, Mr. Chairman, I will proceed with my statement.

Mr. Chairman and members of the subcommittee, I appreciate the opportunity to appear before your subcommittee to discuss several pending bills designed to strengthen the Nation's efforts in the study and exploitation of the vast ocean resources of the world.

The measures before this committee reflect a growing recognition of the need to seek greater understanding of the oceans. As President Johnson stated when he transmitted to the Congress the Nation's proposed oceanographic program for fiscal year 1966:

But never until recently did man seek great understanding of the oceans, because he saw little necessity. There was always a new frontier, unexplored land, unexploited territory.

Now our view of the sea has had to undergo a drastic change. We have always considered them as barriers to invasion; we now must see them as links, not only between people, but to a vast new untapped resource.

The growing recognition of our need to improve our understanding of the oceans is reflected also by a significant increase in the funds we are devoting to oceanographic research and survey programs.

Obligations of Federal agencies for oceanography are estimate to increase from \$62.1 million in 1961 to \$141.6 million in 1966.

The bills now before the committee obviously represent differences of views as to means rather than ultimate objectives.

I will confine my remarks, therefore, to certain basic organizational issues raised by the proposed legislation. I will not describe existing Executive Office arrangements for planning a coordinated national program in oceanography, since this subject was covered by Dr. Donald Hornig, Director of the Office of Science and Technology, in his testimony before your committee.

Oceanography presents a difficult and complex but by no means unique problem in Government organization. Oceanography is not an end or purpose of Government in itself.

Indeed, at other witnesses have undoubtedly pointed out, oceanography is not a discrete scientific discipline, but is a composite of such basic sciences as marine biology, geology, physics, and chemistry.

Oceanographic programs embrace a host of diverse activities ranging from marine charting to fisheries development and ocean forecasting. Oceanographic activities are a necessary incident to, and cannot be divorced from, the basic missions of such agencies as the Navy and the Department of the Interior.

Except for the National Science Foundation and the Smithsonian Institution, all of the present agencies concerned with oceanography conduct oceanographic activities in support of their basic operating missions.

In the foregoing respects, oceanography is similar to meteorology and water resources research in that it encompasses a variety of activities necessary for meeting an agency's immediate operational requirements.

Given the diversity and varied purposes of the activities grouped under the general heading of oceanography, consolidation of all functions relating to oceanography and related sciences in a single agency, as would be provided by H.R. 921, is neither desirable nor feasible.

Establishment of a National Oceanographic Agency would run counter to the basic principle of executive branch organization stated

in section 2(a)(4) of the Reorganization Act of 1949, which directs that agencies and functions of the Government be grouped, coordinated and consolidated "as nearly as may be, according to major purposes."

Any attempt to separate oceanographic functions from the missions which they now serve could cripple seriously a number of on-going programs or give rise to overlapping and duplication.

How do we draw a line between oceanography and the other functions assigned such agencies as the Coast Guard? As the Treasury Department points out, "Where does the oceanography aspect of, for example, ocean-station vessels begin and end?"

H.R. 5884 and H.R. 7849, bills which would establish a Marine Exploration and Development Commission, also create problems of overlapping and duplication and have other undesirable organizational features.

The proposed agency would overlap and duplicate activities now being conducted on the Continental Shelf by a number of Federal agencies.

While the bills attempt to resolve this problem by providing that the Secretaries of Defense, Commerce, and the Interior shall be members of the Commission, we have serious reservations about the ability of an agency organized along these lines either to administer effectively the programs undertaken directly by the Commission or to coordinate successfully related agency programs.

Finally, we believe it would be unsound to create a new agency concerned with development of natural resources in a particular geographic area, thereby complicating national planning for resource development and coordination of resource programs.

As in the case with other scientific and technological programs which necessarily cut across agency lines, we need to develop satisfactory means for coordinating, not consolidating, the diverse and separate programs administered by a number of Federal agencies which relate to the general field of oceanography.

This fact is recognized by H.R. 2218, H.R. 5654, and H.R. 6457, all of which seek to strengthen and improve existing arrangements for coordinating oceanographic programs.

We continue to believe strongly that the desired objectives could be accomplished most effectively by the enactment of H.R. 2218. This bill properly assigns to the President, as Chief Executive, responsibility for defining national goals with respect to oceanography, surveying all significant oceanographic activities, developing a comprehensive program of oceanographic activities to be conducted or supported by Federal agencies, designating and fixing responsibility for the direction of oceanographic activities and resolving differences arising among Federal agencies with respect to oceanographic activities.

The President is authorized by the bill to utilize such advisory resources as he may deem necessary, including an Advisory Committee on Oceanography drawn from outside the Government.

The President would be required to report annually to the Congress as to the general status of oceanography, progress in research and development, financial plans, including proposed appropriations, current and future plans, and requests for such legislation as may be necessary.

Enactment of H.R. 2218 would give appropriate recognition and emphasis to the growing importance of oceanography. The bill establishes congressional policies and intent with respect to oceanography and assigns clear-cut responsibilities to the President for carrying out these policies and reporting on plans and progress to the Congress.

Under the provisions of H.R. 2218, however, the President retains essential flexibility to develop those administrative and organizational arrangements which he believes will assist him most effectively in carrying out the responsibilities assigned to him by the Congress, and in accomplishing the purposes of the act.

The need for flexibility in establishing coordinating arrangements was stressed by President Johnson in his message transmitting Reorganization Plan No. 4 of 1965 to the Congress.

Reorganization Plan No. 4 abolished nine statutory boards, councils, and interagency committees and transferred their functions either to the President or a designated official.

The President emphasized that we must have—

the capacity for fast flexible response to changing needs imposed by changing circumstances.

He noted further that:

As Government grows more complex and programs increasingly cut across agency lines, we must exercise special care to prevent the continuance of obsolete interagency committees and other coordinating devices which waste time and delay action and the undue proliferation of new committees.

Mr. Chairman, I might add that in developing Reorganization Plan No. 4, we found that some of these bodies which have been created by the statute never met because they were not suited to executive branch needs and organization. I think this illustrates the difficulty we have with a number of bills before this committee.

Others such as the National Housing Council have not met since 1961, so the creation of a statutory interagency committee does not necessarily achieve the objective if it is not suited to the arrangements which are required within the executive branch.

Mr. LENNON. I do not mean to have you digress from your statement, but if it is a statutory committee, created by a statute, and it did not meet, then it is clearly the fault of the executive that the statutory committee did not meet; is that not true?

Mr. SEIDMAN. No.

Mr. LENNON. Why not?

Mr. SEIDMAN. I would not agree, Mr. Chairman. It did not meet because—

Mr. LENNON. There was no need for it.

Mr. SEIDMAN. No useful purpose to be served by the committee meeting.

Mr. LENNON. Even though they may sign a bill into law, then, the executive makes the determination that it will flaunt the will of the Congress in creating the statutory committee which the President signed into law by failing to carry out the responsibilities in administering the law.

What function does the executive have except to administer the law which is passed by the Congress which the President signs?

I resent this implication that once the President affixes his signature to a bill that through the Bureau of the Budget or any other agency of

the Federal Government, from the President's Office on down, that they just simply ignore it.

But rather than to offend the Congress by vetoing the bill, they sign the bill and just pay no attention to the implementation of that legislation.

That is just what you said in your statement, that the National Housing Commission was created by law, but the President did not carry out his obligation to see that they met.

I think that is an indictment of the Executive, not of the Congress.

Mr. SEIDMAN. Now, Mr. Chairman, I think I should explain further. In creating these bodies and in providing for these interagency committees, the Congress was assigned to them by law for only advisory functions.

There was no requirement in the law stating that there must be meetings.

Mr. LENNON. Well then, the executive ought to come back and say, now, this legislation has outused its practical purposes. We recommend that it be repealed. Do not repeal it by an indirect act of the executive agency. I agree with you, sir, Doctor, that if there is a world of laws on our books that are not being implemented they ought to be repealed, they ought not to be ignored.

That is the way I feel.

Mr. SEIDMAN. This is exactly what the President did, Mr. Chairman, when he sent the reorganization plan to the Congress, and I am sure that you are not suggesting that pro forma meetings be held by bodies when they no longer have any useful business to transact.

This would seem to me to be a waste of the time of officials and the waste of the Government's funds.

Mr. LENNON. But you are offering that as an explanation, the fact that did not meet is the reason why the President proposed Reorganization Plan No. 4.

I was saying when the usefulness of a Commission created by a statute has ceased, then legislation ought to be recommended by the executive branch of the Government to repeal that unnecessary legislation.

Of course, you say that is what is done by actually effecting a repeal by the adoption of the reorganization plan, is that correct?

Mr. SEIDMAN. That is correct.

Mr. LENNON. I apologize for breaking in. You go right ahead with your statement.

Mr. SEIDMAN. H.R. 5654 and H.R. 6457 differ from H.R. 2218 mainly in limiting the President's flexibility in establishing and maintaining necessary coordinating arrangements.

Both bills would establish statutory interagency committees—contrary to the doctrine underlying Reorganization Plan No. 4 of 1965 which was concurred in by the Congress.

H.R. 5654 would establish a National Oceanographic Council in the Executive Office of the President, and H.R. 6457 would establish a National Oceanographic Council in the Office of Science and Technology.

For the reasons cited in the President's message on Reorganization Plan No. 4, we are opposed to the establishment of such statutory interagency committees.

And, Mr. Chairman, the objection we have to these bills would apply to that part of S. 944, which also provides for a statutory oceanographic council.

The independent National Oceanographic Council which would be established by H.R. 5654 inevitably would fragment responsibilities now assigned to the Office of Science and Technology for advising the President on the coordination of Federal programs relating to science and technology.

Further, there would appear to be little to be gained by substituting a statutory interagency committee which the Office of Science and Technology has already established in this area.

H.R. 6457 attempts to protect the status of the Office of Science and Technology by establishing the National Oceanographic Council within that Office.

The Oceanographic Council, however, would for all practical purposes be an independent entity with its own staff and would not be subject to direction by the Director of the Office of Science and Technology.

Such an arrangement would confuse greatly responsibilities for advising the President on oceanographic matters.

I will touch only briefly on H.R. 9064, which would establish a National Commission on Oceanography, and H.R. 5175, which would provide for a study by the Coast Guard of the legal problems relating to the management, use, and control of the oceans and ocean beds.

The Office of Science and Technology, in its report to your committee dated July 6, 1965, pointed out that a study similar to that contemplated by H.R. 9064 is currently being conducted by a panel of the President's Science Advisory Committee.

Consequently, we concur in the view of the Office of Science and Technology that a statutory study commission should not be created at this time.

We defer to the views of the appropriate agencies concerning the need for the study of legal problems provided by H.R. 5175.

If such a study is undertaken, it would fall more logically within the province of the Department of the Interior than the Coast Guard whose responsibilities for ocean resources are rather limited.

In summary, the Bureau of the Budget favors enactment of H.R. 2218. We are opposed to the enactment of H.R. 921, H.R. 5654, H.R. 5884, H.R. 6457, H.R. 7849, and H.R. 9064.

Mr. LENNON. Mr. Rogers?

Mr. ROGERS. I wanted to check something, I am sorry I was a little late. I wanted to check the statement, Mr. Chairman, if I may.

Mr. LENNON. All right, we will return to you.

Mr. ROGERS. Fine, thank you.

Mr. LENNON. I think it is interesting to note that of the number of witnesses who testified before the subcommittee in the 2 preceding weeks, including Dr. Hornig and Dr. Hollomon, and many others, that this is the first instance, and it is indicative of the Bureau of the Budget, that we use both sides of the paper.

You are the first witness that has done that; I commend you; I think that is fine. [Laughter.]

Doctor, let me ask you if you have seen this week's issue, rather, this month's issue of the American Legion magazine?

Mr. SEIDMAN. No, I have not, Mr. Chairman.

Mr. LENNON. Let me commend for your earnest perusal and study an article that appears beginning on page 8 and the authors are Deane and David Heller, "The Extraordinary Powers of the Bureau of the Budget."

This is the caption of it, "How a Superbureau in Washington Manipulates the Laws, Censors Witnesses Before Congress and Dictates to Departments and Agencies by the Exercise of Powers Never Set Forth in the American Constitution."

They quote some very distinguished Americans now in high places, one of them being a former distinguished Senator from the star State of Texas in which he describes the Bureau of the Budget as a "czar," that is the quote, and he goes on from there.

He is just warming up as he goes on. And he quotes a number of other distinguished persons who are in Government with respect to how he then said that the Bureau of the Budget was able to determine the will of the Congress without authority under the Constitution, and I touched on it briefly a few minutes ago in what I said, but this article is much more eloquent and factual, and I commend it to your reading because it is being widely disseminated among the Member of Congress and it is a little bit, well, frustrating, to read it and see the quotes of some of the people who are now in high places who have reversed their position like they have in so many instances in the last few years on so many other things.

Mr. SEIDMAN. I would mention that our former distinguished Senator from the State of Texas, who is now the President, has made more recent statements about the Bureau of the Budget.

Mr. LENNON. He has made many statements, because I remember many of his statement on important issues as both a Member of the House and the Senate and as majority leader, but people do change.

Mr. SEIDMAN. I have not read the article and I am unable therefore to rebut the specific criticisms. I think the chairman is aware, however, that no powers are vested in the Bureau of the Budget; it serves the President, and the actions that are taken are on behalf of the President, not the Bureau of the Budget.

Mr. LENNON. I am not being critical, Doctor, I am just quoting those in high places in Government who work with you. I am not quoting myself, this is what President Johnson and some others in Government have said about the Bureau of the Budget, and I do think it is rather challenging, and they do document it, of course.

Doctor, let us now, if we can, talk specifically about some of the bills because we do need your counsel and advice.

My recollection is that the Sente bill, 944, which passed the Senate on August 5, I believe, and is now over here and has been referred to this subcommittee within the last few days—it passed the Senate on August 5—did you testify before the Senate Commerce Committee during the consideration by that committee of this bill?

Mr. SEIDMAN. No, I did not, Mr. Chairman.

Mr. LENNON. My recollection is that at the time of its introduction it provided for a National Council, the Vice President, who should be the Chairman, and then the various Secretaries of State, and, in fact, all of those who hold Cabinet-level status.

My information is that either in committee or on the floor it was amended to provide for a commission of—my recollection—five repre-

sentatives from Government, five from industry, and five from universities, institutions, or laboratories, and so forth.

It so happens that there is pending before this committee, and you commented on it already, H.R. 9064, I believe that is your bill, Mr. Rogers, identical to the Senate bill, or it was before it was amended in the Senate.

Mr. ROGERS. Yes, sir.

Mr. LENNON. Well, there are three bills: Mr. Fascell, of Florida, H.R. 5654, and H.R. 6512, and H.R. 7301 by Mr. Hanna, of California, and H.R. 7798 by Mr. Huot, of New Hampshire.

At the time of the introduction of those bills on this side of the Hill, they were identical with the Senate bill 944. Since then, however, the Senate bill, as I understand it, has been amended to create a commission.

You will recall that we passed here in the House legislation year before last that is identical to H.R. 2218, the bill that is now before us, and it, of course, was not even considered by the committee in the Senate.

So, it would look like to get legislation, and I am inclined to believe that the executive branch sort of hopes that we do not get any, period, but it would look like now at this time in the session that there is going to have to be a consensus between the two bodies with respect to legislation that both bodies will pass.

I was thinking about the possibility of H.R. 2218 being amended to provide, it provides for an advisory commission, counsel may correct me if I am incorrect, but it does provide for an advisory commission to the President, but my recollection is it only provides for a minimum of seven.

Mr. DREWRY. That is correct.

Mr. LENNON. And it is permissive only, a minimum of seven. What would you think, Doctor, if 2218 was amended to provide for a Presidential Advisory Commission, not on a permissive basis but a directive basis such as some of this other legislation provides for?

To authorize and direct the President to appoint an Advisory Commission of not less than 15 members, 5 of them should come from Government, 5 of whom should come from industry, and 5 who should come from your laboratories and universities and that segment of the interested people in oceanography?

Dr. SEIDMAN. Mr. Chairman, first, before I respond directly to that inquiry, I do not think we would have a great deal of problem with the provision which is in S. 944 on the Commission, which is merely an authority to create such a commission, without expressly requiring it.

Certainly I would say we are openminded on the latter proposition which the chairman has advanced. Our principal problem, as you know, has been the fact that there is a panel of the Science Advisory Committee currently studying oceanographic programs. We were not objecting to the creation of a commission in principle but our objection was related rather to timing.

It seemed that we would be able better to judge what the charter of the Commission ought to be and where it should concentrate its efforts after we had the report from the panel of the President's Science Advisory Committee.

So, I think we do have some problem on the timing here which ought to be considered, but certainly this is a matter, as I say, on which I think we are openminded.

I do not know that we have any fixed position.

Mr. LENNON. Now, on the Federal Council of Science and Technology, every major agency of the Federal Government is represented by a member; that is true, is it not?

Mr. SEIDMAN. That is correct; every one that has an interest in oceanography.

Mr. LENNON. An interest in oceanography. Even the Department of State, I believe, has a representative on the Federal Council.

Mr. SEIDMAN. There are important international implications.

Mr. LENNON. That is at the observer level, just as the Bureau of the Budget has a member on the Federal Council, but that is always at the observer level.

Mr. SEIDMAN. Correct.

Mr. LENNON. The National Council as provided for in the Senate bill, is, of course, a directive; in other words, it would be established in the Executive Office of the President a national council, and so forth, and it goes on to name them.

I am mistaken in my impression that the Senate bill 944 requires the President to appoint a commission. I think that is within his discretion as I see it now.

I stand corrected on that.

So, your position is that with the existence now of the Federal Council for Science and Technology you have in essence and in substance the same sort of a council that he would have under S. 944; is that a fair statement?

Mr. SEIDMAN. We do not claim that the Federal Council on Science and Technology is the same sort of council as would be provided by S. 944. Our point is that effective coordination of Federal programs, and particularly developing Federal programs, can be most effectively dealt with by the President, because the situation changes from time to time, and what might be a satisfactory arrangement today might not be the best arrangement 12 months from now, and that we can best achieve the goals which I think both this committee and executive branch want to achieve through flexibility in terms of the organizational and coordinating arrangements. The situation with respect to oceanography is common to other areas of science.

The functions under H.R. 2218, and under the other bills which provide for a statutory council, are almost identical. Under H.R. 2218, they are made the responsibility of the President; the Congress requires him to carry them out and report back to the Congress on what he has done, but leaves the particular organizational arrangements for determination by the President.

Mr. LENNON. It seems to be the thinking, apparently on the part of the Commerce Committee in the Senate, which is reflected in the total body of the Senate on the passage of this bill on a voice vote, that perhaps we do not have the coordination at the higher echelons in Government in oceanography that we ought to have.

So many witnesses have indicated their philosophy that the Federal Council for Science and Technology was devoting so little time and so little of its personnel to the consideration of the overall spectrum of oceanography.

That has been the testimony before this committee by many people and organizations outside of the Government that are engaged in oceanography.

Mr. SEIDMAN. Well, as I think I indicated in my statement, there has been a substantial increase in the Federal expenditures for oceanography since 1961. And there has been a small increase since last year, and a larger percentage of that is in ocean surveys and reserach because a large amount of the funds previously had gone into capital requirements in providing ships.

May I just add, Mr. Chairman, I think this issue runs to the program and program level rather than coordinating arrangements.

I do not think a statutory council would contribute much to solving this particular problem.

Mr. LENNON. But out of the budget for fiscal 1966 for the national oceanographic program, by agency, the Department of Defense, more particularly the Navy, of course, gets about 50 percent of the total budget; is that right?

Mr. SEIDMAN. That is correct.

Mr. LENNON. Sir; \$67,999,000 against \$141 million. That is just under half of the total budget.

Mr. SEIDMAN. For 1966, it would be \$68 million in defense, the next largest amount would be \$30 million in the National Science Foundation.

Mr. LENNON. Now, since ESSA has been established in the Department of Commerce, and their counsel, in a letter addressed to the committee, says that they have authority to contract and to make surveys of the Continental Shelf, and their spokesman here the other day indicated that there had been a contract recently signed by ESSA of the Department of Commerce for the survey of a part of the Continental Shelf.

Do you know how much is involved in that contract, Doctor, in dollars and cents as affected against its total budget of \$13 million for 1966?

Mr. SEIDMAN. No, sir; I do not know. I do not have the answer on that. We could provide it for the record.

(The following information was supplied for the record:)

CONTINENTAL SHELF STUDY BY COMMERCE

The Coast and Geodetic Survey signed a study contract with the Battelle Memorial Institute in May 1965, for \$55,000. The study is to extend over a 14-week period, and the report should be completed by mid-September. The objectives of the study are—

1. To identify the present and likely future economic benefits that can be derived from the present and possible future activities of Commerce's survey activities in the Continental Shelf regions;

2. To consider the capability of the Department for meeting future user needs identified in this program; and

3. To delineate present and future geographical regions of commercial interest in the Continental Shelf areas.

The study is intended for use in planning Commerce's future programs. On August 19, 1965, the Department supplied the House Committee on Merchant Marine and Fisheries with background on this project, including a copy of the contract.

Mr. LENNON. Well, you say that a substantial part of the fiscal year 1966 budget is to be spent in surveys?

Now, as I understand it from Dr. Hollomon's testimony, ESSA in the Department of Commerce is the only agency which now has the legal authority to make surveys of any consequence of our oceans anywhere. Is that true?

Mr. SEIDMAN. I do not think that is entirely correct. It is my understanding that the geological survey of the Department of the Interior is now engaged in a cooperative program of reconnaissance on the Atlantic Continental Shelf.

Mr. LENNON. In a letter, and I am going to read that letter to you, it is from Mr. Bob Giles, the General Counsel, directed to Mr. Herbert Bonner, in which he points out that the ESSA in the Department of Commerce has the authority to make these surveys under this Reorganization Plan No. 4 that established ESSA in the Department of Commerce, and he goes into some detail to explain that they do coordinate and advise and counsel with the Department of the Interior, but he does not say anything there about the Department of the Interior being actually involved, contractually or otherwise, in making these surveys.

Mr. SEIDMAN. Although the Department of Commerce has a focal role, other agencies, including Navy, are engaged in surveys. This is indicated in the national oceanographic program for fiscal year 1966, the table A-3, on individual agency budgets, shows that surveys are being undertaken, were undertaken by the Navy in 1964, there were none in 1965 and 1966; Geological Survey is engaged in surveys; also the Bureau of Commercial Fisheries.

Mr. LENNON. Well, Doctor, I am looking at the same thing on the individual budget for agencies by functional areas. So while I notice that the program for fiscal 1966, budget by functional areas, carries the figure \$78 million for research out of a total of \$141 million; then I read on and finally come down to table 3, that is what you are referring to; I believe the Navy's part of that is \$33 million for research.

Mr. SEIDMAN. That is correct.

Mr. LENNON. Now how is the Navy engaged in research with respect to anything that would exploit the resources of the ocean? Their research is related to antisubmarine warfare and sonar and things of that nature. They are not interested in trying to find some method that we can develop that we can exploit the resources of the ocean, are they? They are still attached to Defense, in other words?

Mr. SEIDMAN. The purpose of the programs of the Navy are to meet the special requirements of the Navy which are support of its military mission, primarily.

Now, as in other cases, survey work or research carried out in terms of a specialized mission may have significance in other areas. We are compiling a common body of data and information which may be significant for all of the agencies which are engaged in oceanography.

Mr. LENNON. Now, Doctor, let us return, if we will, to a little more detailed discussion of the Senate bill which we have to consider, too, in these hearings, and you have not spoken directly to that, but you have spoken in opposition to comparable, almost identical House bills.

Which part of S. 944 do you think could be used as an improvement to H.R. 2218?

Mr. SEIDMAN. I think certainly we would be prepared to give consideration, Mr. Chairman, to that part of S. 944 beginning at section

4 which deals with the authorization to the President to establish a Commission on Marine Science, Engineering, and Resources.

Mr. LENNON. I would think, Doctor, that you probably have had a chance to analyze S. 944 since its passage by the Senate.

You say that a Commission on Marine Sciences, Engineers, Resources, or section 4, in substance, would perhaps be a good substitute for that part of 2218 which provides for the establishment by the President of a Presidential Advisory Council.

Mr. SEIDMAN. That is correct. I think we might have some technical language to suggest in section 4.

Mr. LENNON. Now, Dr. Morse in his testimony, I believe it was Dr. Morse, of the Navy, suggested—he did not suggest, he recommended specifically that—I think it was he and Dr. Hollomon both, 2218 ought to provide some annual authorization for funding the work of the interagency committee on oceanography. They both, as I recall it, made that recommendation, one or the other did certainly, stating that the Interagency Committee on Oceanography was dependent upon working, the individuals assigned to that intraagency committee by the various departments and agencies and they had no staff, no central staff at all—that it was on a part-time basis. I think they had one man that gave most of his time to it, and he had no staff.

What do you think about that, Doctor? Some nominal sum on an annual authorization basis. When I say “nominal” I would certainly think of seeing a couple of hundred thousand dollars, or a quarter of a million dollars at the very tops, myself; I do not know what other members of the committee might think.

Mr. SEIDMAN. The bill could provide authorization for administrative expenses.

Mr. LENNON. Within the Office of the Interagency Committee on Oceanography?

Mr. SEIDMAN. The Interagency Committee on Oceanography is a subcommittee of the Federal Council on Science and Technology.

Mr. LENNON. I realize that, but apparently what their complaint is, is that it is not being funded so that they can have a staff, even a very small staff, to keep the thing moving all the time.

Comment on that; is that true or not, or are those gentlemen mistaken? They are on the ICO and I thought they ought to know.

Mr. SEIDMAN. They have five professionals on the staff of the ICO, according to Mr. Berg of my staff, who is accompanying me. I think if the need could be demonstrated and justified, more staff could be provided. I do not know what the specific difficulty is here. I think Mr. Berg said most of this is funded by Navy today.

As you know, under general law there is authority for the members of interagency committees to contribute funds for the support of the committee.

Mr. LENNON. That was certainly my impression, Doctor, and that is the reason I questioned these gentlemen rather closely when they came up with this specific recommendation in their testimony that that would be, in their judgment, they said, a very effective thing to do, and it appeared to me that there must be some justification for it. I would be glad to have your comments, sir.

Mr. SEIDMAN. With the chairman's permission what I would like to do is specifically look into this matter and if I could send a letter to

the committee I think it would be more helpful than giving my offhand judgment; I have not specifically looked at it; I would like to find out what the facts are, how many were proposed, how many were granted, what the reasons were, and if the chairman would agree, I think this would perhaps be the most helpful to you rather than giving an off-hand comment.

Mr. LENNON. I would like very much to have that at the earliest convenient date to you, sir, because we do want to reach some understanding on this legislation very shortly after we complete the hearings.

(The document follows:)

STAFFING OF INTERAGENCY COMMITTEE ON OCEANOGRAPHY

The ICO staff is currently composed of five professionals and four clerical members. The estimated total cost for staff activities during fiscal year 1966 is \$119,925, of which the Navy will contribute \$93,895, the Coast and Geodetic Survey \$17,030, and the Bureau of Commercial Fisheries \$9,000. All personnel billets are supplied by the Navy with the except of one from the Coast Guard.

The central problem involved in providing for an expanded staff within Navy resources is that of directing defense funds and personnel spaces from military to nonmilitary purposes. If required to do so, Navy would support an increased staff but would prefer that separate and additional resources be made available. To date, no specific recommendations as to type and numbers of additional personnel have been formally developed.

Mr. LENNON. Mr. Rogers, are you ready now?

Mr. ROGERS. Thank you, Mr. Chairman.

Doctor, what does the Bureau of the Budget regard as the President's policy and instructions with regard to oceanography?

Mr. SEIDMAN. I think those are generally contained in his letter transmitting the 1966 oceanographic program to the Congress, from which I quoted in part.

Mr. ROGERS. This just says there, you see the oceans as links rather than barriers, but I think surely there must be more of—

Mr. SEIDMAN. The President said:

We are looking forward to a period when our investment in ocean research may bear fruit in terms of faster and more comfortable transportation * * * more accurate prediction of storms and tides that endanger life and property and the strengthening of our national defense.

The specifics are to be found in the President's budget recommendations. The budget recommended by the President, I think, is almost identical with that recommended in the national oceanographic program.

Mr. ROGERS. Do you see any problems with oceanography? Does the Bureau of the Budget feel there are any problems concerning oceanography, or are things going along pretty well?

Mr. SEIDMAN. From what I have been told, I think there has been progress; there are problems. It is a very difficult organizational area, and I think it would not be correct to state that it is not. The new science programs by their very nature necessarily cut across agency lines and create some very difficult problems of organization and coordination. I would not be frank before this committee if I said we thought we had solved them all; we have not.

Mr. ROGERS. Of course, there are problems, very difficult problems, if we are going to have an active program of oceanography. Is the Bureau of the Budget aware of what is being done in this field?

Mr. SEIDMAN. I think the staff on the budget side of the Budget Bureau is aware of this; I personally am not.

Mr. ROGERS. I understand you might not be.

Who on your staff deals with oceanography?

Mr. SEIDMAN. In my immediate staff it is Dr. Berg; then on the budget side, I come from that part of the Budget Bureau that deals with management and organization within the Government, each of the divisions concerned with specific programs does deal with oceanography—

Mr. ROGERS. Who does it?

Mr. SEIDMAN. Each of the budget divisions. For example, the examiner who deals with the Environmental Science Services Administration would be concerned with that part of it.

We have faced the problem in the Budget Bureau, of coordinating scientific programs, that cut across agency lines. We have created what we call a coordinating examiner who has the function of pulling together all of the oceanographic programs, and I think the coordinating examiner is Mr. Dillon who is in the Military Division.

Mr. ROGERS. Mr. Dillon?

Mr. SEIDMAN. Mr. Dillon.

Mr. ROGERS. So he is the top man more or less?

Mr. SEIDMAN. On the budgetary side.

Mr. ROGERS. On the budgetary side; in other words, to handle the amounts of money to be approved?

Mr. SEIDMAN. That is right; he is also the Bureau of Budget's observer on the ICO.

Mr. ROGERS. Now, is he an oceanographer?

Mr. SEIDMAN. No.

Mr. ROGERS. Does he have any background in science?

Mr. SEIDMAN. I really could not respond to your question, Mr. Rogers. I would be glad to get the biographical data for you.

Mr. ROGERS. I think this might be interesting for the committee if you could let us have the background of those men who deal with the oceanographic program in the Bureau of the Budget.

(The information follows:)

BIOGRAPHICAL DATA ON BUREAU OF THE BUDGET STAFF

Enoch Leroy Dillon, budget examiner, Military Division. Attended University of the Pacific and received B.S. degree in business administration in 1948. In 1952, obtained masters degree in economics from Catholic University, and in 1953 engaged in additional graduate work in economics at American University. For the periods 1944 to 1946 and 1951 to 1952, served as a U.S. Army Infantry officer in the United States, the Philippines, Japan and Korea. Organization and methods examiner with the Department of the Treasury from 1948 to 1951 and from 1952 to 1955. Joined the Military Division of the Bureau of the Budget in 1955, and since 1961 has been an examiner in naval research, development, test, evaluation, and procurement. In 1961, designated as Bureau coordinator for Federal oceanography programs.

Clifford L. Berg, management analyst, Office of Management and Organization. B.A. in political science from University of Minnesota in 1942, followed by World War II experience in military personnel assignments. Master of public administration from Harvard in 1951, and Ph. D. in government and economics from Harvard in 1955. Civilian personnel assignment in Veterans' Administration and Air Force from 1946 to 1956, excluding academic leave from 1950 to 1952. Joined Bureau of the Budget as a budget examiner on hospital programs in 1956 and in present assignment of responsibility for science and education organiza-

tion since 1958. Associate professorial lecturer, the George Washington University.

Hugh F. Loweth, Assistant Chief of the Education, Manpower and Science Division. Graduate Trinity College, Hartford, Conn., B.A. in history and political science. Graduate study in public administration at Maxwell Graduate School, Syracuse University. On the staff of the Bureau of the Budget since 1950. Since 1954, responsible in part for programs of the National Science Foundation and since 1957 concerned also with coordination of general science activities of the Federal Government, particularly those affecting academic institutions. From 1962 through June 1965, Chief of the Education and Science Branch, Labor and Welfare Division. Responsible for education and science aspects, which include the National Science Foundation and the Smithsonian Institution.

Harry C. McKittrick, Assistant Chief of the Resources and Civil Works Division (interior programs). Graduate of Park College with A.B. in economics and business administration, 1943. Joined the Bureau of the Budget in 1943 reviewing programs of the War Department and other national security elements, serving as a staff assistant to the Director, and in assignments in the fiscal analysis and legislative reference offices and in the agriculture unit. Has been in present assignment since 1957.

Hilary J. Rauche, budget examiner, Commerce unit (science and technology), Commerce and Housing Division. Attended University of Notre Dame under NROTC (Holloway) program from 1950-54 and received B.A. (economics). Upon graduation, commissioned ensign, U.S. Navy, and served approximately 5 years on active duty as unrestricted line officer. Released to inactive duty as lieutenant in early 1959, and completed 1 year of graduate study in economics at University of California, Berkeley, in 1960. Filled positions in the AEC's San Francisco Operations Office as management analyst (1961), administrative assistant in contracting unit (1962), and contract negotiator and administrator (reactor R. & D. and physical research programs). Left AEC in June 1965 to join professional staff of Bureau of the Budget. Participates actively as a ready reservist (lieutenant commander) in the Naval Reserve.

Mr. ROGERS. Dr. Berg helps you with oceanography, as I understand?

Mr. SEIDMAN. Yes; he does.

Mr. ROGERS. Just for my own knowledge, I am sorry I do not know your background, Dr. Berg.

Mr. BERG. I am not a scientist, either; my background is in government and economics, and I work in the general area of science organization, of which oceanography is, of course, only one element.

Mr. ROGERS. Yes.

Mr. SEIDMAN. I might point out that Dr. Berg has spent some years working in the field of science organization. The study of Federal organization for meteorology, with which your committee is familiar and the methods we have now developed for coordinating meteorological programs stem directly from Dr. Berg.

Mr. ROGERS. If you had a commission—perhaps one of you can answer this—if you had a commission, how many days do you think it ought to spend, a national commission, on studying the problems of oceanography, to present a comprehensive look and recommendations to the President? Say you wanted it to survey the entire program, set goals where we should go, what we should do, the legal problems involved, the organizational problems, the budgetary problems, the proposed funding to come up, say, in a 5- to 10-year program; how long do you think a commission would have to function?

Mr. SEIDMAN. I cannot, again, address myself specifically to oceanography. I would need to talk to Dr. Hornig and others knowledgeable in oceanography. Based on my general experience with study commissions of this type and the complexity of the subject matter,

my own view and personal opinion would be that it could probably not be done in less than 2 years.

Mr. ROGERS. And how many days in the 2 years do you suppose it would have to be?

Mr. SEIDMAN. The amount of time required for members of the commission and staff of the commission would differ. The staff would have to devote almost full time to the effort.

Mr. ROGERS. You would have to have a good staff.

Mr. SEIDMAN. I do not know how many days members of the commission would have to meet. Normally a commission is concerned at the outset, one, with the selection of staff, providing guidance to the staff as to the areas which should be studied and setting out the tasks which are to be performed; and then usually there is a period of, say, 6 months while the staff is at work, and then there is another meeting, in which they review progress reports of staff seeing that they are moving along the lines desired, to see whether modifications are required in the work that is being done; then a subsequent meeting may be held in 3 months or 6 months, to review progress reports. Normally there will be very intensive work by the commission at the end in developing recommendations, writing a report and so on.

Mr. ROGERS. Well, I would agree with you that it is going to take some time, maybe at least a year and a half, to do an adequate study to know.

We all admit there are problems in the field, something should be done. Russia is doing a great deal; we are going to have to match this, if we keep up with what the President wants us to do, to stay ahead of the field.

Dr. Hornig has set up a panel which you referred to but do you know that panel which is supposed to come up with a study is going to meet for 9 months, but only 2 days a month, which means a total of about 18 days; there is no one staff man assigned for responsibility, they do not really have any staff, and out of this we are supposed to get the study to tell us what to do.

Mr. SEIDMAN. Mr. Rogers, I think the purpose of the PSAC panel is certainly not the same as that of the proposed commission. I do not think it is expected to produce an indepth study. However, certainly that panel operating as you described could illuminate some of the problems and perhaps clarify some of the priority areas to which such a commission should address itself.

Mr. ROGERS. But it is not even looking at legal problems, for instance; it is not in the charter. And certainly everyone agrees this is something that should be considered, at least according to the testimony of Dr. Hornig. Furthermore, it is completely outside of the Government, the Government itself does not even have a representative on the panel for the consideration of what the Government itself is going to do.

Mr. SEIDMAN. As I understand it, the purpose is to look at the program and identify problems and the areas warranting priority attention.

Mr. ROGERS. This is what concerns me, and yet everybody comes up, because the Bureau told them to say, well, now, you are not for this study because we are going to set up an in-house study over here in the Office of Science and Technology which was set up just a few

months ago when they understood that this was a movement and this is the feeling of industry itself which testified here, this is also the feeling of those who are in the program, that we need a comprehensive study of some significance to help direct us where to go, and I would hope the Bureau of the Budget would reexamine this and see about cooperating and trying to have a comprehensive study made, putting it on the level that will attract some national attention to it rather than having a little in-house study made, where we have had 10,000 of those.

The Navy has just done one. He does not have to do that; you can conduct in-house studies in one department after another, and this could be done to serve as an "S.O.P." to us to tell us, well, we are studying again.

What we want to do is have a study that can give us advice; you say there are problems and I agree with you, and you do not have the answers to them today, and I do not think we do, either, and for us to move effectively I feel we ought to relook at this and I hope you can get the Budget to go over this again and see if you do not really think it is time now to do something rather than postponing and postponing with a study, study, study. We know the areas that need to be looked at.

Mr. SEIDMAN. Mr. Rogers, I think in response to the questions asked me by the chairman with respect to the Senate bill, I indicated that we were openminded as far as the Commission is concerned.

Mr. ROGERS. I am delighted to hear that.

Mr. SEIDMAN. And certainly we will be prepared to give this very serious consideration.

Mr. ROGERS. Yes; fine.

Mr. SEIDMAN. In my prepared statement I indicated we had a problem with timing, and this might be met in the bill; in other words, we ought to see whatever comes out of this other group before moving into another study. We are not seeking an indefinite postponement, since the report of the PSAC panel is due on April 1.

Mr. ROGERS. I would hope we would not be delayed in getting this other Commission. They can make their finding in this other Commission whatever they may come up with, but we need to get going on a comprehensive study particularly if it is going to take a year and a half or 2 years.

Mr. SEIDMAN. As you know, even when you have legislation, it takes time to make the appointments. There are delays and it takes a long time, even way after legislation is enacted before you find the people you want to serve as Commission members.

Mr. ROGERS. That is why I think we should not delay any more; that is the point I was making.

Further, I was concerned about Assistant Secretary Hollomon's statement where he says he disagrees with you that we are spending more money. Here is his statement:

But what has been happening over the last few years is that the costs of operating oceanographic ships have been rising and claiming a continually larger share of each year's expenditures for oceanography, which means that the money being spent on oceanographic research has in reality declined.

Now, would you comment on that?

Mr. SEIDMAN. I would want again to look at the figures—

Mr. ROGERS. He is saying because of the added expense and the cost, we are not getting as much for the money that we have been spending.

Mr. SEIDMAN. I know we are spending less on capital construction. A good part of our expenditures for oceanography were going into the construction of ships. This is one of the difficulties—oceanography is expensive, it takes time to get the ships to be used to conduct surveys and for research and to obtain the people and train them. Maybe Dr. Berg can respond to this.

Mr. ROGERS. Yes.

Mr. BERG. I think Dr. Hollomon has put his finger on a real problem here; as you get more ships and gather more data, you have a greater problem of analysis with respect to those studies.

These moneys do compete—the research moneys do compete with the ship operating costs, which, of course, are high. It is a problem.

Mr. ROGERS. I think this has been helpful for us to see that you are willing to have an open mind on getting this commission going and getting something going, and I cannot stress, I think, too strongly to you the concern of the Members of Congress that we are not really moving in the field of oceanography as we should. There is great concern of this. This is what, our third week of hearings, Mr. Chairman?

Mr. LENNON. Yes.

Mr. ROGERS. The third week of hearings now and the interest has been extremely high, and the Congress wants something done and I am glad to see that the Bureau of the Budget is coming in with an open mind and let us get something moving.

Thank you, Mr. Chairman.

Mr. LENNON. Thank you, Mr. Rogers.

Mr. Casey, before I yield to you—who, Doctor, of the Bureau of the Budget is on the Federal Council for Science and Technology?

Mr. SEIDMAN. The Deputy Director, Elmer Staats, is the Bureau's representative on the council.

Mr. LENNON. Does he attend, according to your best information, all of the sessions of the Federal Council on Science and Technology?

Mr. SEIDMAN. I think he has been very conscientious in attending meetings and where he has been unable to do so he has sent Mr. Carey, who is the Executive Assistant Director. Mr. Staats has a very deep and personal interest in the whole field of science and technology.

Mr. LENNON. Doctor, who from the Bureau of the Budget is on the Interagency Committee on Oceanography?

Mr. SEIDMAN. Mr. Dillon of the Military Division.

Mr. LENNON. Is Mr. Dillon here this morning?

Mr. SEIDMAN. No, he is not.

Mr. LENNON. Does he attend the regular sessions of the Interagency Committee on Oceanography?

Mr. SEIDMAN. Yes, he does.

Mr. BERG. As well as some of the subcommittees of that interagency committee also.

Mr. LENNON. Do you happen to know, sir, how many meetings he has attended of the Interagency Committee on Oceanography in the past 12 months?

Mr. BERG. No, sir; I do not know how many. We could get that information for you, sir.

Mr. LENNON. If you will furnish it for the record—his attendance at the Interagency Committee on Oceanography and the panels of that Interagency Committee on Oceanography.

(The document follows:)

ATTENDANCE AT ICO MEETINGS

From August 1, 1964, to August 1, 1965, the Interagency Committee on Oceanography held nine meetings. Bureau of the Budget personnel were represented at seven of those meetings with Mr. Dillon in attendance at five of the meetings. No records have been kept of attendance at meetings of the subcommittee of ICO, but such attendance by Bureau staff has been infrequent.

Mr. LENNON. Mr. Casey.

Mr. CASEY. Thank you, Mr. Chairman.

Doctor, I have one question I want to explore. Since the Bureau of the Budget is an arm of the President and also the Office of Science and Technology is an arm of the President, I presume that in preparing the budget for the President on the scientific end, why, the Director of the Office of Science and Technology is very helpful to you in this preparation?

Mr. SEIDMAN. He has a very direct role in this, Mr. Casey. The various components of the Executive Office of the President in recent years pretty much work as a single organization.

I personally happen to sit on the Directors' Review Committee on the Budget, and when matters relating to science programs are before us, Dr. Hornig sits with the Directors' Review Committee and members of his staff are present and participate in the discussions. There is close day-to-day coordination between the staffs of the Bureau of the Budget and staffs of the Office of Science and Technology.

Mr. CASEY. I am trying to get the idea of the mechanics of it. Singling out oceanography specifically, do you inquire of Dr. Hornig on, say, the Department of Navy's budget as to the soundness of their requests for oceanography, or do you just rely on the Navy to convince your particular department?

Mr. SEIDMAN. In all of the programs, the science programs, the Bureau relies very heavily on the Office of Science and Technology, both for its evaluation of the scientific merit and soundness of the program and also on priority. Very often in the budget process you are faced with a choice among many worthy programs and it becomes a question then of making a choice among programs that are fully justified.

Mr. CASEY. Now, Doctor, does the Bureau of the Budget take the position that you prepare a budget within the estimated income of the country and try to keep the deficit as low as possible, or do you shoot for a figure, and if so, does it put your department in the position of seeing what is the most expendable rather than in a position of saying whether something should have been added?

Mr. SEIDMAN. We have done both. There have been occasions where the President, through the Budget Bureau, has recommended

that items be added. Budget policy is established by the President. The general guidance on budget policy is given to the Budget Bureau and the agencies prior to the time the budget estimates are received, and the agencies have this guidance which they are to apply in the development of their proposals for expenditures which are sent to the Budget Bureau.

The President has made very clear, and this has been no secret, it has been a matter of public record—in fact, he announced last week he is going to divide the budget this year in consideration to two things: One, sessions devoted to new programs; and another one to what can be done about on-going programs. And I think he made very clear to the agencies that there are priority requirements in the Government which we need to meet, and he does not want these met merely by adding increases to the budget and the numbers of people in on-going programs; that we have to find the resources to meet our new requirements by cutting out things of less priority or things which are no longer required, and there is a good deal of emphasis on that today.

Mr. CASEY. Now, back to specifically oceanography, what I was interested in was in this ICO document with reference to the underseas research vehicles which the document seems to stress would be quite desirable and most needed at this time.

They state that the member agencies of the ICO are eager—I presume they mean all of them—would be eager to operate these underseas research vehicles on research and engineering projects, but they are, however, reluctant in fiscal year 1966 to embark upon a costly program of development, especially with the state of the art in its present pioneering stage.

Now, of course, there is more to it; I just picked out that one specific statement, but they go on to say that the development of such a vehicle is furnished to technology as well as to give them experience in the capabilities, and so forth.

Mr. SEIDMAN. On this very point, something has happened subsequent to the report of the ICO, and on April 18, 1965, the President announced that the Department of the Navy and the Atomic Energy Commission are jointly developing a nuclear deep ocean engineering vehicle, and so on.

Mr. CASEY. I was wondering, Doctor, if they all felt that was great but they were all afraid to put that particular thing or some other item or some other object that they all thought was very commendable and desirable at this time in the budget. Who gets their nerve up or would you, as the Bureau of the Budget, say, this is something that should be done, and consulting with the Office of Science and Technology decide who should do it and put the money in their budget on your own.

Mr. SEIDMAN. This has been done in certain areas; I would be, again, less than frank if I said this implied that this happened very often—it does not.

Mr. CASEY. I am sure it does not; you have more requests than you know what to do with.

Mr. SEIDMAN. That is right, but, on the other hand, I think one of the functions of the Office of Science and Technology is to identify gaps in our scientific programs. Necessary work sometimes falls between the cracks, because the agencies have varying interests in terms

of their particular mission requirements. Something that may be of priority importance for the Government as a whole or something that ties the various parts together may not receive adequate emphasis. In such cases the Office of Science and Technology would make proposals to the Bureau to assure that an appropriate program balance is maintained.

Mr. CASEY. If they were not in accord as to who should do the particular project, would the Office of Science and Technology probably be the deciding factor as to where would be the best place to put it?

Mr. SEIDMAN. This would be a matter of consultation between the Office of Science and Technology and the Budget Bureau. It might ultimately go to the President for decision.

Mr. CASEY. Thank you, Doctor. I appreciate your contribution here.

Mr. LENNON. Mr. Drewry, please.

Mr. DREWRY. Dr. Seidman, for the past 6 years this committee has been struggling with this problem and we have gotten down to certain essentials which are set forth in H.R. 2218, such as the insertion of a general policy to support oceanography and strengthen the coordination between agencies, assign responsibility to someone by statute who will be responsive to the President and to the Congress. We favored but you did not, the provision of some form of permanent staff that would be free of diversion to other assignments. We wanted to have an annual long-range program for submissions to Congress and provision for a body representing diversity of interest in the oceans, not limited to scientists and not limited to Government.

Your endorsement of H.R. 2218 would be, I would say, substantial endorsement of those particular objectives, with the exception, to some extent, of the permanent staff.

The booklet Congressman Casey mentioned gratifyingly is, even though there is not yet legislation, substantially in line in its format with where we have been seeking to go. Yet, throughout these hearings for the past several weeks, the main burden of the testimony, at least from non-Government sources, and to some important extent from Government sources, has been that we are not doing enough and the coordination is not working as well as it should.

One man put it, "Industrial technology at the present time has developed faster than the Government programs and objectives have."

The Bureau of the Budget seems to be very much in the middle of these things. I would like to ask you a few questions as to the details of the Bureau of the Budget's participation.

I understand you have a representative present at all Federal Council meetings, or substantially all, and likewise at all ICO meetings, or substantially all.

Mr. SEIDMAN. That is correct.

Mr. DREWRY. And I believe they have a proceeding starting off in the spring; there is an early preparation, and then a little later on they get down a little more to brass tacks and finally the program is worked into the budget request material for submission by the separate agencies.

What type of fiscal guidelines do you lay down as the program is planned and developed?

MR. SEIDMAN. There are instructions given to the agencies each year which provide the general guidance in terms of budget preparation; the guidance is not in terms of specific monetary ceilings, but calls for restraint and keeping down expenditures. The President has indicated, I think quite explicitly, that agencies wherever feasible will provide the resources to meet new requirements by either cutting out programs which have outlived their usefulness or are of lower priority or through savings.

So agencies are all under the general instruction with respect to the budget that they are to try to finance to the maximum extent possible the priority programs, the new programs with resources which are derived from savings out of the old programs.

MR. DREWRY. And these are directed to the departments and then in turn to the participants in the ICO, for instance?

MR. SEIDMAN. This goes to the department heads and these are instructions to all of the Government.

I might say that you mentioned briefly that in the spring there is always what we call the budget preview which gives some guidance to the agency, where they come in generally and discuss programs.

This year we tried something new; we told them not to come in with figures, but to discuss program objectives. One of our problems in budget preparation frankly, is that very often programs are justified in terms of the things you do as an incident toward accomplishing the objective and not in terms of accomplishing the objective. In other words, you process so many pieces of paper; the agency is not in business to process paper; its objective is to promote the Nation's health or improve transportation, or some other purpose.

What we endeavored to do in the preview this year was to put the whole emphasis on the outputs—what is the program, what are you trying to accomplish—rather than on the inputs and the various things you do in attempting to achieve the goal.

MR. DREWRY. Then this process is a continuing one. We start off with a beginning and as the ICO, for example, meets, then any new ideas you have or as things develop generally, you—

MR. SEIDMAN. This would come down through the agencies that are members of the ICO rather than the ICO as a whole. I mean each one of the agencies who is a participant in the ICO would have this instruction and would discuss oceanography as well as their other agency programs with the Budget Bureau.

MR. DREWRY. On this guideline question you mentioned in your statement the difficulty of—

MR. SEIDMAN. I might add, Mr. Drewry, because I think it might be of interest to the committee here, of course, the budget is presented by agency in the appropriation structure, so many of them necessarily have to be considered agency by agency. Again, because of this problem we have in the science area, in the Director's review where the Director decides what he is going to recommend to the President, we do have across-the-board review sessions, not by agency, in the field of science, including oceanography and other science programs such as high energy physics. In other words, we have a cross-cutting science directors' review to try again to look at the science programs of all of the agencies as a whole.

Mr. DREWRY. This is one of the points that have been giving me some concern; just to take oceanography, for instance, who would be the advocate for oceanography as a concept before the Bureau of the Budget and who would take initiative to justify the oceanographic budget before the Congress?

Mr. SEIDMAN. There is not an oceanographic budget. As in other fields of science each of the agencies supports its own program. This has usually been more effective in obtaining funds from the Congress, I might add, than where an agency has to justify the budget request as necessary to support another agency's mission.

Our central agencies often have difficulty obtaining necessary funds when they have to explain their needs in terms of some other agency's requirements. What I am saying here is that if the Navy comes in and explains what it needs in terms of its mission, it is much more likely to get a sympathetic hearing from the Appropriations Committee, than another agency is in justifying its program in terms of Navy requirements.

Mr. DREWRY. This is one thing that worries us; oceanography comes up in the budgets of all the various agencies, and the defense of the budget request before the Appropriations Committee is, as I understand it, made by someone, an official of the separate agency.

Is there any provision for Dr. Hornig, for example, to come up and justify the oceanographic part of a particular agency's budget, to say "This portion of this budget item was developed as a part of a broad program of oceanography and not solely as a mission of a particular agency; it has been well coordinated; we think it is essential to the overall program?"

Mr. SEIDMAN. You put your finger on a very good point, Mr. Drewry, it applies not only to oceanography but to other programs. The agencies have to go in and justify their budgets in terms of their own requirements; I think this is the sound way of doing it. However, one element of a program may be of low priority to them in terms of their own mission, but if you dropped it, it might affect your total program quite seriously, in terms of keeping a balance among the various elements of the program. And, again, this is one of the unsolved problems in the present appropriation process.

When an agency is asked by its subcommittee chairman which of its budgetary items it would be willing to delete or reduce, it is likely to give up something which might be rather urgently required in terms of the total program, but which has a lower order of priority for the specific mission of that agency.

Mr. DREWRY. We have heard statements to that effect and it would seem to me to be something that could be correctable perhaps by the Director of the OST himself being the person—

Mr. SEIDMAN. It might well be that it would be useful for the Director of the OST and the Director of the Budget to come before the full Appropriations Committee and explain the part of the budget dealing with science as a whole, so the committee will have an understanding of how the parts interrelate.

Mr. DREWRY. You mentioned in stating your reasons for being opposed to pulling together oceanographic items into a single agency or council, the question of where, for example, the oceanography

aspect of ocean station vessels begin and end. I am still taking in the guideline area.

Do you lay down any guidelines as to what constitutes an oceanographic item as contrasted with something that is purely in the mission of the agency—the normal mission?

Mr. SEIDMAN. Well, it is our view that the oceanographic programs as a whole which are now being carried out do serve the missions of the agencies—the work that the Bureau of Fisheries does in terms of oceanography, which is the development of fisheries resources of the country—

Mr. DREWRY. It relates to its mission, but when do you call it oceanography and when do you call it a mission, or somebody might call a survey—what one person would call survey would be called research by another, for instance.

Mr. SEIDMAN. This gets into problems of terminology. I think generally speaking we have defined everything which relates to the oceans as to falling within the broad field of oceanography. As I think I indicated in my statement, oceanography not only includes a wide variety of diverse activities, but many different scientific disciplines. It is not a single discrete area susceptible to precise definition.

Mr. DREWRY. I agree with you and yet it seems to me important that the terminology be sufficiently understood that when one agency refers to something as being research, that another agency in the comparable field will also call that research, as against the applied use of the information just so we can understand what we are being reported on.

Mr. SEIDMAN. I think Dr. Berg can answer this better.

Mr. BERG. This does pose some difficulties. Every once in a while, for example, you might be working in the area of air-sea interaction. The question is whether you are talking about atmospheric research or ocean research, and there are different committees of the Federal Council involved. We do think one advantage of handing these things to the Federal Council are that decisions can be made to assign a matter to either the Committee on Atmospheric Sciences or to the Interagency Committee on Oceanography. In fact they both might look at it at the same time. These decisions are quite arbitrary at times.

Mr. DREWRY. Just one more question. So far we have not gotten the statutory base for an oceanographic program that we are looking for, but, when we do get it, would you consider that the handling of the problem from this end might be improved by having authorization legislation, such as we now do with regard to the Coast Guard, for instance, in certain of its work; that is, have some area in which there would have to be authorization before appropriation.

I would like to get your reaction from your end of the street as to whether or not that would help hold the program together—if we are going to have coordination rather than the single-agency approach.

Mr. SEIDMAN. First, I should emphasize that we regard this as a matter for Congress since it involves congressional procedure.

I have been concerned with the increasing trend to provide annual authorizations for many types of programs. This trend started in quite recent years. Formerly, legislation generally provided a permanent authorization. Annual authorizations have created some prob-

lems in terms of timing of appropriations, the amount of time involved in going before four committees, et cetera.

There are also—and this is a personal view—some committees which have to give priority to authorization bills. This may mean that other important work in the legislative area has to be delayed until the authorizing bills are acted on.

Now, it is true you get a different point of view from the legislative committee. The authorizing committee is likely to have a more intense interest in the total program than the Appropriations Committee. But it has created certain problems. The requirement for authorizing legislation sometimes has resulted in delays both in the program itself and in action on other legislation which may be before the committee.

I do not think this has necessarily occurred across the board in all areas, but it certainly has occurred in some.

Mr. DREWRY. Then in some respects it is similar to what you were discussing earlier about the flexibility which the Executive desires to have to review programs, and eliminate those which have outlived their usefulness. Acting under broad legislation, the authorizing committee can lose track of what is going on in things they have provided for under the enabling authority. I wanted to get your reaction.

Mr. SEIDMAN. I might say there is another side to the coin. At least the authorizing bill does have the virtue of bringing together a total program so it can be looked at as a whole; otherwise it is looked at in pieces. It goes back to your earlier question that the Congress does not look at the whole program; it looks at each piece in terms of an individual agency's budget.

Mr. DREWRY. That is all, Mr. Chairman.

Mr. LENNON. Doctor, when a department or agency is asked to give its opinion on a certain bill, a report I think we ask for, are those reports always submitted to the Bureau of the Budget for its approval or disapproval before the return to the several committees that make the requests for them?

Mr. SEIDMAN. I do not think it works exactly as described. Each agency is required, on instruction of the President, to submit a proposed report on legislation to the Bureau of the Budget for the Bureau of the Budget's advice as to the relationship of the report to the President's program.

On bills introduced in Congress, where reports are required, any agency is authorized to send forward its views as long as it includes in its report the advice it has received from the Bureau of the Budget.

There have been a few cases in my own recollection where reports have gone forward from agencies where they have indicated this is their view but they have been advised it is not in accord with the program of the administration.

Mr. LENNON. I was interested in your summary in which you stated the Bureau of the Budget's opposition to 5884 and 6009 by Mr. Keith of Massachusetts, and Mr. Rivers of Alaska, which leads me to the letter or report the committee received from the Department of State on its opinion of those two bills dated July 30, 1965; that is about a month and a half ago now. I quote:

The Department would interpose no objection to the enactment of the bills from the standpoint of foreign relations. In fact, the Department believes that the bills might prove most useful in the development of oceanic capability and use which would not only provide a source of raw material for our economy, as the bills contemplate, but forestall domination of the ocean by forces inimical to our welfare.

Then they go on to make certain suggestions with respect to amendments. Then they conclude the report by saying:

The Bureau of the Budget advises from the standpoint of the administration's program there is no objection to the submission of this report.

Now, the Bureau of the Budget opposed those bills, but the Department of State, as I read the language of their report, approves them and it says there is no objection to them from the point of view of the administration.

Clear me up on that a little bit.

Mr. SEIDMAN. The Department of State was addressing itself to one area which properly falls within their responsibility in terms of the international relations and foreign policy of the United States. And the Bureau certainly did not see any grounds for objecting to or indicating that the Department's view as it related to foreign policy was in conflict with the administration's objectives. No objection does not necessarily represent endorsement. A lot of the reports are cleared with no objection; in some ways it is equivalent to no comment.

Mr. LENNON. They did comment. They said in their judgment it could prove most useful.

Mr. SEIDMAN. No; I meant the Bureau of the Budget's advice, where we say there is no objection.

Mr. LENNON. To that type of report.

They go on in this letter—which I know you have a copy of it in your file—make out a pretty good case for that legislation, the Department of State does, regarding the national interest.

Thank you very much, Doctor.

Any further questions, gentlemen?

We do appreciate it, and I know you have been very helpful to the committee in trying to reach an area of agreement on the bill H.R. 2218.

Thank you very much, and I would appreciate it if you would just step up here for a minute; I would like to chat with you off the record for a minute.

(Discussion off the record.)

Mr. LENNON. Back on the record.

We are delighted to have our old friend this morning and apologize for keeping him here so many days, Mr. Donald L. McKernan, Director of the Bureau of Commercial Fisheries of the Department of Interior.

I might say we always welcome your appearance before this committee; since you are not involved with ducks this morning I know why you are not before the other committee.

You will have a seat and you understand if we get a quorum which is likely this morning after 12 noon, so we will get started anyhow.

Thank you, sir.

STATEMENT OF DONALD L. MCKERNAN, DIRECTOR, BUREAU OF COMMERCIAL FISHERIES, DEPARTMENT OF INTERIOR; ACCOMPANIED BY DR. JOHN LYMAN, OCEANOGRAPHIC COORDINATOR

Mr. MCKERNAN. With your permission I have asked Dr. John Lyman, our oceanographic coordinator, to accompany me to the stand.

Mr. LENNON. We are delighted.

Mr. MCKERNAN. Mr. Chairman, in the interest of time I will not read my whole statement but would ask your permission to insert it in the record as if read and comment on some aspects which I feel have not been considered here in your hearings, at least in those parts of it I have had the opportunity to listen to.

Mr. LENNON. Without objection, your complete statement will be included in the record.

(Statement referred to follows:)

STATEMENT OF DONALD L. MCKERNAN, DIRECTOR, BUREAU OF COMMERCIAL FISHERIES, U.S. DEPARTMENT OF THE INTERIOR

Mr. Chairman and members of the committee, the important position that scientific research and development occupies in the affairs of the Nation is a phenomenon of recent development. The oceanographic sciences provide an excellent illustration of the complexity of management of science and its coordination in the Federal Establishment. The various bills which you are considering here today, and the many other pieces of legislation relating to oceanography which have been introduced in the Congress during the last 3 years or more attest to the concern that you feel about the need for adequate control and planning of this important activity.

Before World War II the word "oceanography" was familiar to only a few specialists, and it is doubtful whether many laymen would have recognized the term if they had seen it. The importance of oceanography for defense was recognized during the war, and the few oceanographers in existence at that time were pressed into service to aid in various aspects of naval warfare, including the prediction of the state of the surface of the sea for amphibious landings. Following the war, the science of oceanography began the development which has led to its present importance and concurrent problems associated with its growth. The term "oceanography" is a misnomer, for it means different things to different people. Modern usage most often uses the term "oceanography" to mean the physical description of the ocean. A much more appropriate term for the broad science would be "oceanology." Oceanology includes such things as air-sea interaction and the relation of physical and chemical phenomena to the natural resources of the ocean, living and mineral. The natural resources of the world ocean are of special interest to the Department of the Interior. However, the term "oceanography" as it is used in the United States covers all aspects of ocean science and engineering. This definition has been described briefly as the study of the ocean, its boundaries, and its contents. The definition should be broadened to include the dynamic interactions between these things.

When the Federal Council for Science and Technology was established in 1959, one of the first aspects of Federal science to which it gave attention was oceanography. It found that this important activity was a conglomeration of all the sciences. It was stressed very early that oceanography is not a branch of science, but rather is an application of all branches of science and engineering to the study of the sea. The Council found that many Departments and specialized agencies in the Federal Government had a deep interest in oceanography. The Executive and the Congress became concerned about coordination of the rapidly developing programs.

In the Department of the Interior we have at least four Bureaus with a deep interest in oceanography. The Geological Survey and the Bureau of Mines are concerned with the composition and structure of the ocean floor and margins and with the geological resources, including minerals and the methods of mining them. The Bureau of Commercial Fisheries and the Bureau of Sports Fisheries and Wildlife have an interest in the living resources and their environment. Certain other bureaus and offices in Interior, such as the Office of

Saline Water, have an interest in the ocean. Even within our own Department we find it difficult to coordinate these interests to the satisfaction of everyone. The problem is considerably more difficult when the diverse missions of several departments and specialized agencies are involved.

Oceanographic research is an important activity of the Federal Government which accounts for an annual budget of more than \$140 million, not including certain oceanographic programs of the Navy. Many Government departments and agencies are interested in oceanography, and the present budget includes sizable programs in the Departments of Defense; Commerce; Interior; Health, Education, and Welfare; Treasury; and State; and in the National Science Foundation, the Atomic Energy Commission, and the Smithsonian Institution.

To coordinate this complex series of programs, which cuts across the normal lines of governmental organizations, the Federal Council for Science and Technology established the Interagency Committee on Oceanography (ICO) which was formed to help coordinate the diverse functions of these 6 departments and 3 independent agencies, which include the activities of 22 operating bureaus and offices. Although it is composed of competent people, and utilizes the services of expert panels drawn from the participating agencies, ICO faces many difficulties.

None of the members of the ICO is the policy head of the department which he represents. Decisions of ICO are subject to separate policy review by several department heads. Within the departments having interests in oceanography, decisions may be subject to review by several bureau or office heads. In some of these bureaus or offices, oceanography may be a minor part of the total responsibility, as it may be also within most departments.

ICO members do not devote the major part of their time to ICO responsibilities. They meet at infrequent intervals, and devote only a few hours each month to this coordinating function.

The staff of ICO is loaned and receives budget support from various agencies. It, therefore, has difficulty in establishing priorities, or in making reviews in depth of programs and planning.

The ICO budget is a conglomeration of the budgets of the departments, independent agencies, bureaus, and offices listed above. Although these budgets are considered as a unit within ICO, they pass through normal channels within the executive and legislative branches of Government, as parts of the budgets of the individual departments and agencies. These individual requests are reviewed by different examiners in the Bureau of the Budget, and by many substantive and appropriation committees of the Congress.

The ICO, imperfect though it has been, has so improved communication and coordination within the Federal Government, between the Federal Government and university researchers, and even internationally, that I am sure none of us would want to go back to the pre-ICO days. We applaud Congress in its serious attempts to bring about improvements, however.

In our opinion all of the bills which have been introduced have merit, in that they propose to correct certain of the difficulties described above. On the other hand, most of these bills also would create new problems equally as difficult. It may be that there is no perfect solution to these very difficult problems. However, if the present method of coordination is to be discarded in favor of another method, we should be reasonably confident that the new method is clearly superior to the old. The decision requires deeper and more detailed review than ICO or any other group has been able to provide to date. It would take time to make such a review, but the results should well justify the time and expense involved. This would not create undue delay in the progress of the national oceanographic program, for, as I mentioned before, the present system of coordination under ICO and the Federal Council for Science and Technology, although admittedly imperfect, is by no means ineffective. The progress of the work would suffer far more if by hasty action one imperfect system were to be substituted for another.

It should be remembered also that the ICO mechanism was one of the first such attempts by the Federal Government to deal with the rapidly growing problem of a responsibility for scientific research and development which cut across all existing lines of administration and communication. It is generally agreed that the national oceanographic program has been the most successful example to date of coordination of science in Government. This successful technique should not be cast off lightly without very careful study.

The results of such a study, made by qualified people whose only task would be to concentrate on recommending the best possible arrangement for conducting and coordinating oceanographic and atmospheric research and development,

would have important implications not only for these important national responsibilities, but also for the development and coordinatin of all scientific activities and responsibilities of the Federal Establishment. This should provide maximum assurance that the objectives of the legislation you are considering here today would be met in the most effective manner.

The position of the executive branch of the Government is that H.R. 2218 might be enacted, but that enactment of any of the other bills would be premature at this time. This position is based on the premise that the President's Science Advisory Committee has set up a special Panel on Oceanography which is now making a study of the kind contemplated in H.R. 9064. When this Panel completes its study and submits a report, the Congress can decide whether additional legislation is necessary; and, if so, what legislation would be appropriate. It is possible that additional studies similar to those proposed in H.R. 9064 would then be deemed advisable.

We understand that during the present hearings before your committee a proposal has been made to provide standby authority for the establishment, in the discretion of the President, of a self-liquidating commission, such as proposed by S. 944. We think that this proposal merits serious consideration. If your committee adopts this approach, we would like the opportunity to offer suggestions on the provisions of the legislation.

Mr. MCKERNAN. In the Department of the Interior we have at least four bureaus with a deep interest in oceanography. The Geological Survey and the Bureau of Mines are concerned with the composition and structure of the ocean floor and margins and with the geological resources, including minerals and the methods of mining them.

The Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife have an interest in the living resources and their environment.

Certain other bureaus and offices in Interior, such as the Office of Saline Water, have an interest in the ocean. Even within our own Department we find it difficult to coordinate these interests to the satisfaction of everyone.

The problem is considerably more difficult when the diverse missions of several departments and specialized agencies are involved.

Of course, you are personally very much aware that in order to coordinate this complex series of programs the Federal Council for Science and Technology established the Interagency Committee on Oceanography, which was formed to help coordinate the diverse functions of these 6 departments and 3 independent agencies, which include the activities of 22 operating bureaus and offices.

I have been a member of the ICO, Mr. Chairman, since its first formation, so I am quite familiar with its general operation.

None of the members of the ICO is a policy head of the department which he represents.

Decisions of ICO are subject to separate policy review by several department heads. Within the departments having interest in oceanography, decisions may be subject to review by several bureaus or office heads. In some of these bureaus or offices, oceanography may be a minor part of the total responsibility, as it may be also within most departments.

ICO members do not devote the major part of their time to ICO responsibilities; they meet at infrequent intervals and they devote only a few hours each month to this coordinating function.

The staff of ICO, as the chairman has pointed out, is loaned and receives budget support from various agencies; it therefore has diffi-

culty in establishing priorities or making reviews in depth of programs and planning.

The ICO budget is a conglomeration, as has been pointed out by several people testifying before this committee, of budgets of departments, independent agencies, bureaus, and offices which are listed in my statement.

Although these budgets are considered as a unit within ICO they pass through normal channels within the executive and legislative branches of Government as part of the budgets of individual departments and agencies.

These individual requests are reviewed by different examiners in the Bureau of the Budget and by many appropriations committees of the Congress.

It is my view, Mr. Chairman, that the ICO, imperfect though it has been, has so improved communications and coordination within the Federal Government, between the Federal Government and university researchers, and internationally, that I am sure none of us would want to go back to the pre-ICO days.

We applaud Congress in its serious attempts to bring about improvements, however.

In our opinion, all of the bills which have been introduced have merit in that they propose to correct certain of the difficulties that I have described above.

On the other hand, most of these bills also would create new problems equally as difficult. It may be that there is no perfect solution to these very difficult problems.

However, if the present method of coordination is to be discarded in favor of another method, we should be reasonably confident that the new method is clearly superior to the old; the decision requires deeper and more detailed review than ICO or any other group has been able to provide to date.

It would take time to make such a review, but its results would well justify the time and expense involved.

This would not create undue delay in the progress of a national oceanographic program for, as I mentioned before, the present system of coordination under ICO and the Federal Council for Science and Technology, although admittedly imperfect, is by no means ineffective.

The progress of the work would suffer far more if by hasty action one imperfect system were to be substituted for another. It should be remembered also that the ICO mechanism was one of the first such attempts by the Federal Government to deal with the rapidly growing problem of the responsibility for scientific research and development which cuts across all existing lines of administration and communication.

It is generally agreed that the national oceanographic program has been the most successful example to date of coordination of science in Government.

This successful technique should not be cast off lightly without very careful study. The results of such a study made by qualified people whose only task is to concentrate on recommending the best possible arrangement for conducting and coordinating oceanographic and atmospheric research and development would have important implications not only for these important national responsibilities but also for

the development and coordination of all scientific activities and responsibilities of Federal establishment.

They should provide maximum assurance that the objectives of the legislation you are considering here today would be met in the most effective manner.

The position of the executive branch of the Government is that H.R. 2218 might be enacted but that enactment of any of these other bills would be premature at this time.

This position is based on the premise that the President's Science Advisory Committee has set up a special panel on oceanography which is now making a study of the kind contemplated in H.R. 9064.

When this panel completes its study and submits a report, the Congress can decide whether additional legislation is necessary and, if so, what legislation would be appropriate.

It is possible that additional studies similar to those proposed by H.R. 9064 would then be deemed advisable.

Mr. Chairman, we understand that during the present hearings before your committee a proposal has been made to provide standby authority for the establishment in the discretion of the President of a self-liquidating commission, such as proposed by S. 944.

We think that this proposal merits serious consideration. If your committee adopts this approach we would like the opportunity to offer suggestions on the provisions of the legislation.

Mr. Chairman, that summarizes our point of view and perhaps leaves a little time for questions.

Mr. LENNON. Thank you.

Mr. Casey?

Mr. CASEY. No questions at the moment, Mr. Chairman.

Mr. LENNON. It seems to me, sir, that having been a member of ICO since its formation, and you have been a member of the ICO since that time, that you are in an ideal position to equate and place a judgment on its accomplishments and its difficulties, too, and in my judgment you do that very well on page 5.

You make out a complete case for it and a good case against it, it seems to me.

With the continuation of the ICO, what legislative action can be done to speed up and to eliminate some of the problems that are involved, that you describe on page 5 of your statement, with respect to the function of the ICO?

Mr. MCKERNAN. Well, Mr. Chairman, the administration, of course, takes the view that—

Mr. LENNON. I am talking about you now as an operating member of the ICO for 5 years.

Mr. MCKERNAN. Well, Mr. Chairman, it is my personal view, aside from my position as a member of the ICO and representing the Interior Department, that there is a need for beefing this up, as the Congress has recognized. A number of excellent suggestions have been made in a number of bills that have been put forth.

I must confess that my own personal view leans toward the conclusion that I would like to see considerably more debate than has been possible—

Mr. LENNON. Would you repeat that?

Mr. McKERNAN. Considerably more debate than has been possible even in these rather extensive and, in my opinion, excellent hearings that this committee has carried out, by the people in industry, people in universities, and in government itself.

Now, the modified S. 944, as was pointed out this morning, and I have heard comments about it by the chairman in the course of these hearings; also the so-called Rogers bill, does—

Mr. LENNON. Right at that point, before I forget it, suppose you submit to the counsel of this committee suggestions on the provision of the legislation 944 if the committee, whether the committee did or did not take overt action in that respect.

You made a suggestion that you said if we adopt the approach with respect to a self-liquidating commission, either 944, 2218, or any other bills, that you would like to offer suggestions as to the provisions of this legislation.

Whether the committee does or does not, I would like for you to furnish to this committee, through its counsel, your views with respect to that legislation. Will you do that?

Mr. McKERNAN. Yes; Mr. Chairman.

Mr. LENNON. Thank you.

(The information requested follows:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington D.C., August 26, 1965.

HON. HERBERT C. BONNER,
Chairman, Committee on Merchant Marine and Fisheries, House of Representatives, Washington, D.C.

DEAR MR. BONNER: On August 17, 1965, during the course of the hearings on the several oceanography bills by the Subcommittee on Oceanography, Mr. Donald L. McKernan, testifying on behalf of this Department, was asked to furnish our views with respect to legislative provisions for the creation of a self-liquidating commission such as that provided for in S. 944.

We are advised that the Bureau of the Budget has now furnished to the committee suggested legislative language providing for such a commission which represents the position of the administration on this subject.

Sincerely yours,

CLARENCE F. PAUTZKE,
Deputy Assistant Secretary of the Interior.

Mr. LENNON. Go ahead.

Mr. McKERNAN. It seems to me that the ICO has provided quite good coordination, although as I mentioned imperfect—

Mr. LENNON. You said that. Now, what legislatively can we do to help ICO?

Mr. McKERNAN. I was just saying that we have accumulated a great deal of oceanographic knowledge in just the past few years, but it seems to me now that there is a lag in the continued accumulation of this knowledge and perhaps even a greater lag in the application of it toward using the resources of the ocean and applying this research in a practical way and in a way which would benefit our Nation in many ways, particularly the economic way.

Mr. LENNON. Now let me interrupt you. I hate to do this but I am afraid we are going to get a quorum.

How much time does Bob Abel, Executive Secretary of the ICO give to ICO?

Mr. McKERNAN. A hundred percent of his time.

Mr. LENNON. How much staff does he have? How many secretaries? How many assistants?

Mr. MCKERNAN. Mr. Seidman this morning said five professionals.

Mr. LENNON. Full-time professionals that devote their time to the staff of ICO?

Mr. MCKERNAN. There are five, yes.

Mr. LENNON. All right, sir, furnish for the record, too, the names—these are full-time people, five.

Mr. MCKERNAN. Yes.

Mr. LENNON. The names and their professional titles, identification, a little professional résumé, biographical, please.

Mr. MCKERNAN. I will be very happy to.

(Information to be furnished follows:)

SUMMARY OF ICO PROFESSIONAL STAFF PERSONNEL

From August 1960 to September 1960: Gordon Lill, Executive Secretary.
 October 1960 to present: Robert B. Abel,¹ Executive Secretary.
 From 1962 to July 1963: Hal Visick, assistant to the Executive Secretary.
 From September 1963 to September 1964: John Padan, scientific staff assistant.
 March 1964 to present: Dr. Edwin B. Shykind,¹ Associate Staff Director.
 May 1964 to present: Lynn L. Moore,¹ information specialist.
 February 1965 to present: William W. Windom,¹ administrative officer.
 February 1965 to present: Gerard E. Sullivan,¹ legal assistant.

PROFESSIONAL RÉSUMÉ OF ROBERT B. ABEL

Date of birth: July 21, 1926.

EDUCATIONAL BACKGROUND

Brown University, B.S. in chemistry, 1947.
 Johns Hopkins University, oceanography, 1954.
 George Washington University, engineering administration (MEA 1961), 1961.
 American University (Ph. D. expected 1966—public administration).

SUMMARY OF EMPLOYMENT

1961—Present: Executive Secretary, Interagency Committee on Oceanography, Assistant Research Coordinator, Office of Naval Research.
 1956-60: Hydrographic Office—assistant to Director.
 1950-55: Hydrographic Office—Chief Scientist U.S.S. *San Pablo*—U.S.S. *Rehoboth*.
 1947-50: Woods Hole Oceanographic Institution—chemical oceanographer.

MEMBERSHIP

American Chemical Society (membership committee).
 Research Society of America (chapter president, 1961).
 American Geophysical Union.
 American Society of Limnology and Oceanography.
 Lecturer—Joint Board on Science Education for the Washington Metropolitan Area.
 Marine Technology Society (member of founding board).

PROFESSIONAL RÉSUMÉ OF EDWIN B. SHYKIND

Date of birth: October 10, 1931.

EDUCATIONAL BACKGROUND

Northwestern University, B.S. in geology, 1953.
 University of Chicago, M.S. in geology, 1955.
 University of Chicago, Ph. D. in geology, 1956.

¹ Professional résumé attached.

SUMMARY OF EMPLOYMENT

Associate Staff Director, ICO, March 1964 to the present; supervisory oceanographer, U.S.C.G.
Chief of the Earth Sciences Branch and special assistant to the Director, Science Information Exchange, Smithsonian Institution, July 1962 to March 1964.
Assistant professor of geology, Northern Illinois University, DeKalb, Ill., September 1957 to July 1962.
Soils engineer, Goodkind & O'Dea, Chicago, Ill., April 1956 to August 1957.

MEMBERSHIP

American Association for the Advancement of Science, member.
American Geophysical Union, member.
American Association of Petroleum Geologists, active member.
American Meteorological Society, professional member.
Geological Society of America, member.
Marine Technology Society, foundation member.
Maryland Academy of Sciences, member.
The Society of the Sigma Xi, member (club president 1959-60).
Washington Geological Society, member.

PROFESSIONAL RÉSUMÉ OF LYNN LUCIUS MOORE

Date of birth : July 26, 1926.

EDUCATIONAL BACKGROUND

1945-48 : Middlebury College, Vt., B.A., political science.
1948-49 : University of London, London, England.
1949-50 : University of Colorado, Boulder, Colo.

EXPERIENCE

Information specialist, ICO, May 1964 to present.
Head, Motion Picture Scripts Branch, Naval Photo Center, Washington, D.C., May 1959 to May 1964; M.P. Advisor, Special Projects Office (1959-63).
Editorial associate, Scripts by Oveste Graducci, Inc., Washington, D.C., June 1954 to May 1959.
U.S. Navy, August 1950 to June 1954.
U.S. Marine Corps : July 1945 to October 1946.

MEMBERSHIP

Writers Guild of America (East).

PROFESSIONAL RÉSUMÉ OF WILLIAM W. WINDOM

Date of birth : February 6, 1927.

EDUCATIONAL BACKGROUND

1949-50 : Rollins Park College, Winter Park, Fla., no degree.
1952-55 : Georgetown School of Foreign Service, Washington, D.C., B.S. in Foreign Service.

EXPERIENCE

Administrative Officer, ICO, February 1965 to present.
Motion Picture Script Branch, Naval Photo Center, Washington, D.C., August 1957 to February 1965.
Stone's Mercantile Agency, Washington, D.C., January 1956 to August 1957.
Pan American Airways, Los Angeles, Calif., 1951 to 1952.
U.S. Air Force : 1945-48 and 1950-51.

PROFESSIONAL RÉSUMÉ OF GERALD E. SULLIVAN

Date of birth : October 16, 1937.

EDUCATIONAL BACKGROUND

Villanova University, A.B. in general liberal arts, 1959.
Washington and Lee University, LL. B., 1965.

SUMMARY OF EMPLOYMENT

ICO staff, February 1965 to present, staff officer, (a) international programs;
 (b) manpower and training.
 Navy officer, 1959-1962.

MEMBERSHIP

Phi Delta Phi.
 National Legal Fraternity.

SUMMARY OF ICO CLERICAL PERSONNEL

May 1961: Evelyn T. Martin, clerk-typist.
 September 1963: Sammy D. Sisson, clerk-steno.
 July 1964: Joan M. Hoffman, clerk-steno.
 November 1964: Maxine E. Crowley, clerk-typist.
 March 1965: Robert H. Warsing, physical science aid.

Mr. LENNON. Where are they funded from?

Mr. MCKERNAN. They are funded primarily from the Navy, but our own Department provides a small amount of money for the operation of this office and so does—

Mr. LENNON. What is the total budget of this office we are talking about?

Mr. MCKERNAN. Dr. Lyman informs me it is about \$115,000.

Mr. LENNON. \$115,000 on an annual basis and that comes from the various agencies who have a representative on ICO?

Mr. MCKERNAN. Yes; primarily from Navy, but the other agencies do contribute, and this goes into—

Mr. LENNON. Why could we not get that information the other day when Mr. Abel was testifying or sitting there next to Dr. Morse?

Mr. MCKERNAN. I cannot help you in that regard. Of course, I think Mr. Lyman—

Mr. LENNON. What about the suggestion that has been made that they needed money to maintain the continuous operation of an ICO staff?

Mr. MCKERNAN. Well, there is no question about it, that the every day operation of the ICO and its many subcommittees is underfunded at the present time. I believe this is true. And that additional strengthening of this staff is necessary.

It is cumbersome under the present arrangement; I am sure the chairman realizes this.

Navy gets a little tired of carrying the load for all of the agencies of Government—

Mr. LENNON. Let me interrupt you right there. Has the Executive Secretary of ICO been a Navy representative during the 5-year period of ICO?

Mr. MCKERNAN. Yes.

Mr. LENNON. Is there any requirement that that be so?

Mr. MCKERNAN. No, none at all. The Navy's budget in oceanography has been the major budget, the largest one, and the Chairman of the ICO has come from Navy. Dr. Wekelin was the first one and now Dr. Morse.

Mr. LENNON. He is designated, though, by Dr. Hornig?

Mr. MCKERNAN. By the Federal Council and Dr. Hornig, who is the Chairman of it.

Mr. LENNON. He is designated by the Chairman of FCST in every instance?

Mr. MCKERNAN. Yes.

Mr. LENNON. And does the Chairman designate the full-time Executive Secretary of ICO?

Mr. MCKERNAN. Yes, but he has done this with the general concurrence of the members of ICO.

Mr. LENNON. Do you know of any better arrangement you could have than that?

Mr. MCKERNAN. No, the office itself is simply not adequately financed. It is very difficult for the separate agencies to get adequate financing for a line item of this amount, and Navy has carried the burden here. I know this has been a difficult thing for Navy to finance adequately. Most of us in ICO believe that perhaps double the present financing might be required for an adequate staff working as the ICO secretariat. The reason for this—

Mr. LENNON. You are talking in terms of how much money on an annual basis.

Mr. MCKERNAN. Maybe in the neighborhood of \$300,000 or \$400,000. And this is a guess, Mr. Chairman, I have not—

Mr. LENNON. Out of a budget of \$141 million you cannot get \$400,000 or \$350,000 or \$500,000 from the various agencies to staff an ICO council?

Mr. MCKERNAN. We have not yet, Mr. Chairman.

Mr. LENNON. That is because agencies will not give up any part of their appropriations, is it not?

Mr. MCKERNAN. It could be characterized as that.

Mr. LENNON. How much does the Department of Interior put in?

Mr. MCKERNAN. \$9,000.

Mr. LENNON. Out of about what, \$14 million?

Mr. MCKERNAN. Yes.

Mr. LENNON. \$9,000 out of \$14 million? And just for curiosity, what does the Department of Commerce put in?

Mr. MCKERNAN. I cannot tell you that. About the same, I understand.

Mr. LENNON. The Navy, of course, puts up the lump sum?

Mr. MCKERNAN. Yes.

Mr. LENNON. I do not know just what kind of legislation that this committee could pass that would provide for the funding of the ICO office.

Certainly if this committee authorizes in its bill and the Appropriations Committee appropriated it, then you would be in sort of a position of an oversight committee.

I can see you feel this is the best that can be done, and you are unwilling to substitute something else that might create more problems, but you are not enthusiastic about, at this point—maybe you have been in the past—I do not want to misinterpret what you are saying but I get the feeling that more could be done and more ought to be done and if that is so, I want you to tell us how we can help you to do that.

Mr. MCKERNAN. That is so. I do feel that more needs to be done and that better coordination is required.

Part of this is simply because of the maturity of the program. The present coordinating mechanism was very successful and a huge step forward.

Mr. LENNON. You said they met at infrequent intervals, but that averages at least once a month, does it not?

Mr. MCKERNAN. About once a month. I think in the last year there were about 11 meetings in 12 months.

Mr. LENNON. Are they 5 o'clock meetings?

Mr. MCKERNAN. No, they are long meetings and they usually are from 2 to 4 hours, Mr. Chairman.

Mr. LENNON. And you say that they do not devote a major part of their time, meet at infrequent intervals to devote only a few hours each month to this important function. It therefore has difficulty in establishing priorities or making reviews in depth of programs and plans.

The staff of ICO is loaned and receives budget support from the various agencies.

If it has difficulty establishing priorities and making these reviews in depth of programs and planning, then it is not functioning as it should, is it?

Mr. MCKERNAN. That is right, and Mr. Chairman, essentially I think it does well—

Mr. LENNON. I know something of institutional restraint of witnesses who come before the committees and I am appreciative of it but people ought to be permitted to testify as to their personal observations and knowledge rather than through institutional restraint and I appreciate your candor and frankness.

Now, how can Congress make some contribution to alleviate this situation which you say prohibits the establishing of priorities and does not permit making reviews in depth of programs and planning.

Mr. MCKERNAN. Mr. Chairman, you have asked me personally what I think should be done. I think what should be done must be taken in steps.

I first would like to see a discussion in depth with varying segments of our society who operate and use knowledge on ocean science.

Therefore, my personal opinion is that the measures that are before you which call for very careful consideration of ocean science and ocean use form a practical step to be taken.

This, it seems to me, would lead to an improved mechanism for dealing with this so-called science which has grown beyond the present somewhat limited mechanism that now is operating in the Federal Establishment.

I think that this will lead to legislation, perhaps a consolidation, and perhaps different budgeting, even perhaps maybe to consideration of lead agencies such as Dr. Hollomon mentioned.

On the other hand, it seems to me it is a little premature to make that decision. I should like to see representatives of the interest of industry, the interest of the academic institutions, as well as of those of some of the States who are occupied in ocean science and the application of ocean science, and of the Federal Government look at this problem over a period of time.

I was impressed by Dr. Seidman's mention that he felt—

Mr. LENNON. I wish he could have heard your testimony.

Mr. MCKERNAN (continuing). That a couple of years would be required in order to adequately consider such an important and complicated matter.

I feel the same way.

Mr. LENNON. Now, Mr. McKernan, let us assume that what you say it is necessary to do—in the interval, while we are waiting for the President's Special Advisory Panel on Oceanography to report what can be done to alleviate and to improve conditions with respect to the problems that are faced by ICO?

You say the Congress cannot do that, that has to be done by the Federal Science Council?

Mr. MCKERNAN. I think that under the present constitution of the Federal Council and the ICO itself can improve its present operation and, in fact, it is doing a good deal of soul searching right at the present time attempting to improve its mechanisms.

Now, I am not sure whether I have overstated the problems in my statement, Mr. Chairman, because I am tremendously impressed with what has been accomplished.

Incidentally, I have heard other members of the committees say the same thing. My intent really is to indicate that with the present state of the art we need something more in the way of Government policy, but, in the meantime, we can improve the institutional barriers that make the function of the present organization in effective in some areas—we can improve this some.

In my view the present ICO-Federal council arrangement will not be adequate in the future.

Mr. LENNON. Now, I am impressed with your enthusiasm to improve this. What about your counterparts on ICO and also those who represent the agencies on the Federal Council?

Are they likewise enthused in a desire to improve it?

Mr. MCKERNAN. Yes, there is no hesitation in saying that every member of the ICO wants to make the organization work effectively, and the general cooperation, general feeling of respect among members of the ICO, is very high; perhaps has never been higher than it is at the present time.

And, in fact, recently, during the last few weeks while these hearings have been going on, the Council has been meeting and discussing whether the structure of the ICO could be improved within the limitations in which we operate.

Mr. LENNON. Mr. Drewry?

Mr. DREWRY. No questions at the moment.

Mr. LENNON. Mr. Casey, I am sorry, I thought you had passed.

Mr. CASEY. Reserved.

Mr. LENNON. I am sorry, you go right ahead.

Mr. CASEY. I want to compliment you on your statement. You are the first one that has come up here and has not taken the position that everything was real rosy. You have been very frank in pointing out what you feel has been the accomplishments as well as the major weaknesses of the operation of the ICO.

Now, Dr. Hornig, I believe, said the other day, I think he was the one that said there was consideration for getting a permanent staff for ICO which would eliminate departmental affiliations or loyalty or, I think he said, competition.

Mr. LENNON. Will the gentleman yield to me?

Mr. CASEY. Yes.

Mr. LENNON. That is the reason I am amazed to hear them say they have five people full time. We got the impression that the people they

used were borrowed from other departments, subject to recall, and subject to other activities.

Now you say positively and unequivocally that you have a budget of about \$108,000 or \$109,000, and that you have five full-time staff members assisting the executive secretary, the full-time executive secretary of ICO.

Now, we just do not have all the facts.

Mr. MCKERNAN. Mr. Chairman, then I have caused this confusion, and I want to correct it.

These men, who are working full time for the ICO, are seconded from various agencies. They can be pulled back to their agencies at any time. But they are a full-time staff in a sense of putting 100 percent of their time on ICO work. I am sorry for that misunderstanding.

Mr. LENNON. That is all right. I appreciate that explanation, but are they on salaries of the agencies they represent?

On the payrolls?

Mr. MCKERNAN. Would you help me here because I am not exactly certain about that; I do not want to answer incorrectly.

Dr. LYMAN. It is fairly complicated, but several of them are Navy Department employees and they are working in and for the Navy.

Others are on billets from one agency, and the money that pays for them is reimbursed from other agencies. For example, the \$9,000 that Interior, the Bureau of Commercial Fisheries, puts in, pays less than the salary of one man, and he is on the personnel ceiling of some other agency, perhaps the Coast Guard.

But he is not subject to recall by the Coast Guard because his salary is not being paid by the Coast Guard.

Mr. LENNON. Those employees that are full time, but the agencies they are requisitioned from and who pays the salaries—let us get the whole story—excuse me, Mr. Casey.

Mr. MCKERNAN. We will try and prepare a detailed explanation of this factor, Mr. Chairman.

(The information requested follows:)

Estimated fiscal year 1966 ICO staff budget¹

Agency	Item	Cost
Navy (Naval Research Laboratory).....	Staff salaries:	
	Abel.....	\$19,590
	Windom.....	8,945
	Martin.....	6,060
	Sisson.....	5,000
	Warsing.....	4,630
Navoceanco.....	Moore.....	2 15,640
	Sullivan.....	6,050
	Crowley.....	5,830
	Hoffman.....	4,140
Subtotal.....		75,885
Coast and Geodetic Survey (Coast Guard).....	Shykind.....	17,030
Subtotal.....		92,915
Navy (Office of Naval Research).....	Travel.....	6,000
	Administrative services.....	9,200
	Printing.....	4,000
	Reserve.....	7,810
Subtotal.....		27,010
Total.....		119,925

¹ Estimated figure for fiscal year 1965 is \$95,000.

² \$9,000 supplied by Bureau of Commercial Fisheries.

Mr. LENNON. Mr. Casey?

Mr. CASEY. Does the ICO work up a budget, and then decide who is going to pay what portion of it?

Mr. MCKERNAN. You are talking with regard to the staff?

Mr. CASEY. Do you have any other expenses besides staff?

Mr. MCKERNAN. Travel expenses and sometimes expenses of the subcommittees to visit certain places, certain laboratories, for example, for review purposes, but the—

Mr. CASEY. Is this set up in an ICO account with the various agencies contributing to it? Is that how it is done?

Mr. MCKERNAN. This is set up in the Navy, I believe, is it not, Dr. Lyman?

Mr. CASEY. You set up the expenses on travel or any expenses ICO has, and then the other agencies reimburse Navy?

Mr. MCKERNAN. Yes, essentially Navy handles the bookkeeping aspects of this, we turn the funds over to Navy and they do the disbursing and paying the salaries and so forth.

Mr. CASEY. As I gather from your statement, the prime principal gain that has been made by the inauguration of the ICO has been coordination, which is a broad word, but I presume that means the keeping of any duplication of effort and also a better assignment of responsibilities. Is that it?

Mr. MCKERNAN. Yes, I think both of those descriptive phrases that you have used are correct.

Before, in the pre-ICO days, in our own small bureau, we had no way of really knowing, very well anyway, until after the fact what the ship schedules of the Coast and Geodetic Survey were, or those of some of the other agencies.

Mr. CASEY. The way that would work, I presume, you, representing the Bureau of Commercial Fisheries, when you attend your meeting and you say you come there instructed by the head of your Bureau and possibly the Secretary of the Interior, and you say, "This is what we propose to do and propose in our next budget"?

Mr. MCKERNAN. That is correct.

Mr. CASEY. And someone else says, "Well, we had that in mind but you can do it better," or something, then as you say, you might report back and say, so and so is going to take on something else and is going to conflict with us a bit, I did not have the authority to say, you take it, as you recited in here you have to go back sometimes to one or more department heads; is that correct?

Mr. MCKERNAN. That is correct.

Mr. CASEY. To finally get an answer as to what the position of your particular department is—now, after the ICO, as I see one of the biggest weaknesses which counsel followed up a while ago, was that after you all make decisions and see that there is better coordination, there is no unified effort of the ICO to help any of these agencies get the appropriation for the programs that you have endorsed, is that not correct?

Mr. MCKERNAN. Not quite. What happens is that the ICO budget goes from the ICO to the Federal Council, and it is reviewed by the Federal Council. Quite often the Chairman and some of the senior members of the ICO go before the Federal Council, which is composed, of course, of policymaking members of various departments, and we review, then, the budget and the program of the ICO.

Now, the Federal Council has an input back through the Bureau of the Budget, and as these departmental budgets come through there is an effort made to coordinate the review within the executive and come out with some semblance of a reasonable program.

Now, it is difficult, and it is imperfect at the present time; but it is a great deal better than it was, and there is an input from the Federal Council and the office of the President's science adviser into this—

Mr. CASEY. That is with the Bureau of the Budget?

Mr. McKERNAN. Yes, sir.

Mr. CASEY. I am talking about up here—before congressional committees.

Mr. McKERNAN. Before congressional committees the matter gets more complicated and we do not have a good mechanism worked out.

Mr. CASEY. As far as the executive is concerned, they think it is working great because the Chairman of the Federal Council is also the Director of the Office of Science and Technology who in turn tells the Bureau of the Budget after the various committees, he works very closely with them, and tells them this is in keeping with the executive department's oceanography program. But you completely ignore—I say you—the system that presently exists completely ignores that the Congress does not hear whether you want it OK'd or we do not have the money.

The Congress is also in my opinion supposed to serve as initiating some of these things and insisting on some of them being done, but under the present system we do not have that opportunity.

Mr. McKERNAN. That is correct. As was pointed out before this committee by Dr. Wakelin, I think about a year ago, there are some 32 or so committees before which various segments of the ICO budget go here in Congress.

Mr. CASEY. There are an awful lot of us in Congress that do not believe what the Department tells us is as it should be, on oceanography and other things. We also feel that the Congress itself should not wait necessarily for the executive department to get an idea and throw it to us.

We ought to have sense enough to get an idea of our own sometimes and have the opportunity to promote it and see that it is done.

So, I deeply appreciate your frankness and the benefit of your experience as a member since the inauguration of the ICO and I can see very well from the Bureau of the Budget's standpoint this is called an arm of the executive that they can see that it works fine as far as any ideas they get.

But by the same token I can see also I have borne down on this new project that they all wanted to do but none of them had nerve enough to put it in.

The Congress might want to do it, specifically a committee such as ours, that is interested in oceanography, but we do not have any opportunity to do it.

Mr. McKERNAN. There is no focal point here in Congress, you are absolutely correct.

Mr. CASEY. If the ICO would decide this is a thing that the Navy ought to do, when the Navy goes up for its departmental budget, you state in here that each agency—but if they get up there before Mr. Rivers' committee or Mr. Mahon's Committee on Appropriations, and

they want to start attacking something they are not liable to put up a strong fight.

Whereas if you had somebody like ICO to say, "We are here to back up this program for the Navy," and point up how urgent and how important it is—I thank you very much for your contribution.

Mr. LENNON. It is interesting to observe in line with your questioning, Mr. Casey, that in the Department of Commerce as far as the ESSA is concerned, there is no legislative committee of the Congress that they can go to, they have to go directly to the Appropriations Committee on the recommendation of the President, who submits the so-called ICO budget for the Federal Council.

You take your own Department of Interior, you get some of the authorizations for your Department from this committee, but you have to go to the Interior and Insular Affairs Committee for other authorizations, but the Department of Commerce, so far as its spectrum in Congress, there is no such legislative committee.

So when they go before the Appropriations Committee, based on the recommendations of the ICO, the Federal Council, and then the President, then there is no history or legislative history made of its needs, and they have to start from scratch.

If we can go off the record.

(Discussion off the record.)

Mr. LENNON. Back on the record.

Thank you very much, sir, this will conclude the hearings of the subcommittee this morning.

Tomorrow we will reconvene at 10 o'clock and look forward to having other distinguished witnesses.

(Whereupon, at 12:30 p.m., the hearing was recessed to reconvene at 10 a.m., Wednesday, August 18, 1965.)

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NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

WEDNESDAY, AUGUST 18, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Bob Casey presiding.

Mr. CASEY. The committee will come to order.

Our colleague, William D. Hathaway of Maine is our first witness this morning.

STATEMENT OF HON. WILLIAM D. HATHAWAY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MAINE

Mr. HATHAWAY. Mr. Chairman, members of the subcommittee, though you are not at present considering H.R. 10106 which I recently introduced into the House of Representatives, I feel that this bill has special importance to this important matter of marine and atmospheric affairs and I therefore wish to comment on it.

There is a variety of bills before both Houses of Congress to enhance and encourage the Federal role in the management of our marine affairs. These bills encompass ideas for the improvement of our merchant marine fleet, review of our interests in the law of the sea, exploration of the Continental Shelf, enhancement of our anadromous fisheries management efforts, import restrictions on fisheries products from those nations practicing poor conservation techniques in our adjacent waters, advisory council proposals for the coordination of our oceanographic effort, the establishment of a massive NASA-like organization for the conquest of the oceans—our “inner space”—and many others.

In addition, President Johnson has now proposed Reorganization Plan No. 2, consolidation of the Coast and Geodetic Survey, the Weather Bureau, and the Central Radio Propagation Laboratory to form a new agency in the Department of Commerce to be known as the Environmental Science Services Administration.

All of these ideas have merit and are rooted in the national concern and future direction of our marine and atmospheric activities. They are symptomatic of: (1) The recognition of the tremendous importance of the oceanic and atmospheric environs to our daily lives and economy, and (2) the fragmentary attention we give these matters in government policymaking and administration.

H.R. 10106 is designed to crystallize our attention on the need to coordinate our work in the interrelated areas of marine and atmos-

pheric environments which so vitally affect our economy, trade, international relations, strategic posture, natural resource programs, and our basic continental climate and weather patterns.

It is my hope that this bill and my remarks may serve as a catalyst for the Congress in considering the far-reaching implications of our activities—or lack of them—in exploring, understanding, and using the resources of the atmosphere and the ocean.

It is essential for us to turn our eyes to the sea around us. We are at present seriously neglecting this important area on our earth. This neglect can only be harmful to us. We must develop a “national will” to combat the inadequacy in this area. It is my hope that H.R. 10106 will contribute to the development of a national will to move forward in a strong, coordinated marine and atmospheric program. For only with a well-coordinated and aggressive program can we hope to conquer this unknown field.

In reviewing the problems and potentials inherent in our status and purposes in marine and atmospheric use and technology, my thoughts focus on several matters.

First, let me put into perspective the status and present direction of our efforts to conquer the mysteries of the marine environment. The words of Mr. James H. Wakeline, Jr., former Assistant Secretary of the Navy for Research and Development, are appropriate:

For centuries man has looked to the sea as a surface on which to sail to distant lands for exploration and trade, as an area for naval battles, as a supplementary source of food—but always as a region of mystery with unpredictable and awesome displays of strength. While the world's oceans do, in fact, cover almost three-quarters of the surface of the earth, our real interest lies as much in the volume beneath the surface as in the surface itself. The extent to which we can use this deep domain depends critically upon our knowledge of its boundaries, its properties, and its contents. To obtain this knowledge, we have been working on a concentrated program in oceanography to study the dynamics of ocean behavior on and beneath the surface, to map the depths and shorelines with greater accuracy, and to access the vast storehouse of food, minerals, and chemicals for future exploitation by mankind. From this program, and others related to it, we will learn much about how to alter and control the tremendous energy developed through the interaction of the air and the sea and released as hurricanes, typhoons, and other storms of great destructiveness. It remains for us now to put this knowledge to work and to find out how we can economically extract the resources from the sea for our use. Before we can fully apply this knowledge, however, we must learn how to live, work, and operate in the ocean depths. Without this capability we cannot effectively use the ocean space for our country's defense or make available its vital materials that we will require for future generations on the earth.

In our national assault upon the marine environment, I see a tremendous historic parallel with that of our country a century and a half ago as we began to unlock the frontiers and rich resources of the Western North American Continent.

In this earlier day, Jefferson and a few others who advocated the opening of our West stood alone. Powerful political and industrial forces sought to divert our energies from westward expansion toward Europe and the seagoing trade. John Adams, then Senator from Massachusetts, sided with Jefferson in a display of political courage and wisdom which brought about his ouster from the Senate and what he then believed to be his political demise.

A few years later, Daniel Webster spoke in questioning terms of our great West saying, “What do we want with this vast worthless area? What use have we for this country?” Although I do not hear specific voices in this day against our national marine program effort, there is a counterpart reflected in apathy, lack of concern, and absence of a national will to forge ahead in this area.

The role of the Federal Government in opening our West was to explore, to map and to provide capital and land incentive for the private development of the area. This role was a unique experiment a century and a half ago which staggered the European mind with its audacity. Yet, the Federal Government did not shirk its duty and responsibility and we are benefiting today because of those previous policies.

Are we any less audacious today? I think not. The frontiers of the sea, great lakes, and the atmosphere between earth and space are before us. We need to use their resources and powers. Government can again lead the way through exploration, scientific inquiry, and capital incentive for business and private capital to follow. We need only to channel our energies and coordinate our efforts to lift the curtain of uncertainty from the realm of the little known.

The lifting of this curtain requires recognition of a little realized fact. The fact is that we now possess the technical knowledge and industrial capacity to live, work, explore, and exploit the resources of the marine world. Heretofore, the main thrust of governmental concern with marine and atmospheric affairs has been in the realm of basic scientific inquiry. For a long time, scientific knowledge has been ahead of the engineering technology required to accelerate exploration and resource development in marine environments. This is no longer the case. We now realize that technology has caught up and even surpassed basic science. We already are able to pursue a vigorous course of marine resource utilization which will enhance our economy and greatly contribute to our general welfare. We have the technology, we have but to use it.

Apparently, this basic fact did not influence the administration in its preparation of the Reorganization Plan No. 2 proposal. This plan is directed essentially toward the coordination of basic scientific inquiry within the interrelated fields of marine and atmospheric affairs. This is a sound proposal as far as it goes—but now is the time for governmental action to go further. True, our programs must continue scientific research and inquiry—but this must be in partnership with the technologies of use and development. We must use basic scientific research plus technology as a workable combination to master and use these still unutilized areas of earth for the benefit of man.

We shall require as much effort and as complicated equipment to conquer the marine environs as we now use to conquer outer space. The equipment necessary includes: vehicles to come and go from work sites and in which to map and explore, together with navigational and propulsion systems for these vehicles, underwater construction techniques, unique construction materials, communication systems, power and distribution systems, and a wide variety of new techniques to work in an aquatic environment. We have the technical knowledge to develop these systems. In fact, many now exist. We need only to define and coordinate our national efforts and provide the incentive to attract the interest of those technological industries with the capacity to do the job.

So much for perspective. I would like to draw attention now to some of the effects and problems evident in our present national effort:

First, despite unused fisheries resources in our own waters, we do not catch the fish we eat, expending about \$600 million annually abroad for the importation of fisheries products. This represents a substantial part of our dollar drain. While our own fishing industry is dying, the foreign fishing industries are rapidly growing.

Because our resources are unused, an increasing volume of Asiatic and European fishermen are attracted by our default to use our waters and catch our resources. All too frequently these foreign fishermen utilize exploitive practices in our own waters, seriously undermining our resource conservation efforts. All this evades the law of the sea and the Continental Shelf doctrine and causes extreme embarrassment to our State Department and much international tension.

Accenting this international problem is the relatively low status of our representatives in the Department of State, Interior, or Commerce

who meet with the ministerial level representatives of other nations relative to U.S. interests in international marine affairs. Other nations, very logically, believe that our Government does not care enough about these matters to give them high official attention, and justly so.

Second, much of our international commitment is concerned with underdeveloped countries and dietary lack of protein in 60 percent of the world's population. We ship our surplus grain to nations but do little to attack the basic problem of protein inadequacy. We know that sustained fisheries resources exceed the world's protein requirements—and further, that great unused resources are available just off the shores of many an underdeveloped country. The undeveloped nations need to be taught how to utilize the unused resources.

Other countries, particularly Russia, capitalize on this knowledge by building up the fisheries capacities of underdeveloped nations and by direct landings of fisheries products by their home fleets. In this way the Russian fisheries and merchant marine make a profit of their activities, and at the same time use their vessels as an adjunct of their defense posture throughout the world in recognition of the strategic importance of the world ocean areas—70 percent of the earth's surface.

Our sick fisheries industry and declining merchant marine do not compete—nor do they add the important strategic element of U.S. occupation throughout the world ocean area.

Third, we are constantly reminded that our continental reserves of strategic fossil fuels and minerals are dwindling—that indeed we are living today on the savings required for future generations. Were we to mine more from the sea and the Continental Shelf we would be, in effect, living on our income rather than exclusively on our savings. For every river, every stream, every rain brings dissolved minerals and chemicals from the land to the sea—enriching and replenishing the sea.

By this I do not suggest any abandonment of our interior resources or that we need depend upon the minerals, oil, and gas resources of the sea today and/or even tomorrow. I do maintain, however, that we must accelerate our effort, now, to explore, to chart and locate, and to use the resources of the marine environment. If we do not, others will and we will suffer for our negligence. Through use and industrial incentive our technology will rapidly improve.

Fourth, recent studies have brought to light some serious problems in the aging and deterioration of the Great Lakes, estuarian, and harbor areas. The speed of the aging process in such bodies of water is normally measured in millenia. We now have reason to believe that large quantities of nutrients entering our Great Lakes and coastal bays in waste discharges are speeding up this process significantly. Also, we find that even with the overnight elimination of pollutants from these waters—if such were possible—the reversal of the aging process, or even its slowing down, appears to be next to impossible under the limitations of present knowledge.

To those from our Nation's heartland, I need not overemphasize the economic impact of water level drops or vegetative concentrations in the Great Lakes. We need to learn more about the currents, tempera-

tures, and other factors influencing this aging process of the Great Lakes. This requires an intensive exploratory and research effort which must be undertaken now before it is too late and economic disaster strikes the heartland of our Nation. In addition we should note that the Great Lakes comprise the largest fresh water sea in the world. What we learn in such a microcosm can be of infinite value in our pursuit of knowledge within the world oceans.

Fifth, although the scientific community has recognized the interactions of the air-sea interface in the creation of both broad climatological and local weather patterns, we have as yet scarcely scratched the surface in learning how to modify these phenomena for man's benefit. The area of weather control and manipulation may seem to be unreachable now, but so did the moon 50 years ago.

The difficulties to overcome are numerous, but just envision the day when controlled buildup in the snowpack above a western reservoir can help regulate streamflows for power, irrigation, pollution, abatement, et cetera, or when controlled weather modification can replenish depleted underground aquifers or transport water in rain over barrier mountains to arid but fertile soils. A dream today? Maybe so—but it can be reality tomorrow. We but need a will and a program to make it so.

The work going forward toward more adequate weather warning systems for tornadoes, hurricanes, and floods is fairly well known. But also the Navy and Weather Bureau, in Project Stormfury, seek to find means to modify, bend, or ameliorate these furious storms of tremendous human and economic impact. The day when we can modify the hands of nature for man's benefit—when such recent disasters as the Northwest and Mississippi Valley floods are things of the past—is not too far distant—if we accelerate and enforce our national will to better understand the interacting marine and atmospheric phenomena which cause them. The costs of such accelerated effort are insignificant in comparison with the potential benefits.

Sixth, the need for power to produce the wonders of our industrial and technological age are apparent to us all. We are all familiar with the disparity of power available to various parts of our country. The potentials for the generation of such power by nuclear energy and by the prospects of obtaining vast oil reserves on the Continental Shelf or from the oil shale deposits of Wyoming, Colorado, and Utah are known. Equal, if not greater, power-generating potential exists through the harnessing of tidal power at Passamaquoddy between Maine and Canada. Similar opportunities exist in Alaska, lower California, and many other places in the world. The French have just completed the Rance River project on the coast of Brittany making tidal power a reality.

Possibly of even greater importance as a source of oceanic power, since it is not tied to a specific location, is the use of the ocean thermal-cline as a source of power. In this system electric turbines are powered by steam obtained from water at surface temperature at reduced pressure. Experiments in this area are underway and the technology of the near future should produce a workable powerplant of perhaps 4,500 kilowatts per unit with byproducts of fresh water, fish and plankton, and mineral production.

Another significant source of ocean power is wave action. It is believed that wave action rather than nuclear or solar power would best and most economically provide the power source for the thousands of buoys envisaged in the future exploration and development of the oceans. Ocean currents, of which as yet we know little, may provide still another source of power generation.

These then are some of the problems we face today and a few of the potentials we can enjoy tomorrow.

Let me turn now to how our Government is meeting this great challenge in the marine and atmospheric program area. Our main effort is entitled the national oceanographic program. It is one of several Government-wide programs planned and coordinated by the President, with the advice and assistance of the Office of Science and Technology. In the field of oceanography the Director of the Office of Science and Technology, who also serves as Chairman of the Federal Council for Science and Technology, looks to the Council's Interagency Committee on Oceanography to carry out the program.

As a committee in Government this group has been quite successful in their efforts to coordinate the diverse functions of 5 departments, 3 independent agencies and 22 operating bureaus and offices. Despite their competent work and continual improvement the Interagency Committee on Oceanography suffers from a number of circumstances with which it is powerless to deal. These are:

1. None of its members is the policy head of the department in which he works, nor is departmental oceanographic policy delegated to him. Whenever ICO makes a decision that decision is subject to the independent and individual policy review of several department heads. Within the concerned departments, marine and atmospheric affairs are relatively minor parts of overall responsibilities.

2. Each ICO member has his own full-time job. They meet from time to time and give the ICO program a few hours of attention, but their prime attention is devoted to their own daily responsibilities.

3. The staff of ICO is loaned from other agencies. It receives budgetary support from other agencies. These two situations make it difficult for the most dedicated operation to establish relative program priorities. Even the most objective public servant finds it difficult to judge a project favored by a Bureau Chief who may soon again be his boss.

4. A program is not a program unless it has a budget with which it may be implemented. The ICO budget for a national oceanographic program is a conglomeration of budgets for marine and atmospheric affairs within 22 bureaus and offices. The ICO considers the budget as a whole but each budget request is contained within the several departments, bureaus and agencies. Thus each appropriation request is reviewed by a variety of bureaus of the budget examiners. Each must compete with other agency functions at the bureau and departmental level for "pieces of the appropriation pie" due such agencies. By the time the President's budget is sent to the Congress it is at once unidentifiable

as a national effort and bears little resemblance to the thoughtful design of ICO.

5. The many segments of the President's program bearing on marine or atmospheric affairs is presented to at least 32 substantive and appropriation committees of the Congress. Among these committees there is little communication.

The consequence of all this—despite ICO's best efforts—is lack of a well-balanced national program of marine and interrelated atmospheric affairs or a budget for it. Accordingly, this country does not have a truly national well-directed effort in this vital area of concern. It is for this reason, I submitted H.R. 10106.

H.R. 10106 proposes:

First, the enunciation of the broad national purposes, concepts, and objectives required for a coordinated balanced program in marine and atmospheric affairs. In this, it places emphasis on an acceleration and expansion of marine exploration, technology, and scientific endeavor. It outlines a Federal role of full partnership and coordination with State, local government, industrial and academic activity in the marine and atmospheric resources and environmental uses.

Second, it authorizes a marine exploration fund providing for an accelerated exploration program at the Federal level with cost-sharing incentives for the States, academic, and industrial communities. Loans and grants are authorized for purposes of developing, improving and testing the instrumentation, vessels, vehicles, equipment or facilities so vitally needed to implement a progressive program for marine exploration and discovery.

Third, it authorized a marine and atmospheric research and development fund for the acceleration of basic research in the component areas of necessary scientific inquiry. This includes: the advance of oceanographic engineering, advancement of knowledge pertinent to the geomorphology and geology of the Continental Shelf, Great Lakes, and deep ocean floors and, similarly, for the biological life, chemical and physical characteristics of such environs. It also provides for research and development related to climatological and meteorological phenomena at the air-sea interface and atmosphere as well as the transmission and generation of electrical energy in such environs.

Fourth, it recognizes that the coordination of our major civilian agencies concerned with marine and atmospheric affairs is essential. Coordination and leadership in this area are indispensable. It recognizes three basic areas of Government focus or influence within the framework of our national efforts. These are: (1) Within the Department of the Navy representing the marine and related military and security interests of the United States; (2) Within the National Science Foundation and Smithsonian Institution representing the academic interests in such matters; and (3) Within a new Department of Marine and Atmospheric Affairs representing the civilian marine and atmospheric interests and industry.

In creating this new Department, I believe a moderate, sensible position is taken between the present fragmented operation which we now pursue and the creation of a massive new NASA-like agency for these environs.

Essentially, the new Department would carry the President's Reorganization Plan No. 2 to a logical conclusion. Included in this new Department would be the U.S. Maritime Administration, U.S. Coast Guard, U.S. Coast and Geodetic Survey, U.S. Weather Bureau, the National Oceanographic Data Center, the Coastal Engineering Research Center, the Sea-Air Interaction Laboratory, the Central Radio Propagation Laboratory—all existing agencies—and a new Bureau of Marine Fisheries formed by the Environmental Division of the Fisheries, responsibilities of the present Fish and Wildlife Service. A new Coordinating Office of Marine Geology and Mineral Resources would also be established.

These are the major agencies concerned with marine and atmospheric affairs. There are many other agencies such as the Geological Survey, Bureau of Mines, Public Health Service, etc., concerned with missions in the marine environment, but it is thought to be unwise to separate the marine functions from these present agencies at the time.

In addition, this bill does one other thing: it provides for the establishment of a joint committee of the Congress to be the forum for the consideration of the future direction and role of Government in marine and atmospheric affairs. This I believe necessary if this vital area of national program need is to be properly communicated to the people. The parameters of discussion, the range and scope of the problems, and the scientific, resources, and social areas of inquiry are too broad for consideration within the framework of existing committee structures in either the House or the Senate.

Mr. Chairman, this then is the direction of the legislation I propose. In closing, let me emphasize again my intentions. These are to help focus national attention on the problems and opportunities before this Nation in the marine world and lower atmosphere around us.

I hope that the strength and imagination traditionally inherent in our people will fuse with our renewed efforts in this field to conquer our last frontier on this earth.

In closing, may I remind my colleagues of the words of our late President John F. Kennedy as he said, "Knowledge of the oceans is more than a matter of curiosity. Our very survival may hinge upon it." Now may I add that knowledge alone is not enough, our survival may well hinge on our occupation and use of the vast marine world around us.

Mr. CASEY. Thank you very much for a very interesting and informative statement.

Mr. HATHAWAY. Thank you for allowing me to present my statement.

Mr. CASEY. We are pleased this morning to have Dr. Leland Haworth, who is Director of the National Science Foundation, as our next witness, and he will be accompanied, I understand, by Dr. Richard G. Bader, who is Program Director for the oceanography program, and Dr. William Benson, Head of the Earth Sciences Section. Both of those are in the Division of Mathematics and Physical Science.

Doctor, if you would like for them to join you at the table there we will be delighted to have them.

STATEMENT OF LELAND J. HAWORTH, DIRECTOR, NATIONAL SCIENCE FOUNDATION; ACCOMPANIED BY RICHARD G. BADER, PROGRAM DIRECTOR, OCEANOGRAPHY PROGRAM, DIVISION OF MATHEMATICS AND PHYSICAL SCIENCE; WILLIAM BENSON, HEAD, EARTH SCIENCES SECTION, DIVISION OF MATHEMATICS AND PHYSICAL SCIENCE; AND HARVE CARLSON, DIRECTOR, DIVISION OF BIOLOGICAL AND MEDICAL SCIENCES

Mr. HAWORTH. Mr. Chairman, I would like to also have Dr. Harve Carlson, Director of the Division of Biological and Medical Sciences, also come up. Dr. Carlson is our representative on ICO.

Mr. CASEY. We are delighted to have you this morning, Doctor, and your colleagues, and we will look forward to your contribution to this hearing in which we are trying to give a little impetus and attention to—oceanography—and, of course, we have lots of proposals as you know, before us; any views that you have will be most welcome; whether we agree with them or not, they will be welcome because we know they will be of a constructive nature.

Mr. HAWORTH. Thank you. I believe you have my prepared statement before you.

Mr. CASEY. You can read it or we will be pleased if you would like to just summarize it and place the whole thing in the record; anyway you want to present it.

Mr. HAWORTH. I think unless you feel pressed for time, I would prefer to read it.

Mr. CASEY. You have all the time you need.

Mr. HAWORTH. Thank you.

Mr. Chairman, may I express my appreciation for this opportunity to appear before the Subcommittee on Oceanography, House Committee on Merchant Marine and Fisheries, to discuss the state of oceanography and the ways to strengthen our Nation's efforts in the study and exploration of the oceans and the exploitation of their resources. That oceanography and the results that grow from oceanography are important has been increasingly recognized in recent years.

In particular, the Members of Congress have demonstrated that they are vitally concerned with the future of oceanography and all its implications. Even a cursory study of the chronology of legislative events from 1958 to now indicates that you have attempted to insure that the United States has a strong, viable oceanographic program, one not limited merely to further development of those areas in which steady progress has occurred, but one that will encompass and improve the areas of endeavor that have not received the attention they rightfully deserve. It should be a program directed toward objectives which will not only be beneficial to the national interests, but to mankind as a whole.

Let me discuss briefly what I believe to be the principal substantive aspects of such a program. Broadly speaking, they are of three overlapping kinds. All are necessary to accomplish our ends. First, there is the science of the oceans—the understanding of the processes that occur, the applications of and the relationships between the laws of nature that bring about the countless, incredibly complex, phenomena within the waters and between those waters and the atmosphere above,

the solid earth below and at the borders—yes; even the radiation from the sun which has an enormous effect.

To understand these things requires research—research that entails most of the basic sciences, in all their various ramifications. In a very complex way the laws of these fundamental sciences act as they have acted through the ages to determine the structure of the oceans' bottoms, the composition of its waters, the currents that flow within it, the life with which it teems and, indeed, all of the characteristics and actions of the ocean systems.

These things must be studied from the minute to the grand scale, usually in many places, from the Equator to the polar regions, from the shoreline to the deepest oceans. Countless experiments must be done, countless measurements must be made, every advantage must be taken of modern techniques not only in the experimental sense but also in the use of modern computers and other methods of analysis.

Only through such methods can we understand how the ocean and its bottoms are structured; how the water reacts with its surroundings, and under what conditions; how the living beings exist and propagate in short, how the entire system behaves and why it behaves that way.

Within the Federal Government, this area has been supported primarily by the Office of Naval Research and the National Science Foundation, but it is also true that agencies such as the Bureau of Commercial Fisheries, the Geological Survey, the Environmental Sciences Administration, the Public Health Service, the Atomic Energy Commission and others are, and should be active in research in order to carry out their own missions relating to the sea.

Second, the field of exploration and survey. In contrast to research which attempts to understand the various parameters and processes in typical situations, exploration and surveying is directed at developing a description of the situation at each and every place of interest. It ranges from charting the bottom, its topography and its composition, through identifying the various water masses and current and determining their chemical, geological, and biological parameters and to the behavior of the atmosphere over the various parts of the sea.

Such activities have, of course, existed since man first had his contact with the sea, especially in costal waters and other areas of interest to shipping. In recent times, activities have increased in intensity and have been placed on a much more systematic basis. But much more needs to be done.

Clearly, there is a close interaction between research and exploration. Research scientists depend upon surveys to know where to go to find the situations that they wish to study. Sometimes, of course, they must make surveys themselves. Conversely those who explore and survey must understand the underlying science in order to do their job effectively and to optimize their ability to infer the situation from a minimum of measurements. Indeed, the activities overlap and no sharp line can be drawn between them.

Most of the surveying is in the province of such agencies as the Naval Oceanographic Office, the Coast and Geodetic Survey, the Geological Survey and, in the realm of food, of the Bureau of Fisheries. Increasingly the Public Health Service and the Atomic Energy Commission have had an interest, concerned as they are with problems of

contamination. Some survey work is done by the oceanographic institutions in connection with their research program and a great deal is done by industry, especially in the shallower waters of the Continental Shelf.

Finally, there is the area of utilizing the sea, exploiting its mineral and biological resources, minimizing its dangers to shipping and coastal installations and using it as an environment for both military and civilian maritime activities and for recreation. Both the surveying and research activities contribute knowledge that is essential for the utilization of the ocean. Those who would exploit it must also know and understand the underlying science and where to go to find conditions favorable to the exploitation that they seek. In turn, the research scientists and the explorers must have a knowledge of the exploitation possibilities so that in deciding which to choose among the innumerable tasks they could perform they can be guided by potential uses, on both the civilian and the military side.

The agencies that are legitimately concerned with utilization range through many of the departments and agencies of the Federal Government, but the primary interest in exploitation of resources is, of course, in the Department of the Interior—the Bureau of Commercial Fisheries, the Bureau of Mines, and the Geological Survey. Primary interest in using the sea as an environment is in the Department of Defense—the Navy and U.S. Engineers—and in the Department of Commerce—Environmental Science Services Administration.

As I said earlier, the activities of the National Science Foundation come logically under the first category—that of research. Oceanography has been supported by the Foundation from the start, but its major growth has been since 1958. In that year we supported approximately 60 research grants in the physical and biological aspects of oceanography as well as in marine biology. Today, we sponsor well over 200 such research programs in universities and other scientific institutions studying the oceans and the Great Lakes.

During this same period, our support of senior research personnel has risen from approximately 50 to more than 200, and our support of graduate students through research grants, fellowships and traineeships has gone from less than 40 to over 160.

These figures do not, of course, tell the whole story, for much of oceanographic work is carried out by individuals who had their training in one of the basic sciences.

Included in the above totals is the support of research aboard the *Eltanin*, the research vessel attached to our Antarctic program. In addition, along with other agencies of the Government, we have supported the International Indian Ocean Expedition, which, when all the data are analyzed, will prove to be a major accomplishment in oceanographic research and survey.

Also, just recently, we supported the initial phase of an ocean-bottom coring program. This first endeavor off the east coast of Florida started on April 17, and was completed in 30 days. It was not only scientifically successful, but also demonstrated the economic value of drilling in the oceans.

Our budget for marine research and education over this same period—that is, from 1958 to 1965—has increased from about \$1.5

to over \$17 million a year, not counting the construction of ships and other research facilities.

I might say, Mr. Chairman, although our plans for the current year are not quite completely crystallized as our appropriation bill has just been passed, that this figure will rise to over \$20 million in 1966.

Finally, realizing that the exploration and comprehension of the seas had been hampered by the lack of good research vessels and adequate shore facilities, we have joined other agencies in an attempt to improve the situation. Since 1958, we have supported the conversion or the building of 12 major research vessels, plus numerous small boats, and the construction or remodeling of some 37 shore facilities. In 7 years, we have devoted more than \$31 million to this cause.

The Foundation is one of the original members of, and has actively participated in, the Interagency Committee on Oceanography, which has been very successful in coordinating and developing the Federal oceanographic research program. The accomplishments of this committee have been remarkable, especially considering the short period which has elapsed since the initiation of concentrated oceanographic efforts. Our interest in the collection, storage, and dissemination of oceanographic data follows yours, as is demonstrated by our strong support of the National Oceanographic Data Center, which is operated and funded under an interagency agreement signed on December 23, 1960.

So far I have talked mostly about the National Science Foundation to indicate that our interest and concern parallels that of the Congress. Of course, that interest is equally strong in other agencies. Because of the combined, coordinated, and cooperative determination of the members of the Interagency Committee on Oceanography, we now have a strong and healthy scientific program in oceanographic research. Oceanographic research has shown good progress over the past few years; I think it is well coordinated and strong. I am also convinced that under the present structure it will continue to develop in accordance with the funds available.

I would now like to turn to the potential resources of the sea and their exploitation, a matter that can be vital to the well-being of this Nation.

We know of the petroleum resources on the Continental Shelf, and that millions of dollars per year are expended by private industry not only for its immediate extraction for fuel and usable byproducts, but also for obtaining information on the reserves which can be tapped in the future. Likewise, we are well aware of the fact that chemical companies extract magnesium from the sea water on the Continental Shelf.

The Bureau of Commercial Fisheries is continuing its efforts to locate and find effective means for utilizing the fishery resources of the oceans. The Corps of Engineers is searching the Continental Shelf for sand deposits which can be used to replenish that lost by the erosion of our beaches. The Navy is conducting an extensive program in ocean engineering; the results of this will not only be of value to the military but also for civilian undersea technology.

And, as mentioned earlier, results of potential economic value were recently obtained as a byproduct of a scientific drilling project con-

ducted off the east coast of Florida. Two aquifers and evidence of a phosphorite bed were discovered. If you wish, Mr. Chairman, I can submit for the record a brief statement and two letters which summarize the preliminary results of this drilling program.

Mr. Chairman, I am sure that we do not know the full extent of the ocean resources, including those on the Continental Shelf. This is not because we are not trying; rather it is because this is an area that is relatively new to us. I would say it is quite analogous to the awakening, well over a century ago, that the West had the potential for economic development.

The realization is here, and thus the tempo must be, and, as funds permit, is being increased. Since we are aware that the answers to many of the problems associated with the exploitation of ocean resources are not presently available, nor for that matter, immediately forthcoming, studies are being conducted, surveys are being undertaken, laboratories are being developed and research efforts are contributing the essential information.

Also, industry is expanding its interests. Possibly after studies are completed, after all considerations are evaluated, Government concessions, similar to those made during the development of the West, may prove appropriate.

Quite understandably, industry and others, including the various agencies of the executive department and Members of Congress, are concerned with utilizing, for the benefit of the people of this country, any natural resource that exists on and in the oceans, especially the Continental Shelf. We must not only take from the sea that which we can use now, but also consider resource management and the contemplated needs for the future.

We are not as well organized for exploitation as for research and exploration. I am sure this fact is the basis for much of your concern and your desire to improve the organizational structure. However, sweeping organizational changes and the pronouncement of new programs must be supported by more than a desire to exploit the ocean resources. It is essential that we first understand the problems, the character and extent of whatever resources may exist, and that this information be compared on an economic basis with those resources present on the continent.

Oceanography is an intricate subject. Its complexity and its wide utilization by many agencies of the Government require that we carefully consider each successive step.

Now let me turn my attention to the contents of the specific bills that lie before you. They range from proposals for intensive studies preceding any steps toward reorganization to the other extreme of proposing a Department of Oceanography.

First, there is the concept of general review and coordination. Here I should like to endorse H.R. 2218 introduced by the chairman of this subcommittee, Mr. Lennon, and identical bills, H.R. 3310 by Mr. Pelly and H.R. 3352 by Mr. Bonner. These bills put first things first and lay out reasonable and considered courses of action.

Briefly, they declare a vigorous and comprehensive oceanographic program to be a matter of national policy. They call for a statement of national goals consistent with that policy and for the establishment of plans and programs to pursue those goals. They authorize an

Advisory Committee for Oceanography and finally and importantly provide for an annual report to Congress of progress in the program. As stated in my letter of July 28 to Chairman Bonner, I believe that such legislation would be useful in establishing the guidelines for carrying out our oceanographic program.

Second, certain bills propose establishment of a National Commission on Oceanography to review all aspects of the field—research, surveying, exploitation, and the development of personnel—and to recommend an overall plan for a national program, including its organizational and budgetary aspects. H.R. 9064 by Mrs. Rogers, H.R. 9483 by Mr. Reinecke, H.R. 9617 by Mr. Hanna, and H.R. 9667 by Mr. Downing propose variants of this method. Studies of this sort are, of course, desirable; in fact, they are necessary. However, mechanisms for their accomplishment already exist.

Indeed, as has been testified on previous occasions, such a study is already underway by a Panel of the President's Science Advisory Committee. This is a Panel of distinguished and able men, most of whom are personally known to me, many of them well. They represent not only scientific but also engineering and economic competence. They will carefully consider all aspects of the problem.

In view of the existence of this Panel, to establish a National Commission such as that proposed would, I believe, at this time at least, be unnecessary and indeed unwise. This is not to say that at some time in the future, after the report of the PSAC Panel has been received and studied, that there might not well be reason to establish another, perhaps larger and more comprehensive body, to extend further the results of the present effort.

Third, are proposals to establish, at Cabinet level, a National Geographic Council to take overall cognizance of the field. H.R. 5654 by Mr. Fascell and identical bills by Mr. Fulton, Mr. Hanna, and Mr. Huot provide for such a Council, chaired by the Vice President. Although such a Council would undoubtedly give greater prominence to oceanography and would provide some high-level focus on its programs, it would have the very major difficulty that the heavy responsibilities of its members would prevent them from devoting much of their time to oceanography and they probably would not be experts in the field. Inevitably this would lead to the delegation of authority to those who are more familiar with the subject, such as the members of the present Interagency Committee on Oceanography.

Thus, its constitution would be similar to that of ICO and there would be the disadvantage that it would not be in the mainstream of science and technology within the Government as is ICO, being, as it is, an arm of the Federal Council of Science and Technology and the Director of the Office of Science and Technology. Furthermore, the President would lose the present advantage of having such matters come to him through a single channel, his Special Assistant for Science and Technology.

I should like at this point to add a bit to what has been said about the ICO. From reading transcripts of these hearings, I have the impression that there is some belief that the impact of the committee is largely confined to its formal channels; that is, through the Federal Council for Science and Technology chaired by Dr. Hornig and from Dr. Hornig back to the agencies.

Although this channel is important and concerted formal policies take this route, there is a constant interchange between ICO and the agencies, including upper echelons of those agencies. For example, in the case of the Foundation, most of our thinking and our planning for oceanography is heavily influenced by the reports and more informal information we receive directly from our representative on ICO. For example, although the first formal information to ICO concerning our budgetary plans is nominally at our own initiative, in the making of those plans we take into serious account the discussions held in ICO and the needs as they have been revealed in those discussions.

Although, until our budget has been submitted to the Congress and appropriations have been made, we cannot guarantee complete effectuation of those plans, we make every effort, even in the face of budgetary cuts, to fulfill them as completely as we can.

Thus, the interaction of an agency with ICO involves not only the circle from the agency's management through its staff to ICO, in turn to the Federal Council and to the OST and back to the agency, there is a constant interchange on a more informal, but nevertheless intensive and effective basis, between ICO and the agencies to the great benefit of the program.

H.R. 6457 by Mr. Ashley proposes a Council within the Office of Science and Technology, also composed of Cabinet-level officers. Again, the actual work would inevitably be by delegation so that, in effect, the Council would be a replica of ICO. In addition, this would be an unorthodox organizational arrangement in which officials reporting directly to the President would in this task be working within a single office.

I do not believe that in either form a statutory council composed of Cabinet officials would improve upon this process. Rather, it would complicate the existing situation. Therefore, I recommend that these bills not be enacted.

Fourth, are proposals to establish a Marine Exploration and Development Commission to carry out a program of exploration and development of the marine resources of the Continental Shelf and in some cases the Great Lakes and waters above the Continental Shelf. H.R. 5884 by Mr. Rivers and H.R. 6009 provide for such a Commission. The Commission would take unto itself activities that are, in my opinion, much better carried out within established agencies.

Three of these agencies would be represented on the Commission. This seems to me a needless complication of an already complex situation. Through their regular programs the agencies are already intensively engaged in studies of the Continental Shelf. Indeed, something like one-quarter of the total oceanographic effort is devoted to this problem. The funds proposed in support of such a Commission would to my mind be used much better to supplement those being devoted to the existing programs.

H.R. 7849 by Mr. Teague combines a similar program with the Council proposed by H.R. 5654, and others, and, in my opinion, should not be enacted for the reasons I have given in those two cases.

Five, a full-fledged oceanographic agency is proposed in H.R. 921 by Mr. Wilson. This would, of course, have the appeal of concentrating oceanography within one focal spot within the executive branch and in presentation of the needs for oceanography before the Con-

gress. At first sight it would reduce problems of coordination but it would undoubtedly introduce a quite different set of similar problems of this nature.

The various Government departments and agencies engaged in oceanographic activities directly related to their missions must continue to discharge those missions and hence must be concerned with oceanography. For example, fisheries and other resource aspects of oceanography are undertaken by the Department of the Interior, pollution and other studies by the Department of Health, Education, and Welfare, and the Atomic Energy Commission, defense aspects by the U.S. Navy, et cetera. If oceanography were divorced from these departments it would seriously impair their capabilities for carrying out their missions. In most instances, research, development, and exploration are so inextricably entwined with the responsibilities the individual agencies must discharge that their effectiveness would be seriously impaired.

The need for coordination between the proposed oceanographic agency and the users of the information it developed would to my mind be even more difficult than the present problems of coordination between the agencies in the different aspects of oceanography. For these and other reasons, I recommend against the passage of H.R. 921.

Finally, I should mention H.R. 5175 by Mr. Lennon which would require that a legal study be undertaken by the Coast Guard. Although I am poorly qualified to comment on this bill, I should like to say that I am in favor of the proposition that such a study should be undertaken. Whether the Coast Guard is the appropriate agency, I do not know.

In conclusion, I wish to reiterate that the accomplishments in oceanographic research over the past few years have been quite gratifying; the science has shown steady progress and our facilities are markedly improved. Yet we must do more if we are to attain the desired goals. We are now considering further expansion of our effort in exploiting the resources of the sea. This will require study, financial support and time. Given these and the opportunity to conduct realistic investigations into the potentials of the sea, we will attain the answers necessary to devise and carry out an evermore meaningful program.

Thank you, Mr. Chairman.

Mr. CASEY. Thank you, Doctor.

The results of the tests off the Florida coast, you mentioned that you have that available to put in the record, and I believe we would like to have those, if you will furnish that for the record.

(Documents referred to follow:)

JOIDES DRILLING PROJECT SUMMARY

One of the most significant recent accomplishments in oceanography was the completion of an ocean drilling and coring program on the Continental Shelf, continental slope, and the Blake Plateau off the eastern coast of Florida. The drilling took place on six sites along a transect beginning about 22 miles off Jacksonville in 81 feet of water and extended 250 miles offshore where the ocean depth reaches 3,500 feet. The deepest hole drilled was 1,050 feet below the ocean bottom.

The drilling program began on April 17, about 1 month after a grant was made by the National Science Foundation to the Lamont Geological Observatory, and was completed on May 17. The entire operation was under the supervision of JOIDES (Joint Oceanographic Institutions' Deep Earth Sam-

pling), an organization composed of the University of Miami (Institute of Marine Science), University of California (Scripps Institution of Oceanography), Columbia University (Lamont Geological Observatory), and the Woods Hole Oceanographic Institution. Representatives of the U.S. Geological Survey and other institutions were aboard the drilling vessel *Caldrill*. The Pan American Petroleum Corp. had agreed that JOIDES could use the vessel for such drilling at no cost for the transit time as *Caldrill* was moved from California to the Grand Banks off Newfoundland. The ship was put to its most severe test when drilling at two sites bordering the Gulf Stream. Here currents of more than 3 knots were encountered, but they did not prevent the collection of long cores in this structurally important region.

The sampling has just been completed, thus only preliminary results are available. However, the success of the operation is amply demonstrated by the following:

(1) Two fresh water aquifers were found at a distance of 22 miles offshore. At drill hole depths of 500 and 700 feet, artesian water gushed up with a head of more than 30 feet above sea level. This find greatly extends the known water reserve for this part of Florida.

(2) Extrapolation of structure and lithology can be made from the land outward across the Continental Shelf.

(3) Gamma ray logs in holes indicate an extension of economically important phosphorite beds beneath the Continental Shelf.

(4) Reflected profiles obtained by earlier seismic work were pierced during the drilling. The collection of core samples at these levels will be a great value in interpreting seismic data. A successful velocity log was obtained in the deepest hole and the results confirm seismic velocities obtained previously by other methods.

(5) Abundant fossil organisms were found in the cores and will permit the correlation of near-shore and deepwater forms in the same horizons.

(6) Shallow water fossils were found in the deeper portions of the near-shore drill holes. These are of significance in unfolding the history of this continental margin.

(7) The sedimentary beds of Tertiary age on the Blake Plateau are much thinner than those on this Continental Shelf. This could well be a key reason for the depth of the plateau.

(8) The apparent continuity of the sedimentary beds across the Continental Shelf and slope does not support an earlier idea of the existence of a north-south pre-Tertiary fault.

(9) It is now evident that with the necessary modifications of such drilling equipment, successful drilling can be accomplished in water of 6,000 feet or more. It is also evident from these preliminary results that basic scientific information and data of potential economic value can be obtain by the continuation of deep ocean coring.

U.S. DEPARTMENT OF THE INTERIOR,
GEOLOGICAL SURVEY,
Jacksonville, Fla., June 21, 1965.

Dr. J. LAMAR WORZEL,
Lamont Geological Observatory,
Palisades, N.Y.

DEAR DR. WORZEL: The recent JOIDES drilling program off the coast of northern Florida gave us a rare opportunity to examine the submarine strata that had heretofore been inaccessible to us. Our work in this area is to examine and appraise the water resources in northeastern Florida, particularly the ground water resources which are the most important source of water in this region. The aquifer which supplies most of this water is presently being studied in detail to determine the amount of water available for present and future use and to determine the danger of salt-water intrusion into the aquifer with projected increased use of the aquifer.

Up to the time of the offshore drilling operation we were only able to examine the aquifer to the coastline although we knew that the aquifer extended below the Continental Shelf. This lack of information beyond the coastline limited our work so that we had only an incomplete picture of the hydrologic characteristics of the aquifer. The drilling program made it possible to learn more about the seaward extension of this important aquifer. We are now able to make a

more comprehensive appraisal of the ground water reserves in this area and to better define the dangers of salt-water contamination.

The drilling program has indeed given us much needed data to further our studies on the water resources in this area. In the long run this data will benefit the hundreds of thousands of people in this area who depend on the water from this aquifer for domestic, municipal, and industrial supplies.

Sincerely yours,

GILBERT W. LEVE, *Geologist.*

U.S. DEPARTMENT OF THE INTERIOR,
GEOLOGICAL SURVEY,
Washington, D.C., June 17, 1965.

DR. WILLIAM BENSON,
National Science Foundation,
Washington, D.C.

DEAR MR. BENSON: We in the U.S. Geological Survey are very pleased with the success of the recent JOIDES-Blake Plateau venture and are convinced that such enterprises will yield much new scientific information on the history of the ocean basins and potential resources that lie buried off our continental borders. By this letter I would like to congratulate those individuals who organized and participated in in the venture.

I can foresee additional projects of this type. If such are contemplated, please let me assure you of our continuing interest in participation as collaborating scientists. Do not hesitate to call on us for help or advice in planning or evaluation of future projects of this kind.

Sincerely yours,

W. T. PECORA, *Chief Geologist.*

MR. CASEY. Mr. Dow?

MR. DOW. No comment, Mr. Chairman.

MR. CASEY. Mr. Pelly?

MR. PELLY. Mr. Chairman, I would like to say I think Dr. Haworth has made a clear-cut statement that will contribute much to the thinking of the committee. It has been very helpful and I appreciate his being with us today.

MR. HAWORTH. Thank you, Mr. Pelly.

MR. CASEY. Doctor, it seems to me that you and your department are in a little different situation than the other agencies who have appeared here, because you take most of them, they are primarily—their primary responsibility is not oceanography or sciences as such while your's is.

MR. HAWORTH. That is right.

MR. CASEY. Of course, you have many, many other endeavors in the scientific field other than oceanography. Since this is an era where science is coming to the forefront, I am sure that yours is a very fascinating and busy task.

And also you have your own separate appropriation for your scientific endeavors.

MR. HAWORTH. Yes.

MR. CASEY. So that you are different in this respect, and one of the weaknesses of the system that I feel exists is that when the ICO decides on a particular program, if they should assign it to some agency primarily concerned with, say, defense or parks and wildlife, why, sometimes that particular appropriation or money for that particular project does not receive the attention before a congressional committee.

I would like to know whether you feel that the present setup insofar as the other agencies, have they been successful in getting the necessary funds to carry out some of these, not just the projects

that are necessary for their particular agency, but related basic research that should be conducted along with the primary responsibility?

Have you noticed any difficulty in sometimes getting funds for this?

Mr. HAWORTH. Well, Mr. Chairman, I guess to be honest, I should say that most agencies think that they do not get enough funds for any of their activities.

Mr. CASEY. That is right.

Mr. HAWORTH. And certainly oceanography shares in this without any question. There has not been as much money available for oceanography as many of us would like to see. I do not think it is peculiar in this respect. In fact, in my opinion it has done very well in the last—will, since I have been familiar, which is about 4 years.

I came to Washington about four and a half years ago. And it has certainly done very well in that time because of, I think, three factors. Of course, it had been sort of brought into the spotlight back in 1958, along in there by such things as the academy study, and so on.

Then there was the very great interest of the Congress which has helped not only in the sense of appropriations, but also in the sense of spurring on the executive branch, calling attention to it, and, of course, Mr. Kennedy's great interest was a stimulus to it. The support of oceanography has grown much more rapidly than the support of most fields; indeed I cannot think of another field that has scientific implications or scientific basis and so on, that has grown as rapidly except space.

Now, it started pretty low. It did not have the attention or the support that it deserved and perhaps it has not yet caught up.

With respect to your question about the competition, say, within the Defense Department between research and survey and so on in oceanography and other Defense activities within Commerce or whatever department, this, of course, is always a problem. It is a problem within the Science Foundation, the competition for funds for research in oceanography as compared to research, say, in the atmospheric sciences, or anything else.

I think that problem would exist no matter what our organization is. Suppose we were starting all over again and had some different kind of organization of the Government; in principle we could have departments of oceanography and departments of this and that, with missions in a sort of horizontal way instead of a vertical way, as we now have them, then you would have the competition between, say, those aspects of oceanography that apply to defense as compared to those aspects of oceanography that referred to commercial exploitation, and you would have a similar problem, except with a different cut.

It would be sliced horizontally instead of vertically, if I can be very crude about it.

I think that the solution is just to keep pushing; for everyone who is interested to do everything we can to promote it; to improve organizational arrangements; for Congress to do appropriate things; for the executive branch to sharpen itself up as much as it can, and so on.

Mr. CASEY. How is the National Oceanographic Data Center—how is it funded?

Mr. HAWORTH. It is an interagency funding. Dr. Carlson could perhaps give you a more descriptive detail than I could.

Mr. CARLSON. The Data Center is funded by, I believe, seven of the agencies. Now, Dr. Bader is a member of the Board of Trustees. Is that right, Dr. Bader?

Mr. BADER. Yes.

Mr. CARLSON. And we provide funds for their operation, which is under the management of the Navy.

Mr. CASEY. Do they contribute to the funding of it, is that established by the Board of Trustees, or is it established by ICO, or who determines how much support you shall give to a study?

Mr. CARLSON. I would like to ask Dr. Bader to answer that because he does sit on the Board of Trustees.

Mr. BADER. The Board of the NODC receives from the staff of NODC the information concerning the requirements for the budget, the priorities for the various activities that they feel should be done and the actual dollars that are requested.

The Board, in turn, evaluates this and finally decides at a specific level which can be funded by the various agencies involved.

Each of the agencies every fiscal year puts a specific sum into the operation of the Oceanographic Data Center.

Mr. CASEY. Now, does that Board—is that Board just composed of representatives of the various agencies?

Mr. BADER. They are representatives of the agencies that are funding the National Oceanographic Data Center, yes, sir; and users of it.

Mr. CASEY. That Board determines the operation, the amount of new equipment, the amount of personnel, and what have you. Is that right?

Mr. BADER. The Board actually, after receiving the information from the staff of NODC, evaluates this information to determine whether the budget and the equipment and priorities of that which they want to do can be funded, so, in this sense, yes, the Board does say, "You can have a piece of equipment."

Mr. CASEY. The staff is all Navy?

Mr. BADER. The staff is on Navy billet; yes, sir.

Mr. CASEY. And the staff then is on the Navy's funding and what you all do is contribute whatever the staff tells you is necessary, you determine how much each of you should take on. Is that right? The Board does that?

Mr. BADER. The Board makes the general—

Mr. CASEY. How many are on the Board, Doctor?

Mr. BADER. I think there are nine, sir.

Mr. CASEY. Nine different agencies?

Mr. BADER. Nine different agencies. It is the AEC, National Science Foundation, the Department of Commerce, Department of Interior, the Navy, there have been a few new members to the Board recently. I think the number is nine. I am not positive, but I could get that for you.

Mr. CASEY. The Coast Guard?

Mr. BADER. Yes, sir.

Mr. CASEY. And Treasury?

Mr. BADER. Yes, sir.

Mr. CASEY. Do other agencies contribute to the data that goes into this Center, or is it limited to the nine that are on the Board?

Mr. BADER. No. Actually, the data that goes into the Center can come from all sources. The data that goes into the Center is derived from papers that have been published in technical journals, and the staff removes this information from the journals and it is included in the data that is at the NODC.

They get input from the Navy, they get input from the Coast and Geodetic Survey, and so forth, so they get information from more than just the membership.

Mr. CASEY. We have heard approximately 22 bureaus and agencies, and so forth, that are in the oceanography field to some degree. Is there any obligation or compulsion that this data goes to the Center so that you will have everything that is available?

Mr. BADER. Well, there is this type of an obligation. In our connection with the development of oceanographic programs we attempt to compile a list of the declared national oceanographic programs.

For instance, Woods Hole Oceanographic Institution may be going on an expedition to a specific area. They, in turn, may be supported by the Navy, by the National Science Foundation, or by some other organization. They will list this as a declared national oceanographic program and will then turn over all of the information they have to the National Oceanographic Data Center, which, in turn, will list it in the World Data Center.

So, it is then essentially in both places. The World Data Center A is that Center set up during the IGY.

Mr. CASEY. Have you had any difficulty in financing the operation of the Center?

Mr. BADER. Pardon, sir?

Mr. CASEY. Have you had any difficulty in financing the operation of the Center? Getting sufficient funds?

Mr. BADER. No; I think that we have been able—in the Foundation, at least to finance it at the level they have requested.

Mr. CASEY. I am not speaking of the Foundation. I am speaking of you as a member of the Board. Has the Board had difficulty in getting sufficient funds to get the operation set up satisfactorily?

Mr. BADER. I think the Board feels that the Data Center is functioning well. Possibly the Data Center could expand more rapidly than it has, but it has shown a significant increase in the past few years as far as its number of personnel and its—

Mr. CASEY. What has restrained its more rapid expansion? Funds, or what?

Mr. BADER. Essentially funds.

Mr. CASEY. And you say you have not had any difficulty in getting the amount that you thought was necessary from the Science Foundation, it has been able to furnish what it thought was necessary. Where has the shortage been?

Mr. BADER. I think all of the agencies have funded it to the extent that they can, and as I said, we have been satisfied with the increase in the capabilities of the National Oceanographic Data Center. With more funds it probably could increase faster.

However, we also feel that the development of something like the Data Center should not just explode, but rather it should grow slowly in an essentially smooth, realistic growth line, and it has done this over the past few years.

Mr. CASEY. Your personnel comes from the Navy. Do they limit you on the number of personnel you can have there, and does the Board feel that you have all the personnel you should have there?

Mr. BADER. Well, the fact that they do come from Navy billets does have some effect. The Navy has only a specific number of billets and if some are utilized for NODC, it obviously may have some effect on the rest of the Navy. But I do not think we have any real strong feeling that there is not sufficient personnel on the Data Center staff to conduct the work that is now being done.

Mr. CASEY. I know you do not want to be critical of the Navy, and you are not critical of the Navy, because you know what their other obligations are, and that is what we are getting to, is that their other obligations are so much more important to their specific assignment than furnishing personnel to the Data Center that it does have, as you say, some effect on the more rapid expansion of the Data Center, because the personnel comes from the Navy and if they put too many in there it will cramp something else?

Mr. BADER. I do feel, sir, that if this type of an imposition on the Navy billets was not there, that the data center could expand faster. However, I do not think that it is necessary nor do I think that it is wise for a data center of any sort or even a research program to expand too rapidly. It has to expand on a relatively well-planned basis.

Mr. CASEY. Let us pin it down, Doctor. First, you said you felt we—I presume you were speaking about the Board—felt that it could expand more rapidly than it had. Also, you felt that the fact that the personnel were Navy billeted had some effect, and I presumed it was not a salutary effect or you would not said it had some effect on the expansion of the operation, so the setup could stand some improvement.

Now, what it will take is something else?

Mr. BADER. Correct.

Mr. CASEY. And the fact that we are having these hearings is that so many of these functions do come from various agencies and you do not have the opportunity. In other words, for someone to come before a congressional committee or appropriations committee and say the data center needs this and this, and you have appropriations specifically for the data center.

Those are some of the things that we are exploring and want to get into here.

Mr. HAWORTH. Mr. Chairman, if I could interrupt for a minute to go back to an earlier question about whether all the agencies were contributing their data to the data center, and you mentioned the 22 agencies and bureaus and so on.

Of course, the 9 members of the Board represent more than 9 of these 22, because they are in Commerce and Interior and so on.

Mr. CASEY. I understand that, and I can readily understand, too, where most likely where you make a grant or the Navy makes a grant to a private institution or an educational institution, why, you require that all of their findings go into the center.

Doctor, you mentioned the shortage of vessels, that you were trying to work on that. How do you get together and try to determine who is going to ask for vessels, research vessels, oceanography vessels, and so forth?

Mr. HAWORTH. This is a rather complex process. In the first place, each agency becomes aware of the needs for vessels, not only those agencies that have in-house operations such as the Navy, but also those agencies that are supporting research and surveys and so on outside the Government by grants and contracts; they become aware of the needs for vessels of various laboratories, organizations of one sort and another.

In the case of the Foundation, for example, we get proposals from Woods Hole or Scripps or wherever it might be, and those total needs are discussed in ICO and there is a rather concerted look at the whole thing; decisions are made about how many should be asked for.

In the period beginning, I guess I would say—I am having to depend on what I have been told in this connection—beginning about 1960 there was, of course, a very sharp increase in funding for this sort of thing.

The result was, in my opinion, that in terms of our total funds we have a little bit overshot on this, and that as I believe Secretary Morse pointed out to you, we had the embarrassment this past year of having in a sense more vessels than we could use most effectively. So the need at the present time, as we increase funds, is in general, though not in every instance, to fund more completely the use of the vessels we have rather than to get more vessels.

I do not mean this as absolute, but as relatively. So that that question is for the moment sort of in abeyance. Incidentally the impact is not only in that we have new vessels, but it is also that we have a lot better vessels.

The newer ones are far more effective than the older ones, so that the increase in capability in terms of vessels and also shore facilities is very great, indeed, and this is just coming into fruition in the last year or so.

Mr. CASEY. Thank you, Doctor.

Mr. Rogers?

Mr. ROGERS. Thank you, Mr. Chairman.

Doctor, I am sorry I was somewhat late, but I have read your statement quickly.

Who actually has the responsibility in the National Science Foundation for your activities on oceanography?

Mr. HAWORTH. Well, next to me, the responsibility for all our research lies in Dr. Randal Robertson, who is the Associate Director for Research. Reporting to him are various research divisions headed by directors. Dr. Carlson, for example, is the Director of the Division of Biology and Medicine.

Our oceanographic activities are in two of those divisions, the Physical Sciences Division and the Biological and Medical Division, and the organization for doing oceanography is different in the two divisions.

In the Physical Sciences Division there is an Earth Sciences Section, headed by Dr. Benson, and within that is the Section on Oceanography, headed by Dr. Bader. This is the group that does all aspects of what I will call "physical oceanography." I am using the term a little differently than Dr. Hollomon is—physical oceanography as distinguished from biological oceanography. In the biological field there are various aspects of interest of the biologists in the oceans.

One kind of interest is an interest in the biology of the ocean, biological life in the oceans, because it is in the oceans; and the other kind is an interest in which some kind of life that is in the ocean is used to study general biological principles and the fact that it is an aquatic is incidental.

Let me give an example. This does not have really much to do with oceanography. In the study of nerve reactions with the ultimate interest in the human nervous system, the nerve system of the squid is used to study nerve interactions, because in that case the reactions are slow as compared to a human being and one can study them much better. This might be called a kind of marine biology. I am sure this is not included in the oceanography program, but it is an example of my second point; it just happens that the squid lives in the ocean.

On the other hand, there is the kind of interest that is really an interest because of the ocean. Because of the two kinds it seems better in biology—according to the biologists, and I do not know enough about it to have a personal opinion—not to separate out the oceanographic side of biology as distinguished from what I will call marine biology of the second kind of interest, but to divide it into the various kinds of interests of biologists.

So, it is a different organization—

Mr. ROGERS. So the real emphasis then is not on oceanography on the biological side, you are telling me?

Mr. HAWORTH. It is not a focal interest the same way as it is on the physical side.

Mr. ROGERS. I understand.

How is your budget divided as for support on the biological side and on the earth sciences side?

Mr. HAWORTH. Well, I can speak on the latter personally and I will let Dr. Carlson tell you about the former.

Mr. ROGERS. As far as oceanography—

Mr. HAWORTH. I understand.

On the physical side, where it is identifiable as a package, as we form our budget, we actually do a two-stage process in a sense—the various sections and subsections of the Foundation, which includes the Physical Oceanography Subsection, get up proposals for the upcoming budget. They have been going through that, for example, for the 1967 budget in the past few months.

These are then assembled up the line and they are put together in the total earth sciences, and that is put together in the total physical sciences, and so on. But the identity is kept clear up to me.

Well then, inevitably it turns out the totals add up to more money than is realistic. We then work back and forth and gradually arrive—by negotiation, if you will, that perhaps is too strong a word—but at a final budget in which the oceanography, the physical oceanography, keeps its identity.

On the other hand, as you can tell from my description of the ocean, it is not separately identified as a package on the biological side in quite the same sense, although we are also aware and are able, for example, to tell ICO at any stage what the situation looks like, and how we have reacted to what they think should be done, and so on,

but what that process is inside the Biology Division, I think Dr. Carlson could tell you better than I.

Mr. ROGERS. Thank you.

Dr. CARLSON. In the Biology Division, as the Director has stated, we do not have a specific area that is designated as biological oceanography, or marine biology. However, the primary source of support for this area of science is in the environmental sciences and in systematic biology, with a smaller amount coming from regulatory biology, and from metabolic biology, and then we also have our facilities program separated rather than having it as an integral part, as they do in the physical biology, and there is a special line item for facilities in oceanography, both ship and shore facilities.

Mr. ROGERS. How many marine biologists do you have on your staff?

Dr. CARLSON. Dr. John S. Rankin, Jr., Program Director, Environmental Biology, is the marine biologist in the Biological and Medical Sciences Division. However, the National Science Foundation uses a number—between 35 and 50—of consultants from colleges and universities to provide scientific judgment on specific projects and programs.

Mr. HAWORTH. I should say, and I failed to, Mr. Rogers, that the facilities should not, perhaps, be dignified as line items as they are discussed by Congress, although they are shown in our detailed budget as separate items for facilities, both ship and shore, in both the physical and the biological areas.

Mr. ROGERS. Now, what is your comparable budgets in the two areas?

Mr. HAWORTH. I am afraid I could not say the breakdown. Our total budget, as I said, is about half and half.

Incidentally, I should have also mentioned, of course, that the Antarctic program has a component of oceanography, and we arrive at that by a different method. There the totality of the Antarctic program is in one office in the Foundation. The head of that is parallel to Dr. Carlson, and there, because we have the total responsibility for the whole Government for that program, we treat that as a unit and although it is very easy to separate the oceanography from the rest, because obviously one is on land and one is on sea, but the process is, of course, a little different there, but very easily identified.

Mr. ROGERS. This puts about \$7 million to each activity, would you say?

Mr. HAWORTH. I would say there is probably about \$7 million, roughly in the physical side in Dr. Bader's shop, about that in Dr. Carlson's shop, and perhaps three or so in the Antarctic program.

The Indian Ocean Expedition, incidentally, although it was treated as a national program, was contributed to by both Dr. Bader and Dr. Carlson.

Mr. ROGERS. How many ships are you building this coming year?

Mr. HAWORTH. We are not starting any new ones this coming year.

Mr. ROGERS. Or any planes?

Mr. HAWORTH. Not this coming fiscal year.

Mr. ROGERS. What about the next fiscal year?

Mr. HAWORTH. There are some that are building—

Mr. ROGERS. I understand that some have not been completed that have already been contracted for. But you have no plans for construction?

Mr. HAWORTH. For this current year, I am speaking now of large ships.

Mr. ROGERS. I understand.

Are you aware of the capability of the U.S.S.R. and the number of ships they use?

Mr. HAWORTH. I do not know. I do not know whether any of the staff does or not.

Mr. CARLSON. I think Dr. Bader might have the answer to that.

Mr. BADER. I do not know the number of the oceanographic fleet, but their oceanographic fleet is larger than ours, primarily because they do not necessarily distinguish between what is an oceanographic research vessel and what might be a fishing trawler.

They do oceanographic work aboard their normal fishing trawlers. So I do not think that a comparison of actual numbers would be a realistic one, though their overall fleet might be considered larger.

Mr. ROGERS. What would you say our fleet is? What would be the number of our oceanographic fleet, that you would classify as oceanographic ships?

Mr. BADER. We have built since 1958, 39 major ships. Now, this does not include, of course, the ships that were already in existence prior to 1958—ships such as the *Vema* at Columbia. It does not include some of the ships that were in operation before 1958 by the Government agencies.

I could get you the number and total, but I do not have the total at the present time.

Mr. ROGERS. This might be helpful.

(The information requested follows:)

Inventory of research/survey vessels in the U.S. Oceanographic Fleet (National Oceanographic program only)

U.S. NAVY SURVEY/RESEARCH SHIPS

Name	Age	Name	Age
Tanner	1944	Mizar (Agor-11)	1964
Maury	1943	Archerfish (submarine)	1943
San Pablo	1942	Gilliss	1963
Rehoboth		Davis	1963
Bowditch	1944	Sands	1964
Dutton		Lynch	1965
Michelson		Agor	1967
Towee	1941	Kellar	1965
Sheldrake		Silas Bent	1965
Serrano	1943	Ags-27	1966
Littlehales	1945	2 Agor	1968

U.S. COAST AND GEODETIC SURVEY

Pioneer	1943	Whiting	1963
Surveyor	1960	Hydrographer	1930
Oceanographer	1966	Bowie	1943
Discoverer	1966	Hodgson	1943
(Not named)	1966	Davidson	1967
Explorer	1940	McArthur	1967
Pathfinder	1942	Patton	1941
Mount Mitchell	1967	Lester Jones	1944
Fairweather	1966	Marmer	1932
Rainier	1967	Rude	1966
Peirce	1963	Heck	1966

Inventory of research/survey vessels in the U.S. Oceanographic Fleet (National Oceanographic program only)—Continued

NATIONAL SCIENCE FOUNDATION

Name	Age	Name	Age
Eltanin	1957	Anton Bruun	1930

U.S. COAST GUARD

Ingham	1937	Rockaway ¹	
Spencer		Chincoteague ¹	
Campbell ¹		Absecon ¹	
Taney ¹		Half Moon ¹	
Casco	1943	Mendota	1944
Yakutat		Escanaba	
Humboldt		Minnetonka ¹	
Castle Rock		Ponchartrain ¹	
Barataria ¹		Evergreen	1943
Gresham		Northwind	
Bering Strait		Westwind ¹	

BUREAU OF COMMERCIAL FISHERIES

Albatross IV	1963	Undaunted	1945
Charles H. Gilbert	1952	David Starr Jordan	1965
Townsend Cromwell	1964	Murre II	1943
George B. Kelez	1944	(Not named)	1966
Black Douglas	1938	John N. Cobb	1950
Delaware	1950	Oregon	1946
Delaware (replacement)	1966	Oregon (replacement)	1967
Geronimo	1945		

PRIVATE INSTITUTIONS

Brown Bear	1934	John E. Pillsbury	1942
Hoh	1943	Josiah Gibbs	1944
Thompson (AGOR)	1965	Conrad (AGOR)	1963
Agassiz	1944	Vema	1923
Argo	1944	Trident	1944
Baird	1944	Atlantis I	1931
Horizon	1944	Atlantis II	1962
Oconostota	1944	Chain	1944
Paolina-T	1944	Crawford	1927
Washington (AGOR)	1965	Gosnold	1943
Caprice	1965	Te Vega	1930
H. M. Smith	1945	Kyma	1952
Acona	1961	Inland Seas	1944
Yaquina	1944	Teritu	1954
Alaminos	1944	Eastward	1965
Gerda	1948	Alpha Helix	1964
Catamaran	1966		

¹ Icebreakers and ocean station vessels being equipped with oceanographic laboratories and winches.

NOTE.—Preceding information taken from Interagency Committee on Oceanography Pamphlet No. 17 (January 1965) "National Oceanographic Program—Fiscal Year 1966."

Mr. ROGERS. As a rough guess, what would you say—if we have built 39 since 1958, there were probably not too many in existence before 1958?

Mr. BADER. I would say we have probably doubled or more than doubled the institutions fleet, but I am not sure of the exact number.

Mr. HAWORTH. And certainly much more than doubled the capability, because, as I said a while ago, the new ones are much more effective.

Mr. BADER. The *Atlantis II* is a very good example of this and also

the new *Agors* that are being built by the Navy; there are two of them nearing completion.

You can do practically everything that you want aboard ships of this sort. The *Atlantis II*, for instance, is completely quiet. You can do acoustical work—

Mr. ROGERS. Do we have any nonmagnetic oceanographic ships?

Mr. HAWORTH. The Navy does, yes.

Mr. BADER. As I say, you can do acoustical work, physical oceanography, such as hydrographic cast, biological oceanography, sediment coring and the laboratory facilities are such that one can work on the materials while at sea, so all of these make up for a more effective utilization than with the ships in the past.

Mr. ROGERS. I understand you run the data center. It is under your jurisdiction.

Mr. BADER. Funds for the National Oceanographic Data Center come from the physical oceanography program, yes, sir.

Mr. ROGERS. You fund them?

Mr. BADER. We fund them.

Mr. HAWORTH. His program funds the Foundation's share. Actually there are, I think, nine agencies that help fund it. Nine departments or agencies.

Mr. ROGERS. Yes.

Now, do you have in your shop any 5- or 10-year program for oceanography, that you see in the future what you want to do?

Mr. HAWORTH. Not in any precise science, Mr. Rogers?

Mr. ROGERS. Do you think it would be a good idea to have some plan like that?

Mr. HAWORTH. Well, we try as best we can and, of course, there is a projected plan for the Government as a whole, but there is a lot of give-and-take in this as time goes along, about who will do this and who will do that.

We have tried to project funds, but things change so rapidly that it is, of course, pretty difficult to do that.

Mr. ROGERS. I notice you have in your statement felt that a national commission to study the goals, perhaps the organizational set-up, the funding, the problems involved in the overall oceanography problems of this Nation—you think it should be undertaken at this time?

Mr. HAWORTH. Not at this time, and I stress the "at this time." This is because there exists the PSAC study which, as I said, is being done by a group of very, very good people; as I said in my testimony, I think that it might very well be that this should be followed up by a broader study with perhaps extra emphasis on the resources side, but building on the base of the study that is now going on.

I am not trying to project beyond a year or so in my statement.

Mr. ROGERS. Of course, I am concerned that any delay of an overall study would probably take a year and a half or two years to be an effective study?

Mr. HAWORTH. I would think so, a year anyway; that is, in as complete a sense as your proposal.

Mr. ROGERS. To undertake all problems.

It is my understanding from Dr. Hornig that the group he has set up is a group of all outside of the Government people.

Mr. HAWORTH. They are all from outside the Government, although I can think of at least three who have very recently been in the Government: Dr. Fleagle, who was in OST under Dr. Wiesner, and then under Dr. Hornig; Dr. Ruina, who was the head of ARPA until, I guess, 2 year ago; and Dr. Larson, who was in DOD fairly recently.

So there are those three at least, and I do not recall if there are any others. I happen to have a list of them here. I guess there are no others that I recognize that have been in the Government.

Mr. ROGERS. It is my understanding that they will meet once a month for 2 days. This is their projected schedule.

Mr. HAWORTH. I am not fully conversant with how often they are meeting. That might be a statistical average—for example, during the summer, of course, they are meeting more frequently and longer. During the winter, when some of the academic people have their teaching duties and so forth, it will probably be less, but as I gather, it is 2 or 3 days a month for a year or something like that.

Mr. ROGERS. About 9 months, 2 days, they advised me.

Dr. Hornig, whose office has undertaken to set this up, does not have a staffman that is fully assigned to them, so that they are operating pretty much on a shoestring, it looks like to me, and for 18 days now of study either going to come up with a plan to develop this Nation's oceanography program. They do not have any charter to write to go into the legal problems, we know that.

We do not actually have a Government representative on the panel as such, and yet we are a very major contributor to research and development in this field, and it concerns me that everyone is taking a pat answer, "Well, we are going to do a little study here, and let us not do anything until we do this study."

We have had a number of studies on oceanography. The Navy did one. Surely we could have used that, and it seems to me that this present study that is going on could be presented to a national commission and not hold up getting going on this thing that we know is going to have to be taken into consideration, particularly they are not even considering all of the problems involved in oceanography. Would you agree?

Mr. HAWORTH. This might well be a good way to approach it, Mr. Rogers, but I do not—

Mr. ROGERS. It seems to me you are trying to tread water here.

Mr. HAWORTH. I do not think we should have two things that are exactly parallel in time.

Mr. ROGERS. I would hope we would have a broader comprehensive study than is going on now.

Mr. HAWORTH. Let me give you an example of, I think, the sort of thing perhaps that you are saying.

In the field of weather modification, the National Academy has a committee on atmospheric sciences, as you know, and that committee has a panel on weather modification; that panel was set up a year and a half or so ago, something of that sort. It is nearing the end of its study. We will have a report, I gather, sometime in the fall.

As you know, the National Science Foundation has a special responsibility assigned to it by the Congress in the field of weather modification which goes beyond just our usual basic science support type of activity.

So, about a year ago we set up a Commission—under our statutory authority to set up certain kinds of Commissions—with certain numbers and kinds of people, and we deliberately timed that commission so that it could take advantage of the somewhat narrower, in that case, studies of the Academy; The Commission is not trying to go back into all of the detailed scientific studies that the Academy panel has gone into, but is using the latter's results as one facet of their own study.

And I think you are perhaps suggesting a similar sort of thing.

Mr. ROGERS. Because, in other words, if we wait now until the PSAC panel comes in—and it will be another year—before we get the National Commission going on it, this is going to delay us another year.

You say throughout your testimony, page 9, we are not as well organized for exploitation as for research and exploration. Again, it is essential that we first understand the problems.

Throughout your testimony you are saying we just do not know where to move it, and I think this is a correct statement. And then you come in and say, we are not ready to go with a Commission yet, we are going to wait until the PSAC panel comes in.

It seems to me that to not grasp what we need to do in oceanography—and this is one of our problems and this is why the Congress is set up and why there are so many bills introduced—that there is no one with enough urgency coming forth saying, let us get going and do something.

I would hope you would reconsider your advice, your agency here, and comment for strong support not only for the bill you support but for a National Commission, but do something to help us direct the efforts and the interests of the entire Nation on this problem, and I would hope that your people will, as I am sure many of them are very familiar with the advances Russia is making.

The President said we want to stay ahead, but we are not going to do it unless we know where we are going to go, set some goals and do it.

I do not think you have the answer right now, I do not think the Congress does right now, I do not think the Navy does right now, and I am sure the other departments do not, because we have gotten conflicting views in spite of the fact that the Budget has tried to straighten them all out.

We still have personal views. Two say we ought to have two courses here, Interior and Commerce, but the Navy does not agree with that. So here we go around. It seems to me to not be imaginative enough to say, let's get on with what we have to do, is just delaying the whole problem and the solution which we need, and I would hope that you would reconsider and talk with your colleagues in the scientific community.

This recent meeting here of oceanographers endorsed the idea of a study. Industry itself have had their witnesses here to endorse this, a national commission to get into this problem, and I would hope that the leadership that your organization could exert in this area would be put behind this, too.

Thank you. Thank you very much.

Mr. CASEY. Mr. Grover, do you have anything?

Mr. GROVER. No.

Mr. CASEY. Captain Bauer?

Mr. BAUER. I do have, Mr. Chairman.

Doctor, let's consider the Indian Ocean Expedition. You financed this?

Mr. HAWORTH. We financed part of it.

Mr. BAUER. Did you finance the Coast and Geodetic Survey research ship that took part in the Indian Ocean?

Mr. HAWORTH. Dr. Bader can tell you in detail what we did finance there.

Mr. BAUER. Could you tell us what you financed?

Mr. BADER. I have a summary sheet here.

Mr. BAUER. Could you submit that for the record then?

Mr. BADER. Yes, and I can give you a total if you would like. The total for the Indian Ocean Expedition was \$21,654,000; this was expended from fiscal year 1961, with an estimate for fiscal year 1966.

Mr. BAUER. Does this \$21 million include the cost of working up the data and publication of it?

Mr. BADER. In some part it does, but the main body of data that are now being processed and will require future spending from our regular research budget. This will be necessary.

Mr. BAUER. Will you have enough money to work up the data?

Mr. BADER. We will have enough money to work up the data only as we spread this over a period of years. It is going to take a great amount of both time and money, for instance, if the biologists are to do all of the systematics that are necessary. In other words, the biological aspects of the Indian Ocean Expedition cannot be worked up in a very short period of time.

Systematic biology is a very slow process and will be funded over a number of years. The same is true for air-sea interaction studies, the same for the geophysics and geology.

Mr. BAUER. Is that shown in your summary?

Mr. BADER. No. This summary only goes up to 1966. It shows the total expenditures as of 1965, with the estimate for 1966. The U.S. Navy percentage of the total \$21,654,000 was 15 percent; the National Science Foundation, 78 percent; the Bureau of Commerce Fisheries, 3 percent; the Weather Bureau, 3 percent; and the Coast and Geodetic Survey, 1 percent.

(The chart follows:)

Expenditures for the International Indian Ocean Expedition

[In thousands of dollars]

	1961	1962	1963	1964	1965	Estimated 1966	Total	Percentage
U.S. Navy.....	693	230	1,300	803	250	-----	3,276	15
National Science Foundation.....	85	2,117	4,420	5,209	3,727	1,400	16,958	78
Bureau of Commercial Fisheries.....	-----	-----	102	154	154	125	535	3
Weather Bureau.....	-----	-----	320	365	-----	-----	685	3
Coast and Geodetic Survey.....	-----	-----	-----	125	75	-----	200	1
Total.....	778	2,347	6,142	6,656	4,206	1,525	21,654	100

Mr. BAUER. That points up one final question, Mr. Chairman, I think that is of concern to us, and that is: When you give a grant for research, Doctor, do you fund for the publication of the results?

Mr. BADER. Yes, sir; for our normal research grants. And since the line item in our budget for the Indian Ocean expedition extended only

over the period of field operations, analysis, and publication of the Indian Ocean results must be supported by our regular research funds, too.

Mr. CASEY. Again, Doctor, we certainly appreciate your being here and bringing these gentlemen with you, and for your contribution today.

I look forward to seeing you again in the future and I am sure we will.

Mr. HAWORTH. Thank you.

Mr. Chairman, would you be interested in a list of the grants that we have given in oceanography, that we have given in fiscal year 1965?

Mr. CASEY. I think that would be helpful, and also the breakdown that you proposed, Dr. Bader.

Mr. BADER. Fine. We will insert those in the record if there is no objection.

(Documents referred to follow:)

NATIONAL SCIENCE FOUNDATION SUPPORT OF OCEANOGRAPHY AND LIST OF GRANTS
FOR FISCAL YEAR 1965

Summary of National Science Foundation support of oceanography, fiscal year 1965

	General research ¹	Inter- national Indian Ocean ex- pedition ²	Facilities ³	Confer- ences and studies ⁴	Science informa- tion ⁵	Educa- tion ⁶	Total ⁷
Number of grants or contracts.....	237	16	28	7	17	40	345
Amount.....	\$13, 443, 176	\$3, 726, 616	\$5, 616, 740	\$92, 400	\$405, 925	\$549, 718	\$23, 834, 575

¹ This research budget includes the Division of Mathematical and Physical Sciences, the Division of Biological and Medical Sciences, the Office of Antarctic Programs, and the Office of International Science Activities (includes air-sea interaction and geophysics).

² The International Indian Ocean Expedition expenditures are from the Division of Mathematical and Physical Sciences and the Division of Biological and Medical Sciences.

³ The facilities total is derived from the Division of Biological and Medical Sciences, the Division of Mathematical and Physical Sciences, the Office of Antarctic Programs, and the Division of Institutional Programs.

⁴ Conferences include special studies, planning groups, etc., but does not include educational groups such as teachers' conferences, etc., which are listed under "Education." These conferences were supported by the Division of Biological and Medical Sciences, the Division of Mathematical and Physical Sciences, and the Office of International Science Activities.

⁵ Science information includes translations, publications, and the support of the National Oceanographic Data Center. These expenditures come from the Office of Science Information Service and the Division of Mathematical and Physical Sciences.

⁶ Education includes teachers' conferences, summer institutes, fellowships, trianeeships, etc., but does not include those graduate students supported under research grants.

⁷ The total number of organizations supported in fiscal year 1965 in oceanography by the National Science Foundation was 124. These organizations come from 34 States plus Puerto Rico and the District of Columbia.

Research in physical aspects of oceanography

Institution	Principal investigator	Title	Duration (months)	Amount
University of Alaska	Rae, K. M.	Support of the RV <i>Alona</i>	12	\$132,400
Bermuda Biological Station for Research, Inc.	Garrels, R. M.	Effects of Silicate Minerals on Ocean Water Composition	24	58,900
University of California (San Diego)	Cox, C. S.	Generation and Propagation of Long Period Internal Waves in the Sea	12	17,000
Do.	Craig, H.	Isotopic Oceanography and Geochemistry	24	64,300
Do.	Fisher, F.	Effect of Pressure on Conductivity of Solutions	24	99,900
Do.	Issacs, J. D.	Development of Inexpensive Deep-Sea Free Vehicles and Instruments	12	40,000
Do.	Keeling	Carbon Dioxide in the Atmosphere and Its Exchange With the Oceans	24	219,600
Do.	Menard, H. W.	Morphology and Structure of the Sea Floor Compared With the Continents	24	98,600
Do.	Munk, W. H.	Long Waves and Tides	24	107,300
Do.	Riedel, W. R.	Stratigraphic Study of Radiolaria in Cenozoic Sediments	24	60,000
Do.	Shepard, F. P.	Submarine Canyon Studies	12	49,100
Do.	Spies, F. N.	Marine Geological Studies by Diving Saucer	6	136,000
Do.	Suess, H. E.	Determination of Tritium in Natural Waters	12	30,400
Do.	Tyler, J. E.	Hydrologic Optics Research-Spaceflight Spectroscopy	24	140,700
Do.	Vacquier, V.	Heat Flow Through the Ocean Floor	24	179,200
Do.	do.	Paleomagnetism of Deep-Sea Cores	24	43,200
Do.	van Andel, T. H.	Sedimentation, Morphology, and Structure of Small Formations of the Mid-Atlantic Ridge	24	66,500
Columbia University	Be, A. W. H.; McIntyre A.	Paleoecology of Coccolithophorids and Planktonic Foraminifera in Deep-Sea Sediments	24	60,000
Do.	Boecker, W. S.; Takahashi, T.	The Degree of Calcium Carbonate Saturation in the Oceans	12	33,500
Do.	Broecker, W. S.; Jacobs, M. B.	Clay Mineral Separation Procedures for Geochemical Studies of Deep Sea Sediments	12	16,100
Do.	Ericson, D. B.	Pleistocene Oceanography as Recorded in Deep-Sea Sediments	24	62,500
Do.	Broecker, W. S.; Thurber, D. L.	The Application of Natural Radioactivity to Hydrologic and Oceanographic Problems	12	40,400
Do.	Worzel, J. L.	Joint Oceanographic Institutions Deep Earth Sampling (JOIDES) Program on the Blake Plateau	6	250,200
Do.	Worzel, J. L.	Geophysical Investigations in the Shikoku-Philippine Basins, With Crossings of the Ryukyu, Japan, and Philippine Trenches	4	52,000
Colorado State University	Gray, W.	Development and Non-Development of Tropical Easterly Waves Into Hurricanes (Typhoons)	36	78,900
Department of Commerce (Weather Bureau)	Gentry, C.; Miller, B.	Movement and Structure of Tropical Cyclones	36	15,600
Duke University	Pilkey, O. H.	The Origin and Environmental Significance of the Carbonate Fraction of Southern U.S. Atlantic Shelf Sediments	24	25,000
University of Georgia	Henry, V. J.	Research Equipment for the University of Georgia Marine Institute, Sapelo Island, Ga.	12	19,900

Research in physical aspects of oceanography—Continued

Institution	Principal investigator	Title	Duration (months)	Amount
Harvard University	Robinson, A. R.	Research in Oceanic Dynamics	24	\$60,000
University of Hawaii	Chamberlain, T. K.	Sediment and Bottom Current Distribution in Submarine Canyons, East Central Honshu, Japan.	24	55,500
Do	Groves, G. W.	Low-Frequency Surface Waves in the Pacific Ocean.	24	68,600
Do	Woolard, G. P.	Support of Oceanographic Program	12	12,800
Do	do	Operational Support of Oceanographic Research Vessel.	12	90,000
Do	do	Shipboard Equipment.	12	52,100
Do	do	Gravity, Magnetics, and Bathymetry of the Seas about the Solomon and Bismarck Islands.	24	52,700
Do	do	Comparison of Pendulum Measurements of the Pacific Ocean.	24	43,800
Lehigh University	Chave, K. E.	Geochemical Comparison of Carbonate Sedimentation in Carbonate and Non-Carbonate Marine Environments.	24	40,000
Do	do	Geochemistry of the Plankton of the Bermuda Platform	24	38,200
Massachusetts Institute of Technology	Stommel, H. M.	Research in Oceanic Physics	12	85,500
Universidad Nacional Autonoma de Mexico	Salas, G. P.	Studies in Coastal Lagoons	36	31,500
University of Miami	Emiliand, C.	Marine Geology in the Caribbean and Adjacent Areas	36	10,700
Do	Hofmeister, J.	Florida Coral Reef Studies	12	38,100
Do	Hurley, R. J.	Seismic Reflection Studies of the Bahamas and Florida Straits.	12	59,800
Do	Koocy, F. F.	Radium and Radiocarbon in Caribbean Waters.	6	19,100
Do	do	Facility for Magnetic Tape Plotting System	12	36,700
Do	Ostlund, G.	Oceanographic and Hydrological Studies With Natural Tritium.	12	70,600
Do	Richardson, W.	The Direct Measurement of Transport in the Straits of Florida and Adjacent Channels.	24	160,000
New York University	Kirwan	Momentum Transfer at the Air-Sea Boundary	24	71,300
Northwestern University	Birchfield	Wind-Driven Circulation in Lake Michigan	24	25,100
San Jose State College	Miller	Land-Sea Boundary Effects on Small-Scale Circulation	24	127,700
Oregon State University	Burt, W. V.	Oregon Oceanographic Studies	12	85,400
Do	do	Research in Air-Sea Energy Exchange	12	45,600
Do	do	Oregon Oceanographic Studies	12	200,000
Do	Berg, Bodvarsson, Mesecar	Temperature Microstructure at the Ocean Floor	12	52,900
Do	Defeyes, K. A.	Removal of Alkalinity From Sea Water by Clay Minerals.	24	46,400
Do	Patullo, J. G.	Frontal and Tidal Currents on the Continental Shelf	12	23,600
Do	Weyl, P. K.	Physical-Chemical Properties of Sea Water	24	50,300
University of the Pacific	Daetwyler, C. C.	Recent Sedimentation and Faulting in the Submerged San Andreas Rift Valley.	12	2,300
University of Rhode Island	Knauss, J. A.	Partial Support of RV <i>Trident</i>	12	200,000
Do	do	Current Measurements in the Gulf Stream and the Western Boundary Deep Countercurrent	24	113,000
Rice University	Lankford, R. R.	Sedimentology and Foraminiferal Ecology, Inner Continental Shelf of South Louisiana.	24	27,300

Texas A. & M. University.....	Cochrane, J. D.....	Partial Support of Operations of the Research Vessel <i>Albatross</i>	12	147,000
University of Washington.....	Creager, J. S.; McManus, D. A.....	Sediments and Foraminifera of the Chukchi and Bering Seas.....	24	9,200
Do.....	Nayudu, Y. R.....	Submarine Volcanics and Their Alteration Products in the Northeast Pacific.....	12	15,000
Do.....	Ratray, M.....	Studies in Marine Hydrodynamics.....	12	57,300
Do.....	Whetten, J. T.....	Mineral Composition of Columbia River Sediments.....	24	37,400
Do.....	Businger, J. A.....	Development of Sonic Anemometry and Its Application to the Study of the Atmospheric Surface Layer.....	24	16,500
University of Wisconsin.....	Ostenson, N. A.....	Gravity Investigation of the Arctic Basin.....	12	15,000
Woods Hole Oceanographic Institution.....	Hersey, J. B.....	Geophysical Studies Related to Deep Drilling in the North Atlantic.....	6	21,800
Do.....	Kraus.....	Air-Sea Interaction.....	22	91,900
Weizmann Institute of Science.....	Pekerts, C. L.....	Determination of Tides in the Real Oceans.....	24	40,000
Total.....				4,776,600

Research in biological oceanography and marine biology

Institution	Principal investigator	Title	Duration (months)	Amount
University of Alaska.....	Goering, J. J.; Dugdale, R. C.....	Dynamics of the Nitrogen Cycle in the Sea.....	24	\$62,400
American Museum of Natural History.....	Freudenthal, H. D.....	Biology of Planktonic Foraminifera.....	24	61,000
University of Arizona.....	Pickens, P. E.....	Neurological Correlates of Patterned Behavior in Anemones.....	24	14,700
Bermuda Biological Station.....	Chave, K.....	Summer Research Program on Organism-Sediment Interrelationships.....	36	75,400
Do.....	Sutcliffe, W. H.....	Expanded Biological Studies of the Sargasso Sea.....	12	38,400
Boston University.....	Courtney.....	Morphology of Sound-Producing Mechanisms in Fish.....	12	3,180
Brooklyn College.....	Goldstein, S.; Belsky, M.....	Experimental Ecology of Primitive Marine Fungus.....	24	37,200
Do.....	Schreibman, M. P.....	Endocrine Regulated Process in Teleost Fishes.....	24	19,650
Brandeis University.....	Gibbs, M.....	Pathways of Carbohydrate Metabolism.....	36	107,200
Bryn Mawr College.....	Oppenheimer, J. M.....	Micro Studies of Ribonucleic acid in Induction and differentiation of the lens in amphipods and teleosts.....	24	37,800
B. F. Bishop Museum.....	Banner.....	Research for and Preparation of a Revised Reef and Shore Fauna of Hawaii (exclusive of fishes).....	12	11,600
University of California (Berkeley).....	Wilt, F. H.....	Regulation of Protein Synthesis in Embryogenesis.....	15	38,400
Do.....	Kruger, L.; Schwassmann, H. O.....	The Organization of the Visual System in Teleost and Elasmobranch Fish.....	36	32,900
University of California (Davis).....	Baskin, R. J.....	Physical Properties of Invertebrate Striated Muscle.....	24	11,200
University of California (Los Angeles).....	Parker, B. C.....	Translocation in the Giant Kelp Macrocytis.....	24	45,100
Do.....	Gordon, M. S.....	Physiology and Biochemistry of Deep-Sea Organisms.....	12	28,200
Do.....	Appleman, D.....	Physiological Function of Catalase.....	24	18,000

Research in biological oceanography and marine biology—Continued

Institution	Principal investigator	Title	Duration (months)	Amount
University of California (Santa Barbara)	Neuschul, M.	Studies of Subtidal Marine Algal Communities.	24	\$11,900
Do	Davenport, D.	Vessel Charter for Marine Research.	12	43,500
University of California (San Diego)	Fager, Hubbs	Biological Studies Utilizing the Cousteau Diving Sauer-Layer Studies.	12	79,000
Do	Boden, B. P.	Development of Oceanographic Instruments for Scattering Layer Studies.	24	98,500
Do	Brinton, E.; McGowan, J. A.	Distribution and Biology of Pacific Zooplankton.	36	110,000
Do	Strickland, J. D. H.	Zooplankters in the Marine Food Chain.	24	63,400
Do	Wiersma, C. A. G.	Whale Feasibility Studies.	12	2,400
California Institute of Technology	Wiersma, C. A. G.	Studies on the Nervous System of Crustaceans and Other Arthropods.	36	78,700
Cape Haze Marine Laboratory	Saunders.	Blood Parasites of Puerto Rican Fishes.	12	7,200
Do	Clark, E.	Studies on Red Sea Fishes.	12	4,500
Columbia University	Burkholder, Pfister	Numerical Taxonomy of Marine Micro-organisms.	24	40,000
Do	Whittenberg, J.; Whittenberg, B.	Oxygen Transport and Myoglobin Function.	24	45,000
Do	Hinegardner, R.	The DNA Content of Animal Cells Through Geological Time.	12	13,000
Do	Walford; Prager.	Systematics of Dinoflagellates.	12	28,800
De Paul University	Salmon, M.	Visual and Acoustical Communication in Certain Marine Crustaceans.	36	26,800
Duke University	Menzies, R. J.	Cooperative Research and Research Training Program in Biological Oceanography.	-----	394,500
Do	Costlow, J. D.	Environmental Effects on Larval Development and Shell Formation in <i>Littorina pelta</i> Philippi.	24	26,300
Do	Horn, E. C.	Contribution of Hemolymph Constituents to Oocyte Metamorphosis.	24	32,800
Emory University	Burbanck, W. D.	Ecology and Evolution of Ecotypes of Estuarine Crustaceans.	36	33,200
Florida Geological Survey	Puri.	The Ostracods of the Bay of Naples.	36	32,400
Florida State University	Oppenheimer, C. H.	Effects of Sediment Diagenesis and Compaction on Microbial Activity.	12	16,000
Do	Frieden, E.	Role of the Thyroid Hormone in Amphibian Metamorphosis.	24	20,000
Franklin and Marshall College	John, K. R.	Schooling Behavior of Fishes.	24	19,800
University of Georgia	Cormier, M. J.	Chemistry and Enzymology of Bioluminescence.	36	78,000
Do	Pomeroy, L. R.; Johannes, R. E.	Metabolism of Plankton.	24	40,000
Do	Cormier, M. J.; Dure, L. S.	Mechanism of Bioluminescent Reactions and Developmental Biochemistry of Plant Embryogenesis.	12	17,800
Gulf Coast Research Laboratory	Abbott, W.	Summer Research at the Gulf Coast Research Laboratories.	24	24,500
Harvard University	Rubbinoff, I.	Reproductive Isolating Mechanisms in Panamanian Ichthyofauna.	12	9,400
Do	Fell.	Reassessment of Taxonomy and Evolution of Echino-dermis.	36	35,900

Do.....	Levine, R. P.....	Photosynthetic Electron Transport with Mutant Strains of <i>Chlamydomonas Reinhardtii</i>	24	39,500
University of Hawaii.....	Lenney, J. F.....	The Proteinase of Yeasts.....	24	20,000
Do.....	Chu, Yamaguti.....	Platyhelminthes of Fishes in Hawaiian Waters.....	12	25,900
Do.....	Banner.....	The Alpheid Shrimp of Australia.....	24	5,900
Do.....	Reese, E. S.....	Physiological Mechanisms Underlying the Behavior of Marine Crustacea.....	36	25,200
University of Houston.....	Lawrence, A. L.....	Digestion and Absorption of Carbohydrates by the Gut of Selected Holothurians.....	24	23,500
University of Illinois.....	Spiegelman, S.....	Relation of Morphogenesis to Genetic Transcription and Translation.....	24	79,900
Do.....	Freeman, G.....	Embryonic Reserve Cells in Tunicates.....	24	7,500
Iowa State University.....	Arnold, J. M.....	Influences of the Egg Cortex on the Development of the Molluscan Embryo.....	36	85,900
Johns Hopkins University.....	Brinley, F. J.....	Collection of Squid for Experimental Purposes.....	12	17,000
Lawrence University.....	LaMarca, M. J.....	Functional Studies of the Reproductive Organs of Elasmobranchs.....	12	4,900
Lehigh University.....	Sutcliffe, W. H.....	Dynamics of Oceanic Zooplankton.....	24	20,800
Lewis and Clark College.....	Kozloff.....	Morphology, Taxonomy and Systematic Position of the Oriboncheid Mesozoa.....	24	14,400
Little Rock University.....	Spangenberg, D. B.....	Growth and Differentiation in Aurelia Aurita.....	12	6,000
Los Angeles County Museum.....	Applegate.....	Interrelationships of Selected Modern Shark Families.....	12	1,900
University of Maine.....	Roberts.....	Cytotaxonomy of Northern Clupeiform Fishes.....	24	18,000
Do.....	Everhart, W. H.....	Comparative Behavior of Hatchery-Reared and Wild Landlocked <i>Salmo salar</i>	12	12,000
Marine Biological Laboratory.....	Armstrong, P. B.....	Operation of Boat for Collecting Research Materials.....	24	56,000
Do.....	do.....	Support of Programs in Invertebrate Zoology and Marine Botany.....	36	205,250
University of Maryland.....	Paterson.....	Lacustrine and Estuarine Fungi.....	48	18,400
Do.....	Hillman.....	Comparative Study of Free Amino Acids Among Allopatric Populations of <i>Crassostrea Virginica</i>	24	5,100
Do.....	Mansueti.....	Eggs, Larvae, and Young of the Fishes of the Chesapeake Bay Region.....	18	30,500
Do.....	Adeiman, W. J.; Sautt, J. P.....	Internal Perfusion of Lobster Axons.....	12	18,400
Massachusetts Institute of Technology.....	Bell, E.....	Cellular and Molecular Studies on the Differentiation of Skin, Lens and Other Cells.....	24	188,000
University of Massachusetts.....	Wilce.....	Benthic Marine Algae of the Arctic.....	36	28,900
University of Miami.....	Moore.....	Systematics and Zoogeography of Western North Atlantic Caecidae.....	12	11,100
Do.....	Wisby, W. J.....	Hearing and Allied Senses in Fishes.....	24	38,300
Do.....	Wood, E. J. F.....	Research Problems in Marine Microbiology.....	12	17,800
Do.....	Smith, F. G. W.....	Shin Operating Costs for Biological Research.....	12	186,200
Do.....	de Sylva, D. P.....	Growth, Reproduction and Mortality of Istiophorid Fishes.....	12	3,400
Do.....	Starck, W. A.....	Leithyolamida on Florida Coral Reef.....	24	28,000
Do.....	Meyers, S. P.....	Participation in Expedition Orysses 65.....	12	1,200
Do.....	Iverson, R. M.....	Formation of Polyribosomes and Proteins During Development of Sea Urchin Eggs.....	24	54,500
Do.....	Chambers, E. L.....	Proteolytic Enzymes as Activators of the Ovum at Fertilization.....	36	26,000
Do.....	Metz, C. B.....	Fertilization Mechanisms and Gamete Physiology in Marine Invertebrates.....	24	93,900

Research in biological oceanography and marine biology—Continued

Institution	Principal investigator	Title	Duration (months)	Amount
University of Michigan	Burch, J. B.	Cell and Tissue Culture Methods for Mollusks	24	\$15,000
Do.	Taylor	Taxonomic and Floristic Studies on Tropical Marine Algae	36	25,300
Mount Desert Island Biological Laboratory	Doyle, W. L.	Specialized Research Equipment	12	48,400
Mount Sinai Hospital	Chanley, J. D.	Steroid Compounds from Invertebrates	24	32,000
University of New Hampshire	Bullock	The Morphology and Taxonomy of the Acanthocephala	24	12,300
New York Zoological Society	Goreau, T. F.; Wells, J. W.	Ecology of Hermatypic Scleractinia on the Outer Slope in Jamaica, West Indies	24	51,400
Occidental College	Stephens, J. S.	Ecology and Zoogeography of Three Species of Blennioid Fish	24	14,100
Ohio State University	Collinvaux	Taxonomy of Calcareous Green Algae	36	23,000
Old Dominion College	Marshall, H. G.	Ecology of Coccolithophoridaeae of Atlantic Coastal Waters	24	15,000
University of Oregon	Scheer, B. T.	Neuroendocrine Control of Metabolism in Relation to Molt in Crustaceans	36	65,250
University of Pittsburgh	Vincent, W. S.	Nucleolar Function	24	54,700
Princeton University	Rebhun, L. I.	Molecular Anatomy, Structure and Assembly of Internal Motile Systems in Cells	24	66,200
Do.	Fischer, A. G.	Rhythmic Skeletal Growth Fabrics in Marine Organisms	24	29,100
University of Puerto Rico	Sagardia, F.	Properties of the Glycogen Phosphorylase System in the Muscle of the Crab, <i>Callinectes danae</i>	24	16,300
Radcliffe College	Canet	A Monograph of the American Penaeid Shrimps, Genus <i>Penaeus</i>	24	17,600
University of Redlands	Hollenberg	Polysiphonia and Closely Related Genera	24	16,000
Rensselaer Polytechnic Institute	Boskin, R. J.	Physical Properties of Invertebrate Stratified Muscle	24	11,200
University of Rhode Island	Wood, R. O.	Benthic Plant Ecology	12	6,100
Do.	Hannan, C. S.	Carbon Dioxide Fixation in Invertebrates	24	15,000
University of Rochester	Yasumae, W.	Physiology of Photosynthetic Organisms	24	46,000
Rutgers University	Durand, J. B.	Yearly Nitrogen Cycle in an Estuary	12	3,100
Rutgers University	Trame, F. B.	Environmental Factors Controlling Diurnal Change in Phytoplankton	24	16,100
Sacramento State College	Mizelle	Monogenetic Trematode Parasites of Fishes	24	28,300
San Francisco State College	Bowen, S. T.	Genetics of <i>Artemia salina</i>	24	32,900
Smithsonian Institution	Barnard	Systems of the Antarctic and Sub-Antarctic Gammaridean Amphipods	24	32,400
Do.	Gibbs; Weitzman	Systematics of Stomatoid Fishes	36	27,100
University of South Florida	Friedl, F. E.	Nitrogen Catabolism in the Snail <i>Lymnaea stagnalis</i> jugularis	24	11,300
University of Southern California	Garth; Haig	Porcellanid Crabs of the Indo-West Pacific	24	19,100
Do.	Garth	Xanthid Crabs and Other Decapod and Stomatopod Crustaceans Inhabiting Reef-Building Corals of the Maldiv Islands and Southem Ceylon	12	4,500
Do.	Chambers, L. A.	Ship Operations for Biological Research	24	218,400
Do.	Savage, J. M.	Comparative Ecology of the Midwater Faunas	24	42,000

Stanford University			Research and Graduate Training in Biological Oceanography	24	393,000
Syracuse University	Eckert, R.		Bioelectric Triggering and Coordinating Mechanisms in Single Cells.	10	57,000
University of Tennessee	Winborn, W. B.		Fine Structure of Tissues Engaged in Transport.	24	14,100
Texas A & M University	Harry		Systematic Studies on Selected Taxa of Fresh and Brackish Water Mollusks.	36	19,200
University of Texas	Parker, P. L.		Boat Operations for Marine Research	24	32,300
Virginia Institute of Marine Science	Wass		Systematic Studies on Paguridae	24	10,000
University of Virginia	Melton, D. F.		Reflex Pathways in the Surf Clam	24	10,000
University of Washington	Faine, R. T.		Faunal and Trophic Studies of an Intertidal Community	36	14,800
Do.	Bause, K.; Komaki, Y.		Ecology of Euphausiid Larvae	17	31,700
Do.	Fernald, R. L.		Graduate Student Research in Biological Oceanography	36	30,800
College of William and Mary	Black, R. E. L.		Protein Synthesis in Unfertilized Eggs of Marine Invertebrates.	24	115,300
Wilson College	Allen, M. J.		Polychaete Development Investigated with Radioautography and Histochemistry.	24	22,700
University of Wisconsin	Hasler, A. D.		Spatial Orientation of Fishes and its Sensory Bases	36	77,600
Do.	Emlen, J. T.		Cetacean Population Dynamics and Behavior	12	5,000
Woods Hole Oceanographic Institution	Conover, R. J.		Marine Zooplankton Community	24	51,200
Do.	Sanders, H. L.		Composition, Structure, and Dynamics of Marine Benthic Communities.	24	73,700
Do.	Mather, F. J.; Schroeder, W. C.		Biology of Larger Pelagic Fishes of the North-Western Atlantic.	12	26,800
Do.	Grice, G. D.; Hulsemann, K.		Systematics and Distribution of Indian and Atlantic Ocean Copepods	24	60,900
Do.	Hessler		Taxonomic Study of Deep Water Benthic Isopods, Gayhead-Bermuda Transect	24	43,000
Yale University	Deevy, G. B.		Life History Studies on Marine and Fresh Water Zooplankton.	36	24,300
Do.	Sweeney, B. M.		Circadian Rhythm in Photosynthesis in the Marine Algae Gonyaulax and Acetabularia.	36	32,000
Yeshiva University	Sudak, F. N.		Events of the Cardian Cycle in Rajiformes	24	4,400
Total					5,621,530

Antarctic oceanographic research

Institution	Principal Investigator	Title	Duration (months)	Amount
Alpine Geophysical Association. University of Arizona.	Officer, C. B. Mead, A. R.	Support of RV <i>Ellanin</i> . Experimental Investigation of Aspects of Polar Adaptation in Weddell Seal.	12 12	\$347,172 9,100
University of California. California Institute of Technology.	Sievers, H. A. Lwoenstam, H.	Graduate Studies in Oceanography. Biogeochemical Study of Skeletal Carbonates of the Benthic Organisms in Antarctic Seas.	12 12	4,500 42,800
Columbia University Do.	Burkholder, P. R. Ewing, M.	Biological Investigations in Antarctica. Systematic Marine Biology Survey in the Drake Passage and Scotia Sea.	12 3	1,800 8,500
Do.	Heirtzler, J. R.	Geophysical Studies From <i>Ellanin</i> in Pacific-Antarctic Area.	24	140,100
Do.	Heezen, B. C.	Study of Stratigraphic Significance of Late Mesozoic and Cenozoic Radiolaria and Diatoms From Sediments of Southern Ocean.	24	64,900
Do.	Be, A.	Ecology of Antarctic Skeletal Plankton.	9	40,500
Do.	Worzel, J. L.	Systematic Oceanographic Survey of the Southern Ocean.	12	100,000
DePaul University.	Mowhinie, M. A.	Physiology of Antarctic Krill.	6	11,700
Duke University	Menzies, R.	Study of Systematics, Distribution and Origin of Antarctic Deep-Sea Marine Isopoda.	12	16,000
Florida State University	Goodell, H. G.	Marine Geological Investigations USNS <i>Ellanin</i> , South Pacific Ocean.	12	68,450
Military Sea Transportation Service. New York Zoological Society	Gano, R. A. Montreuil, P. L. J., Ray, C.	Support of RV <i>Ellanin</i> . Submarine Ecology, Acoustics and Parasitology of the Lophodontine Seals of Antarctica.	12 12	1,469,000 23,000
Old Dominion College. University of Oregon.	Zaneveld, J. S. Morris, R. W.	Benthic Algal Vegetation of the Ross Sea. Thermal-Metabolic Relationships in Stenothermal Fishes.	3 12	3,600 19,000
Rayflex. Roanoke College. Smithsonian Institution.	Williams, B. Holloway, H. L. Wallen, I. E.	Rayflex Electro-Sonic Profiler System. Study of Endoparasites. Sorting of Collections from USARP.	12 12 12	67,277 24,000 63,600
Do. University of Southern California.	do. Mohr, J. L.	<i>Ellanin</i> Cruise Participations. Research Program for Biological Oceanography in the Antarctic Seas.	12 12	21,000 113,900
Do. Do.	Savage, J. do.	Examination of Antarctic and Subantarctic Fishes. Vertical and Horizontal Distribution of Pelagic and Benthic Fauna in Antarctic Seas.	4 12	7,100 195,800
Texas A. & M. University.	Leipper, D. F.; Capurro, L.	Surface and Deep Current Measurement in Drake Passage.	12	25,000
Do.	El-Sayed, S. Z.	Productivity Studies of Antarctic Waters (Pacific Sector).	12	39,300
Do.	Bottino, L. R.; Jeffrey, L. M.	Lipid Composition of Antarctic Marine Organisms and Sea Water.	12	35,500
Texas Instruments. Stanford University.	Barry, D. T. Wohlschlag, D. E.	Oceanographic Services for <i>Ellanin</i> . Support of Deep Freeze Program.	12 12	4,097 46,600

University of Washington.....	Untersteiner, N.....	Sonic Device to Measure Ablation and Accretion on Underside of Polar Ice.	12	9,000
Woods Hole Oceanographic Institution.....	Scheville, W.....	Bioacoustic Field Studies of Seals.	12	3,400
Yale University.....	Turekian, K. K.....	Barium, Calcium and Strontium in Oceanic Profiles With Special Emphasis on the Antarctic.	12	19,350
Total.....				3,045,046

International Indian Ocean Expedition

Institutions	Principal investigator	Title	Months	Amount
Department of the Air Force.....	Stone.....	Research Meteorologists for the International Indian Ocean Expedition.	12	\$50,000
Alpine Geophysical Association, Inc.....	Officer, C.....	Support of R/V <i>Anton Bruun</i> .	12	359,716
University of California.....	Fisher, R. L.; Spiess, F. N.....	Participation in the International Indian Ocean Expedition.	12	150,000
Columbia University.....	Ewing, M.....	do.	6	335,400
Do.....	do.....	Support of Research Vessel <i>Vema</i> .	12	200,000
Do.....	do.....	do.	12	300,000
University of Hawaii.....	Ramage.....	Atmospheric Circulation Project for the International Indian Ocean Expedition.	17	229,100
University of Michigan.....	Badgley; Fleagle.....	Comprehensive Study of Energy Transfer Near the Earth's Surface.	18	73,400
Smithsonian.....	Benson.....	Ostracoda of the Indian Ocean.	24	24,200
Wake Forest College.....	Higgins.....	A Systematic Study of Indian Ocean Kinorhyncha.	24	24,500
University of Michigan.....	Badgley; Fleagle.....	Comprehensive Study of Energy Transfer Near the Earth's Surface.	24	282,500
Woods Hole Oceanographic Institute.....	Eyre, P. M.....	Studies in the Indian Ocean.	13	1,100,000
Do.....	Hunt, J. M.....	Comparative Geochemical Studies of the Major Organic Constituents in Ocean Waters and Sediments.	24	122,900
Do.....	Bunker.....	Air-Sea Interaction for the International Indian Ocean Expedition.	17	79,100
Do.....	Ryther, J. H.....	U.S. Program in Biology for the IIOE.	12	320,000
Smithsonian Institute.....	Fehlman, H.....	Sorting of Collections from the International Indian Ocean Expedition.	24	75,800
Total.....				3,726,616

Oceanographic facilities

Institution	Principal investigator	Title	Duration (months)	Amount
Alpine Geophysical Association, Inc.	Beckmann, W.	Design and Construction of Sub-Ice Observation Chamber.	6	\$2,774
Askania-Werke	Withoff, J.	ASKANIA Seagravimeter Gs-2.	18	94,456
Bermuda Biological Station	Sutcliffe, W.	Improved and Expanded Laboratory and Graduate Research Facilities.	24	162,000
University of California (Berkeley)	Hand, C.	Construction of Research Facilities for the Bodega Marine Laboratory.	24	171,000
University of California (San Diego)	Scholander, P. F.	Lab Ship and Related Shore Facilities.	24	695,600
Do.	Spess, F. N.	Construction of Ship Operating Facilities to Support the Scripps Institution of Oceanography Research Program.	24	193,900
University of Chicago	Inghram, M. G.	Construction of a Building to House the Department of Geophysical Sciences.	12	220,000
Columbia University	Ewing, M.; Burkholder, P.; McInyre, A.	A High Resolution Electron Microscope Facility.	12	63,900
Do.	Worzel, J. L.	Pier Facility for Mounting Sea Operations.	12	120,000
Florida State University	Oppenheimer, C.	A Specialized Facility for Field Operations in Marine Research.	12	15,500
University of Florida	Martin, T. L.	Expansion of the College of Engineering.	24	622,900
University of Georgia	Henry, V. J.	Modifying, Equipping, and Partially Operating the University of Georgia Marine Institute's Research Vessel.	24	34,450
University of Hawaii	Woollard, G. P.	Acquisition and Conversion of an Oceanographic Research Vessel.	12	40,000
Do.	Cutting, W.	Construction of a Marine Experimental Biology Lab.	24	550,000
Massachusetts Institute of Technology	von Arx, W. S.	To Equip a Graduate Research Laboratory for Physical Oceanography.	24	118,700
University of Miami	Koczy, F. F.	Alterations and Improvements to R/V <i>John Elliott Pillsbury</i> .	12	300,000
Do.	Smith, F. G. W.	Construction of a Sea Wall.	12	31,000
University of North Carolina	Chestnut, A. F.	Laboratory for Marine Ecology and Estuarine Oceanography.	12	150,000
Northeastern University	Scott, R. E.	Construction of a Physics and Electrical Engineering Research Building.	36	18,286
Oregon State University	Burt, W. V.	Marine Biological Equipment and Service Building for Marine Sciences Lab.	12	75,000
Do.	Wang, C. H.	Construction of a Nuclear Research Facility.	36	12,674
Potter, McArthur and Gilbert	Potter, S.	Design for Antarctic Peninsula Research Ship.	6	23,000
Smith College	Villafraña, G.	A Science Center for all Sciences.	24	75,000
University of South Carolina	Brunton, H.	Geology Research Laboratory Renovation.	18	8,200
University of Southern California	Chambers, L.	A Marine Biological Laboratory on Santa Catalina Island.	12	500,000
Texas A. & M. University	Mackin, J. G.	Construction of Research Facilities for Electron Microscopy.	36	35,000
University of Washington	Barnes, C. A.	Expansion of Vessel Staging Facilities.	12	856,400
Woods Hole Oceanographic Institution	Fye, P. M.	Construction of Dook Facilities.	12	288,000
Total				5,447,740

Oceanographic conferences and studies

Institution	Principal Investigator	Title	Months	Amount
Cape Haze Marine Laboratory	Clark, E.	Support of a Conference on Reproductive Physiology of Fishes	12	\$2,600
Columbia University	Broecker, W. S.	Meeting on Pleistocene Stratigraphy in Deep-Sea	12	2,900
Massachusetts Institute of Technology	Ippen, A. T.	Study of Wave Hydrodynamics and Coastal Processes	16	21,000
University of Miami	Koehn, F.	International Conference on Tropical Oceanography	12	21,000
Do.	do.	Support of the Planning of the Joint Oceanographic Institutions, Deep-Earth Sampling (Joides)	24	22,600
National Academy of Sciences	Vetter, R. C.	Support of the Scientific Committee on Oceanic Research	12	3,000
Office of Naval Research	Berg, W. E.	Support of the Committee on Oceanography of the National Academy of Sciences	12	20,000
Total				92,400

Oceanographic science information

Institution	Principal Investigator	Title	Amount
American Geological Institute		GeoScience Abstracts	\$20,000
American Geophysical Union		Soviet Oceanography	17,965
Do.		Russian Journal Oceanography	35,360
Do.		Soviet Hydrology—Selected Papers	6,300
Do.		Izvestiya—Atmospheric and Oceanic Series, and Earth Physics Series	98,000
American Meteorological Society		Evaluation of Foreign Geophysical Journals	3,050
Do.		Meteorological and GeoAstrophysical Abstracts (1964)	11,600
Do.		30-year Cumulative Index to Shore and Beach	30,000
American Shore & Beach Preservation Association		Arctic Bibliography	750
Arctic Institute of North America		Support of Pacific Scientific Information Center	2,500
B. P. Bishop Museum, Hawaii		Engineering Index (1965)	3,500
Engineering Index, New York		Development of a Thesaurus in Meteorology	12,000
Rutgers, the State University		Translation and Publication of Material Related to Oceanography	8,700
Special foreign currency science information program		Soviet Hydrology—Editing and Abstracting Services	33,000
U.S. Environmental Science Services Administration		Support of World Data Center A—Oceanography	2,200
U.S. Naval Oceanographic Office	Jacobs, W. C.	Support of the National Oceanographic Data Center	24,000
Do.	do.		167,000
Total			405,925

Oceanographic education support

Institution	Principal investigator	Title	Amount
American Geophysical Union (Oceanography) Associated Films, Inc.	Smith, W. E. Finchout, R.	Visiting Scientists (Colleges) Circulation of Motion Picture International Indian Ocean Expedition—U.S. Program in Biology.	\$6,400 9,625
Bowdoin College University of California	Gustafson, A. H. Lasker, R.	Summer Institute in Marine Biology for Secondary School Teachers. Research Participation for College Teachers.	42,030 11,360
Do.	Do.	Graduate Fellowships	7,600
Do.	Do.	Cooperative Graduate Fellowship	4,900
Do.	Do.	Postdoctoral Fellowships	6,650
Do.	Do.	Graduate Fellowships	10,356
California State College at Long Beach	Hardy, R.	Summer Institute in Field Natural History for Secondary School Teachers (Vertebrate Ecology, Marine Life, Entomology, Paleontology).	10,748
Cape Haze Marine Laboratory Cornell University	Woollever, J. D. Shaw, R. W.	Student and Cooperative Program. Summer Institute in Earth Science and Space Science for Secondary School Teachers (Astronomy, Geology, Oceanography).	11,460 15,413
University of Hawaii	Zeitlin, H.	Research Participation for High School Teachers (Physics, Chemistry, Botany, Zoology, Oceanography).	2,370
Humboldt State College Louisiana State University	Lanphere, W. M. Bennett, H. J.	Summer Institute in Marine Biology for Secondary School Teachers. Student and Cooperative Program.	54,140 16,735
Massachusetts Institute of Technology University of Miami	Do.	Cooperative Graduate Fellowship	5,100
University of Michigan Middle Tennessee State College	Wiser, J. E.	Graduate Fellowships Graduate Traineeship	10,356 5,178
New York University New York State University College at Oneonta	Wilson, P. C.	Summer Institute in Science and Mathematics for Secondary School Teachers (Biology, Aquatic Ecology, Chemistry, Physical Chemistry, Propagation). Summer Institute in the Earth Sciences for Secondary School Teachers (Physical Geology, General Astronomy, Historical Geology, Oceanography).	13,444 10,356 13,522
Old Dominion College Oregon State University	Zaneveld, J. S.	Undergraduate Research Participation Graduate Fellowship	8,400 6,600
Do.	Do.	Graduate Traineeship	3,178
University of the Pacific University of Puerto Rico University of Rhode Island	Hedgpeth, J. W. Lugo, H. L.	Research Participation for High School Teachers. Conferences for College Teachers	16,225 21,290
Do.	Do.	Cooperative Graduate Fellowship	4,460
Do.	Do.	Student and Cooperative Program	1,800
Screen Presentations, Inc University of South Carolina	Gerber, C. D. Colquhoun, D. J.	Graduate Traineeship Purchase of Color Release Prints and Color Negative of the Motion Picture International Indian Ocean Expedition—U.S. Program in Biology. Undergraduate Research Participation	5,178 8,520 1,050

Texas A. & M. University.....	Schroeder, M. C.....	Summer Institute in Earth Science for Secondary School Teachers (Oceanography, Geology, Algebra-Trigonometry, Astronomy, Meteorology, Rocks and Minerals).	12, 012
U.S. Navy Electronics Laboratory.....	Young, R. W.....	Research Participation for High School Teachers (Physics, Mathematics, Electronics, Psychology, Oceanography).	2, 930
Virginia Institute of Marine Science.....	Bailey, R. S.....	Student and Cooperative Program.	13, 600
Do.....	Bailey, R. S.....	Research Participation for College Teachers.	19, 740
University of Virginia.....	Cole, J. W., Jr.....	In-Service Institute in Biology, Chemistry, Physics, Earth Science, and Oceanography for Secondary School Teachers for 1965-66.	6, 236
University of Washington.....	Fleming, R. H.....	Academic Year Institutes.	69, 200
Universities of Washington and Tokyo.....	Fleming, R. H.....	Science Faculty Fellowship.	15, 675
University of Washington.....	Fleming, R. H.....	Summer Institute in the Oceans, the Earth and its Atmosphere for Secondary School Teachers (Oceanography, Earth Science, Astronomy).	21, 636
Wesleyan University.....	Cronin, J. E.....	Summer Institute in Earth Science for Secondary School Teachers (Astronomy, Geology, Meteorology, Oceanography).	4, 750
Woods Hole Oceanographic Institution.....	Malikus, W. V. R.....	Summer Program in Geophysical Fluid.....	37, 505
Total.....			549, 718

(The following letter was received for insertion in the record:)

NATIONAL SCIENCE FOUNDATION,
Washington, D.C., September 9, 1965.

Mr. JOHN M. DREWRY,
Chief Counsel, Committee on Merchant Marine and Fisheries,
House of Representatives, Washington, D.C.

DEAR MR. DREWRY: This is in reply to your telephone request of August 20, 1965, for further information on the Foundation's plans for providing funds for the analysis of data and publication of the results of the U.S. participation in the International Indian Ocean Expedition.

As Dr. Bader pointed out in his testimony on August 18, it is the Foundation's normal practice in making research grants to provide sufficient funds to carry a given project through publication. In the case of the Indian Ocean Expedition, however, the funding has been on an annual basis, and this has appeared as a line item in our budget request. For a number of reasons it was decided not to continue this line item in our budget beyond the period of field operations in the Indian Ocean. Therefore, although some preliminary analysis and publication has been accomplished, the bulk of that work remains to be done, and funds for it must come from our general research budget.

As shown in the table we submitted for the record, the total U.S. expenditure for the IIOE to date approximates \$21 million, of which the Foundation has provided about \$16 million. As a result of these expenditures, the various investigators have amassed a great deal of valuable material that awaits study and analysis. We estimate the total cost of analysis and publication at about \$5 million, of which \$2.5 million would be for physical oceanography (including geological and geochemical work), \$2 million for biology, and \$0.5 million for atmospheric studies. Except for some of the biological studies, most of this work could probably be done in 2 to 3 years if sufficient funds are available.

Sincerely yours,

WILLIAM E. BENSON,

Head, Earth Sciences Section, Mathematical and Physical Sciences Division.

Mr. CASEY. Our next witness is Mr. David H. Frantz, Jr., president of Ocean Research Equipment, Inc., Falmouth, Mass.

Dr. Frantz, we welcome you here this morning. I understand that you are a friend of our colleague, Congressman Keith. He is in another committee in an executive session but we will let him know you are before us, so if he can get loose I know he wants to be here if he possibly can.

I think in that regard I imagine he has seen your statement so we will let you go ahead and give your statement while we are waiting to see whether Congressman Keith can be in attendance.

STATEMENT OF DAVID H. FRANTZ, JR., PRESIDENT, OCEAN RESEARCH EQUIPMENT, INC.

Mr. FRANTZ. All right, sir. For the record, Mr. Chairman, it is "mister," not "doctor."

Mr. CASEY. All right.

Mr. FRANTZ. Mr. Chairman, I appreciate being invited to comment on the oceanographic bills being discussed by this committee. My interest in a strong Federal oceanographic program is that of an engineer, a small businessman, and of an alumnus of a scientific institution, Woods Hole Oceanographic Institution, where I functioned not as a scientist but as an engineer attempting to provide the tools of the trade to the oceanographer.

I see, in a number of the bills being considered, and in a number of statements that have been made before this committee, a failure to recognize a pitfall, a pitfall which is causing controversy where no con-

troversty need exist, fear where no fear need be, and which can, if not recognized in whatever legislation is enacted, cause administrative friction within the Government and inefficiencies in the utilization of the talents of industry and of the private institutions.

This pitfall is the failure to recognize that it is impossible to define rigorously the differences between oceanography, the pure science; oceanography, the applied science; oceanographic survey; and oceanographic engineering. Neither is it possible to so categorize the people engaged in these fields, nor the money they may spend in pursuit of their professional goals. Neither is it possible to draw rigorously defined lines between oceanography in the broader sense, meteorology, geophysics, mineral prospecting, or any other activity which might be carried on, at, or through a boundary of the water mass, which is fundamentally what we are studying when we study oceanography.

Most of the bills I have seen implicitly or explicitly recognize the need for greater coordination of existing efforts in the ocean, for greater Federal support of the effort, and for Government encouragement of private effort in the field. These objectives are desirable; in terms of return in the investment to our society, few programs which are properly the object of Government spending look more promising economically.

However, both in and out of Government, many activities which are now being associated very closely with "oceanography" have been carried on very effectively for years within existing organizations. In general, what duplication there has been has not been pernicious and much of the activity has been conducted by dedicated people not at all jealous of the parallel roles taken by others; more of it has been dictated by purely economic considerations—the offshore activities of the oil companies, for example—this being an example of non-Government activity.

We need a stronger Federal program for oceanic activities, but in the interests of coordination, we must not eliminate or discourage activities which have been doing an outstanding job. When I call the "marriage" of the Coast and Geodetic Survey to the Weather Bureau, to form the Environmental Science Service Administration, is a most refreshing development and an example of enlightened administration seeing a true community of interest to the benefit of the Nation as a whole.

Successful legislation will provide a program which discovers where such mergers are possible and desirable, while at the same time recognizing that some such mergers could be administratively disastrous. Successful legislation will distinguish between engineering and science in budgeting for each, but it will recognize that the division is sometimes a hazy one. Many new engineering techniques in oceanography have been funded by bootlegging from budgets nominally for research.

Development funds should not and need not be labeled as "scientific" funds. I believe that a witness before this committee has stated that prospecting is not a proper role of Government; I believe that in certain cases it may well be a proper role, but funds for prospecting should be labeled as such, not as funds for science.

I consider H.R. 6009 an example of legislation which recognizes the distinction between science, exploration, and engineering. It is

frankly labeled a "Marine Exploration and Development Act," its geographical limits are quite rigorously defined and its promise of economic return more immediate than other areas of endeavor. It is not mutually exclusive with other bills which consider other problems, and it does not threaten any of these existing agencies which are now doing an outstanding job.

I am personally involved with a type of small business which, quite frankly, would benefit from such a program, but I also feel that such small businesses, most of which are now making their technical contributions in oceanography out of proportion to their gross sales when compared to big industry, will more than pull their weight in a program of Continental Shelf exploration.

I wish to thank the subcommittee for giving me this opportunity to present these opinions.

Mr. CASEY. Thank you very much, Mr. Frantz.

Mr. Keith, we will give you the honor of opening this questioning.

Mr. KEITH. Thank you, Mr. Chairman.

I am proud to make note of the fact that Mr. Frantz is one of my constituents, and that his firm is located in my district very close to the Woods Hole Oceanographic Institution.

His comments, of course, are significant. I am particularly pleased that he singled out my bill for favorable comment. It is one of the few nice things that has happened to me during these hearings. Most of the previous witnesses have been a little more critical of H.R. 6009 than he.

But my bill, as he says, gives an opportunity for the private sector to participate in the national oceanographic program more actively, and I believe more profitably to the public good.

We have in my district and throughout the country literally hundreds of small oceanographic research companies and engineering companies who are contributing greatly to our progress in the field of oceanography, and contributing in the long run to the strength of our country. Mr. Frantz' firm is typical of these and I think it is very helpful of him to come down here as a representative of small industry and be, in fact, the only such representative of small industry to testify on these hearings. I am proud to have him as a constituent and I join with you in welcoming him here to the committee.

I do not have any questions to ask of him. I would prefer, instead, to have other members of the committee do that. Thank you, Mr. Chairman.

Mr. CASEY. Mr. Rogers?

Mr. ROGERS. Thank you, Mr. Chairman.

Mr. Frantz, I think you have pointed out some of the problems we have, there is no question about it. I think it is going to be necessary for the Congress, as you say, to get into the field very actively and pass legislation to help center our goals on what needs to be done, and I, too, want to join my colleague in saying we do appreciate your coming here and giving us the benefit of your thoughts, particularly from a different viewpoint, from a man that has to deal with all of this in business; and I might say, too, I am sure you are aware the contribution your Congressman has made to this entire field has been very significant. Thank you.

Thank you, Mr. Chairman.

Mr. CASEY. Mr. Pelly?

Mr. PELLY. Mr. Chairman, I would like to join with our colleague, Mr. Rogers of Florida, and point up the contribution that your Congressman has made toward oceanography as a member of this committee, and I think I can say without any equivocation at all that he has shown probably as much or more interest in this subject than anyone. He is very proud of your great institution, Woods Hole, and is trying to do everything he can for oceanography, and I think we are very lucky to have him.

To me it is significant as an alumnus of Woods Hole that you have come down here as a businessman. This points up what a wonderful system of government we really have when a citizen can come before a committee of Congress and express his views. Certainly, as I say, it points up that this is a great country and I for one want to join Mr. Keith in welcoming you here, because I think oceanography would be advanced if more people similar to yourself would come before our committees and express their views.

I happen to represent a different coast, the State of Washington, where we have, we think, a very fine college of fisheries, and it is a long ways to come, but I wish some of my constituents that were as interested as you are would come and appear before this committee. I welcome you here today and hope that you will feel that the effort that you made in coming down here was worthwhile; I think it was.

Mr. FRANTZ. Thank you, Mr. Pelly.

Mr. CASEY. Mr. Dow?

Mr. DOW. Yes, I would like to compliment Mr. Frantz on a very thoughtful and well-expressed presentation.

I have one question, Mr. Frantz, and that is, Under this general head of "Marine Exploration and Development" which is covered in the bill offered by Representative Keith, could you give us a typical example of some project that might be undertaken within the scope of this act? In other words, what would be the objective of a project? What would the results be, and what would be the means of attacking it?

Mr. FRANTZ. I am not a geologist; I am an engineer who manufactures equipment, but I would say that a very proper activity under such legislation would be an assessment of the mineral resources on the Continental Shelf.

Now, how far the Federal Government wants to go in that kind of exploration I am not prepared to say. I think there comes a point when the knowledge so gained is public knowledge and if it has economic value it will then be used by those non-Government activities—mining companies, for example—who will then derive economic benefit from the resources that have been proven.

Mr. DOW. Of course, you know that all over the world there are big mining and petroleum companies that are exploring on dry land, on all the continents—

Mr. FRANTZ. And they are getting their feet wet, too.

Mr. DOW. They are developing new deposits of nickel, for instance, in Canada, and oil in various places.

Now, I would judge in your opinion, then, that these private organizations are not exploiting the possibilities in the sea as much as they should, and something needs to be done about that.

Mr. FRANTZ. I think that is correct. Where the economic stakes are high enough and the odds look good enough, they certainly do. The oil companies are not seeking Federal help as far as I know in financing offshore prospecting; in fact, undoubtedly they would not welcome it. But I am sure there are other cases where, well, manganese nodules is one resource that has been mentioned often.

There is certainly considerable doubt at just which point the exploitation of this resource becomes economically feasible, but I think the determination of this point can be made based on federally financed exploration, prospecting, and gathering of knowledge.

Mr. Dow. We do not have a bill or a Federal authority that authorizes exploration and development of this sort on dry land, but apparently in the sea the private entrepreneurs are not applying themselves as eagerly as they are on land and therefore you think that there should be, that the exploration should be taken up by the Government through the means of incentives like you have here in this act introduced by Mr. Keith?

Mr. FRANTZ. I do, sir.

Mr. Dow. In other words, the Government needs to take a greater proportion of the effort on its shoulders than you might say it does normally on the land?

Mr. FRANTZ. I do, sir, simply because there may be a mile of water between the operator and what he is looking for, and this encompasses a whole technology which is relatively new, and the techniques of which are developing.

Mr. Dow. Thank you, sir.

Mr. CASEY. Thank you, Mr. Dow.

Of course, I too, want to welcome you, Mr. Frantz, because, after all, if we just hear the big industries and the big operators, why, sometimes we might lose our perspective.

As I understand it, you are now primarily in the design and manufacturing of equipment; is that correct?

Mr. FRANTZ. That is correct, sir.

Mr. CASEY. And I presume your experience at Woods Hole led you to realize that there needed to be someone in that field and so you struck out on your own; is that right?

Mr. FRANTZ. That is correct, sir.

Mr. CASEY. Well, I admire you for it and that is what makes this country tick.

I know you have made your statement very brief, which we appreciate, and I think that possibly I want to follow up a little more on defining your ideas as you expressed to Mr. Dow as to the Government's proper role in prospecting, as you put it.

Now, from your response to his questions I gather that you think the Government might prospect to the extent of determining whether they had enough deposits of a particular mineral to encourage private industry to then bid for the rights or something of that nature; is that correct?

Mr. FRANTZ. The mechanism by which the private industry exploits this knowledge I am not prepared to make a statement on, but I do believe, in fact, that up to the point where the knowledge becomes available the financing of this is, indeed, a proper role of Government.

Mr. CASEY. Of course, oil exploration, that started on dry land and just went on out in the water as they found that the oil-bearing sands or stratas projected out kind of in a shelf, and as you say, in fact, they charge them a bonus and an annual lease for the right to prospect out there, but they think it is worth a gamble.

As I understand it, you would not favor the Government going into the production business; is that right, as such?

Mr. FRANTZ. That is my opinion, yes. Actually the expression of that opinion goes further than I intended to go.

Mr. CASEY. I felt from your response to Mr. Dow that you took the position that what you considered prospecting was just determining whether something was there and then making it known to the public so that they would be induced to go after it on their own.

Mr. FRANTZ. That is correct, sir.

Mr. CASEY. Because I felt that being a man who struck out on his own here and having gone into a new business, felt like the Government should not be getting into any fields that were not properly its sphere, and I wanted to develop that a little further. Also it is in conflict with the previous statements we had here in which the oil industries had made the broad statement by one representative who said he was not speaking for all of the oil industry but was speaking for the American petroleum industry, they were a little afraid of this, Government getting into the business, so to speak, of exploration and development of resources.

I certainly appreciate your appearing here also and taking your time from your business and making this journey to Washington to give us the benefit of your views as a small businessman and we certainly welcome you at any time because you can be most helpful to us.

Mr. FRANTZ. Thank you very much, sir.

Mr. CASEY. Mr. Keith, did you have anything else? After all, this is a real friendly witness and you want to develop him all you can.

Mr. KEITH. I would just like to tell him that I did not prearrange the performance of my colleagues on this committee. They have been more than generous with their comments concerning me and just modest in their expressions of gratitude concerning your visit here today.

Mr. CASEY. He should have made you put in the record what you told me before you left. It was very complimentary to you, Mr. Frantz, and it shows that you both have equal admiration and respect for each other.

Thank you very much.

Mr. FRANTZ. Thank you, Mr. Chairman.

Mr. CASEY. We have now Prof. Charles Stephan. Professor Stephan is chairman of the Department of Ocean Engineering, Florida Atlantic University, Boca Raton, Fla.

Have you ever heard of that, Mr. Rogers?

Mr. ROGERS. Yes, indeed, Mr. Chairman, and I want to say I am delighted to see the professor here; and some of our members had the opportunity to visit Florida Atlantic University, which is a new State university in Florida, to see what they are doing in this field. It is a very exciting program that they are developing there

and I think it is going to make a great contribution to this whole field, and Professor Stephan is chairman of this department as it begins.

I am delighted to see you here.

Mr. STEPHAN. Thank you, sir.

Mr. CASEY. Before he took the bit away from me, here, I too, want to welcome the professor and without any further delay we will let you proceed.

STATEMENT OF CHARLES R. STEPHAN, CHAIRMAN, OCEAN ENGINEERING DEPARTMENT, FLORIDA ATLANTIC UNIVERSITY, BOCA RATON, FLA.

Mr. STEPHAN. Thank you, Mr. Chairman. I have a relatively short statement I would appreciate the opportunity to read.

Mr. CASEY. Go right ahead.

Mr. STEPHAN. Mr. Chairman, distinguished members of the committee, it is a great honor to be permitted to testify before this committee. Based not only upon my present position as professor and chairman of the department of ocean engineering at the newest State university in Florida, Florida Atlantic University, but also upon long participation in the U.S. Navy's antisubmarine warfare, research and development, training and oceanographic programs, I am most interested and concerned with our future national programs in oceanography, ocean engineering, and education. In the Navy, I was privileged to chair the working group that prepared the Navy's first 10-year plan for oceanography, TENOC 1961, participated in Admiral Stephan's—incidentally not a relative—deep submergence systems review group in 1963 and have maintained close association with Dr. Wakelin and Mr. Abel of the Interagency Committee on Oceanography to the present day.

Increasing interest in oceanography is evident, not only in our own country, but also among our friends and enemies, whose latter effort in many instances has exceeded ours. Interest in ocean engineering, which may be briefly described as "the application of oceanographic science and engineering technology to the performance of useful work in the oceans," is increasing rapidly, not only in defense applications but also in all phases of the development of ocean resources.

This is evidenced by the tremendous interest of industry in the presentation and reception of ocean-engineering papers at the recent ASLO/Marine Technology Society's Oceanography and Ocean Engineering Conference in Washington, D.C., this past June.

The interest of Congress is clearly shown in the "Chronology of Events Related to Federal Legislation for Oceanography From 1956 to 1965." The number of bills presented and their scope shows full appreciation of the importance of the problem. While some bills have been passed, most were held up pending resolution of the many divergent interests, opinions, and agency policy conflicts. However, our national oceanographic, and to a lesser extent, ocean-engineering programs have progressed through many excellent programs in the various departments and agencies of the Government and the co-

ordinating efforts of the Interagency Committee on Oceanography of the Federal Council for Science and Technology.

Each department and agency of the Government has its oceanographic program designed to meet its needs, to answer its questions, and to research for advantages to its future. These are good, I should say excellent, programs designed by dedicated, intelligent men to meet their department's specific needs.

The ICO has done, and is doing, a magnificent job defining and correlating the individual programs into a national program which shows where we are going in oceanographic science and technology. Through its panels it analyzes the various programs, recommends and suggests means to strengthen the overall program through normal agency channels.

These agencies—

retain responsibility for accepting or rejecting specific projects and for finally developing and conducting their own annual programs.

These words are taken from the "National Oceanographic Program 1966," ICO Pamphlet No. 17.

In other words, the agencies must be willing and able to absorb recommendations made by the ICO within their own budgets and resources if they involve projects that are not included in their original annual programs. No one can expect a department or agency to put much of its limited resources into projects that will not bring a direct return to their program; and they do not. This, then, is a basic problem that must be solved in our national oceanographic program.

To solve this problem, certain bills now before you recommend the establishment of a National Oceanographic Council patterned after the National Aeronautics and Space Council which would, in effect, take all of the oceanographic programs and their support out of the various departments and agencies and place them under one new Government agency. Such a drastic step would, I personally believe, cripple the many outstanding programs now existent that meet the needs of their sponsors, drain the country's inadequate supply of oceanographers and ocean engineers and add another level of planners, managers, and operators between the producer and consumer. This, I feel, would be bad.

However, the current feeling that the national oceanographic program is too splintered, that it lacks central direction and that it is inadequate, is real and must be faced and the problems corrected. Industry also continually asks, as I have found in numerous consulting sessions: "Just what does the exploration and development of ocean resources mean to us in terms of future revenue to my company?" These are questions that must be faced and solved for our national welfare, defense, and industrial progress. Generalized statements on the "great resources available from the sea," the "needs to meet the increased demands of the expanding populations for food and materials," are not specific enough to spur great industrial participation. What I feel are needed include:

(1) Specific and detailed surveys of our Continental Shelf to determine what is available, where, and what are the means to gather and process the resources.

(2) A similar survey of the Great Lakes.

(3) Detailed surveys of deep ocean areas where oceanographic knowledge indicates a probability of valuable resources that are obtainable.

(4) Studies to really determine what use and importance these resources can be for today, tomorrow, and the more distant future.

(5) Development programs to devise new ocean-engineering techniques, equipment, and systems to exploit ocean resources at the depths at which they exist.

(6) The study, development, and prosecution of new international law and/or treaties to protect claims, rights of nations, and individuals engaged in deep ocean projects.

(7) Development of a coordinated national education support program, not only for graduate oceanographers, but also for undergraduate and technical students in ocean engineering and oceanographic science and technology to meet the expanding needs of the future.

Many bills now before you cover certain details of the above items. But the very fact that there are so many bills before you makes it apparent that a thorough study of the problem as a whole is necessary by a highly qualified group of experts from Government, industry, and the scientific and engineering communities who can and will look at the problems from an overall, national viewpoint.

Accordingly, I strongly recommend the establishment of a self-liquidating commission as set forth in Congressman Rogers' bill, H.R. 9064, at the earliest possible time, to review the current oceanographic and ocean-engineering programs both in Government and industry; determine the true and actual needs of these same activities, and determine the important areas that are not covered by existing programs and for which there is no support now. For these unsupported items, and for these alone, I feel the Commission should recommend the designation or, if necessary, the establishment of an organization, together with appropriate financial support, to accomplish them.

This, I feel, is urgently needed to cover those oceanographic and ocean-engineering national requirements which are beyond the scope, responsibility, or capacity of existing governmental or industrial programs to meet. The seven items mentioned above, I feel, are examples. A Commission study would undoubtedly find more or possibly delete some of those I mentioned.

I believe that the work of such a commission would not only be accepted but would be welcomed by Government agencies and industry and further, it would not interfere with the vital programs now in progress. Working in close cooperation with the ICO, the Commission could define a true national oceanographic program which provides not only for the essential programs now in progress but also can provide the means to plug the voids that now make our national program inadequate.

Wasteful duplication of effort, if found—and I might point out all duplications are not necessarily wasteful—would be reported immediately to the responsible agencies and the ICO for appropriate action. Recommendations for early action on existing bills or recommendations for new legislation could be made by the Commission as soon as the studies so indicate.

The designation of specific national projects to Government agencies or industry, together with recommended financial support, could

likewise be accomplished during the life of the Commission or assigned to designated agencies thereafter. Once the survey was completed and the tasks, funding and organization established to accomplish the full program, the Commission should be terminated. This, I believe, will provide the wisest and best program with minimum disturbance of vital projects now in progress.

There are many who may feel that we must do something right now and not spend more time in studies. One cannot dispute such urgency but the fact that our oceanographic program has made great progress during the 9-year period of the oceanographic debates, the fact that industry would rather be told "where to go" rather than just "let's go," and the fact that the overall problem has really been expanded from just "oceanography" to the all-inclusive, true problem of "oceanography and ocean engineering" all made it necessary not only to move quickly, but, more importantly, to move wisely and well. This, I believe, can be done through Congressman Rogers' bill, H.R. 9064.

I appreciate the opportunity to make this statement, sir.

Mr. ROGERS. Thank you very much, Professor Stephan.

Mr. Dow?

Mr. Dow. Mr. Stephan, I do not know if you are familiar with H.R. 2218, which is another bill that has been—

Mr. STEPHAN. Yes, sir; I have it here.

Mr. Dow (continuing). That has been offered here.

Would you care to explain the thinking in your mind for why you prefer the bill offered by Representative Rogers to the bill, H.R. 2218? And I do not say that because I have any prejudice about either bill, but I would be glad to have your opinion, sir.

Mr. STEPHAN. For one thing, sir, I feel that H.R. 2218 pertain primarily to the science of oceanography and does not really extend far enough into the ocean engineering problems. That is one thing, sir.

This being primarily a policy bill, as I read it right quickly, sir, without having the chance to review it again, I did not feel it gave the means for implementation that I considered were part of Congressman Rogers' bill.

Mr. Dow. Thank you, Mr. Stephan, for a very thoughtful presentation.

Mr. STEPHAN. Thank you, sir.

Mr. ROGERS. Mr. Pelly?

Mr. PELLY. Professor Stephan, you recommend yourself very highly to me when you indicate that you have been in touch and associated with Dr. Wakelin. We of this committee certainly learned to admire him and to respect him, and you certainly do yourself great credit with me when you indicate your association with him; and I might add, too, that in your support of our colleague, Mr. Rogers, you certainly upgrade yourself in our opinion, because we certainly have enjoyed our association with Mr. Rogers and we are going to watch the growth of your great institution down there.

There has been a real need, I think, for an increase in the number of institutions of learning in connection with oceanography. On the west coast we only have two of them that I know of that are really outstanding. I have always heard from our people there was a need for more.

I am very glad you are here today. I listened to your testimony with great interest. It is obvious that you have given a lot of thought to this

subject, because you have very definite ideas, and particularly I am interested in the fact that you are very critical of the idea of putting all the various responsibilities that are now under various agencies of Government into one single agency, and the way that it might deplete the personnel that is available.

Actually, in the NASA program, in the Space Agency, the Government is having to pour millions of dollars back to educational institutions to try to develop scientists and engineers to replace those in private industry that NASA has taken away, in order to develop its program.

I take it that actually you do not favor that type of operation as far as the pursuit of oceanography is concerned?

Mr. STEPHAN. If I may, sir, I would like to explain perhaps a little further than I did in my paper.

I feel that an agency such as NASA, or to go back to another program that is close and dear to my heart, the Polaris program in the Navy, have been very successful because they had a single product as an end product. I do not believe that this is true in our national oceanographic program, sir. I feel that here we are developing a competency in a broad area, not coming to the end of putting a man on the moon or to develop a particular system that will do a specific thing.

In this particular (NASA) case the designation of a single agency, I feel, is not only justified but perhaps the best way, although maybe not the most economical. But when you are trying to develop a competency for the Nation in a broad area of science or engineering, I do not feel that this can be done by an agency without drawing almost everybody in the country with competence into that agency, sir.

Mr. PELLY. I must say that I originally started out with the thought that if we were ever going to get any place we were going to have to have one agency in order to get enough support, in order to develop the resources of the sea and explore them; but I have, over the years, come to the conclusion and can now agree with you that it is better if we proceed in another way, and this was the reasoning of the late President Kennedy.

Mr. STEPHAN. Yes, sir.

Mr. PELLY. And certainly no one had a greater interest in this. President Kennedy did not want to put this all in one agency.

I certainly welcome you here today; I enjoyed your contribution very much.

Mr. ROGERS. Thank you.

Mr. Keith?

Mr. KEITH. Nice to see you again, sir. I noted that you in your testimony left out the word "Boca Raton" as the location of your institution.

Mr. STEPHAN. I was trying to save a second of time, sir.

Mr. KEITH. I see. Well, it brought back very pleasant memories of our visit down there, and all of us, I think, were very impressed with your efforts in the field of ocean engineering.

As I look over your testimony—and I think it is an excellent appraisal of our problem—you list the things that you feel are needed on page 2, and the No. 1 item you have is:

Specific and detailed surveys of our Continental Shelves to determine what is available, where, and what are the means to gather and process the resources?

And you go on to say in other subparagraphs there that other needs are the development of programs to devise new ocean-engineering techniques and equipments and systems to exploit ocean resources at the depths at which they exist. And, then you talk, in the next subsection, 6, of:

Study, development, and prosecution of new international law and/or treaties to protect claims, rights of nations, and individuals engaged in deep ocean projects.

And the fourth one:

Studies to really determine what use and importance these resources can be for today, tomorrow, and the more distant future.

Those in essence are really the objectives of legislation which Mr. Rivers and I filed at the start of this session.

Mr. STEPHAN. Yes, sir.

Mr. KEITH. And I had filed in earlier years a bill which has passed the Congress once and which was not signed, and which later on was passed by this committee but did not get concurrence a second time from the Senate. It is the one that is essentially the same as Mr. Lennon's now.

And sort of as a last resort I said, well, let us get into this thing, let us have some on-the-job training in a way which can give us these techniques and give us the coordination of effort to accomplish some of the major objectives that we have all been talking about. That was the reason for the Continental Shelf exploration bill.

By assigning that role and that mission to a particular commission and getting on with the show, we could, it seems to me, learn a great deal not only about oceanography but about the resources of the Continental Shelf, its potential contribution, and at the same time we could learn a lot about organization for an attack on these problems.

I am delighted to see that your testimony here supports the objectives of that mission with very high priority, and I would hope that simultaneous with the passage of Congressman Rogers' very thoughtful approach to this problem, we could begin to actually attack it by substantial effort which I feel would be certainly as remunerative as Operation Moho and not any more expensive, at least in the initial phases, and which probably would be much more productive in the development of our oceanographic resources.

Would you care to comment?

Mr. STEPHAN. I do feel, sir, as I stated here, even though these were not listed in a particular order of priority, that I did consider this survey of the Continental Shelf to be one of the top priority items. I felt this was a part, an extremely important part, of the whole problem, which I recommended the commission study, and that, as the commission went to the execution of individual problems, they could properly recommend highly, the passage of a bill of the type of your bill, sir, very strongly.

Mr. KEITH. Ever since I have been in the Congress we have been talking about ways and means. I think it is time that we get out and undertake the job, and that is the reason for my bill.

Mr. STEPHAN. Yes, sir.

Mr. KEITH. Thank you, Mr. Chairman.

Mr. ROGERS. Thank you, Mr. Keith.

As has been said, I think you have made a real contribution here; particularly I think it has been helpful to have you set out specifically goals that have to be considered as to how we are going to begin them and when.

I, of course, share your feeling that the best way for us to proceed to really get something done is to have a national commission.

Mr. STEPHAN. This is my personal feeling, sir.

Mr. ROGERS. Because I think we need to focus the attention of the whole Nation on the urgency of this problem and I do not know any better vehicle to use than this national commission and really set our goals and to pull the oceanographic community together to help solve this problem.

So I think you have made a real contribution and we are very grateful to you for your appearance here today.

Mr. STEPHAN. Thank you.

Mr. ROGERS. You have been on a recent trip to the Atlantic, Project Neptune—Atlantic, which this committee is most interested in, and at the suggestion of the counsel, he wondered if it would be possible for you to stay over tomorrow and perhaps brief the committee, although you have not had time, I know, to make all of your findings but give us your impressions.

Mr. STEPHAN. If that is desirable I will be glad to do it, sir.

Mr. ROGERS. That would be fine.

So, this completes the list of witnesses today. We will adjourn over until 10 o'clock tomorrow morning when we will hear any additional witnesses and to take up H.R. 7778, and we hope also to go into executive session at that time.

The committee stands adjourned.

(Whereupon, at 12:10 p.m. the committee was recessed, to reconvene at 10 a.m., Thursday, August 19, 1965.)

NATIONAL OCEANOGRAPHIC PROGRAM LEGISLATION

THURSDAY, AUGUST 19, 1965

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OCEANOGRAPHY OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES,
Washington, D.C.

The subcommittee met at 10:30 a.m., pursuant to recess, in room 1334, Longworth House Office Building, Hon. Paul G. Rogers presiding.

Mr. ROGERS. The committee will now continue the hearings on oceanography.

Our first witness this morning is the gentleman from Massachusetts, the Honorable F. Bradford Morse.

STATEMENT OF HON. F. BRADFORD MORSE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS

Mr. MORSE. The past two decades have proven to be an era of pioneering, exploration, and discovery in science—never before in history has there been a more productive period in this or in any other field. But in this era we have devoted a great deal of our energies to atomic science and space exploration, and have seemed to neglect an equally important branch of science—oceanography. The water that covers three-fourths of the earth's surface contains countless untapped resources, which if harvested, could provide incalculable benefit to the people of the world. But there can be no benefit derived from these resources without research and technology in oceanography, and there can be no such research and technology without an impetus from the Federal Government, encouraging this work through extensive oceanographic programs.

As it stands now, there are numerous departments, agencies, and private concerns which are engaged in various types of oceanographic research. This sort of work is inadequate, however, for two basic reasons. First, each concern does research only in those areas which affect it directly, thus many areas are totally neglected. Second, since information gained by one concern is virtually unavailable to others, a considerable amount of duplication of work occurs. For an efficient oceanographic program, there must be created an agency whose purpose it would be to formulate oceanographic programs, as well as to coordinate information gained by other concerns. The councils provided for in S. 944 would fulfill these requirements effectively, and place oceanography on a par with space, aeronautics, and atomic energy.

Dr. Harold E. Edgerton, professor of electrical measurements in the department of electrical engineering, Massachusetts Institute of Technology and chairman of the board of Edgerton, Germeshausen & Grier, Inc., told the Senate Commerce Committee when he testified on this legislation that:

A strong national commitment to oceanography would certainly be a step down the road to effective utilization of all our resources, human and physical.

Dr. Edgerton pointed out that the present high quality of work being conducted by industry and education alike promises outstanding cooperation and imaginative response to the programs proposed in S. 944. There are vast amounts of resources to be found in the seas from which great benefits can be derived; a national commitment to oceanography would lead to effective utilization of all these resources, plus enable us to employ more of our human labor supply. An extensive program of research and technology would open up new areas of human endeavor calling for new skills and manpower as yet uncommitted. Opportunities would be created for scientists, researchers, technicians, laborers, and clerical people. In the greater Boston area, three major universities are already proceeding with active expansion of facilities to be devoted to the fields of oceanography, in order that they may effectively train their students in this field.

The abundance of natural resources in the seas is a prime reason for the development of oceanographic programs. These resources come under four major headings: biological, physical, geological, and chemical. Biological resources, the marine animal life, are important to man's physical well-being. Fish are an integral part of the American's diet, and a complete understanding of their characteristics and habits would greatly increase the yearly harvest, thus providing more food for more people.

The physical characteristics of the oceans are of prime concern to people of many fields—fishing companies must learn more about marine currents since these currents directly affect the distribution of fish; the Navy Department, as well as transport companies, require an understanding of currents in order to prepare maritime shipping routes; and the weather bureau must be concerned with currents, since they affect the transferral of energy between air and sea, affecting the climates of the seas and continents, and their weather patterns. Even public health agencies are interested in the physical characteristics of the marine environment: they are concerned with the flow of river water into the ocean due to its impact on offshore pollution. Currents and countercurrents are just being discovered, but years of work will be required before we have a reasonably complete understanding of these phenomena.

Information concerning the geological aspects of the ocean floors is also needed by many concerns. Petroleum and chemical companies must have this information in order to determine where they should begin their search for their resources, and the Navy Department must have a knowledge of the contours of the ocean floors so that they may plan their submarine expeditions.

The waters and floors of the ocean abound with virtually untouched chemical resources. Industry's need for these elements and minerals is increasing at a fantastic rate, and as a result, the once plentiful supply found in the continents is fast becoming exhausted. Industry will

soon be forced to look to the seas as a new source of materials. The seabed and subsoil of the oceans contain minerals of incalculable value; these areas are rich in petroleum, tin, sulfur, iron, and coal; the southwest African coast contains vast diamond deposits; gold is found off Alaska, and phospherite off California. The deep ocean floor harbors extensive deposits of manganese nodules, which contain such important minerals as iron, nickel, copper, lead, and zinc. The challenge for this country is to develop equipment that will enable the economic recovery of these minerals from the ocean bed, and to do so before any other nation can claim squatters rights on the areas. Since manganese nodules form at the rate of 10 million tons a year, a rate many times that of present world consumption, the world will have an inexhaustible supply of these metals once technology has been developed for recovering these nodules, and separating their basic elements.

Another important natural resource is sea water itself, which contains a good amount of salts and minerals in solution. Here again, technology must be devised to extract these minerals, since their benefits to industry and society would be immeasurable. Work should also be done on the desalinization process so that sea water can be rendered fit for human consumption at small expense. The people in the Northeastern States realize now more than ever the importance of being able to extract drinking water from the sea.

A national commitment to oceanography, then, would enable us to effectively use all of our resources. S. 944 is designed to stimulate the acquisition of knowledge and technology in the field of oceanography; the committees outlined in this legislation would provide a comprehensive program of ocean technology, engineering, and research, embracing the exploitation and development of the capability to do useful work with the seas. They would be groups that would put together some real objectives in the new and important field of oceanography. I strongly favor an increased national concern with oceanography, and therefore urge your favorable report on this legislation.

Mr. ROGERS. The subcommittee thanks you for a very fine statement.

We have as our next witness Prof. Charles Stephan, who agreed to stay over last night and brief us on a recent project which this committee is very interested in.

STATEMENT OF PROF. CHARLES STEPHAN, CHAIRMAN, DEPARTMENT OF OCEAN ENGINEERING, FLORIDA ATLANTIC UNIVERSITY, BOCA RATON, FLA.—Resumed

Mr. STEPHAN. Mr. Chairman, I am happy to discuss in a preliminary fashion, Project Neptune Atlantic, which was sponsored by the Office of Naval Research, Biology Branch, under Dr. Sidney Galler, and run under my direction in July 1965.

As I did not expect to make this presentation until yesterday, I request your indulgence as I refer to some rather rough notes prepared without reference to project data which is still being assembled.

Mr. ROGERS. We appreciate that.

Mr. STEPHAN. To start, sir, if I may I would like to give the objective of this particular cruise.

It was to test the feasibility of the research-ship-of-opportunity concept wherein an instrumented van or module is placed on board a merchantman to take oceanographic and biological data, including the processing of living organisms gathered by the ship, during its regular cruise without interference with the ship's operation schedule, or normal routine.

The background is that the original Project Neptune, sponsored by Dr. Galler, started with a Pacific phase conducted in the Pacific Ocean on board the American Mail Line ship *Java Mail* during its cruise from Seattle, Wash., to Hong Kong in October–November 1964. I was privileged to participate in the short shakedown period of this cruise in September during the passage of *Java Mail* from Los Angeles to San Francisco.

The results of Project Neptune Pacific, which was classed as a prefeasibility test of the research-ship-of-opportunity concept, was reported in detail in the hearings before this subcommittee on January 22, 1965—Serial 89-1.

As you know, that cruise was classed as a complete success, having demonstrated the ability of a small scientific party to obtain various oceanographic data and the gathering of biological samples, utilizing a mobile science van laboratory on board ship.

Dr. Clinton Maag, Acting Life Sciences Officer of NAMTC, Point Mugu, lead the project with the assistance of Dr. Aron and Mr. Bercaw of the General Motors Defense Research Laboratory, Santa Barbara, Calif., and those able mariners, Mr. Jack Drewry and Capt. Paul Bauer of the House Merchant Marine and Fisheries Committee.

The success of that project lead to the initiation and support of Project Neptune Atlantic by Dr. Galler and the Office of Naval Research to do a complete and more advanced feasibility test of the research-ship-of-opportunity concept in the Atlantic. As invited by Dr. Galler, my associates and I at Florida Atlantic University prepared and submitted a proposal on February 15, 1965, which was accepted by the Office of Naval Research. A contract was issued to do the project in early June 1965.

The intervening time between the submission of our proposal and the receipt of the contract was occupied by planning for the project, transporting a mobile van laboratory from Point Mugu to Boca Raton, Fla.; which, incidentally, was accomplished by a Marine Reserve transport aircraft on a training transcontinental flight; refurbishing and altering the van to meet our requirements; preparing requisitions for equipment and supplies; and planning the cruise with Atlantic ship lines. When we received our contract in June we rushed our purchase orders through and were able to assemble all our gear, outfit the van, and get it ready for transport to the port of embarkation in less than 1 month from receipt of the contract. We would have greatly appreciated more time but we were able to do it in about 4 weeks.

After a preliminary survey, the selection of ship lines and specific ships available in the limited time available within our academic calendar, resolved itself into a choice of the S.S. *Mormacdraco* of the Moore McCormack Lines and two ships of the American Export-Isbrandtsen Line. Contract delays, project timing, and the maritime strike finally settled our choice to the S.S. *Export Champion* of the

American Export-Isbrandtsen Lines departing Hoboken, N.J., on July 9, for Spanish and Italian ports.

We contracted to load our van on July 8 and run the project until arrival in Genoa on July 26. I may add that during this time, the assistance of Adm. Roy Gano of the Moore-McCormack Lines and Capt. G. R. Miller of the American Export-Isbrandtsen Lines were invaluable to us.

The preparation, equipping and fitting out period was hectic. We had to ship the van from Boca Raton, Fla., to Hoboken, N.J., on a low bed trailer because the van towing bridle and tires were inadequate for the 1,300 mile trip. Actually the van was never intended to be towed except for short distances and it could not be. The van was equipped, all gear stowed, tied down and the van loaded at Florida Atlantic University on July 2. It reached Hoboken, N.J., on July 6.

The van was loaded on board the SS *Export Champion* on July 9 at pier A, Hoboken. After some temporary difficulties matching the electrical power of the van to that of the ship, we tested all the equipment and sailed that evening for Rota, Spain.

The cruise, unlike the Pacific phase, had no underway shakedown period. All our equipment had to work as there were no service stations or outside assistance available during the longest leg of the cruise, the first leg. Everything did work and for this I must cite the excellent help we received from the Navy Oceanographic Office in installing its equipment and training us in its use the night before we sailed; the technical assistance of Francis Associates of Marion, Mass., whose Mr. Cate and Valm helped us tremendously during the installation phase, the help and advice of Mr. Bercaw of the General Motors Defense Research Laboratory of General Motors, from Santa Barbara, Calif.; and most of all, Mr. Frank Carnaghe, senior electronics technician of General Motors Defense Research Laboratory who accompanied us and kept all equipment going well through the cruise, including that of the Oceanographic Office and the equipment of his competitor, Sippican Corp. Actually, the Sippican equipment never went out but Mr. Carnaghe helped us maintain it in a spirit of cooperation that warrants note.

The cruise had its ups and down as I will explain in detail in a moment. The engineering and deck departments of the SS *Export Champion* helped us out with repairs and rerigging whenever we needed it. At Rota, Spain; the U.S. Navy, specifically men from the U.S.S. *Holland*, practically rebuilt a jetnet that was damaged during the tests. They did this in less than a day. Throughout the cruise, cooperation was the order of the day and never an exception.

We visited Rota, Cadiz and Cartagena, Spain; plus Naples and Genoa, Italy, where the scientific party disembarked and returned to the United States by air. The van was sealed and offloaded at Hoboken last Thursday. It is now on its way to Boca Raton, Fla.

We accomplished all tests scheduled. I would now like to tell you in more detail what went on.

The scientific party consisted of: Dr. Harrison Hoffmann, associate professor of microbiology, Florida Atlantic University; Mr. Frank Carnaghe, senior electronic technician, General Motors Defense Research Laboratory, Santa Barbara; Mr. A. F. Kellum, student assistant to Dr. Hoffmann; and myself as scientific officer and project leader.

The following tests were scheduled: Biological sampling at ships' speed of 19 to 19½ knots, which incidentally, is the fastest that this has ever been done; oxygen consumption and other tests on living specimens in the Van laboratory on board ship; temperature structure determination by expendable Bathy thermographs (BT's) every 4 hours during the cruise, plus BT drops before and after each biological sampling; constant recording of main injection temperature ductivity and salinity; and periodic salinity checks against Copenhagen Standard Sea Water samples; atmospheric and weather data; and data for manpower, cost and equipment analyses.

With regard to our test schedules, we performed jetnet tows at least twice a day each of which was followed by a 4- to 6-hour analysis, if we had a successful tow, by Dr. Hoffmann and his associate.

We made expendable BT runs every 4 hours during the whole cruise, plus BT runs before and after each jetnet tow, we made temperature and salinity readings continuously, and we kept a continuous weather log.

Our funding in the amount of \$16,700 was supplied by the Office of Naval Research.

The following facilities and equipment were used: The ship from the American Export-Isbrandtsen Lines; the van supplied by the U.S. Navy; the scientific equipment from Florida Atlantic University Laboratories and Navy contract purchase for special equipment; the seamanship and towing equipment on contract purchase; the expendable BT system by Packard Electric Co. and the General Motors Defense Research Laboratory and also another expendable BT system from Francis Associates (Sippican Corp.).

The jetnet was provided by the General Motors Defense Laboratory on loan. The constant reading temperature and conductivity recorders and a portable salinometer were provided by the Oceanographic Office of the Navy.

The expendable BT temperature profiles we ran across the ocean, were an outstanding success with both the Packard (General Motors) and Francis Associates (Sippican) equipment; all equipment worked very well. The Packard equipment was used for 68 runs. Sixty-six were totally successful and one was a partial success; the Sippican was used for 28 runs with 27 being totally successful.

The data has yet to be analyzed and correlated to be sure of our results.

We made 17 biological tows using the jetnet. Twelve gathered plankton samples but many samples were mangled; five had samples suitable for viability tests on living organisms. We performed biological tests and in one case the samples were kept alive for more than 30 hours on board ship.

A preliminary analysis shows that the towing configuration of the ship, which I will demonstrate on a chart in just a moment, was not satisfactory. We used three different stations in the ship and we received quite a bit of damage to our jetnets.

The quantity of plankton samples received at high speed were marginal; however, we were able to get sufficient to conduct most of our tests.

The oxygen consumption and viability tests desired by Dr. Galler are now under analysis by Dr. Hoffmann, but we did prove that the tests can be conducted at sea.

We faced a considerable number of problems including vibration, crowded space, and other features of the van that need improvement.

Dr. Hoffmann also made some bacterial cultures which may be of great interest in the future.

The salinometer, temperature conductivity recordings from main injection probes were run with excellent results. We had a little trouble with some of the equipment, but Mr. Carnaghe was able to correct them. In one case, a temperature probe in the main injection line carried away. We are not sure whether it was caused by something hitting it or whether vibration caused its failure.

There is a very interesting development in the new BT recording equipment provided by the General Motors Corp. It is a digital taper in the expendable BT system which records the data on tape as well as on a chart record. This tape can then be placed on a high speed ratt (Radio Teletype) circuit for rapid transmission ashore. Actually we did transpose some material from our data and sent it by radio to the Navy numerical weather facility in Rota, Spain. When we got to Rota and checked with the people at the Numerical Weather Central, it was amusing to find that they wanted to know how this data ever came from a merchantman. I think, in this there is a tremendous promise for rapid data acquisition and transmission for ASWEPS or Oceanographic Projects of the future.

One other item of interest before I refer to the charts, is that while we were at Cadiz, Spain, our group visited Rear Admiral Balèn who is Chief of the Spanish Hydrographic Office. He was extremely interested in our project. He came out to the *Export Champion* and spent 4 hours with us on board ship. We discussed not only our project but also some of the work that he is doing in the establishment of an Oceanography program in Spain. It is my intention to contact the Navy Oceanographer and the University of Washington to see if we can give some help to Admiral Balèn and the Spanish Navy in this very important work that they are doing.

If I may now, I would like to refer to these charts for just a moment.

Mr. ROGERS. Yes.

Mr. STEPHAN. These were done rather rapidly. I will try to read them because I recognize that you cannot see them too well.

The objective of Project Neptune Atlantic: To test the feasibility of the research ship-of-opportunity concept wherein an instrumented van or module is placed onboard a U.S. merchantman to take oceanographic and biological data, including the processing of living organisms at sea, during the ships regular cruise; without interfering with the ship's operations, schedule, or normal routine.

We did carry out this objective.

The data we took on the cruise included: Type of run that we made, either a BT run or a jetnet sampling; the ship's position from the ship's actual track. I must agree with Captain Bauer that this leaves a lot to be desired in accuracy, but I do think at least that it is sufficiently accurate to within maybe 3 to 4 miles.

The time and the identification of each BT record, which are now being reproduced at General Motors and at Francis Associates.

We checked surface temperature using a bucket thermometer. We took the temperature at the main condenser injection which is about

10 to 12 feet below the surface and the water conductivity which, putting both of these together, permitted us to compute salinity.

Wind force and direction, air temperature, humidity, clouds, visibility, sea state, and had a place for remarks where we recorded what actually was going on of special interest.

In addition to that regular data, we have a digitized tape of every BT trace made by the General Motors equipment. This is now being processed at the numerical weather facility of the Navy at Monterey and I believe will be at a tremendous advance for special projects such as ASWEPS and other oceanographic programs of the future.

We have continuous temperature and conductivity readings on circular charts, and as I mentioned before, have bacterial cultures that are now being analyzed.

We had a considerable problem in the towing of our jetnet. I would like to show rather quickly what actually occurred.

The first part of Project Neptune in the Pacific was run on a ship with engines amidships. They were able to tow aft and had little difficulty towing at the speeds of about $15\frac{1}{2}$ or 16 knots. The ship we were assigned had engines aft and our van was placed just forward of the afterdeck house, a distance approximately 100 feet forward of the propeller. The tow point we had was right about here [indicating].

Looking at the plan view, our initial towing station was right here starboard side aft [indicating]. We had no difficulty whatsoever in streaming the tow, she went back aft as far as we wanted.

However, when we hauled in the tow, and the jetnet got abreast or just forward of the screw, the tremendous suction of the screw pulled it in and bashed it along the side of the ship. We immediately had damage. We never were able to make one recovery in which we did not have some sort of banging along the side of the ship at that station.

We then moved forward to an amidships station. This time we were unable to put a long tow aft because the suction could take charge of it immediately and we were afraid of getting the jetnet and wire into the screw.

But again, on more than half of these tows, as we pulled it forward, the jetnet continued to hit against the side of the ship.

These were the two stations that we used in the Atlantic until we got to Rota. We did have major damage on both of our jetnets, and as I said, previously the Navy repaired the jetnets at Rota. After leaving Rota we towed from a forward station on the port side. This gives a longer tow and we never had any further trouble of hitting the side of the ship with the jetnet from here. However, this is an extremely awkward, crowded place, too far away from our van, and I strongly recommend if we do this project again that we use a ship where the tow point can be aft, either above or abaft the propeller itself.

I thought this would be of sufficient interest for this to be brought to your attention.

Very quickly, I'd like to give a comparison of the various Project Neptunes.

Neptune Pacific, the first; our Project Neptune Atlantic second, and as I understand it, now under consideration, Project Neptune Great

Lakes, where a project may take place going from the Great Lakes into the ocean.

The participants: Pacific—Naval Air Missile Test Center, General Motors and your members of the House Merchant Marine and Fisheries Committee; Atlantic—Florida Atlantic University and General Motors, assisted by the Oceanographic Office, the fleet weather facility and the American Export Line.

The objective of the Pacific, prefeasibility; in our phase, feasibility; and the recommendation for the Great Lakes project will probably be a total scientific experiment.

The tests: Biological sampling for Pacific; temperature, by BT, and salinity measurements at medium speed; in Atlantic, we did it at high speed, with biological sampling, working with living matter on board the ship; and, in this particular case, we used an "engines aft" ship which we found to be unsatisfactory.

The equipment: The General Motors Defense Laboratory jetnet equipment was used on both tests; the Packard BT's were used on both tests; but we also used Sippican BT's and we had a little bit more equipment for temperature and salinity in the engine room.

The results were highly satisfactory for Project Neptune Pacific. Ours is still under analysis but I feel our objective was satisfied but we will have a lot of recommendations for improvement.

As tentative conclusions, and I emphasize the word "tentative," because it is still under analysis I offer:

The concept of the research ship of opportunity is feasible. The biological tests on living organisms can be done, but improvements are needed. Laboratory modules without wheels should be investigated. The means to dampen vibration in the laboratory is needed. The jetnet is marginal at high speeds; tows must be made aft. No "engines aft" ships should be used.

The expendable BT systems were very satisfactory. The digital taper for expendable BT promises to be vitally important to rapid oceanographic data transmission and processing for future ASW and oceanographic purposes.

The cooperation of the ship line, their officers and crew was outstanding. There was no interruption to the ship's operation, schedule or routine, and the overtime costs were nominal.

The last thing, the cooperation of the Oceanographic Office, NAMTC Point Mugu, General Motors, Francis Associates, the American Export Isbrandtsen Lines, the Office of Naval Research, and the other colleges of Florida Atlantic University were outstanding.

The recommendations we believe we may make are: (1) to conduct a complete scientific experiment in the next phase; (2) to consider design of a new module for Research Ship of Opportunity—not a modification of an existing van; (3) to explore the advantages of digitized output of an expendable BT system for ASWEPS and other oceanographic systems; (4) to devise a better high-speed biological sampler for high-speed research ships of opportunity; (5) to consider deck space allocations plus quarters and services for a small scientific party in new merchant marine construction or conversion; and (6) future support for the RSO concept.

Mr. ROGERS. Thank you very much, Professor Shephan. We are very pleased that this has been so successful because this committee is

particularly interested in this project. It sounds like you had a very successful trip.

Mr. STEPHAN. A very interesting one.

Mr. ROGERS. Are there any questions? Mr. Downing.

Mr. DOWNING. A very interesting paper.

Mr. STEPHAN. Thank you very much.

Mr. ROGERS. Thank you very much, Professor Stephan.

(The following clipping was submitted for inclusion in the record:)

[From Science magazine, Apr. 16, 1965]

**OCEANOGRAPHY: HOUSE SUBCOMMITTEE ENCOURAGES USE OF MERCHANT SHIPS
TO GATHER DATA ON THE HIGH SEAS**

The recently released record of a morning hearings before a House oceanography subcommittee reveals an unusual example of persistence by a congressional committee in advocating a particular mode of research and a novel instance of congressional staff members serving as observers and participants in a scientific enterprise.

Titled "Oceanography—Ships of Opportunity,"¹ the hearings before the Oceanography Subcommittee of the House Merchant Marine and Fisheries Committee dealt with a project designed to show whether the American merchant marine fleet can be used to gather oceanographic data without hindrance to normal operation of the vessels.

The hearings, held January 22, were cast in the form of a seminar to discuss what Subcommittee Chairman Alton Lennon, Democrat, of North Carolina, called an "interesting experiment" conducted last fall. Under review was a voyage of the merchantman *SS Java Mail* across the North Pacific, which Lennon describes as an attempt "to determine whether or not oceanographic data could be collected for merchants ships on a truly not-to-interfere basis."

Called Project Neptune—Pacific, the effort was sponsored by the Office of Naval Research with the collaboration of the Naval Missile Center at Point Magu, Calif. (which provided a mobile lab and scientific personnel), the General Motors Research Laboratories at Santa Barbara, and the American Mail Lines, Ltd., of Seattle. The committee appears to have acted as a kind of broker in the project by helping to bring the principals together.

The oceanography subcommittee was formed in 1959 at a time when the oceanography budget was expanding and congressional committees were vying for jurisdiction.

"Our subcommittee soon became interested," said Lennon, "in the possibility of the greater use of the merchant fleet for the collection of oceanographic data. The National Academy of Sciences Committee on Oceanography advised us that worldwide surveys, ocean surveys, were prime essentials to any concerted research program."

The subcommittee maintained its interest and looked for ways to learn whether the idea was feasible.

"The use of the *SS Java Mail* last fall was the test," said Lennon. "Committee staff members of our subcommittee participated to a rather large degree in an observatory capacity, and they advised our committee that this worked exceedingly well, and it proved the merit of this particular concept; that it showed the way to make a greater and immediate advance in our oceanographic programs by freeing our new, specialized oceanographic research ships to do advanced work while these existing 'ships of opportunity,' as we refer to them, collected the basic survey data."

A strong proponent of the ships-of-opportunity idea has been Sidney Galler, head of the biology branch of the Office of Naval Research, who has been interested in finding more efficient and less expensive means for obtaining bio-oceanographic data which the Navy needs.

The use of ships of opportunity for gathering scientific data actually has a history which dates back to the earliest days of the U.S. Navy. The Navy Oceanographic Office, for example, is running a 4-year program using Military Sea Transport Service ships to make bathythermograph readings. The Bureau of

¹ Copies of the hearings (Serial No. 89-1) may be obtained from the Committee on Merchant Marine and Fisheries, U.S. House of Representatives, Washington, D.C., 20515.

Commercial Fisheries has been getting systematic records of seabird sightings from some commercial ships to gain information on the fisheries. Project Neptune was different in that an effort was made to determine whether much more extensive and sophisticated work could be done.

The voyage of the *Java Mail* covered 17 days in October, in which the ship traveled from Seattle to Yokohama and then to Hong Kong. On board were members of a four-man scientific party which included two Ph. D.'s, and also two committee staff members. They were John M. Drewry, an attorney who is chief counsel to the full committee, and Paul M. Bauer, consultant to the committee, an engineer who teaches earth sciences as an adjunct professor at American University in Washington. It is worth at least a footnote in the annals of Congress-science relations that the two staff members went along and then gave the committee their assessment of the project.

The original aim of Project Neptune-Pacific was simply to test equipment and procedures and to determine whether the activities of the oceanographers would create problems with the crew, or interfere with the operation of a merchant ship. However, Dr. Clinton H. Maag, head of the life sciences department at the Point Mugu Naval Missile Center, who was in the scientific party on the *Java Mail*, told the committee, "we have come back with a relatively large volume of data, especially large when one considers the actual investment in the cruise" (about \$14,000).

The crucial question was whether oceanographic work could be done while the *Java Mail* was traveling at normal cruising speeds (about 15 knots); oceanographic research vessels usually either lie to or move very slowly when collecting samples or data. The work had to be done without requiring the ship to slow or alter course and without interfering with the crew.

In addition to sowing drift cards and bottles, the scientific party took salinity samples, made continuous surface-temperature measurements, and collected zooplankton with a "jet net," a high-speed sampler with an intake designed to minimize water turbulence. According to the scientists, they picked up samples of zooplankton and larval animals at 16 knots and found 75 percent of the samples in "excellent" condition.

The development of suitable instruments and rapid collection devices is a key factor in realizing the ships-of-opportunity idea. The jet net seems to point the way, and so does an "expendable bathythermometer," which detaches itself from a float after being cast overboard and then transmits data, via a wire, as it sinks to the bottom of the sea. Advocates of the ships-of-opportunity concept admit that much needs to be done with instrumentation, and they hope that industry will be motivated to step up R. & D. in this sector by the voyage of the *Java Mail* and by Project Neptune-Atlantic, now in the offing under the aegis of Florida Atlantic University, Boca Raton.

Research ships of opportunity appear to have special appeal to marine biologists, many of whom tend to see themselves cast in the role of stepchildren in the family of oceanography. They complain that deep-water research voyages are too often planned to suit the requirements of those who do physical and chemical oceanography at the expense of the seagoing biologists.

While ships of opportunity may in fact provide splendid platforms for research in fair weather and foul, the use of such ships would seem to be only half the battle. At the hearing James M. Snogross, head of special development at the Scripps Institute of Oceanography, indicated this as a mild caveat in what was otherwise a morning of unrelieved optimism. Feasibility of the ship of opportunity he viewed as demonstrated, but he noted the importance of the quality of instruments.

"This, perhaps in a major way," he said, "accounts for our slowness in being able to start, since it is only at the present time that suitable instruments have in fact been available. They are by no means perfected at the moment, but they are workable and quite practicable and usable. This in a way has opened up the basic concept of expendable or disposable instruments. It is in fact a major change in the availability of tools which the oceanographer has at his command. I think without question this new concept is so significant that it will require a great deal of rethinking of our methods of operation, and further, it changes our basis of costing out the system.

"We have entirely new relationships which we must think about. All of this, of course, underscores the necessity of careful planning. It is quite obvious that a major ship-of-opportunity program, assuming it gets underway,

could, without proper direction, literally flood scientific laboratories with plankton samples. This is rather easily done. It would be disastrous.

"We need careful planning. The ship-of-opportunity program needs to be a part of a system operation, integrated with the necessity for collecting data. We must have a need for the data, and a valid use for it. We do not wish to collect data for data's sake."

JOHN WALSH.

Mr. ROGERS. We have a statement to insert in the record.

Mr. DOWNING. Mr. Chairman, with the permission of you and the committee I would like to submit the statement of Dr. William J. Hargis, Jr., who was here to testify last week but unfortunately was not able to be accommodated.

Dr. Hargis is the director of the Virginia Institute of Marine Science and the dean of the School of Marine Science of the College of William and Mary. He is one of the foremost scientists in oceanography and I hope that the members of the committee will have an opportunity to read his statement, and I submit his statement for the record.

Mr. ROGERS. Without objection it is so ordered. I am sure the members of the committee will be pleased to have this testimony.

(The document referred to follows:)

STATEMENT BY DR. WILLIAM J. HARGIS, JR., DIRECTOR, VIRGINIA INSTITUTE OF MARINE SCIENCE

I am convinced that a strong restatement of national purpose and a thorough review of marine science activities would be useful. Recent growth of marine science has been so rapid that some reorganization and regrouping would be productive. Because of the nature and history of marine science this will not be easy to accomplish properly and effectively. In contrast to space and atomic energy activities, oceanography has a long history and many Federal agencies, State marine laboratories, private institutions, and industrial establishments have developed or been assigned missions and acquired special interests in the field. General interest in space and atomic energy developed almost de novo.

As problems with the marine environment, long hidden by the vastness of the sea, itself, and obscured by society's terrestrial difficulties, increase and as public awareness of marine science grows, and knowledge of the seas expands and stronger national interest in oceanography develops, the essential unity of marine science emerges. With this emergence the interests and missions of the various agencies and institutions appear to, and—in some cases, do overlap and duplicate one another. This overlap and duplication have evolved quite naturally and independently of design on anyone's part.

Recent years have seen several efforts at defining a national purpose, laying out a national program and affecting coordination in marine science. The excellent efforts of the National Academy of Science-National Research Council, the activities of the Interagency Committee on Oceanography, and the proposals and actions of your own Committee on Merchant Marine and Fisheries in this direction are noteworthy.

As much as any other individualist, and most scientists are individualists, I am leary of coordination from outside or above. However, a definition and statement of purpose for the national oceanographic program and some coordination are probably necessary.

In deciding which agencies and institutions are to be consulted and/or coordinated the Congress must decide whether it wishes to deal with the national oceanographic program (total national oceanographic effort) or the Federal oceanographic program, which are two different things. The former includes all marine science activities and agencies, non-Federal and Federal, and is somewhat diffuse. The latter is confined to the oceanographic activities of various Federal activities, which constitutes a much neater package for coordination. Because this basic decision evidently has not been made, it may be premature to provide for a permanent council at this time without examining the matter more carefully.

I know that study commissions often are delaying mechanisms and that their recommendations often go unheeded but an effective study and determination of

the problems requiring correction still seems the best place to begin. We should know the patient and his ills before prescribing treatment. Several of the bills under consideration by the committee, and those by Congressmen Downing and Rogers come immediately to mind, are pointed in this direction.

Two cautionary notes should be added here. No matter what action is taken at this time, every effort should be made to protect the healthy, competitive aspects of marine science programs and avoid overcoordination and resulting stultification. Further, should a permanent body be established, careful arrangements must be made to provide mechanisms for continual review by members of the various sectors of the oceanographic community, non-Federal as well as Federal.

In effecting such legislation, I would respectfully urge the committee to:

(1) Encourage additional and increasing financial support of marine science, and marine engineering. Both need far more support than they are receiving and additional support is easily justifiable on many grounds.

(2) Make special effort to see that the biological aspects of oceanography are more adequately supported. In the broad sense, oceanography (better still—marine science) includes biological oceanography which is perhaps the most important segment to society and yet most support has gone in other directions. It seems to be very difficult to secure support for biological facilities such as marine biological laboratories, biological vessels, etc., partially because funds for these things seem to be scarce.

(3) Make sure that all sectors of the marine science community are represented in all stages of the deliberations and of the Council.

(4) Take great pains to point up the importance of the roles of State marine laboratories, colleges and universities, private institutions and industrial organizations in the development of knowledge about the oceans and their exploitation. (Certain statistics about State efforts are already part of the record of hearings of your committee.) Especially should the States be encouraged to support of marine science. Federal funds should supplement and not supplant State investments in oceanography.

I am extremely interested in the oceanographic activities of the committee and am willing to assist in its work. If I can do so, please call on me.

Mr. ROGERS. The next witness is Lt. Comdr. Don Walsh, former commander of the *Trieste*.

Commander, we are delighted to have you here and let the committee benefit from your experiences. I know you have had some unusual ones and we have admired your work a great deal. We are pleased to have you give testimony today.

STATEMENT OF LT. COMDR. DON WALSH, FORMER COMMANDER OF BATHYSCAPHE "TRIESTE"

Commander WALSH. Thank you very much, Mr. Chairman, it is indeed an honor and privilege for me to appear here again.

I am afraid I will have to apologize for not having a prepared statement in that my invitation was just received about this time yesterday.

Mr. ROGERS. We understand; that is perfectly all right.

Commander WALSH. About half a decade ago I had the great pleasure of testifying in some of the pioneering hearings held under the auspices of the Science and Astronautics Committee under the sponsorship of my Congressman, Mr. George Miller. In this past half decade I have watched with great interest the ebb and flow of congressional interest in the ocean sciences and their organization. The winds of change are blowing now and it is certainly expected by the entire oceanographic community that we will have some positive policy and direction from this body's deliberations.

As a, perhaps self-professed, champion of ocean sciences and technology, I am in the somewhat ludicrous position now of being on the

program at the time when you should be in executive session and perhaps am delaying your deliberations, but I would like to take—

Mr. ROGERS. We probably will not go into executive session today, so feel free.

Commander WALSH. Thank you, sir; I hope it is not my fault.

I would like to take the position perhaps of a summarization. I have listened with interest in the last 3 weeks to your hearings. I am greatly interested in what you are doing and the great progress that you have made but am concerned about a couple of points which I thought I would like to propose at this time.

One, is that I feel that the real issue here is somewhat lacking in emphasis, though certainly not in the verbiage of the many bills that have been presented. In reading through these this morning, the preamble or the first sections are very accurate, but I felt that in the testimony we have not developed the principal issue involved, and this is the projection of our national sovereignty into the world ocean.

We have talked a great deal about resources, from platitudes to very specific citations of ocean resources, both food and mineral; we have alluded to the military aspects of oceanography in various areas; but I feel the real impact is: Is the United States prepared to project its national sovereignty into the world ocean?

Is that not the real question here today and through these hearings?

That it is, is certainly reflected by the level of activity that we are now conducting.

The Navy, in ocean sciences and technology, and I am emphasizing technology also, is supporting, I would say, up to 80 percent of our national effort because we, that is the Navy, represents this projection of our national seapower into the world ocean.

I think this point should be emphasized.

I find no fault, of course, with the legislation which recognizes this. I am just saying that in the hearings I left that we might have been somewhat silent in this aspect, and the emphasis really is here, because without a strong seapower the considerations of the use of the sea, of the ocean and sea resources, are really meaningless.

We are a traditional seapower, and I feel that this seapower of our Nation has been manifested in cycles. We had a cycle when President Theodore Roosevelt created the great white fleet and emerged on the world scene as a great seapower.

Another cycle was the buildup before World War II, and now I feel perhaps your deliberations are contributing considerably to a new resurgence of seapower, because I mean seapower not only as a military projection of our national power, but also a strong merchant marine, a strong fishing industry, and a strong resources industry involved in the oceans; but principally it is a projection of our national power.

Another point that concerns me is that we have, in these deliberations, heard a great deal about ocean sciences, but sciences without any application are—I will not say “worthless,” that would be too harsh a term—but without application they are somewhat academic.

I see our national program as analogous to an object sitting on a tripod. One leg of this tripod is the environmental science, ocean-

ography, which we certainly have covered to a fine degree in these 3 weeks of hearings.

The other two legs are human resources, trained personnel, and of course, ocean technology.

I was very pleased with Professor Stephan's statement yesterday which emphasized ocean technology and engineering.

Again, I recognize that many of the bills have cited these deficiencies, or let me say in a different sense, the need to have greater efforts in this area, but I wonder if it has been adequately brought out in the hearings.

Human resources—very important—we are only turning out and have been for several years, about 20 Ph. D's a year in oceanography. It takes nine Ph. D's to make up for losses of people leaving the profession.

To maintain a 9-percent growth in the field of human resources, that is trained ocean scientists, and we are just talking scientists now, we need at least 45 a year. Today, two-thirds of our oceanographers are coming from outside professions.

In other words, we need more schools; we need more facilities for instruction.

On the technology side we have to be careful when we draw historic parallels with the space program because the space program was able to utilize the great technological base of our aviation industry which built almost half a million aircraft in 1944 alone. We do not have this technological base, this vast technological base in what I would like to call "inner space."

We have to build it, we have to recruit people from the other areas, and I think industry has shown an amazing good faith in the future of this business.

Great segments of the aircraft industry are vitally interested in ocean sciences and technology. This is a very important area, but remember, without human resources the other two areas, science and technology, just will not go.

A very real manifestation of our need to have a very highly developed ocean technology is very current in the news. The loss of this jetliner over the lake near Chicago—now, here is a type of aircraft that represents a huge capital investment on the part of the airlines and the aircraft industry.

We are unable really to—we have not the technology, the good technology to go out and work in just a couple of hundred feet of water to recover this aircraft to find out what the causes were. And this is a tremendous problem to our aircraft accident investigators—being able to work in the water.

We have a good historical example of the importance of this. This is not just a remote case, but the British Comet Airliner. As I recall, the real solution came from the one that was recovered from the sea floor off Italy where they discovered the fatigue cracks in the pressurized cabin were the cause. In other words, metal fatigue causing the cabin to crack and blow apart after it was pressurized after a certain number of cycles, and this was based on wreckage recovered from the water.

Here is a very real and timely requirement for ocean technology. There are legions of employments, both civilian and military that

are important, but we must have a vigorous ocean technology program, and this must be considered not as a separate bill or separate area but as an integral part of any national plan, and we have talked, I feel, too much, about oceanography here as an entity unto itself.

We must relate it to our national goals, we must relate it to the application of this knowledge, technology, and finally, we must consider human resources, because education in this country is receiving a great deal of interest. Currently I am in graduate school myself in oceanography at Texas A. & M. University, and I sense the interest of these young people but I also feel that we must develop more facilities.

The final area I would like to present to you is that there has been, I feel, something of a critical tone, and I may be wrong, just a thread through these hearings that we are somewhat critical of what has been done to date.

I would take the other tack and say that we should be very grateful to this very small band of dedicated scientists, administrators, and technologists who have carried the great load since, say, 1958, when oceanography and ocean technology really began to move in this country. Through their own inertia they have worked in the darkness doing what they thought was best for the Nation. From this we have seen our national programs triple or quadruple in these 7 years. Despite lack of formal organization we have done well.

I think it is amazing that we do not have to take our hat off to any nation as far as our progress in inner space is concerned. We are not involved in me-tooism, we are not trying to catch up with a sputnik clamor; we evolved, and our program is competitive with any program in the world.

Granted, we have finished I would say, the first generation of growth, and now it is time to organize, it is now time to define our goals, it is now time to provide an essential framework, a skeleton upon which to really take off.

I do feel that the commendation from this committee would be in the best interests of all of these dedicated men who have tried to play it the way they saw it. Of course we have had proliferation of programs as we grew up in the dark.

It would be a very fine thing, I think, if this committee went on record as acknowledging and thanking the efforts of these unsung heroes who work in the clamor of the space age, because we certainly are in the space age today, who felt that our real future lies in the ocean. I doubt that much wheat or food resources will come from space; and I wonder what the cost of mineral resources from the moon might be by the time they are shipped back to earth.

I believe that the United States should be engaged in two world-important programs—one, our space effort, and the other, our "inner space" effort.

On this note I would like to complete my testimony and I thank you very much for the opportunity to be here.

Mr. ROGERS. Thank you very much, Commander Walsh, that is an excellent statement and I think you have pretty well summarized for us here a lot of the testimony that has been given.

I think there has been a critical note, I would agree with you, come forth in the hearing throughout the questioning, not so much as criti-

cizing what has been done—we have made great progress and this committee recognizes that, but a critical note that we are not really ready to move, people have not grasped the vision of what can be done yet.

You see, in looking at the background, you may not be aware of it, but this committee 2 years ago passed a bill that we are still considering now.

Commander WALSH. Yes, sir.

Mr. ROGERS. The Senate passed it, and then because of some who were in the field in Government, asked the President not to sign it, and he vetoed it.

Commander WALSH. Yes, sir.

Mr. ROGERS. So, we have some reason for some criticism, not that we are trying to underplay the great efforts that have been done, and I would agree with you, we owe a great debt of gratitude to those who have devoted their lives to this field and are doing a magnificent job, but we want to do more and urge them and try to be helpful, and the Congress has felt the Congress must step into this field very firmly in order to help give some direction and that is the purpose of these hearings and we intend to accomplish that.

Commander WALSH. Yes, sir; and I see that the great bulk of these people, these dedicated workers, have long shared your frustrations and I think that the great bulk of them are completely sympathetic to the purpose of this legislation.

Mr. ROGERS. I think this has developed, we were pleased, particularly when we got them to give their personal views.

Commander WALSH. Yes, sir, I think that is very important.

Mr. ROGERS. Mr. Casey?

Mr. CASEY. I, too, want to compliment Commander Walsh on his statement in helping us get a good perspective. Having observed these hearings as you have, of course, you are in a position to kind of help us analyze this from a more objective point, I think, than we have ourselves.

However, with reference to this attitude that seems to be predominant about the kind of argumentative or critical—of course, I have not been up here as long as some of them, but unfortunately I notice that some of the ones that get the most done are the meanest members, which I think is poor psychology.

I really do, and every once in a while I will tell some agency that I have been working with them, telling them I want to work with them to accomplish something, and along comes some member who gets on the floor and just chews them out and begins to ride them hard and the next thing you know he gets it accomplished.

He gets all the credit and they appreciated my cooperativeness, but nevertheless they let him take the credit for having pushed them into doing something.

It is a sorry system. Frankly, I think things should be accomplished by sitting down and discussing them in a gentlemanly manner, but you always have the conflict in our system between the legislative branch and the executive branch, and I do not think it will ever end as far as that is concerned.

As the chairman here pointed out, the bill we passed that was vetoed was in my opinion very mild compared to most of these we have now.

Now, if we generate enough interest they may get something stronger and it may not be to the best interest.

Now, what we are trying to find out is what would be the best interest.

You will notice the bill that passed the Senate, Mr. Magnuson's bill, he is a very influential gentleman in that body being chairman of the committee that he controls, and when I say controls, I mean controls.

And he passed it with a voice vote.

Now, he may be in a position to say, this is going to be it. And if we should pass his bill, and, there has been not a word of support for his bill before this committee, but I dare say that if he is sufficiently strong in his support for his particular measure, it will not be vetoed, because again, it is "who holds, the meanest situation." [Laughter.]

Commander WALSH. Right. Many excellent studies have been done; this was brought out in the hearings. I think most of the basic pick and shovel work has been done in developing an important and viable program though there have been certain disagreements and frictions.

No program has emerged as the victor, and I think this is a most useful function you are serving here, because I see in most of your legislation a study of existing efforts; in other words, we should have a "study of the studies."

Why go back to the fundamentals? This has been done by many agencies—industry right now, the National Security Industrial Association, is involved in a study of ocean sciences and technology from an industrial-based point of view.

Excellent work has been done, but we need somebody now to take all of the products of these essentially good efforts and develop a viable, workable, national program in the best interests of our country, and I think that the point was well brought out earlier in these hearings that if the legislation had passed—had passed 2 years ago—we would have had a 2-year-old yardstick by which to measure your current deliberations.

You do not have this yardstick so I feel the recommended approach to this legislation is very wise, and that is to survey the situation at various degrees and levels, but not to leap right into an omniscient Federal agency or new department.

Mr. CASEY. (presiding). I do not want to belittle the fact and the observation you know, that we do owe a great deal of credit to accomplishments of this small group and I think it is even more magnified when you look, you sat here and listened to the mechanics of the very fouled-up methods of accomplishing something.

They have fine methods as far as determining in the executive department, but after they determine something the push is gone; they go their separate ways. That is the main fault, I think.

Commander WALSH. These human resources, we must husband these resources because you cannot legislate scientists into existence, it is impossible.

Therefore, these limited resources we have we must use to the best effectiveness within our power, and this is one of the strongest arguments for your deliberations.

At best we have 3,000 oceanographic scientists in the United States, at least, depending on whose count you take, 1,500, and this in-

cludes graduate students working in the field. There are 3,000 people in our country charged with exploration of 71 percent of our planet.

Now, if that is not an imbalance, I have never heard one, and if that is not the opportunity for young people to get into a field, I have never heard of an opportunity.

Mr. CASEY. I certainly appreciate your observations and I think they will be most helpful in generating more interest, and I just hope that we can accomplish some of the things you pointed out here to stimulate development of some, particularly the human resources that you referred to, because when you fall short of human resources you may have all the material to work on, but if you do not have the people to develop it, you are in poor shape.

Thank you, very much.

Commander WALSH. That is right.

Mr. CASEY. Mr. Tupper?

Mr. TUPPER. Mr. Chairman, I would just like to thank Commander Walsh for an excellent extemporaneous statement, I think it shows considerable expertise in this field and when printed it will be very interesting reading for all members of the committee and hopefully the Congress.

Commander WALSH. Thank you, Mr. Tupper.

Mr. CASEY. Mr. Downing?

Mr. DOWNING. Mr. Chairman, I share the views in his statement. Several of us on this committee had the privilege of going down in an experimental submarine 150 feet this year. How far down did you go down in the *Trieste*?

Commander WALSH. Approximately 7 miles. I would like to say that this is a good example of, shall we say, non-me-tooism in that in 1958 we purchased the bathyscath *Trieste*, in 1958 the Trieste Group at the Navy Electronics Laboratory in San Diego, Calif.—proposed a program to the Navy Department that we take it to the island of Guam and have a try at conquering, I suppose in exploration jargon, conquering the deepest known place in the ocean.

Mr. DOWNING. Why did you stop at 7 miles?

Commander WALSH. That is all there is. That is the deepest place in the ocean.

Mr. DOWNING. In other words, you hit bottom?

Commander WALSH. There are finite limits as far as depth exploration goes in the ocean. In the best tradition of exploration, by the way, we planted the U.S. flag in the deepest place in the world ocean, much as Sir Edmund Hillary put his country's flag on top of Mount Everest.

This record was set by the U.S. Navy in the name of the United States and we placed our flag there at that time.

Mr. DOWNING. How far did you go off Guam?

Commander WALSH. About 200 miles, this is the Marianas Trench. The low points in the Marianas Trench, the two principal ones are the Nero Deep and the Challenger Deep. The deeps usually are named after the survey ships that discovered them, and this Challenger Deep is named after the British survey ship H.M.S. *Challenger*, which found this point in the early 1950's; it was later checked out by the Russians and then by our own Scripps Institution of Oceanography.

They all agreed it was the deepest place. I think that none would have agreed that we would have been along a few years later to go down in it.

Mr. DOWNING. How deep is that?

Commander WALSH. 35,800 feet, approximately. This was over 5 years ago, so you will have to forgive me—

Mr. DOWNING. Well, that is still, what, 7 miles, 8 miles?

Commander WALSH. It is roughly 7 miles—closer to 6½, I suppose.

Mr. DOWNING. And the *Trieste* is physically capable of going to that depth?

Commander WALSH. Yes, sir; if we could find a deeper hole, and I doubt it, we could go with that craft to some 40,000 or 50,000 feet with some degree of safety.

Mr. DOWNING. Are you able to—I do not mean to take the time of the committee, Mr. Chairman, but it is interesting.

Were you able to do anything at that depth? By doing, I mean were you mobile or could you—

Commander WALSH. Yes, sir; the craft enjoys some mobility but let me preface this statement by saying that the venerable *Trieste I* has been retired after 10 years of active service.

In late 1963 she was retired and is now laid up at San Diego, Calif., having been replaced by the *Trieste II*, which is entirely U.S. built.

Now, the *Trieste I* did have limited mobility, and we are talking in the order of yards. However, when we landed on the sea floor at this depth the bottom sediment was so fine that it went up in a cloud before the window and we were essentially blind for our whole stay on the bottom of 20 minutes.

Just before we landed we did see a small shrimp form, and a flat fish, something like a halibut.

Mr. DOWNING. What would be the pressure at that depth?

Commander WALSH. Close to 8 tons per square inch. The total pressure on the cabin was about 200,000 tons. The cabin being a small sphere similar to the cabin of a stratosphere balloon.

There was a two-man crew; myself and Jacques Piccard, the son of the inventor of the bathyscaphe.

Mr. DOWNING. And you saw sea life at that depth?

Commander WALSH. Yes, sir; this probably was the most significant scientific payoff of that dive.

Mr. DOWNING. Were these unusual forms of sea life?

Commander WALSH. No, sir; rather conventional.

I might add that neither Mr. Piccard nor myself are qualified ocean scientists, and although having done much of this work we are a little short in that particular area. This is why I am going to school now, to get some "calibration."

Mr. DOWNING. That is interesting.

How long did it take to get down?

Commander WALSH. It took about 5½ hours to get down and about 3 hours to get up. But I have been told by my engineer friends that if you took a Civil War cannonball and dropped it in the water, it would take about an hour to reach bottom, so I suppose we were doing fairly well.

Mr. DOWNING. Where could you store 7 miles of cable which would permit you to get to that depth?

Commander WALSH. Now the *Trieste*, the bathyscaphe is an underwater free balloon, it is entirely free of the surface, this was the thing that the inventor of the bathyscaphe, Auguste Piccard developed.

We all recall Dr. Beebe's famous descents in the bathysphere near Bermuda in the 1930's, in a craft that was cable tethered to the surface ship. Of course, it was somewhat linked to the fortunes of the surface ship. If there were 8-foot waves at the surface that cabin went up and down 8 feet.

As you can imagine this is somewhat difficult for a biologist to observe the life forms if he is moving up and down 8 feet. But the bathyscaphe type of undersea research vehicle is independent of the surface and therefore only limited in depth as to the strength of your cabin and not by any surface considerations.

The real importance of such a device among many devices in ocean sciences and technology is that these little machines, these deep research submersibles, can take the trained mind and trained eyes into the environment.

Here you have the strange situation in the world ocean where scientists are not able to directly observe that which they wish to study. For many years they have had to stay on oceanographic ships, at the surface interface, and lower artificial "eyes" and "hands" into the ocean in the form of cameras and dredges.

Now we can take that man directly into the environment and let him see firsthand that which he wishes to study.

Mr. DOWNING. We used the *Trieste* in the *Thresher* disaster but not with much success.

Commander WALSH. We used both *Triestes* here; the *Trieste I* went in 1963 immediately after the submarine was lost. The following year when the *Trieste II* was doing some survey work in that area they did come across other remnants of the submarine.

Unfortunately, I was not attached to the program during this time, and I know very little about it.

Mr. DOWNING. Thank you very much, Commander.

Commander WALSH. Yes, sir.

Mr. CASEY. Thank you very much, Commander.

Mr. Dow?

Mr. Dow. Yes; I would like to commend you, Commander, on a very splendid statement. You know technical men often have the reputation of being a little narrow in their sights, in their vision of the broad picture, but I would say in your case you certainly display not only a great technical competence but also a vision of the whole picture and statesmanship involved in this oceanography program.

I would like to compliment you on that, and I would like to predict a great future for you in this work.

Commander WALSH. Thank you, sir.

You are very kind.

I will have to admit as to a certain penchant for a field of oceanography I like to call political oceanography, because this is exactly what we are involved in right now. We have the five basic fields of oceanography: Geology, biology, and so on; but I feel this is one more to be added to the list. Political oceanography, which concerns itself with the administration of oceanography and the national and international legal problems involved in the utilization of the world oceans, is the area that I consider my field.

Mr. Dow. You are certainly right.

Thank you.

Mr. TUPPER. Mr. Chairman, if I may, if Commander Walsh has no objections, I would like to make a part of the record the biographical information on Commander Walsh. He is a very modest man, and I think that the record should show he has had the Legion of Merit Award by President Eisenhower and a great many significant awards. I think this might be very helpful as part of our record.

Mr. CASEY. It also shows that he chose Texas A. & M. to further his studies.

Mr. TUPPER. I think so.

Commander WALSH. It also shows I am an admiral in the Texas Navy, Mr. Casey.

[Laughter.]

Mr. CASEY. There is certainly no objection to putting that into the record.

(Information referred to follows:)

BIOGRAPHICAL INFORMATION: LT. COMDR. DON WALSH, U.S. NAVY

Lieutenant Commander Walsh was born in Berkeley, Calif., and attended schools in the San Francisco Bay area until his graduation from Alameda High School in 1949. In 1950 he entered the Naval Academy from which he graduated in 1954.

His naval career began in January 1949, when he enlisted in the Naval Air Reserve at Naval Air Station, Oakland, Calif. He received his appointment to the U.S. Naval Academy through the Naval Reserve in 1950. After graduation from U.S. Naval Academy with the class of 1954 he participated in the Bermuda yacht race on board a Navy sailboat before reporting to Coronado, Calif., for Naval Amphibious Warfare School. After 2 months at this school he reported to his first ship, the U.S.S. *Mathews* (AKA-96), an attack cargo ship. During 2 years in the *Mathews*, Lieutenant Commander Walsh held many jobs on board, ending his tour as the ship's navigator. In 1956 he was ordered to the U.S. Naval Submarine School at New London, Conn., for the 6-month course of instruction for submarine duty. In January 1957 he reported aboard the submarine *Rasher* (SSR-269) at San Diego, Calif., where he served until September 1958. During this time he qualified in submarines and was promoted to lieutenant. In September 1958, he was ordered to duty on the staff of Commander Submarine Flotilla One in San Diego where he served until March 1959 when he was ordered to duty as officer in charge bathyscaphe *Trieste* at the Navy Electronics Laboratory, San Diego, Calif. After a 3½-year tour with the *Trieste*, Lieutenant Commander Walsh was ordered to the submarine *Sea Fox* (SS-402) at San Diego in the summer of 1962. During 9 months aboard the *Sea Fox* he served as the operations officer and navigator. In March 1963 he attended Prospective Commanding Officer School for submarines and in April qualified for command of submarines. April also brought another change of duty when he was ordered to report to the submarine *Bugara* (SS-331) for duty as executive officer. He was detached from this San Diego based ship in November 1964 in order to accept a scholarship in oceanography at Texas A. & M. University in College Station, Tex. He reported to Texas A. & M. in mid-January 1965.

Lieutenant Commander Walsh is married to the former Joan Betzmer of Carlsbad, Calif., and they now live at 405 Fairway Drive, Bryan, Tex., 77803.

One of the high points of his career was his tour as the officer in charge of the bathyscaphe *Trieste*. As pilot of the Navy's first deep submersible he helped pioneer deep ocean research in the United States. Though many important diving operations were conducted during his 3½ years with this program the best known of these was the nearly 7-mile-deep dive made into the deepest known part of the ocean. This dive took place in January 1960, in the Challenger Deep located in the Marianas Trench some 200 miles southwest of the island of Guam in the western Pacific. This dive was the final dive in a 6-month series of deep dives known as Project Nekton. The four principal pilots of the *Trieste* during

this series were Lieutenant Commander Walsh; Lt. Comdr. Larry Shumaker, U.S. Navy, the assistant officer in charge; Dr. Andreas B. Rechnitzer, the chief scientist; and Jacques Piccard, the son of the *Trieste's* inventor. The deepest dive was made after a series of dives to 18,000 and 24,000 feet. On the 23d of January 1960, Lieutenant Commander Walsh and Jacques Piccard completed the 9-hour dive to 35,800 feet, and this marked the end of Project Nekton I. In the summer of 1960 the project team, less Mr. Piccard, returned to Guam to carry out Project Nekton II which involved deep ocean scientific studies to depths of 18,000 feet. This 5-month project terminated in the late fall and the *Trieste* was returned to its home base at Navy Electronics Laboratory at San Diego, Calif. From this time until his detachment in July 1962, Lieutenant Commander Walsh engaged in local diving operations with the bathyscaphe for Navy Bureau of Ships scientific requirements.

In recognition of this pioneering work in "inner space" the principal members of the first *Trieste* team were awarded many different awards and citations. These were not for individual accomplishment but for recognition of a U.S. "first" and of the whole team who had worked hard to make the initial program a success. For his part as the military head of this project Lieutenant Commander Walsh was awarded:

The Legion of Merit by President Eisenhower.

A letter of commendation from the President.

Gold Medal of the City of Trieste, Italy.

Distinguished Service Medal from the Theodore Roosevelt Association.

Richard Hopper Day Memorial Medal from the Philadelphia Academy of Natural Science.

Chicago Geographic Society Gold Medal.

The Golden Plate Award from the American Academy of Achievement.

One of the Ten Outstanding Young Men of the Year (1960) by U.S. Junior Chamber of Commerce.

In addition to the foregoing, there have been many awards in the form of citations, keys to cities, and honorary appointments to various societies and offices.

Lieutenant Commander Walsh has utilized his unique background as the basis for speaking and writing on the importance of oceanography and the oceans. He has given over 700 speeches, radio, and TV programs on this subject and its variations; in addition he has authored nearly 30 articles and papers on this area. His principal interest is in developing greater public interest in the importance of inner space and encouraging young people to enter the field of ocean science and technology as a career.

Believing in the importance of continuing education, Lieutenant Commander Walsh is completing postgraduate work in the field of political science. He is currently in graduate school on a scholarship sponsored by Texas A. & M. University in the Department of Oceanography and Meteorology. In addition he is studying American law through work with a correspondence institution. His interest in these seemingly varied areas is the application of scientific technology, law, and political science to the 71 percent of our planet that is covered by water.

Lieutenant Commander Walsh has membership in several professional societies which are listed below:

The Naval Institute.

The Explorer's Club.

The International Oceanographic Foundation.

The Marine Technology Society.

The American Aviation Historical Society.

The Air Force Historical Association.

The Naval Historical Foundation.

The American Academy of Political and Social Sciences.

Honorary life member of the National Geographic Society.

For free time activities he is interested in flying, boating, photography, skin-diving, and travel. He has had his own airplane and a 30-foot ketch; however, travel is the principal leisure interest. He has made five trips to Europe, five to the Far East, visited the Arctic and South America. Since his marriage 2 years ago he and his wife have driven and camped up into the interior of Alaska to within 50 miles of the Arctic Circle, and this past December they spent 2 months camping in Mexico, visiting 25 of the 29 States in that country. As an outgrowth of this hobby he also lectures on his travels using colored slides that he has taken during the various trips.

More biographical information on Lieutenant Commander Walsh can be found in the current International Who's Who and in the junior chamber of commerce publication "Outstanding Young Men of America."

Mr. CASEY. Commander, again, I want to express my appreciation, of course, you could tell you were interested in the political aspects when you were talking about the sovereignty of the ocean; I hope sometime you will have an opportunity to observe as I did, one session and see that you really get into politics when you try to get all these countries to agree on territorial waters, fishing waters, and what have you.

The fact that we have had one agreement so far which as I understand it gives the minerals to anyone who has the capacity to recover them, but we are still in doubt as to what is above the actual laws or—there is no agreement, from the floor of the ocean on up.

It is a fascinating study and the more you get into it the more interested you are going to be.

Commander WALSH. Yes, sir; I would like to interject at this time, I think perhaps the American people are not aware of the fact that as of June 1964, when the convention on the Continental Shelf came into force, as a force of international law, that the United States gained sovereignty over an area of the Continental Shelf about equivalent to three times the size of France.

A major territorial acquisition for our country, and of course, this is why it is so important that we now assess its value and worth.

Mr. CASEY. The man on the street thinks that 3 miles of the territorial waters is all. They have to realize that territorial waters is whatever that particular country thinks it can get away with.

Commander WALSH. That is the situation today; yes.

Mr. CASEY. Peru is trying to claim 200 miles.

Commander WALSH. There are 4 nations claiming 200 miles.

Mr. CASEY. Thank you ever so much. If we have no further witnesses this morning, we do not have a quorum so we cannot go into executive session.

(The following material was submitted for inclusion in the record:)

STATEMENT OF S. DILLON RIPLEY, SECRETARY, SMITHSONIAN INSTITUTION

During late 1961 Drs. Remington Kellogg and A. C. Smith, then Directors of the U.S. National Museum and of the Museum of Natural History, agreed with a suggestion of the Interagency Committee on Oceanography to increase the activity and expenditures of the Museum of Natural History in oceanography. Oceanography was defined in the Museum as marine natural history, to include all of the activities of the Division of Mollusks, Fishes, and Marine Invertebrates, as then constituted. Provision was made for appropriate increases in staff in order to permit the Institution to more actively participate in the national oceanography program.

It occurred to Dr. Smith in early 1962 through frequent discussions with the curators of the Marine Divisions (Drs. Harald Rehder in mollusks, Leonard Schultz in fishes, and Fenner Chace in marine invertebrates) and with the newly employed chairman of the Department of Zoology, Dr. Horton H. Hobbs, Jr., that the oceanography program should not only revitalize the existing systematics efforts in the museum but also examine the Smithsonian Institution's capability to provide leadership in related areas not adequately covered in the then existing organization of the Museum of Natural History.

Two new tradition breaking organizational concepts were approved in the first 2 months of 1962. First, an advisory and coordinating position of Assistant Director for Oceanography was established in the Museum of Natural History to (1) aid museum staff members in their marine research, (2) maintain liaison

with oceangoing vessels and scientists to collect biological materials, (3) help with recruitment of outstanding marine sediment and taxonomic scientists, (4) represent the Smithsonian Institution on various committees and councils concerned with oceanography, (5) bring the Smithsonian's oceanographic plans and needs to the attention of scientists and administrators elsewhere, (6) act for the Director in his absence, and (7) plan, develop, and operate for the Institution a sorting center for marine biological and geological materials.

The second new concept is embodied in item (7) to establish a sorting center for marine collections. Traditionally the Institution had avoided most of the efforts to orient itself toward services. The original charter called for the increase and diffusion of knowledge among men, loosely defined as to do research and publish it. This new activity was a deliberate response to a felt need; to coordinate the collecting of natural history specimens from the ocean and to provide service in several ways, thus insuring that the collections were processed for their intrinsic scientific value.

The Institution has developed its modern oceanography program generally around the concept of exploratory oceanography. It is concerned with the kinds, distributions, and populations of organisms and sediments in the world ocean. It has an active program to learn all about the organisms and sediments encountered in the ocean and to insure that the maximum scientific information is made available concerning these objects. Thus the activities of the Institution generally revolve around the collecting of specimens.

Scientists in the Institution participate in collecting expeditions to all oceans. They engaged in collecting efforts on the National Science Foundation's vessels *Anton Bruun* and *Te Vega* during the international Indian Ocean expedition. They collected specimens on the Woods Hole oceanographic vessel, *Chain*, and on the Bureau of Commercial Fisheries vessel, *Geronimo*, during the international cooperative investigations of the tropical Atlantic. They continue to collect on the National Science Foundation's Antarctic program vessel *Eltanin* in the Antarctic. They have participated in a South Atlantic cruise of the National Aeronautics and Space Administration. They have collected on ships of the Scripps Institution for Oceanography, the University of Miami Institute of Marine Sciences, the Johns Hopkins University Oceanography Department, the Columbia University's Lamont Geological Observatory, and the U.S. Coast and Geodetic Survey. The Institution's level of effort for oceanography in fiscal year 1966 will be about \$1,400,000 (\$800,000 appropriation and \$600,000 estimated from grants and contracts).

As the legal repository for collections made with Federal funds the Institution receives collections from the Coast Guard, the Geological Survey, the Bureau of Sports Fisheries and Wildlife, the Navy Department, the Army Coastal Engineering Research Center, the Atomic Energy Commission, the Public Health Service, the Department of State, and other agencies as well as from those listed in earlier paragraphs.

In its new role the Institution not only actively collects specimens and passively receives and stores them, but plays a part in the planning and staffing of expeditions. Although this role is new in this century and in oceanography, the Institution provided such expeditionary services as equipment and instructions for collecting and staff participation in most of the expeditions opening up the Western United States in the 1850's and for some years thereafter. The recent development in oceanography is thus a new application of the traditional activities of the Institution.

The Institution plans and supplies labels for expeditions; sends instructions for special collecting procedures; suggests and supplies preservatives, containers, packaging, and shipping procedures; subsidizes the shipping costs and provides a distribution center for subshipment in the United States; and, sends junior staff members on collecting expeditions with senior staff members of this and other agencies and institutions to provide the maximum return of specimens for the money invested.

The concern of the Institution with collections extends to the equipment used. In order to study the populations of organisms of the ocean, it is necessary to use quantitative measures of abundance. Acute awareness exists of the primitive state of instrumentation for marine population evaluations. Wherever and whenever possible the Institution encourages the activities of any public or private agency to engage in the improvement of equipment for collecting use. It utilizes experimental equipment and participates in evaluations of its effectiveness. It offers counting and other services for instrument testing. It consults

with the developers of devices and tools for collection and assists research in such developments.

Recently it has become feasible to consider the use of undersea vehicles for evaluation of subsurface populations of organisms and sediments. Scientists from the Institution have participated in familiarization and research dives of Electric Boat's vehicle *Asherah (Star II)* and of Cousteau's *Diving Saucer*.

Requests have been made for experience with *Alvin*, *Aluminaut*, *Trieste II*, and other existing vehicles as well as for the opportunity to use Seabed I and Seabed II facilities of the Navy as diving bases for marine biological research. It has been reasonably well established that utilization of such facilities for research is most helpful to biologists and geologists and geophysicists; all are within the direct interest and responsibilities of the Institution. The use of these vehicles and similar new devices is restricted only by funding limits.

Although the above responsibilities are important, the strength of the Institution lies in its unique competence to gain scientific information from mixed, multiple collections of miscellaneous specimens from the environment. The Institution makes a necessary and basic contribution to any program concerned with the biology and geology of the oceans by establishing the identity of the specimen collected. It provides unique opportunities for the establishment of a program of environmental forecasting by focusing attention of mathematicians on the collections.

This function, of course, is not restricted to the marine field. The collections of the Institution are the largest body of reference materials in the world. Something in the order of 30 millions of names have been given to biological specimens. The tedious but essential job of applying the proper name to an unknown specimen is a major effort of the Museum of Natural History. Specimens collected are named and arranged for the convenient reference of scientists and laymen. New objects are described and named, compared with older ones and grouped for convenience and accessibility. Basic premises are developed concerning the relationships of superficially different organisms. Evolutionary trends are described and predicted.

Scientists in the Institution produce field guides and monographs of the marine organisms for use in related biological research. Organisms and sediments are studied as they provide information on the abundance of resources for the Bureaus of Commercial Fisheries, Sports Fisheries and Wildlife, Mines, Geological Survey, Parks, and Recreation of the Department of the Interior. The organismal and sedimentary information produced in the Institution is basic to the mission of the National Aeronautics and Space Administration in its search for and predictions of life and conditions on other planets and of survival of life and conditions on other planets and of survival of life support systems on interplanetary missions.

Studies of pollution of the seas by the Public Health Service and the National Institutes of Health rest on knowledge of species being obtained by Institution scientists. The Institution studies and stores the pre- and post-Bikini collections of the Navy and the Atomic Energy Commission and it must provide species information for critical tests of environmental pollution by fallout, nuclear explosions, and the operations of nuclear stations, and vehicles.

Sound propagation studies of the Navy's Bureau of Ships, Oceanographic Office and Office of Naval Research depend on knowledge of biological species taken from the reference collections, and monographs of the Institution. Fouling and bioluminescence studies basic to the Office of Naval Research, the Maritime Administration, the Coast Guard, the Coast and Geodetic Survey require support and identifications by the Institution.

Basic biological and geological research of all agencies of the Federal Government as well as of universities and all private agencies depend to a great degree on the adequacy of reference collections in the Institution and the ability to provide fundamental statements of the relative abundances of organisms in all parts of the world ocean. Only in the National Museum and its State, municipal, and private equivalents is provision made for the long-term maintenance of collections accessible for comparative and cooperative research. This obvious function requires a continuing viable collection-oriented research effort.

In organizing the Institution for expanded modern marine research full consideration was given to the support needs of other agencies, and the overall status of biological programming in the Interagency Committee on Oceanography in which the Institution maintains membership.

Through its membership in the ICO and chairmanship of the ICO research panel, the Institution has been able to anticipate the needs and become aware of

the plans of other agencies in biological and geological research and to direct its own growth to areas consistent with or complementary to the missions of other agencies. The total effort of the Institution has been included in the ICO's national oceanography program, beginning in fiscal year 1963 and is subject to review by the ICO and its panels, as well as by the Federal Council for Science and Technology and the Bureau of the Budget.

The unique situation of the Smithsonian constituted by statute as an establishment which administers both Federal appropriations and private funds from endowments, grants, and contracts, has enabled it to maintain the flexibility necessary to accommodate varied public and private interests in its marine program. Funds have been received from the Atomic Energy Commission and the Navy for curating and study of collections made prior to the Bikini experiments. Funds have been received from the Link Foundation for production of a brochure, "Opportunities in Oceanography." With moneys from the U.S. Antarctic research program of the National Science Foundation, the Institution has sent scientists and collections personnel to the Antarctic and processes and records Antarctic collections.

A National Science Foundation grant and an ONR contract provide assistance for the sorting and distribution of specimens as a part of the International Indian Ocean Expedition. Assistance from the Bureau of Commercial Fisheries and the Office of Naval Research have helped with sorting and study of collections of the International Cooperative Investigations of the Tropical Atlantic. The Naval Oceanographic Office has helped fund sorting of specimens within its interest. Private individuals have donated sums of money to the Institution for special projects such as fieldwork in marine paleobiology, trips to dive on undersea vehicles, collection of mollusks in the mid-Pacific and collecting in the Caribbean.

When called upon by appropriate Federal agencies the Institution has engaged in essential classified marine research supported by the Department of Defense; however, this type of research has never been a substantial percentage of the Institution's program.

From the beginning, the Institution has been dedicated to research and involved in educational activities in cooperation with universities and other institutions of higher learning. In the marine sciences a number of the Institution's staff members have participated in educational programs of U.S. universities and have served as experts in foreign educational efforts. Recently, in recognition of the acute shortage of students of taxonomy and of trained systematists, and recognizing the danger of separating scientists from graduate students, the Institution has arranged cooperative programs with several universities, including Duke, Johns Hopkins, Kansas, and George Washington, and contemplates a relationship with many others, to enable the Institution's scientists to train their successors. Although the man-year investment of any one scientist in such activities may be slight, the sum of the activities of the marine scientists will be a significant contribution to graduate education of new systematists and real "insurance" that the national collections are studied.

Recruitment of new scientists into the Institution's marine program has been reasonably successful. An outside advisory committee was convened in late 1962 to recommend an appropriate Federal level of effort in the Institution. The committee believed, and that belief is shared in the Institution, that about 100 scientists are required to provide the necessary competence to serve the Nation's oceanography efforts through 1970. Only about 12 of these scientists were employed in fiscal year 1962 and in fiscal year 1966, 46 scientists are utilized in the program.

As mentioned previously, the Institution in fiscal year 1962 had research competence in marine invertebrates, mollusks, and fishes. Scientists have now been employed with competence in various fields so that divisions of the museum having marine scientists include crustacea, mollusks, worms, echinoderms, fishes, birds, invertebrate paleontology, paleobotany, sedimentology, petrology, and cryptogams. Additional scientists are located in the Smithsonian Oceanographic Sorting Center and a category of "senior scientist" has been established as an award for merit, with full-time research assignment of a few persons within the museum's departmental structure.

The facilities for marine research in the Institution include headquarters in the Museum of Natural History. A substantial portion of the approximately 17 acres of floor space in this museum are available for marine collections and laboratories. The laboratories contain research microscopes, dissecting equipment, microtomes, special viewing devices, electron microscopes, an electron probe

microanalyzer, X-ray equipment including diffractometers, histological equipment, freezers and freeze-drying equipment, and special processing devices and materials of great variety.

In the navy yard annex 45,000 square feet of space is allotted to the Smithsonian Oceanographic Sorting Center. This will be described in more detail in a later section.

The Smithsonian Laboratory of Radiation Biology has the latest in equipment to measure the radiation impinging on the ocean's surface and to study the efficiency of transformation of physical energy to the potential energy in green marine and land plants. The Canal Zone biological area has recently acquired facilities for running sea water on the Pacific and on the Atlantic sides of the Panamanian Isthmus in the zone.

In fiscal year 1965, as excess property to the Navy Reserve Fleet, the Institution obtained custody of *YF 868*, a covered freight lighter with a welded steel hull. This vessel has been reactivated and is presently engaged in research on coralline algae of the North Atlantic. Rechristened the *Phykos* (or sea plant), the vessel is 133 feet 9 inches long with a beam of 30 feet and a draft of 8 feet. The full load displacement is 650 tons.

Phykos has twin screws and two 600-horsepower Fairbanks-Morse diesel engines. Power comes from two diesel generators, 30 and 60 kilowatts in size. The diesel fuel capacity is 16,000 gallons and the water capacity is 3,000 gallons. The vessel provides accommodations for 11 persons. A cargo boom on the main deck, rated at 11,200 pounds at 30 feet from the center line, has provided for on and off loading an undersea research vessel, *Asherah*, both on the dock and at sea for research. A gasoline winch was installed to work with a stern A frame for operation of dredges.

As indicated above, the principal new facility in the oceanography program is the Smithsonian Oceanographic Sorting Center, established in January 1963. The Center was conceptualized to receive bulk, mixed, marine samples from governmental and private sources, including the U.S. National Museum; separate them into appropriate taxonomic groups for identification and study by specialists; obtain and coordinate the data taken at the original collection station at sea to provide maximum environmental information; experiment with preservation, labeling, accessioning, shipping, and storage of specimens; train technicians for all aspects of specimen handling; and provide information and forms to oceanic expeditions to assure the collection of appropriate field data.

Of special note is project support for strong involvement of the Sorting Center in the U.S. Antarctic Research Program of the National Science Foundation (NSF). With NSF support the Center is listing specimens taken from all past U.S. efforts in the Antarctic, and both sorts and maintains records of specimens now being taken from the Antarctic. In addition, the photographs of the ocean bottom taken from the research vessel *Eltanin* are duplicated and distributed to scientists.

Also noteworthy are collections made available for study by the National Science Foundation through the International Indian Ocean Expedition by the Bureau of Commercial Fisheries and through the Intergovernmental Oceanographic Commission's International Cooperative Investigations of the Tropical Atlantic. Other collections have come to the Sorting Center from the Pacific Halibut Commission, the Inter-American Tropical Tuna Commission, the Guinean Trawling Survey, the Geological Survey, the Coast Guard, the Naval Oceanographic Office, the Coast and Geodetic Survey, the Coastal Engineering Research Center, the Laboratory of Radiation Biology of the University of Washington, the University of Michigan, the Atomic Energy Commission, and the Government of Chile.

As of May 15, 1965, when the last total was compiled, the Center had sorted 4,332,660 specimens and 2,589,886 had been shipped to 110 scientists for study and identification. The results of these studies speak to the success of the Center and of the significance of the Institution's new efforts.

The Sorting Center has served as a unifying influence in the systematics of marine organisms by providing specimens and information concerning the stages of their processing, together with information on the commitments of specialists scattered throughout the world. Visiting scientists may find working space in the Center. An increasing number of the individual specimens from multiple bulk collections are being processed for their research value and the results may be fitted together more effectively. It is anticipated that this flourishing activity will go on from its healthy beginning to do much to meet the challenge of man's expansion into the ocean.

Support of the Congress is, of course, vital to the Institution's oceanography program. Established for "the increase and diffusion of knowledge among men," the Institution's charter is quite broad, permitting it to do research in the areas where there are opportunities for progress. It reports to a Board of Regents which includes members of both Houses of Congress and maintains close liaison with the legislative as well as the executive branches of Government.

Generally, the Institution favors any scientific organization or study which leads to broader interest and support of marine research. We must reserve comments on proposed legislation until our Board of Regents has had a chance to study it. The Institution stands prepared to participate in any effort to augment the national effort in the field of oceanography.

STATE OF CALIFORNIA,
GOVERNOR'S OFFICE,
Sacramento, August 19, 1965.

Hon. ALTON LENNON,
Chairman, Oceanography Subcommittee, House Committee on Merchant Marine and Fisheries, House Office Building, Washington, D.C.

MY DEAR CONGRESSMAN: I have reviewed the proposed National Oceanographic Act of 1965, S. 944, and I am most favorably impressed with the proposal. The provisions for expanded research in the oceans and Great Lakes and the establishment of a National Oceanographic Council are greatly needed steps toward asserting the Federal Government's leadership in the Nation's oceanographic effort. The primary legislative objectives of the act, to set forth a policy and purpose for our national oceanographic program, and to provide high level guidance and coordination to Government activities under the program, are entirely consistent with California's interests in moving forward with its oceanographic program.

The passage of S. 944 will provide both the basis for Federal leadership in oceanography and the focus through which the oceanographic efforts of California's government, educational and research institutions, and industry may contribute to the national goals set forth in the bill.

I therefore urge your support in seeing that S. 944 is given favorable consideration by Congress.

Sincerely,

EDMUND G. BROWN, *Governor.*

WOODS HOLE OCEANOGRAPHIC INSTITUTION,
OFFICE OF THE DIRECTOR,
Woods Hole, Mass., August 3, 1965.

Hon. HASTINGS KEITH,
House of Representatives,
Washington, D.C.

DEAR SIR: I am gratified to see the interest and concern for the Nation's ocean program which has been evidenced by you and your colleagues. The number of bills now pending in the House Committee on Merchant Marine and Fisheries gives clear testimony to the fact that the Members of Congress recognize the need to strengthen the Nation's ocean program and intend to do something about it.

The national oceanographic program has greatly increased in size in recent years and we are beginning to learn many things about the oceans which were previously unknown. There is a great difference, however, between our present excellent national oceanographic program which is producing basic knowledge about the oceans, and the necessary comprehensive program of the future which will lead to a utilization of this knowledge for the benefit of mankind. I think the time has come when this country should push forward with an ocean engineering program. In some ways it will complement the present oceanographic research program, but an ocean engineering program really has quite different objectives and will require different techniques for achieving them.

There are many reasons why we should have an ocean engineering program. Two of the most cogent, to my mind, are the need to conquer the ocean depths for peaceful purposes and the need to develop the vast resource potential of the oceans. You and your colleagues are all keenly aware of the many arguments

why this country should embark on an ocean engineering program, and I shall not reiterate them here, but I do believe that the case in favor of an ocean engineering program can be defended solely on the basis of these two goals.

I have often been asked why it is necessary for the Federal Government to sponsor engineering development in the oceans when private industry is capable of doing it. The answer, I think, is simply that the initial cost of undertaking engineering projects in the oceans is large, while the rewards may be long delayed in realization or so diffuse as to be unexploitable by a single industrial enterprise. We cannot expect an industrial enterprise, unaided by the Government, to undertake the necessary research and engineering studies, to fund construction of a system, and to underwrite its operation when private industry cannot expect a satisfactory financial return on its investment. A good example of the area wherein the expenditure of public rather than private funds is indicated is the possibility of improving the fishing grounds by controlled returning of nutrients to the surface waters. No single company can be expected to undertake this important project. Some projects in the oceans will undoubtedly prove to be of such a nature that industrial enterprises will gladly undertake them. There is no doubt in my mind that once the Government has led the way into the ocean deeps, industry will not be far behind. This is good and healthy and I think it should be encouraged in every way possible.

The present national oceanographic program includes some ocean engineering projects, but the goal of all of them is to improve the capability for carrying out basic research programs. An example close at hand is the Navy-sponsored development of our deep research vehicle, *Alvin*. This project has necessarily entailed a great deal of ocean engineering, but the objective has been to provide a vehicle for oceanographers to use in their basic research projects. Although the several departments and agencies involved in the national oceanographic program undertake ocean engineering projects in order to fulfill their mission in the oceans, there are gaps between their present missions that preclude the development of a comprehensive ocean engineering capability. These gaps must be filled if we are to develop the capability of conquering the ocean depths for peaceful purposes and exploiting the vast resource potential of the oceans.

There are many ways in which these gaps in present ocean engineering projects could be filled. I think it is fairly obvious that the oceanographic research and engineering programs now underway are indeed germane to the operations of the departments and agencies sponsoring them. It is not nearly so clear to me that the development of an ocean engineering capability can be satisfactorily split up among many organizations. I tend, therefore, to think that there should be a new Government organization whose primary responsibility is ocean engineering.

There are numerous ways in which the new organization might be formulated. It could be a new department in the executive branch as recently proposed by Senator Muskie, or it could be similar to the old National Advisory Committee for Aeronautics. Each of these possibilities has many pros and cons. You and your colleagues are far more knowledgeable than I in the matter of Government organizations and the legislation necessary to produce the desired results. I, therefore, hesitate to suggest any one approach as being more appropriate than another.

I do think we need to have a great deal of thought about the long-range objectives of a new organization, much along the lines of the study proposed by Dr. James Wakelin in his address at the Marine Technology Society Conference. We need further thought about the most effective form for the new organization to take; we need to identify more exactly the public stake in the oceans; and we need to consider and define more explicitly our international responsibilities in this area.

I also think that there are many ocean engineering projects of some urgency that should be undertaken without waiting for the results of a comprehensive study. Last summer at the Navy's seabed study in Monterey, several of these ocean engineering products were identified and discussed. The final report of the conference discusses not only the defense systems which will require an increased ocean engineering capability, but also systems that will be utilized for basic research projects in the oceans. Undersea laboratories, deep research vehicles, flip ships, and tethered research vehicles are but a few of the systems which were identified.

In conclusion, I would respectfully suggest that Congress take appropriate action to accomplish the following:

(a) Expand the present national oceanographic program so as to further enrich our increasing knowledge about the oceans.

(b) Initiate action which will permit the starting of a number of ocean engineering projects immediately.

(c) Establish a study group to define our national goals in the oceans and to work out a well-conceived ocean strategy that will assure our continued pre-eminence in this portion of the earth.

(d) Establish an appropriate Government agency which will have a well-defined mission in ocean engineering.

Respectfully yours,

PAUL M. FYE.

OCEAN RESOURCES, INC.,
La Jolla, Calif., August 18, 1965.

Hon. ALTON LENNON,
Chairman, Subcommittee on Oceanography, House Committee on Merchant Marine and Fisheries, Washington, D.C.

DEAR CONGRESSMAN LENNON: Enclosed is a statement I prepared in support of H.R. 6009, the Marine Exploration and Development Act.

I support this bill wholeheartedly. It is a good and very necessary piece of legislation. On the practical side, I believe its wording is sufficiently broad to allow the Commission that this bill will establish the necessary latitude to accomplish the goals set forth. The only change I would suggest is on page 1, line 10, between the words, Shelf and under, might be added, "and the sea floor to a depth which admits of economic mineral exploitation." The Geneva Convention also makes this statement.

I am sorry that I was unable to testify in person before your subcommittee, however, I would be happy to do so at any time in the future should you think my testimony would be pertinent. Also I would be delighted to help you in any other way by supplying information or other aid concerning the mineral resources of the sea. There are several copies of the book, "The Mineral Resources of the Sea," around Congress. Representative Bob Wilson of California has a copy as do Senators Bartlett, Magnuson, and T. Kennedy. If you think it would be of help to you or your subcommittee to have a copy, let me know and I will send one on to you.

Sincerely yours,

JOHN L. MERO, *President.*

STATEMENT OF JOHN L. MERO, PRESIDENT, OCEAN RESOURCES, INC.

My name is John L. Mero. I am president of Ocean Resources, Inc., of San Diego, Calif. In rendering this statement, however, I am testifying in my personal capacity as an interested citizen. I have been asked to deliver this statement as an expert on the subject of the "Mineral Resources of the Sea." Such expertise as I might possess on the subject arises from my experience of the past 15 years which I have spent almost totally engaged in marine mineral resource studies as a student, postdoctoral fellow, research engineer at the University of California, consultant to numerous large corporations and Government agencies, and now as a manager of a company engaged in research and development of the mineral resources of the sea. I have also authored a book entitled, "The Mineral Resources of the Sea."

MINERAL RESOURCES OF THE SEA

The benefits which the United States could derive by a major program of well-coordinated oceanographic research already have been discussed in considerable detail by many other persons. Consequently, I will limit my comments in this statement to the mineral resources of the sea. While it is a well-known fact that the sea can serve as a source of all mankind's protein requirements, it is a much less known fact that the sea can also provide the earth's population with its total consumption of many industrially important mineral commodities. What is even more remarkable is the observation that the sea can provide these mineral commodities at a cost of human labor and resources that is a fraction of that required to win these materials from land sources.

As a source of minerals, the sea has been little exploited relative to its potential. The major reasons for this default are, I believe, a lack of dissemination of the limited knowledge concerning what is in the ocean in the way of mineral deposits and the absence of a proven technology to exploit the deposits on an economic basis. Whereas we have at our disposal all the equipments and technologies necessary to gather adequate information concerning the deposits and their environments, very little has been done in this regard. In fact, the Bureau of Mines' marine mineral program has been directed away from this very goal. As you are aware, the Subcommittee on the Department of the Interior and Related Agencies of the House Committee on Appropriations has stated that it sees no need for the Bureau to engage in marine mineral resource evaluations. No publicly sponsored U.S. oceanographic expedition has ever devoted any of its time to the search for economic mineral deposits in the sea. The meager information that we do possess has been gleaned as a byproduct of scientific studies concerning the sediments of the ocean floor. From these gleanings, however, we have obtained samples of what seem to be extremely rich mineral deposits which apparently cover great areas of the ocean floor. Based on these sparse data, considering the sea's vast extent, it is possible to say that the presently available mineral deposits of the sea could easily supply the population of the earth with its total consumption of manganese, nickel, cobalt, copper, phosphorus, limestone, common salt, magnesium, bromine, fluorine, potassium, boron, sulfur, aluminum, and various other less important minerals as well as supplying substantial portions of its consumption of iron ore, lead, zinc, titanium, molybdenum, uranium, zirconium, and so on.

Many of these materials are strategic for the United States, while others are obtainable only at exorbitant prices from limited continental sources.

Because the sea is the ultimate repository for most of the continent's wastes, human as well as natural, it is continuously receiving a tremendous influx of material. The rivers of the world alone dump some 4 billion tons of mineral material into the sea annually. Rather than depositing these materials in the indiscriminate form in which they are received, the sea acts as a great chemical retort, working on a truly grand scale to separate and concentrate those elements it receives from the continents. Many of the resulting mineral deposits would be considered extraordinarily high-grade if on land. We find in the ocean, deposits of manganese nodules, measured in the billions of tons, which grade as high as 2.5 percent of copper, 2 percent of nickel, 0.3 percent of cobalt, 35 percent of manganese, as well as containing economically significant quantities of lead, zinc, molybdenum, etc., all in the same deposit. On land such a deposit normally would be considered ore-grade if it contained like amounts of any one of these elements. Other deposits of the nodules grade as high as 2.1 percent of cobalt or 51 percent of manganese. The reserves of metals in the nodules now speculated to be lying at the surface of the sediments of the ocean, and, economically minable, are measured in terms of thousands of years at our present rates of consumption. More interesting is the observation that many of these metals are annually agglomerating in the nodules at rates that greatly exceed our annual consumption of these materials. And this renewable feature, we have found, is a very common attribute of many of the mineral deposits of the sea, whereas, on land, the mineral deposits are generally considered wasting assets and totally nonrenewable.

Although our studies are not backed up with operating experience, save for the mining of near shore submerged placer deposits, these studies indicate that we could produce many important industrial minerals from the sea at fractions of the cost of winning these metals from continental deposits. Also we would experience a tremendous increase in our capital utilization efficiency for a deep sea mining system that could produce annually \$250 million worth of copper, nickel, cobalt, manganese, etc., would involve a capital investment of only about \$100 million, whereas, on land, a mine to produce about \$100 million worth of products annually would normally involve a capital investment of about \$250 million. Then, too, many of the materials we could recover from the sea are strategic minerals for the United States not only militarily, but politically and, certainly, economically. For the United States could temper its dollar drain by at least \$1.2 billion annually by extracting metals from the ocean floor deposits rather than buying them from foreign nations as we now must. Also, we could utilize many of the new technologies for processing the ocean floor minerals that have been developed at great expense by the AEC for the processing of domestic uranium deposits and by the Bureau of Mines for processing

domestic manganese and cobalt and nickel ores. These techniques are now largely lying fallow because it is more economic to buy these materials from foreign nations at a great cost in dollars rather than develop our very low-grade domestic resources. Over the years the Bureau of Mines has expended tens of millions of dollars in developing techniques to mine and process our domestic reserves of low-grade manganese ores. Despite this heavy expenditure of funds we now mine hardly any manganese in the United States, but annually purchase about 2 million tons from various foreign sources. Manganese is absolutely essential in the production of steel and thus a highly strategic mineral for the United States. Also, our Government has, in the past, invested in excess of \$300 million to develop the cobalt-nickel deposits of Cuba only to see these mines and process facilities fall into the hands of the Communists. Such an investment in the ocean floor mineral deposits would not only free us of many politically unstable sources of strategic minerals but would provide us with those minerals at a greatly reduced cost as well as open up essentially unlimited sources of these minerals which are politically and royalty free sources. We would also be developing technologies which are militarily significant and thereby steal a page from the Russian mode of operating its great fishing fleet.

While we presently have no direct evidence that the Russians are building equipment to exploit the mineral resources of the sea, we do know that much of the significant exploration of these deposits is being done by Russian oceanographers and that pronouncements in the Russian literature are constantly characterizing these deposits as, "great new resources for the peoples of the world." Much of the best information we have concerning ocean floor deposits of minerals off our own coasts comes from the Russian literature which they are generous enough to send us. I often wonder about the information they have gathered which we do not see. And what a tragedy it will be for us to one day find the Russians, perfectly legally, mining strategic minerals off our own coasts the way they presently catch many of their fish. While we, by our niggardly expenditure of research funds for oceanography, and total absence of funds for mineral resource development, fall, again, by the wayside, and, then, must resort to a crash program to catch up. For in failing to develop the resources of the sea, we are not only losing the propaganda battle with the Russians, but infinitely more important, we are failing to develop a resource which can provide a great deal of real wealth for the people of the United States.

If propaganda is the object of spending money for research, and in the space program, it surely is the motivation for much of the money spent, then the development of the resources of the sea can be considered one of the great propaganda victories of all time. For in developing the technology of winning minerals from the sea we will present to every nation of the earth the wherewithal to obtain many of the essential basic raw materials necessary for an industrial society. Coupled with the development of the food resources of the sea, essentially all materials necessary for an acceptable and adequate standard of living in an industrial society can be gained by all nations from the sea. Because of the unbelievably vast extent of the resources of the sea, there would be sufficient material for all peoples of the earth for the foreseeable future, assuming the simple guidelines of conservation are observed. Thus, one of the historic causes of war, that of the need for raw materials and food for an expanding population and economy will be removed. There will be sufficient food and minerals for everyone that might wish to secure them. By giving the technology to secure these materials to the rest of the nations of the world, the United States could gain a propaganda victory over the Communists which would overshadow all others. For in doing so, we would make available to these undernourished nations materials of real value, materials that they desperately need, and materials that we desperately need.

The development of such a technology should not markedly affect production from present land sources of such commodities, in fact it would exert a stabilizing influence in the production of such commodities. For any nation that realizes that the commodities we now buy from them are equally as available from other sources, tends not to be so truculent in expropriation procedures or in charging exorbitant royalties and taxes on materials mined from deposits within their jurisdiction.

But the technical and economic advantages of exploiting the mineral resources of the sea are even more important than the political. For, in the sea, we find materials that are available without removing any overburden,

without the use of explosives, and without expensive drilling operations for sampling or ore breakage. There will be no drifts to drive, shafts to sink, or town sites to construct in developing a deep sea mine. An ocean-mining operation, because it would be an entirely new concept in mining, can be designed for automation from the beginning. The equipment would be very flexible to move from one area to another for the various types of ore as the market demands. Sea transportation can be used to carry the mined material to most of the world's markets with no other form of transportation involved. About 75 percent of the material, and more in some cases, being mined and handled is salable in contrast to the 2 percent or so of today's copper and nickel ores. The unlimited amount of the sea floor minerals should establish a base price and supply for nodule contained metals which certain of these commodities need. But most important, the sea floor minerals should prove to be a less expensive source of many materials than are our present land sources.

Whereas we might think, that in the face of the studies and data that has been developed, private corporations in the United States would be anxious to develop many of the ocean mineral deposits, the fact is that they are not. The minerals industry in the United States, tends to be quite conservative in its policies of approaching completely new technologies which cannot be developed efficiently on a small scale. Also, the legal cornerstone of the minerals industry, that of one group or company being able to secure complete control of a deposit so that it may develop it as it sees fit, is absent in many of the ocean floor deposits. For these and other good and valid reasons industry needs the help and encouragement of its Government in developing these deposits. Ironically, our Government, by charging incredible high bonus bids, rentals, and royalties on those offshore mineral deposits within its jurisdiction is actually discouraging industry from developing these truly great and important mineral deposits. This condition should be immediately rectified and Congress could easily do so by directing the Department of the Interior to charge only nominal bonus bids, rentals, and royalties until industry can see its way to paying such costs from a developed technology from which the high risk has been removed. The Federal Government will gain its share of the wealth produced through the income tax, regardless. Charging initial high fees simply for granting companies the right to develop the technologies for offshore mining, while saddling industry with the very considerable risks inherent in developing such a technology, is incredibly shortsighted on the part of our Government.

More important is the fundamental research that our Government could finance such as explorations and sampling of the deposits, studies of the environmental conditions of the deposits, studies and development of the methods of mining and processing the minerals, as well as studies concerning the social, economic, and political overtones of developing such a technology. While a start has been made in this regard by the Bureau of Mines and the Geologic Survey, the funds thus far appropriated for ocean minerals research are vastly inadequate. Considering the economic benefits to be gained from such research, I strongly urge Congress to carefully consider support of such activities. House bill 6009, entitled the "Marine Exploration and Development Act," if passed, would do much to rectify our neglect of this important area of oceanographic research. The scope of the activities described in this bill is sufficiently broad to enable the agency controlling the expenditure of the funds provided by the bill to function in an appropriate and adequate manner to accomplish goals of substantial and meaningful worth. The level at which the commission's activities is pegged in the bill are certainly adequate for the initiation of this program, however, possibly a better level would be that which is commensurate with the funds the Treasury now receives as bonus bids, rentals, and royalties from all offshore non-living resource exploitation. The reinvestment of these funds in the development of the additional resources of the sea would pay huge dividends to our Government in the form of income taxes realized from the profits of companies operating in the offshore areas. Implementation of this bill would also allow the United States, under the Geneva Convention to appropriate vast areas of the deep ocean floor, off the geologic Continental Shelf, for minerals exploitation, and, incidentally, for correlary military purposes. I most strongly urge passage of H.R. 6009, as a necessary measure to assure not only future generations, but our present generation, of an adequate participation in the benefits of utilizing the resources of the sea.

CHAMBER OF COMMERCE OF THE UNITED STATES,
Washington, D.C., August 26, 1965.

Hon. ALTON LENNON,
Chairman, Oceanography Subcommittee, Committee on Merchant Marine and Fisheries, U.S. House of Representatives, Washington, D.C.

DEAR MR. LENNON: Private and public oceanography effort is vital to the economic welfare and security of the Nation. Effective coordination of present and future scientific and technical programs is therefore essential. The establishment of priorities for various oceanography programs and their attendant funding is of utmost importance. However, the approach contained in S. 944, H.R. 7849, H.R. 921, and other similar proposals would unduly centralize governmental control and support of oceanography effort. This may create more problems than it solves by disrupting current activities.

A logical approach would be a study, such as proposed by H.R. 9064, of the extent of the nature and direction of future oceanographic efforts. This study should be conducted by an independent ad hoc group composed of professionals appropriate to the subject, and drawn from Government, industry, and the academic community. The findings of this group would permit the Congress to effectively evaluate the type of legislative action needed in the field of oceanography.

Noteworthy progress and advancement have been clearly demonstrated under the present Federal Interagency Committee on Oceanography of the Federal Council for Science and Technology. A hasty decision on changing the current organizational pattern of coordination of oceanography activities could unduly disrupt the statutory missions and relationships of existing private and governmental activities.

The diversity of interest and the complexity of the legal, technical, and economic obstacles confronting an accelerated development of the ocean's resources require the most prudent study and evaluation of how best to proceed.

It is our suggestion that the committee delay consideration of any new Federal organizational plans on oceanography until such time as a qualified study and report can be presented to the Congress.

Sincerely,

DON A. GOODALL,
Legislative Director.

STATEMENT OF F. G. WALTON SMITH, DIRECTOR, INSTITUTE OF MARINE SCIENCE,
UNIVERSITY OF MIAMI, AND PRESIDENT, INTERNATIONAL OCEANOGRAPHIC
FOUNDATION

I appreciate the opportunity of submitting a statement with regard to the bills concerning the organization of oceanography now under consideration by your committee.

My opinions are based upon 35 years of experience in full-time oceanographic research and teaching and, more recently, in the organization and administration of a graduate curriculum in oceanographic engineering.

The continental shelves, which are merely the fringes of the ocean, occupy an area greater than that of the entire moon. The depth of water is less than 1,000 feet over the shelf and men have already begun to reside and work in depths which are a substantial fraction of this. It seems reasonable, then, that increased efforts to conquer the potentially rewarding ocean environment should be undertaken with at least some reasonable fraction of the support that is given to invading the relatively inhospitable moon. It is therefore heartening to see a greatly increased interest directed toward our hitherto neglected frontier, the world ocean. In recent years, in fact, there has been a pronounced tendency for Government agencies to expand in the direction of oceanography, so that there are now about 20 agencies involved. This has been equally true of industry and the universities.

There is a distinct danger, however, in too rapid a proliferation of this effort, beyond the capacity of the existing qualified and experienced scientists and engineers to train increasing numbers of recruits to the field. Any legislation enacted must therefore recognize the important role of qualified educational institutions in meeting the demand for capable and well-trained personnel. It must also recognize the importance of continued and increased support of basic research at universities, since scientists cannot be properly trained without the opportunity to engage in original research.

The growth of interest in oceanography has brought with it a need for coordination, in order to avoid misdirected efforts. The enthusiasm with which Government agencies and a large number of major engineering corporations have plunged into oceanography, frequently with inadequately trained personnel, is matched by that of many universities, hitherto lacking in interest in the oceans, which have recently hastened to open new departments of oceanography, not all of which are well manned or suitably located. In fact, some of the more enthusiastic newcomers are in inland locations.

It is therefore clearly desirable that steps be taken to prevent unnecessary duplication of effort among Government agencies, between Government and industry, and between Government and the universities.

The universities have two functions to perform, those of education and of basic research. Government agencies have specific missions in which the knowledge developed from basic research may be applied to the exercise of a useful function in government. The Government agencies, in general, should be restricted to such specific missions. Engineering industry is primarily concerned with the development and manufacture of systems and equipment to carry out the missions both of Government and of private enterprise. There obviously are no clear lines of separation between these missions, but there is certainly a very real need of some coordinating body with the knowledge, the responsibility, and the authority to prevent flagrant deviations from them, and to minimize the danger of unhealthy competition.

The establishment of a National Oceanographic Council, as provided for by H.R. 5654 appears to be a logical and orderly way of insuring coordination, controlling duplication of effort and presenting a unified program to Congress.

The diversity of objectives in the oceanographic activities of the various agencies is such that the reorganization of all such agencies into a single operating agency is not practical. On the other hand, the possibility of transferring certain agencies into one department in order to unify their administration and to insure closer adherence to their logical functions, may be worthy of consideration. Possibly this study could be accomplished under the terms of H.R. 5654. Should it be decided, however, that a commission such as proposed in H.R. 9064, H.R. 9483, and H.R. 9667 is necessary to consider this, I do not believe that a period of 2 years is necessary to formulate recommendations, but that 6 to 12 months should be adequate, in view of the lengthy and careful study already made by Members of Congress.

Although there may be grounds for continuing the separate existence of some or even most of the 20 or so agencies engaged in oceanographic operations, there appears no good reason for adding new ones, or for extending the work of still more agencies in this direction.

STATEMENT OF WILLIAM R. NEBLETT, EXECUTIVE DIRECTOR,
NATIONAL SHRIMP CONGRESS, INC.

The interest of the National Shrimp Congress in the several bills now pending before your subcommittee is a very compelling interest, as the domestic shrimp fishery of the United States feels that several aspects of a comprehensive oceanographic program, including fisheries' biology, chartings and soundings, estuarine surveys, and other matters vitally affect our fishery.

As an example of this interest the National Shrimp Congress has recently published a pamphlet entitled "An Oceanographic Program for the Gulf of Mexico," copies of which are attached hereto.

The domestic shrimp fishery is centered primarily in the south Atlantic Ocean and the Gulf of Mexico, from North Carolina to Texas; with an additional cold water fishery of which the chief producing State is Alaska and in which there is some shrimp production in the States of Washington, Oregon, and California. The U.S. shrimp fishery is also one of the few remaining U.S. fisheries engaged in distant fishing so that knowledge and information concerning the oceans bordering some other nations is also important to this fishery. It should also be pointed out that in dollar income the U.S. shrimp fishery is the No. 1 fishery of the United States.

The fact that the domestic shrimp fishery is not dominated or controlled by a few large corporations or enterprises, but is widely scattered and affords employment and income to a large number of individual vessel owners, small businessmen, makes it somewhat difficult for this industry to hold meetings and

to express its views in Washington. Nevertheless, it has been possible in recent years through the National Shrimp Congress to coordinate and analyze the problems of the domestic shrimp fishery and to present them appropriately to the Congress or to the bureaus and agencies of Government concerned. The nature of this industry is such that its principal administrative problems have been mostly concentrated in the Bureau of Commercial Fisheries, Department of the Interior, and, because of the high seas fishery, in the appropriate section of the Department of State. Our scattered industry is not well equipped or organized, nor could it become so without a tremendous expense, to deal with a number of Federal agencies in addition to the State agencies now involved. Therefore, the domestic shrimp industry regards with a high favor the centralization of oceanographic programs (which will most certainly affect this industry) in an agency of the Federal Government to which a direct approach could be made by industry.

In reviewing the several bills which have been introduced and are before the subcommittee we find considerable merit in each of the approaches because it is obvious that the need for centralization and organization of an oceanographic program is recognized, thus:

(a) H.R. 2218 has merit because it recognizes the scientific aspects of oceanography and provides for an advisory committee to be consulted by the President, as the result of which the President would report to Congress and ask for appropriations and legislation. This would, however, have the effect of scattering the various oceanographic programs among the many department and agencies of Government, each with its particular interest in one limited phase of oceanography. The bill does not provide for a separate agency to handle oceanographic programs and it would be difficult to fix responsibility in the event of failure of coordination.

(b) H.R. 5654 is identical to S. 944 which has already received favorable action in the Senate and which has excellent possibilities. Certainly the National Oceanographic Council proposed therein is a high-level organization composed of the Vice President, Cabinet members and other high officials of Government. The impetus of having a program recognized at such a high level of Government is undoubtedly beneficial. This bill also provides a Council with a working staff so that with proper staffing it is envisaged that this Council would be in an excellent position to advance oceanographic interests. It is noted that the Council would appear to be more of a coordinating agency between the various departments and agencies of the United States than the type of agency which would in itself have the position and power to establish and execute oceanographic programs. It would appear that the strength of this approach lies in top-level representation of the membership and the weakness would lie in the coordination between various Government agencies. If a major coordinated program were launched it is conceivable that the failure of the one particular agency to cooperate or to obtain a sufficient allocation of funds, etc. could result in some confusion and delay. Nevertheless, the National Shrimp Congress would heartily endorse H.R. 5654 and hope that the top-level members would impose on their respective departments a priority on oceanographic programs agreed to by the Council.

(c) H.R. 9064. This bill goes a step further organizationally by the establishment of a National Commission on Oceanography which to us in industry appears more adequately to effect a partnership between Government, industry, and scientists. It would appear that the individuals comprising this Commission would have primary interest in the subject matter and enthusiasm in the carrying out of the program. However, it would not be a permanent commission but it would undoubtedly, after envisaging comprehensive programs, recommend the type of permanent body considered most desirable for carrying out future objectives. Whether such an interim commission is necessary or whether there is now available sufficient knowledge of the problems to enter immediately upon the solution of them is beyond the knowledge of the writer. This principle is, however, a sensible and systematic approach to a major problem.

(d) H.R. 921. This bill would immediately establish a permanent agency of the Federal Government with the sole and primary purpose and plan of developing programs for oceanography and related sciences. The domestic shrimp industry would certainly favor such an agency on the basis that it could take

its oceanographic problems directly to a body specifically charged with the solution of those problems and able, we presume, to provide study and solution. It may be argued that a separate agency with its own staff may prove to be somewhat more expensive than a coordinating agency which used available facilities in various departments; however, if the programs envisaged are as urgent as we believe them to be, then the direct approach is the recommended one.

The foregoing four bills have been used as examples of four different types of approaches to the resolution of a very important matter. Your attention is also respectfully invited to the provisions of S. 2251 introduced by Senator Muskie and others on July 7, 1965. We presume that a companion bill will be introduced in the House of Representatives and that this will eventually reach your committee if it has not already done so. This proposed legislation would establish the very highest level of responsibility for marine and atmospheric affairs of the Federal Government by providing a Department of Marine and Atmospheric Affairs with a Secretary. The particular agencies which would become components of the proposed Department comprise the very agencies which would, under other proposed legislation, require coordination between them. Certainly the purposes of long-range oceanography and related programs would be best served by such a grouping of present agencies into one department. A fishery organization is compelled to view this type of a government organization as the one most favorable to a continued development of fisheries and a proper utilization of ocean life and resources.

The domestic shrimp industry, through the National Shrimp Congress, is pleased that so much energy and attention is being given to this major problem and is ready upon call from your committee, to answer such questions and present such further views or recommendations as you may require.

STATEMENT BY STUDENT DONALD E. THOMAS, JR., AGED 14

My name is Donald E. Thomas, Jr., son of Dr. and Mrs. Donald E. Thomas. I live in Mount Lebanon, Pittsburgh, Pa., and my father is a scientist at Westinghouse Atomic Power Laboratories. I am now in the ninth grade at Andrew W. Mellon Junior High School. During the eighth grade I took a science course consisting of oceanography which interests me very much. My teacher in eighth grade was Miss Hogan and in the seventh grade Mr. Herbert New. I intend to be a scientist so I read books on the subject and want to make this statement in my own behalf.

Because of my interest in oceanography, Representative Fulton asked me to write a statement on the usefulness of oceanography study to my generation. So I am presenting my views for the congressional Committee on Oceanography. I think Congress should listen to young people, too. We can't vote, but I have to pay taxes, so I should have some say.

The supplies of minerals in our world mines are running out slowly and a new set of mines is needed. For centuries our rivers have been carrying minerals in their waters into the ocean where they remain as sediment. These minerals are found on the floor of the oceans in deep layers.

Oil has been found under the Gulf of Mexico. This means there was dry land during the age of prehistoric animals. Oil, with the possibility of other minerals of all kinds, is probably under the ocean floor. Some of these minerals could be in sea plants, but the problem is to extract these minerals. Scientists will certainly learn to mine these minerals during my generation.

In the less distant future, there could be vast fish farms for all kinds of seafoods in the oceans. On these farms, as the Japanese do today, we could grow a vast quantity of food for the underfed people of the world.

Military bases could be built on the ocean floor which would be free of air raids.

Let's stop ignoring 70 percent of the world's surface. I hope this committee tells Congress and the U.S. people really to get busy on the oceans. I'm all for it, and I'll pay my share.

Ocean research will really amount to big advances for science and will surely pay big returns.

Truly the ocean contains the past and the future.

REYNOLDS SUB-MARINE SERVICES CORP.,
Washington, D.C., August 24, 1965.

Hon. ALTON LENNON,

Chairman, Subcommittee on Oceanography, Committee on Merchant Marine and Fisheries, U.S. House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Reynolds Sub-Marine Services Corp. is pleased to comment on H.R. 10432, a bill which provides expanded research and development in the marine environment by establishing a National Council on Marine Resources and Engineering Development and an associated Commission on Marine Science, Engineering, and Resources.

The portion of the subject bill dealing with the encouragement of private investment enterprise in exploration and technological development is of particular interest to any industry seriously involved in the oceans. Reynolds International, Inc., in connection with Reynolds Metals Co., has devoted 5 years and several millions of dollars to producing the advanced deep research submersible *Aluminaut*, now ready for charter operations to Government agencies, institutions, and industry.

The appointment by the President of persons with a competency in the areas of science, engineering, and resources from industry, institutions, and the Government would permit a comprehensive evaluation of the oceanographic and engineering tools offered by industry. We sincerely believe that a commission of this composition will not only permit the saving of Government funds through the elimination of duplicate efforts but will also provide a coordinated ocean exploration and exploitation program that will be unsurpassed in the world.

Your consideration of these comments will be greatly appreciated.

Sincerely yours,

ARTHUR L. MARKEL,
Vice President and General Manager.

Attachment.

AUGUST 9, 1965.

"ALUMINAUT" OPERATIONS BRIEF

The all-aluminum submarine *Aluminaut* set a new endurance record for deep submergence submarines by transiting the Straits of Florida last Wednesday. The *Aluminaut* stayed submerged for 32 hours while traveling at an average depth of 1,250 feet. The transit took place after several dives to the bottom of the Gulf Stream, 2,750 feet deep.

A five-man crew took the silver-zinc battery-powered 51-foot craft across the Straits of Florida from the Bahamas to Miami in 10.5 hours at 1,200-foot depths. J. Louis Reynolds, chairman of Reynolds International, Inc., the *Aluminaut's* owner and developer disclosed. The submarine normally carries a crew of two. The craft covered a distance of approximately 70 miles at speeds up to 3.5 knots.

During the descent to 2,700 feet, the deep research submersible was approximately 180 feet above the bottom, thus allowing her high resolution sonar to map the bottom contours. All submergences deeper than 500 feet limited visibility from the four viewing portholes and the underwater television to 40 feet. Arthur L. Markel, vice president and general manager of Reynolds Sub-Marine Services Corp., the subsidiary handling *Aluminaut* operations, stated that the abundance of plankton below the 300-foot level produced a backscatter of *Aluminaut's* underwater lights thus preventing any greater visibility. Consequently, the submarine relied on its forward-looking high-resolution sonar to search ahead beam to beam 800 yards.

Mr. Markel said the 33-hour run was highly successful indicating a substantial reserve of battery power and life support systems. The submarine releases oxygen and uses a carbon dioxide scrubber system to provide life support to the crew and scientific personnel.

While on the dive, the latest in a series of underwater trials, stress information on the 6.5-inch thick hull was continuously measured. The *Aluminaut* is destined to go continuously deeper until her design depth of 15,000 feet is reached. Deeper dives will be made step by step since *Aluminaut* is too large to fit into any high-pressure test tank facilities available in the world today. Hundreds of bits of data are collected to monitor her response to increasing depths and greater distances traveled.

Dr. T. Robert Kendall, an oceanographer from the University of Hawaii, was aboard the tender vessel *Privateer* during the run to observe the capabilities of the *Aluminaut* for oceanographic research. Dr. Kendall, an underwater photographer of some reknown, took pictures of the *Aluminaut* at a depth of 150 feet as she was submerging.

Crew members for the Straits of Florida trip included four from Reynolds Sub-Marine Services and one from the Electric Boat Division of General Dynamics Corp., who built the craft. Crew captain was Robert E. Serfass of Reynolds.

In addition to Captain Serfass who comes from San Diego, Calif., crewmen were Robert H. Canary, Groton, Conn., Alfred L. Rutherford, Montville, Conn., James J. Cooney, of Philadelphia, and Horace D. Barnett, an Electric Boat employee from Groton.

Of note during the underwater maneuvers—a British warship in the Bahamas vicinity was invited to detect *Aluminaut* by sonar. The destroyer attempted to acquire the *Aluminaut* on her sonar, but it was not clear that detection was made of the aluminium hull of the craft at deep points. A U.S. Navy patrol aircraft also attempted to detect *Aluminaut* using other than sonic means but was evidently unsuccessful. Communications with the British destroyer were by underwater telephone.

Sea trials in mid-July demonstrated the feasibility of controlled drift for scientific observations when the *Aluminaut* took a 25-mile "free ride" in the Gulf Stream at depths in excess of 1,000 feet and currents up to 3½ knots velocity.

REYNOLDS SUB-MARINE SERVICES CORP.

"Aluminaut" log brief

Date	Time	Details
August 3	1000	Submerged; 16 miles southwest of Cat Cay, Great, Bahamas Bank.
	1022	Depth, 1,950 feet.
	1040	Depth, 2,500 feet.
	1050	Depth, 2,750 feet; dropped 2,500 lbs. shot; completed strain gage readings; bottom 180 feet below.
	1230	Surfaced; stayed buttoned up.
	1330	Loaded 1,500 lbs. shot
	1400	Submerged.
	1430	Depth, 950 feet.
	1440	Depth, 1,200 feet.
	1500	Depth, 2,500 feet.
	1530	Depth, 2,000 feet.
August 4	1600	Depth, 1,500 feet.
	2130	United Kingdom Frigate <i>Tarter</i> invited to observe <i>Aluminaut</i> .
	0100	<i>Tarter</i> departs apparently after no success in detection.
	0700	Commenced transit of Straits of Florida on <i>Aluminaut</i> course of 280° T; <i>Aluminaut</i> at 1,200 feet.
	1000	VP-26 P-2V ASW aircraft attempted detection; no results.
	1715	Depth, 550 feet.
	1735	Surfaced with 30-degree angle.

Pertinent data on dive

Ampere hours expended—battery	540
Ampere hours left—battery	110
Total available	650
Maximum H ₂ percent	.08
Maximum CO ₂ percent	.8
Minimum O ₂ percent	18.0
Time submerged (hours)	33.0
Time underway (hours)	31.5
Mileage, transit (nautical miles)	25
Mileage, total (nautical miles)	63
Average speed in transit (knots)	2.4
Current at 1,200 feet in Gulf Stream 1.8 knots at 005° T.	

NATIONAL FISHERIES INSTITUTE, INC.,
Washington, D.C., August 4, 1965.

HON. HERBERT C. BONNER,
Chairman, House Committee on Merchant Marine and Fisheries,
Washington, D.C.

DEAR MR. CHAIRMAN: The National Fisheries Institute, having a deep and abiding interest in oceanographic research and operations, would like to add its word to those of others supporting the establishment of a responsible organization.

The commercial fishermen of the United States feel oceanography may be the answer to future fish catches and the utilization of the fisheries bordering the United States.

In view of the fact that there are between 18 and 22 agencies, bureaus, departments, commissions, etc., presently concerned with this highly technical subject, and because there is no central control, the National Fisheries Institute is extremely interested in the establishment of a central body to plan for, direct, control, and evaluate the activities in this field. This body should report to the President of the United States and the Congress of the United States. It should be charged with determining what must be done in this field, who shall do it, how it shall be done, how duplication can be avoided, and how the results can be evaluated and put to the greatest good.

The myriad of bills introduced makes it difficult to support any one individual bill; therefore, we suggest that the members of the committee in their wisdom select what appears to them to be the most productive piece of legislation introduced, and shepherd it to passage.

If it please the chairman, we would like to request that this letter be made a part of the permanent record.

Sincerely yours,

F. P. LONGEWAY, *Executive Director.*

MISSION BAY RESEARCH FOUNDATION OF SAN DIEGO.
Newport Beach, Calif., August 12, 1965.

HON. ALTON LENNON,
Chairman, Subcommittee on Oceanography, Longworth House Office Building,
Washington, D.C.

DEAR CONGRESSMAN: It was with deep regret that I found it impossible to accept Mr. Drewry's invitation to appear personally and present my views to your committee during the hearings.

Here is a brief statement of my personal recommendations arrived at after 2 years of intensive study of our national posture. I represent a private foundation that is currently indexing all of the literature from some 45 countries for the benefit of our subscribers.

It is obvious from an overview of the international situation that currently our Nation is experiencing an "unrecognized national emergency" related to the field of marine sciences. Our leadership at the executive level has failed to exert the same interest in our problems of national security as in other matters of lesser import.

In spite of our fragmented effort we do have under way many, many vital and effective programs, originated, directed, and being executed by brilliant and dedicated men in government, education, and industry. No legislation should be enacted that will interfere with these. If legislate we must, then I favor first the objectives and plan espoused by the recently enacted S. 944. This will, if properly administered, result in a marine department at some future but practical date.

The greatest single effect of the National Oceanographic Council would be to help focus public attention upon marine problems.

In closing, I strongly recommend that your present subcommittee be elevated to full committee status. Marine sciences and all of its activities are entitled to have such representation.

Your subcommittee is to be commended for the fine work accomplished to this date, and full stature would add to its effectiveness.

Respectfully submitted.

T. R. GILLENWATERS.

AMERICAN SOCIETY OF CIVIL ENGINEERS,
New York, N.Y., July 23, 1965.

HON. HERBERT C. BONNER,
*Chairman, Committee on Merchant Marine and Fisheries,
U.S. House of Representatives, Washington, D.C.*

DEAR CONGRESSMAN BONNER: It is appreciated that opportunity has been given for comment from the American Society of Civil Engineers pertaining to the several bills under study currently, intended to provide a comprehensive, long-range and coordinated national program in oceanography. (H.R. 3352, etc.) With my earlier letter, May 12, 1965, I expressed the interest of this society in such legislation. Now the hearings are scheduled, more detailed comments are offered.

Such comments will be directed to three points: the need for the program; the inclusion of engineering studies in the program; the nature of coordination of the program.

Oceanographic studies have lagged behind geographic studies, yet both are essential to the orderly development of resources in the service of mankind. In very recent years, the pace of studies of the oceans has quickened. In this effort, many disciplines have been involved. This interrelationship of different kinds of specialists was recognized in the policy report issued by the Federal Council for Science and Technology, in June 1963. Anticipating significant engineering contribution to the studies, this Council proposed increasing support by the Federal Government for a program "to comprehend the world ocean, its boundaries, its properties, and its processes, and to exploit this comprehension in the public interest, in enhancement of our security, our culture, our international posture, and our economic growth."

Specifically, more information is required to increase safety and improve reliability of navigation on the surface of the oceans. By comparison with geographic studies, the vast undersea regions remain practically unknown. Civil engineers have been immersed in studies of the coastal areas, with many questions yet to be answered. It appears that there is little question regarding the need, *per se*, for studies. It is the extent of such studies, and the directing, coordinating and financing of such studies which need to be brought into focus. Legislation, such as embodied in H.R. 3352, and similar bills, would provide needed coordination.

For effective coordination of studies, it appears that the legislation should have more specific reference to engineering involvement. In this effort, it is not possible to separate engineering from science, yet science has been given the emphasis in this legislation. One example of engineering involvement is in the need to know more about the interaction of sea and land. Coastal engineering has matured as a field of practice, yet the need for extended studies in this relationship is evident. Another example is the impact of pollution on resources of the ocean. Pollution abatement is a field of extensive engineering development, which needs to be extended to oceanographic studies. In another relationship, the services of surveyors and mappers need to be extended, so that the nature of bottom topography can be better understood.

Specifically, it appears that the program of continuing systematic research must include engineering research. Also, the work of the Advisory Committee, which would be established by legislation, would be facilitated with the addition of civil engineers, knowledgeable in subject areas such as those listed briefly.

Finally, the coordination of work undertaken by Federal agencies, or financed directly by Federal grants does not include all of the effort being extended, or to be extended, in the proposed program in oceanography. Extensive work is being done by industry, or by research organizations financed privately. Thus, it appears that the coordinating program should be "national" in scope, to provide free interchange of information between all involved, to give encouragement to the Federal Establishment, but at the same time make the best possible use of other studies, through systematic coordination of all involved.

Respectfully yours,

WILLIAM H. WISELY,
Executive Secretary.

NATIONAL ACADEMY OF SCIENCES,
NATIONAL RESEARCH COUNCIL,
COMMITTEE ON OCEANOGRAPHY,
Washington, D.C., August 2, 1965.

Hon. ALTON LENNON,
*Chairman, Subcommittee on Oceanography,
House Committee on Merchant Marine and Fisheries,
Washington, D.C.*

DEAR CONGRESSMAN LENNON: On behalf of the Committee on Oceanography of the National Academy of Sciences-National Research Council, I wish to express our interest in the hearings you have scheduled on the various pending bills directed to strengthening the Nation's oceanographic program, especially through providing improved means of consolidating or coordinating the activities of the numerous agencies involved in ocean research and development.

Our committee has recognized the need for the national oceanographic program to be developed and funded in a more unified manner, and the importance of establishing some new machinery in the executive branch and the Congress to make this possible. Although individual members, in their personal capacities, have commented in favor of some of the bill, the committee feels that it does not have a basis for recommending the best solution to this problem.

We sincerely hope that the hearings which your committee is holding will be most useful toward the formulation of appropriate legislation.

Sincerely yours,

M. B. SCHAEFER, *Chairman.*

(Whereupon, at 11 :30 a.m., the hearing was adjourned.)

NATIONAL ACADEMY OF SCIENCES

COMMISSION ON ORGANIZATION OF RESEARCH

REPORT OF THE COMMISSION

WASHINGTON, D. C., 1942

1942

Published by the National Academy of Sciences

1200 Constitution Avenue, N.W., Washington, D. C.

The Commission on Organization of Research was organized in 1941 to study the organization of research in the United States. It was composed of members from various scientific fields and was chaired by Dr. [Name]. The Commission's report, published in 1942, provides a comprehensive analysis of the current state of research organization and offers recommendations for improvement. The report is divided into several sections, including an introduction, a description of the current organization of research, a discussion of the problems facing research, and a series of recommendations. The Commission's findings are based on extensive consultations with scientists, engineers, and administrators from various institutions and government agencies. The report is a landmark document in the history of research organization in the United States and has influenced subsequent efforts to improve the efficiency and effectiveness of research.

COMMISSION ON ORGANIZATION OF RESEARCH

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The Commission on Organization of Research was organized in 1941 to study the organization of research in the United States. It was composed of members from various scientific fields and was chaired by Dr. [Name]. The Commission's report, published in 1942, provides a comprehensive analysis of the current state of research organization and offers recommendations for improvement. The report is divided into several sections, including an introduction, a description of the current organization of research, a discussion of the problems facing research, and a series of recommendations. The Commission's findings are based on extensive consultations with scientists, engineers, and administrators from various institutions and government agencies. The report is a landmark document in the history of research organization in the United States and has influenced subsequent efforts to improve the efficiency and effectiveness of research.

A P P E N D I X

—
Abridged Chronology of Events Related

To

FEDERAL LEGISLATION FOR OCEANOGRAPHY
1956-65

—
Prepared by

THE LIBRARY OF CONGRESS
LEGISLATIVE REFERENCE SERVICE

—
JULY 21, 1965

APPENDIX

Abridged Chronology of Events Related

To

THE FEDERAL INVESTIGATION OF

1930-33

Prepared by

THE BUREAU OF INVESTIGATION

DEPARTMENT OF JUSTICE

JULY 31, 1933

LETTER OF TRANSMITTAL

THE LIBRARY OF CONGRESS,
LEGISLATIVE REFERENCE SERVICE,
Washington, D.C., July 15, 1965.

HON. ALTON LENNON,
*Chairman, Subcommittee on Oceanography, Committee on Merchant
Marine and Fisheries, House of Representatives, Washington, D.C.*

DEAR MR. LENNON: I am pleased to forward an "Abridged Chronology of Events Related to Federal Legislation for Oceanography, 1956-65" in response to your request.

This chronology was first prepared in January 1965 on the initiative of the Science Policy Research Division, when intensified activity in the 89th Congress in the field of ocean sciences and engineering was reflected in frequent requests for information and legislative research. The chronology has been periodically updated, and the enclosed material reflects congressional actions through July 15, 1965.

The study is in five parts. Part I is a chronology, beginning with landmark events in 1956, that highlights legislatively significant action by both the President and the Congress; Part II contains explanatory notes which elucidate contents of the earlier list; Part III is a brief summary of Federal funding in oceanography, by agency and functional area; Part IV contains a summary of congressional action by the 86th, 87th, 88th, and 89th Congresses related to oceanographic legislation, and Part V is a selected bibliography of those papers and articles bearing on elements of oceanography of legislative rather than scientific interest.

This chronology was prepared under the guidance of Dr. Edward Wenk, Jr., Chief of the Science Policy Research Division, with major assistance by Miss Florence Broussard, research assistant.

Sincerely,

HUGH L. ELSBREE, *Director.*

LETTERS OF TRANSMITTAL

The Library of Congress
Lamont-Huntington Survey
Washington, D.C., July 18, 1967

Dear Sirs:
The Subcommittee on Oceanography, Committee on the Environment and Public Works, House of Representatives, U.S.C. 95-101, is pleased to forward to you the following report: "Abridged Chronology of Oceanography Research in Federal Agencies for Oceanography, 1945-1965". This report is being prepared in response to your request that the Subcommittee be kept advised of the progress of the activity in the field of oceanography and engineering. The report is being prepared for information and legislative purposes. The report has been periodically updated, and the latest edition is being prepared through July 15, 1967. Part I is a chronology, beginning with the year 1945, and the report is divided into two parts: Part I is a chronology of oceanography research in Federal agencies, by agency, and Part II is a selected bibliography of oceanography of legislative interest. The report was prepared under the guidance of Dr. Howard C. Conner, Director of the Lamont-Huntington Survey, and is being prepared in response to your request that the Subcommittee be kept advised of the progress of the activity in the field of oceanography and engineering. The report is being prepared for information and legislative purposes. The report has been periodically updated, and the latest edition is being prepared through July 15, 1967. Part I is a chronology, beginning with the year 1945, and the report is divided into two parts: Part I is a chronology of oceanography research in Federal agencies, by agency, and Part II is a selected bibliography of oceanography of legislative interest.

Very truly yours,
Howard C. Conner, Director

Abridged Chronology of Events Related to Federal Legislation for Oceanography 1956-65

PART I.—CHRONOLOGY

- August 9, 1956.* Rear Adm. Rawson Bennett, acting for Office of Naval Research and three other Federal agencies, requested President Detlev Bronk, National Academy of Sciences, to appoint a committee representing the scientific community to provide advice and guidance on needs and opportunities of oceanographic research (Note 1).
- November 1957.* First meeting of Committee on Oceanography, National Academy of Sciences (NASCO).
- April 29, 1958.* Agreements formulated by U.N. Conference on the Law of the Sea, Geneva, concerning sovereignty over territorial sea, contiguous zones, and Continental Shelf.
- December 27, 1958.* White House released report by the President's Science Advisory Committee on "Strengthening American Science" that recommended establishment of a Federal Council for Science and Technology to coordinate programs involving a large number of Federal agencies. This report also mentioned oceanography as an example of several fields warranting special stimulation.
- January 1, 1959.* Long-range planning for Navy oceanography embodied in report TENOC (Ten Years in Oceanography) endorsed by Adm. Arleigh A. Burke within budget limits considering other Navy needs (Note 2).

86th Congress

- February 15, 1959.* NASCO released its summary of 12-volume report on "Oceanography, 1960-1970," recommending that the Federal Government assume responsibility for accelerating a national program of research, surveys, education, and construction of facilities by approximately doubling the level of effort over the next 10 years. Increases in expenditures were proposed from about \$24-\$30 million for the base year 1958 to roughly \$80 million per year for the 1960-69 decade (Note 3).
- February 17, 1959.* House Merchant Marine and Fisheries Committee established Special Subcommittee on Oceanography.
- March 3 to June 2, 1959.* Hearings convened by House Merchant Marine and Fisheries Committee, under Special Subcommittee on Oceanography chaired by Congressman George P. Miller, on "Oceanography in the United States," testimony invited from 42 Government, university and industry witnesses concerning NASCO goals and proposals.

- March 13, 1959.* Federal Council for Science and Technology (FCST) established by Executive Order 10807, to advise and assist the President in Government-wide planning and coordination (Note 4).
- April 13, 1959.* H.R. 6298 introduced by Congressman Overton Brooks to amend National Science Foundation Act of 1950 so as to provide explicit financial assistance for university teaching facilities and for students in oceanography (Note 5).
- May 1959.* Subcommittee on Oceanography, later Interagency Committee on Oceanography (ICO), established under FCST to coordinate programs of some 15 Federal agencies having statutory authority to engage in some phase of oceanographic research (Note 6).
- June 22, 1959.* Senate Resolution 136, introduced by Senators Warren G. Magnuson, Clair Engle, and Henry M. Jackson, set forth national policy to strengthen the entire field of oceanography. Passed by the Senate unanimously, the resolution (1) emphasized importance of oceanography to the Nation and the existing legislative authority of many agencies to engage in oceanographic research, (2) commended the NASCO report, (3) concurred on NASCO recommendations for a well-balanced and coordinated expansion of the programs with increased Federal funds, (4) proposed interagency coordination be developed possibly through a new Oceanographic Research Board or Commission, and (5) urged increased international cooperation and data exchange subject to Presidential supervision.
- August 4, 1959.* S. 2482 to remove geographical limitations on operations of Coast and Geodetic Survey introduced by Senators Warren G. Magnuson and Clair Engle.
- August 11, 1959.* H.R. 8611, identical to S. 2482, introduced by Congressman Herbert C. Bonner.
- August 19, 1959.* S. 2482 passed by Senate.
- August 25, 1959.* Hearings convened on H.R. 6298 by House Science and Astronautics Committee, Subcommittee on Earth Sciences.
- September 5, 1959.* S. 2692, Marine Sciences and Research Act of 1960, introduced by Senator Warren G. Magnuson (with 12 other Senators), contained a specific declaration of policy to strengthen oceanography so that the United States would not be excelled by any other nation. To meet these objectives, it called for a comprehensive 10-year program of research and surveys explicitly following funding recommendations of NASCO, and coordinating Federal agencies through a new Division of Marine Sciences in the National Science Foundation (Note 7).
- January 6, 1960.* H.R. 9361, identical to S. 2692, was introduced by Congressman Thomas M. Pelly.
- February 9, 1960.* Hearings convened by special subcommittee of House Merchant Marine and Fisheries Committee on "Oceanography in the United States—Part II."
- February 15, 1960.* H.R. 10412, introduced by Congressman George P. Miller, to establish a public policy and Federal coordination of Federal oceanographic surveys, through a new coordinating Committee on Oceanographic Surveys representing seven agencies.
- April 15, 1960.* S. 2482 became Public Law 86-409.

- April 20-22, 1960.* "Marine Science" hearings on S. 2692 convened by Senate Commerce Committee.
- April 28-29, 1960.* General hearings on "Frontiers in Oceanic Research" convened by House Science and Astronautics Committee.
- May 2, 1960.* H.R. 12018, introduced by Congressman George P. Miller, to establish within Coast and Geodetic Survey a new National Oceanographic Data Center and National Instrumentation Test and Calibration Center (Note 8).
- May 17-25, 1960.* Hearings on H.R. 9361 convened by Special Committee on Oceanography, House Merchant Marine and Fisheries Committee.
- June 7, 1960.* Senate Commerce Committee reported out favorably Marine Sciences and Research Act, S. 2692, as amended; Senate Report 1525 (Note 9).
- June 17, 1960.* H.R. 12700, introduced by Congressman Overton Brooks to amend the NSF Act of 1950 by creating, in the National Science Board, a Special Committee on Marine Sciences composed of Government officials and university scientists to develop and encourage a national program in marine sciences, to encourage cooperation, and to evaluate Government-wide programs in this field.
- June 25, 1960.* Senate passed S. 2692 unanimously.
- July 1, 1960.* House Science and Astronautics Committee released Report 2078 detailing the importance of oceanography to the Nation, and resources necessary to achieve these goals, and concluding that a federally sponsored program was probably needed amounting to \$160 million per year for the next 10 years (Note 10).

87th Congress

- February 9, 1961.* S. 901, Marine Sciences and Research Act of 1961, similar to S. 2692 of 86th Congress, introduced by Senator Warren G. Magnuson.
- February 13, 1961,* H.R. 4276, Oceanographic Act of 1961, introduced by Congressman George P. Miller, to expand and develop aquatic resources of the United States by creating a new National Oceanographic Council with representation of six agencies at Cabinet level, (1) to develop long-range plans, (2) coordinate interagency programs, (3) to establish a new data center and instrumentation center, (4) to strengthen Smithsonian Institution activity in the programs, and (5) to report annually to Congress. The proposed National Oceanographic Council, patterned after the National Aeronautics and Space Council, was established under Public Law 85-568 when NASA was established.
- February 15, 1961.* H.R. 4340, introduced by Congressman George P. Miller, to expand functions of Coast Guard to include oceanographic research.
- February 15, 1961.* House Merchant Marine and Fisheries Committee established Standing Subcommittee on Oceanography.
- February 23, 1961.* Special message on Natural Resources transmitted to Congress by President John F. Kennedy, emphasizing, among other areas, need for oceanographic research.

- March 2, 1961.* S. 1189, introduced by Senator Warren G. Magnuson, to expand functions of Coast Guard to include oceanographic research.
- March 15, 16, 17, and May 2, 1961.* "Marine Sciences" hearings on S. 901 and S. 1189 convened by Senate Commerce Committee.
- March 29, 1961.* Executive Communication 734, transmitted to the Congress by President John F. Kennedy, supporting a sharply accelerated program of oceanography through supplemental appropriations for fiscal year 1962 (Note 11). (\$97.5 million requested; \$104.8 million appropriated.)
- April 27, 1961.* Hearings convened on H.R. 4340 by Subcommittee on Oceanography, House Merchant Marine and Fisheries Committee, "Oceanography, 1961—Phase 1."
- May 4, 1961.* H.R. 6845, introduced by Congressman George P. Miller, similar to S. 1189.
- May 22, 1961.* Hearings convened on "Project Mohole" by Subcommittee on Oceanography, House Merchant Marine and Fisheries Committee, "Oceanography 1961—Phase 2."
- June 19–23 and July 14, 1961.* Hearings convened on H.R. 4276 by Subcommittee on Oceanography, House Merchant Marine and Fisheries Committee, "Oceanography 1961—Phase 3."
- June 20, 1961.* Senate Commerce Committee favorably reported out S. 901; Senate Report 426 (Note 12).
- July 28, 1961.* S. 901 passed unanimously by Senate.
- October 5, 1961.* H.R. 6845 approved (Public Law 87–396).
- February 29 to March 2, 1962.* Hearings convened by Subcommittee on Oceanography, House Merchant Marine and Fisheries Committee, chaired by Congressman John Dingell, on effectiveness of FCST Intragency Committee on Oceanography.
- June 9, 1962.* Office of Science and Technology established in Executive Office of President under Reorganization Plan No. 2 (Note 13).
- July 18, 1962.* H.R. 12601 introduced by Congressman John Dingell, Oceanographic Act of 1962, to establish a national policy to develop and maintain a coordinated, comprehensive and long-range national program in oceanography. The bill gave the Office of Science and Technology (OST) responsibility to establish a national program in oceanography, through a newly established Assistant Director, provide an annual report on programs and Government-wide budgets to the Congress, and authorized a statutory advisory committee to serve OST composed of university and industry scientists.
- August 14, 1962.* "National Oceanographic Program for fiscal year 1963," developed by Federal Council's Interagency Committee on Oceanography, was released by Office of Science and Technology. (\$126 million requested; \$124 million appropriated.)
- August 14, 1962.* H.R. 12601, as a clean bill superseding H.R. 4276 reported out favorably by House Committee on Merchant Marine and Fisheries; House Report 2221 (Note 14).
- August 20, 1962.* H.R. 12601 laid on table; S. 901 amended to conform to language of H.R. 12601 and passed by House.

September 27, 1962. House and Senate conference committee on S. 901 reported out a bill similar to H.R. 12601 and urged passage by both Houses; House Report 2493. This bill was passed by both Houses prior to adjournment of 87th Congress, but then pocket vetoed by President Kennedy (Note 15).

88th Congress

January 9, 1963. H.R. 13, identical to amended version S. 901, passed by the 87th Congress and vetoed, introduced by Congressman Herbert C. Bonner. (H.R. 880, H.R. 895, H.R. 1001, H.R. 3119, and H.R. 4428 identical.)

January 31, 1963. S. 627, introduced by Senator E. L. Bartlett (and 30 others), would foster research and development to promote commercial fisheries through a program of Federal-State cooperative research.

June 12, 1963. H.R. 6997, introduced by Congressman Alton Lennon as "Oceanographic Act of 1963," similar to H.R. 12601 of 87th Congress, but revised to meet White House objections that brought pocket veto. The bill sets forth the national policy to develop and maintain a comprehensive, coordinated long-range program in oceanography; provides for President, with OST assistance, to develop goals, coordinate programs, and fix agency responsibilities and report annually to the Congress, and authorized seven-man advisory committee. (H.R. 7015, H.R. 7029, H.R. 7036, H.R. 7040, H.R. 7047, and H.R. 7922 identical.)

June 24, 1963. H.R. 6997 supported by Director, Office of Science and Technology, in letter to Chairman Bonner, House Merchant Marine and Fisheries Committee.

July 26, 1963. FCST long-range plan, "Oceanography: The Ten Years Ahead," and the "National Oceanographic Program for Fiscal Year 1964," prepared by the Interagency Committee on Oceanography and transmitted by Director, OST, to Congress (Note 16). (\$156 million requested; \$124 million appropriated.)

July 31, 1963. H.R. 6997 reported out favorably by House Merchant Marine and Fisheries Committee. (House Report 621; Reference 17.)

August 5, 1963. H.R. 6997 passed by House of Representatives.

February 26, 1964. S. 2552, introduced by Senator Warren G. Magnuson, to exempt oceanographic research vessels from the application of certain inspection laws and for other purposes.

March 19, 1964. "National Oceanographic Program for Fiscal Year 1965" transmitted to Congress by President Lyndon B. Johnson. (\$138 million requested; \$135 million appropriated.)

April 15, 1964. H.R. 10904, introduced by Congressman Bob Wilson, to establish a National Oceanographic Agency headed by Administrator appointed by President with Senate consent, with transfer of functions related to oceanography now vested in other agencies (Note 17).

May 13, 1964. H.R. 11232 introduced by Congressman Richard Hanna authorizes National Science Foundation to study legal problems arising out of management, use and control of natural resources of oceans and ocean beds.

May 20, 1964. S. 627 became Public Law 88-309; Senate Report 338.

May 27, 1964. H.R. 11419, introduced by Congressman Alton Lennon, similar to H.R. 11232 but authorizes study by Coast Guard.

June 10, 1964. Effective date for the Continental Shelf provision of treaty concerning Law of the Sea, from agreements formulated at Geneva April 29, 1958 (ratified by U.S. Senate May 26, 1960; Note 18).

June 23-30, 1964. Hearings on "National Oceanographic Program, fiscal year 1965," convened by Subcommittee on Oceanography, House Merchant Marine and Fisheries Committee.

July 9, 1964. S. 2990, introduced by Senator Warren G. Magnuson, to establish National Oceanographic Council, patterned after National Aeronautics and Space Council in the Executive Office of the President, to advise and assist in (1) surveying all significant oceanographic and marine science activities, (2) developing a comprehensive Federal program of oceanographic and marine science activities, (3) designating and fixing responsibility for the direction of major oceanographic and marine science activities, (4) providing for effective cooperation among all Federal agencies engaged in oceanographic and marine science activities, (5) resolving differences arising among agencies with respect to oceanographic and marine science activities, and (6) reviewing annually the oceanographic and marine science activities conducted.

Requires the Council to submit to Congress within 1 year after enactment a comprehensive program of proposed legislation in furtherance of oceanography and the marine sciences.

Provides for an annual report containing the activities and accomplishments in the field of oceanography and marine sciences during the preceding year and an evaluation of such activities and accomplishments.

August 1, 1964. S. 2552 passed Senate.

September 19, 1964. H.R. 5159 became Public Law 88-307 (introduced by Congressman Wayne N. Aspinall March 28, 1963), establishing a temporary Public Land Review Commission with instructions to submit a final report to the President and Congress not later than December 31, 1968, concerning the disposition or retention of public lands, included among which are the mineral resources defined "as being under the control of the United States in the Outer Continental Shelf."

December, 1964. NASCO issues report on "Economic Benefits From Oceanographic Research," recommending annual Federal support of \$280 million for the next 10 years (Reference 24).

89th Congress

January 4, 1965. H.R. 153, introduced by Congressman Peter W. Rodino, would provide for the establishment, under the National Science Foundation, of a National Science Academy. Section 13(a) would provide for establishment of specialized institutions including one in oceanography, as a means of advancing science and research activities of the Academy.

January 4, 1965. H.R. 921, identical to H.R. 10904 of 88th Congress, introduced by Congressman Bob Wilson, to establish the National Oceanographic Agency.

- January 11, 1965.* H.R. 2218, identical to H.R. 6997 of 88th Congress, introduced by Congressman Alton Lennon, to provide for a comprehensive, long-range and coordinated national program in oceanography. (H.R. 3310, introduced by Congressman Thomas M. Pelly on January 21, and H.R. 3352, introduced by Congressman Herbert C. Bonner on January 24, are identical.)
- January 19, 1965.* S. 627, introduced by Senator Warren G. Magnuson, to exempt oceanographic research vessels from the application of certain vessel-inspection laws, and for other purposes. (Identical to S. 2552, 88th Congress.)
- January 22, 1965.* Hearings convened by Subcommittee on Oceanography, House Committee on Merchant Marine and Fisheries ("Oceanography—Ships of Opportunity," Serial No. 89-1).
- January 24, 1965.* President's budget submitted, requesting \$141.6 million for oceanography.
- January 25, 1965.* H.R. 3419, introduced by Congressman Richard Hanna, to exempt oceanographic research vessels from the application of certain vessel inspection laws.
- February 1, 1965.* S. 909, introduced by Senator Warren G. Magnuson, to authorize the Secretary of the Interior to initiate a program for the conservation, development, and enhancement of the Nation's anadromous fish in cooperation with the several States.
- February 1, 1965.* S. 944, introduced by Senator Warren G. Magnuson, to provide for expanded research in the oceans and Great Lakes, to establish a National Oceanographic Council, and for other purposes. (Similar to S. 2990 of 88th Congress, but with expanded scope.)
- February 1, 1965.* H.R. 3954, introduced by Congressman Thomas M. Pelly, to prohibit fishing in the territorial waters of the United States by vessels other than vessels of the United States in order to expand the definition of the term "fisheries."
- February 10, 1965.* S. 1091, introduced by Senator E. L. Bartlett, to provide a program of marine exploration and development of the resources of the Continental Shelf to be planned and conducted by a new operating commission-type agency (Note 19).
- February 18, 1965.* H.R. 5175, introduced by Congressman Alton Lennon, authorizes the Coast Guard to conduct a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.
- February 19, 1965.* Hearings on S. 944 convened by Senate Commerce Committee.
- March 2, 1965.* "National Oceanographic Program, fiscal year 1966," transmitted to Congress by President Lyndon B. Johnson.
- March 2, 1965.* H.R. 5654, introduced by Congressman Dante B. Fascell, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes. (Identical to S. 944, 89th Congress.)
- March 5, 1965.* H.R. 5884, introduced by Congressman Ralph Rivers, to provide a program of marine exploration and development of the resources of the Continental Shelf. (Identical to S. 1091, 89th Congress.)
- March 9, 1965.* H.R. 6009, introduced by Congressman Hastings Keith, to provide a program of marine exploration and development of the resources of the Continental Shelf. (Similar to S. 1091, 89th Congress.)

- March 16, 1965.* Hearings on S. 944 convened by Senate Commerce Committee.
- March 17, 1965.* House Committee on Interior and Insular Affairs discharged from further consideration of H.R. 5884 and bill referred to House Committee on Merchant Marine and Fisheries.
- March 18, 1965.* H.R. 6457, introduced by Congressman Thomas L. Ashley, provides for a comprehensive, long-range, and coordinated national program in oceanography to be developed by a National Oceanographic Council established in the Office of Science and Technology. Functions of the Council are similar to those in S. 944; membership of the Council is at sub-Cabinet level, with the Chairman to be designated by the President from the Council members.
- March 18, 1965.* H.R. 6512, introduced by Congressman James G. Fulton, provides for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes. (Identical to S. 944, 89th Congress.)
- April 6, 1965.* Senator Warren G. Magnuson received resolution adopted by State of Alaska urging congressional enactment of S. 944.
- April 8, 1965.* H.R. 7301, introduced by Congressman Richard Hanna, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes. (Identical to S. 944.)
- April 8, 1965.* H.R. 7320, introduced by Congressman Hastings Keith, to exempt oceanographic research vessels from the application of certain vessel-inspection laws, and for other purposes.
- April 12, 1965.* Hearings on S. 944 convened by Senate Commerce Committee.
- April 13, 1965.* S. 1778, introduced by Senator Warren G. Magnuson, to establish the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife as separate services in the Department of the Interior and to abolish the U.S. Fish and Wildlife Service.
- April 18, 1965.* White House releases Presidential announcement to develop small nuclear-propelled oceanographic submarine with responsibility assigned to Navy Special Projects Office (that concurrently is supporting a deep submergence search and research project in aftermath of *Thresher* loss).
- April 29, 1965.* S. 627 passed Senate without amendment; Senate Report 168.
- May 3, 1965.* H.R. 7798, introduced by Congressman J. Oliva Huot, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes. (Identical to S. 944, 89th Congress.)
- May 3, 1965.* S. 627 referred to House Merchant Marine and Fisheries Committee.
- May 4-6, 1965.* Hearings on H.R. 3419 and H.R. 5175 convened by House Merchant Marine and Fisheries Committee.
- May 4, 1965.* H.R. 7849, introduced by Congressman Olin E. Teague, to provide for the development of ocean resources in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes. (Generally combines provisions of S. 944 and S. 1091.)

- May 12, 1965.* S. 1954, introduced by Senator E. L. Bartlett, to protect coastal fishery and other resources by implementing the Convention on the Territorial Sea and the Contiguous Zone.
- May 13, 1965.* Reorganization Plan No. 2 of 1965, transmitted by the President to the Congress, intending to consolidate the Weather Bureau, Coast and Geodetic Survey, and later the Central Radio Propagation Laboratory of the National Bureau of Standards, all in Department of Commerce, to form a new Environmental Science Services Administration.
- June 9, 1965.* Hearings by House Committee on Government Operations on Reorganization Plan No. 2.
- June 15, 1965.* H.R. 9064, introduced by Congressman Paul G. Rogers, to establish a National Commission on Oceanography, composed of 15 members appointed by the President, to make a comprehensive investigation of oceanography and to recommend an overall plan for an adequate national oceanographic program. The bill calls for an interim report to be submitted within 1 year from enactment and a final report in no later than 2 years with the Commission terminated 30 days after the final report.
- June 28, 1965.* H.R. 9483, introduced by Congressman Ed Reinecke to establish a National Commission on Oceanography. (Identical to H.R. 9064, 89th Congress.)
- June 30, 1965.* S. 627 amended by House Merchant Marine and Fisheries Committee and reported favorably to the House; House Report 599 (Note 20).
- July 2, 1965.* H.R. 9617, introduced by Congressman Richard Hanna, to establish a National Commission on Oceanography. (Identical to H.R. 9064, 89th Congress.)
- July 7, 1965.* S. 2251, introduced by Senator Edmund S. Muskie, to coordinate and consolidate the major civilian marine and atmospheric functions of the Federal Government through the establishment of a Department of Marine and Atmospheric Affairs, to enunciate national policies pertinent to the marine and atmospheric interests of the United States, to further the expanded exploration of marine environs and the use of marine resources, to encourage research and development in the marine and atmospheric sciences and technologies, and for other purposes.
- July 7, 1965.* H.R. 9667, introduced by Congressman Thomas N. Downing, to establish a National Commission on Oceanography. (Identical to H.R. 9064, 89th Congress.)
- July 14, 1965.* S. 627 passed by the House, as amended, and referred back to Senate for concurrence.
- July 15, 1965.* S. 944, for expanded research in the oceans and the Great Lakes, and to establish a National Oceanographic Council, was unanimously voted out favorably by Senate Committee on Commerce, with amendments (Note 21).

PART II—EXPLANATORY NOTES

NOTE 1. Matters on which the proposed Academy committee was encouraged to provide advice include (1) problems arising from the international character of the oceans; (2) disposal of atomic waste; (3) long-range planning for development of oceanic food and mineral resources; (4) planning, coordination, and direction of purely scientific investigations, including requirements for added funding for conduct of research and new facilities (Reference 13, p. 23).

NOTE 2. The TENOC report projected growth in Navy research and development funding for oceanography from a \$7.6 million base for fiscal year 1959 to \$27.8 million in fiscal year 1969. Additionally, expenditures were projected over a 10-year interval of approximately \$63 million for buildings, piers, and 18 new ships. An analysis of these proposals is given on page 128 of Reference 7.

NOTE 3. Scope of the NASCO study is reflected in titles of the reports amplifying proposals (Reference 3).

Basic research in oceanography during the next 10 years

Ocean resources

Oceanographic research for defense applications

Artificial radioactivity in the marine environment

New research ships

Engineering needs for ocean exploration

Education and manpower

Oceanwide surveys

International cooperation

History of oceanography

Marine sciences in the United States

The Committee's recommendations were intended to strengthen the marine sciences to a level consistent with both national needs and inherent limitations such as the rates at which ships and laboratories can be built and new oceanographers can be trained:

"1. The U.S. Government should expand its support of the marine sciences at a rate which will result in at least a doubling of basic research activity during the next 10 years.

"2. The increase in support of basic research should be accompanied during the next 10 years by a new program of oceanwide surveys. This will require a twofold expansion of the present surveying effort.

"3. The United States should expand considerably its support of the applied marine sciences, particularly in the areas of military defense, marine resources and marine radioactivity.

"4. The Navy and the National Science Foundation should each finance about 50 percent of the new basic research activity except ship construction. The Navy should finance 50 percent of the new research ship construction with the Maritime Administration and the National Science Foundation sharing the remainder. The Navy, through the Hydrographic Office, should finance 50 percent of the deep ocean surveys, while the Coast and Geodetic Survey should finance the balance. The Navy should sponsor completely all military research and development operations.

The Bureau of Commercial Fisheries should finance the greater part of the recommended ocean resources program. The Atomic Energy Commission should finance the major part of the research dealing with problems of radioactive contamination of the oceans. The National Science Foundation and the Office of Education should sponsor jointly the proposed program for increasing scientific and technical manpower in the marine sciences. Efforts aimed at fostering international cooperation in the marine sciences should be sponsored by the Department of State; the International Cooperation Administration, and the National Science Foundation. Other agencies should take responsibility for certain aspects of the proposed program, particularly the Public Health Service, the Geological Survey, and the Bureau of Mines.

"5. Private foundations and universities, industry, and State governments should all take an active part in the recommended program of expansion."

NASCO recommended funding in categories of basic research, biological and mineral resources, radioactivity in oceans, hydrographic surveys, ship operations, education and training, new laboratories, and research ships. Only funds over the 1958 base were recorded, and these have been added to Federal estimates for the base year of 1958 in Table 17 of Reference 7. The 10-year total amounts to \$867 million, of which \$347 million represents investments in new ships and facilities. After an interval of new ship construction, annual budgets would level off at about \$80 to \$85 million. In a more recent analysis of oceanography in terms of economic benefits (Reference 23) NASCO recommended annual Federal funding of \$280 million for the 1965-74 decade.

NOTE 4. The Federal Council for Science and Technology considers problems which affect more than one Federal agency or concern the overall advancement of the Nation's science and technology. More specifically, serving in an advisory capacity to the President and to heads of member agencies concerned, the Council is directed to recommend policies and other measures—

1. To provide more effective planning and administration of Federal scientific and technological programs;

2. To identify research needs, including areas of research requiring additional emphasis;
3. To achieve more effective utilization of the scientific and technological resources and facilities of Federal agencies, including the elimination of unnecessary duplication;
4. To further international cooperation in science and technology.

(See Reference 18.)

The Council is composed of the Special Assistant to the President for Science and Technology, who serves as Chairman, and officials with scientific or professional background of policy rank from eight departments and agencies most heavily engaged in scientific research and development. Observers are also appointed from Bureau of the Budget, Department of State, and Federal Aviation Agency.

Current membership of the Federal Council is listed below:

Dr. Donald F. Hornig (Chairman), Special Assistant to the President for Science and Technology
 Dr. Nyle C. Brady, Department of Agriculture
 Dr. Harold Brown, Department of Defense
 Dr. Thomas F. Bates, Department of Interior
 Dr. Edward W. Dempsey, Department of Health, Education, and Welfare
 Dr. Leland J. Haworth, National Science Foundation
 Dr. J. Herbert Hollomon, Department of Commerce
 Dr. Glenn T. Seaborg, Atomic Energy Commission
 Mr. James E. Webb, National Aeronautics and Space Administration

OFFICIAL OBSERVERS

Gen. William F. McKee, Federal Aviation Agency
 Dr. Herman Pollock (Acting), Department of State
 Dr. Herbert Scoville, Jr., Arms Control and Disarmament Agency
 Mr. Edwin S. Mills, Council of Economic Advisers
 Mr. Elmer B. Staats, Bureau of the Budget

EXECUTIVE SECRETARY

Dr. Charles Kidd, Office of Science and Technology

NOTE 5. The National Science Foundation is responsible for promoting education in the sciences but has carried out these functions by endeavoring to balance support in all fields without explicitly supporting any single one.

NOTE 6. Federal agencies currently participating in one or more aspects of oceanographic research and represented on the ICO include—

Navy Department: Office of the Oceanographer; Bureau of Ships; Bureau of Naval Weapons; Bureau of Yards and Docks; and Office of Naval Research

Army: Corps of Engineers
Commerce: Coast and Geodetic Survey; Weather Bureau;
Maritime Administration
Interior: Bureau of Commercial Fisheries; Geological Survey;
Bureau of Sports Fisheries and Wildlife; Bureau of Mines
National Science Foundation
Atomic Energy Commission
Health, Education, and Welfare: Public Health Service
Treasury: Coast Guard
Smithsonian Institution
State Department

Soon after its formation, the Interagency Committee on Oceanography undertook to tabulate oceanographic activities and budgets of these Federal agencies and denoted the aggregate set of activities as the "National Oceanographic Program." Subsequently, the ICO initiated Government-wide planning in oceanography such that the program of each agency reflected plans of others. Programs are now published annually by the ICO, the most recent presented as Reference 27. Government-wide budgets are listed by agency and by functions of research, surveys, ships, instrumentation, and shore facilities. No division is made between basic and applied research or engineering. Analysis of ICO operations are contained in References 7, 13, 22, and 25.

NOTE 7. This bill took explicit note of NASCO recommendations and TENOC, and provided for the construction of new ships, new facilities, and instruments, the development of manpower, the establishment of a national oceanographic records center and of international cooperation and emphasized application of oceanographic research to improve economic and general welfare related to living, marine resources.

The proposed Planning and Coordinating Division in the National Science Foundation was authorized and directed to develop a continuing national policy and program that included Navy's TENOC; to recommend contracts and grants for education and research; to encourage cooperation of participating Federal agencies, the NAS, and universities; to foster information exchange; and to evaluate scientific aspects of programs sponsored by the Federal Government. Highly detailed authorization was included in the bill in terms of funds, sizes, and numbers of ships, etc.

NOTE 8. The National Oceanographic Data Center would acquire, process, and disseminate a wide variety of scientific, technological, and related environmental information. It would be guided by an advisory board representing four other Federal agencies and reporting to the Secretary of Commerce. The National Instrumentation Center would provide test and calibration services for all Federal agencies and private institutions on a cost-reimbursable basis.

NOTE 9. In reporting out S. 2692 (Reference 6), the Senate Interstate and Foreign Commerce Committee noted that oceanography is

vital to national interests, that research in this field has been neglected and that it was the purpose of this bill to strengthen U.S. capabilities through a national policy of coordinated and balanced studies, the education and training of additional scientists, construction and operation of new ships and laboratories, the coordination of various Federal agency programs and improved international and inter-departmental exchange of data. The bill emphasized the importance of oceanography for military security and reflected a view that the U.S.S.R. program surpassed that of the entire free world.

The Senate report contains comments from the executive agencies, all opposing enactment of S. 2692. While supporting goals, the agencies and the Bureau of the Budget asserted that growing Federal budgets in oceanography were already responsive to the NASCO proposals, that extension of NSF authority to coordinate programs of other agencies was inappropriate, and that such coordination was being initiated under the Federal Council. There was also strong objection to the specificity of authorization.

NOTE 10. This 180-page analysis by the Legislative Reference Service (Reference 7) summarized arguments in support of oceanography by leaders of Congress and the executive branch, scientists, and others; inventoried existing U.S. capabilities in oceanography in terms of level of research, ships, laboratories, and manpower; made direct comparisons with Soviet oceanography; compared three different 10-year plans and identified issues in oceanography before the Congress concerning the degree of urgency, national goals and problems in organization to achieve these goals. The House Committee on Science and Astronautics endorsed the body of the report and added a set of 20 of its own conclusions that oceanography had been neglected, that expansion in the program was warranted by a factor of 4 over then-current levels and that such expansion could be achieved without waste through proper long-range and coordinated planning. The Committee was also sympathetic to the view that future expansion of oceanography should be concentrated more heavily in the civilian agencies than in the military, that although authority already existed for individual agencies to conduct parts of the program, coordination needed to be improved to meet criteria stated in the body of the report. The Committee also concluded that a major study of Federal organization for oceanography was necessary, particularly to explore whether objectives in program planning and coordination would best be accomplished through a new agency to plan and coordinate a national program, although major sectors would continue to be undertaken by existing agencies. Three advisory and coordinating committees were visualized; one similar to the ICO, one similar to NASCO, and a third reflecting interests of American industry and commerce.

NOTE 11. While Federal funding for oceanography was growing in fiscal years 1960 and 1961, questions were raised by congressional committees as to whether this represented increased support or whether the scope of definition of Federal activities encompassed by the National Oceanographic Program had been expanded without

actual increase in level of effort. The supplemental appropriations by President Kennedy explicitly increased funding to expand and replace the fleet that was made up almost exclusively of over-age converted ships, new shore facilities and new education and training programs. Survey and research programs were also somewhat increased (Reference 9, page 1). For funding trends, see Part III following these notes.

NOTE 12. In supporting the Marine Science and Research Act of 1961 (Reference 12), the Committee listed 15 benefits from an expanded program of oceanographic research in both the seas and the Great Lakes. The bill included a statement of national policy that a sustained program of scientific studies, surveys, education, and training were vital to defense, to rehabilitation of commercial fisheries, and increased utilization of marine resources, living, chemical, and mineral; development of a better scientific knowledge of the world around us and to expand the Nation's commerce and navigation. The bill also legislated a coordinating mechanism.

The report includes statements by executive agencies opposing the bill on the grounds that the administration was already accelerating oceanographic research budgets, that coordination was the responsibility of the newly founded FCST, so that all of the objectives of the bill would be accomplished without the need for new legislation.

NOTE 13. According to the President's letter of transmittal dated March 29, 1962, the Director, OST, is expected to advise and assist the President as the President may request with respect to—

"1. Major policies, plans, and programs of science and technology of the various agencies of the Federal Government, giving appropriate emphasis to the relationship of science and technology to national security and foreign policy, and measure for furthering science and technology in the Nation.

"2. Assessment of selected scientific and technical developments and programs in relation to their impact on national policies.

"3. Review, integration, and coordination of major Federal activities in science and technology, giving due consideration to the effects of such activities on non-Federal resources and institutions.

"4. Assuring that good and close relations exist with the Nation's scientific and engineering communities so as to further in every appropriate way their participation in strengthening science and technology in the United States and the free world.

"5. Such other matters consonant with law as may be assigned by the President to the Office."

Responsibilities for Government-wide planning and coordination in basic research and education had been the responsibility of the National Science Foundation. But since such policies transcend agency lines and since the Foundation is at the same organizational level as other agencies, new arrangements were instituted that permitted the President to utilize his Executive Office for advice and assistance on Government-wide issues in science and technology.

With this legislative base, the Congress would have access to scientific advice at the level of the President that had previously been denied the Congress when such advisory apparatus operating both as the FCST and the President's Science Advisory Committee was chaired by the President's Science Adviser and thus protected by Executive privilege.

NOTE 14. H.R. 12601 took note of the need for a strengthened program of oceanographic research, the interagency character of Federal programs, the objections raised by the executive branch to other proposed legislation and the recent establishment of the Office of Science and Technology for the explicit purpose of developing and coordinating programs that cross agency lines—and the need for a legislative base for an annual congressional review of Government-wide program and budgets previously lacking because the FCST had no legislative base.

The Committee report includes objections of the executive branch concerning H.R. 4276, and noting these objections, considered H.R. 12601 as a clean bill to supersede H.R. 4276. Detailed analysis of needs for a national policy and for coordination in oceanography are set forth in Reference 14.

NOTE 15. No explanation for the pocket veto of H.R. 12601 was released by the White House. From subsequent reports, hearings, etc., two major objections have been identified: First, that to give OST operating responsibility over other agencies violated the principles that it should only advise the President and not be interposed in lines of authority between the heads of other departments and the President. Second, the bill would also provide for a special staff in one field of science that could lead to a proliferation of such positions in OST for special fields of science. (See also House Report 621 accompanying H.R. 6997.)

NOTE 16. The report "Oceanography: The Ten Years Ahead" embodies for the first time a statement by the executive branch of a national goal in oceanography: "To comprehend the world ocean, its boundaries, its properties, and its processes, and to exploit this comprehension in the public interest, in enhancement of our security, our culture, our international posture, and our economic growth." The report also lists the coordinated plans for the decade 1963-72 of the 20 Federal agencies which conduct and sponsor oceanographic research. Included are a statement of research objectives and projections of the funds, facilities, and manpower needed for their accomplishment, categorized by agency, by function, and by subordinate goals of "strengthening basic science, improving national defense, managing resources in the world ocean, managing resources in domestic waters, protecting life and property, insuring the safety of operations at sea."

According to the forwarding memorandum, "This 10-year plan represents the best judgment of the Federal Council as to size and priorities of programs consistent with national requirements. It also takes into account the compatibility between funds, manpower, and facilities. It has been carefully reviewed by a number of outside consultants serving the Office of Science and Technology. But rather than an unalterable blueprint, this plan is more an outline—a statement of requirements in which context annual plans can be prepared. It will be supplemented by additional reports on special topics, such as manpower and instrumentation needs."

NOTE 17. This bill is patterned after proposals of the National Security Industrial Association that also urges a sharp increase in Federal funding to approximately \$900 million annually (Reference 21).

NOTE 18. Four conventions formulated at the UN Conference on the Law of the Sea: "Territorial Sea—Executive J," 86th Congress, 1st Session. A convention on the sovereignty over territorial sea and contiguous zones; ratified May 26, 1960 (became effective September 10, 1964).

"High Seas—Executive K," 86th Congress, 1st Session. A convention on international use of the high seas, ship registry and control, and the protection of the oceanic waters from pollution; ratified May 26, 1960 (became effective September 30, 1962).

"Fishing and Conservation—Executive L," 86th Congress, 1st Session. A convention on fishing and conserving the living resources of the high seas; ratified May 26, 1960. (Ratification by 22 nations required before the convention becomes effective; June 1, 1964, only 14 deposits of ratification had been received. As of October 1964, no additional ratifications had been received.)

"Continental Shelf—Executive M," 86th Congress, 1st Session. A convention on the sovereignty over the waters adjacent to the territorial sea to a depth of 200 meters or (beyond that depth to wherever exploitation of natural resources is practicable) and the exploring and exploiting of the Continental Shelf; ratified May 26, 1960 (became effective June 10, 1964).

NOTE 19. This bill would establish policy to accelerate exploration and development of physical, chemical, geological, and biological resources of the Continental Shelf, to encourage private investment in utilization of its resources, to determine benefits and to disseminate information on resources and to develop an engineering capability to operate on and above the Continental Shelf.

NOTE 20. Amendments removed the limitation on exemptions so as to treat all vessels engaged in oceanographic research on the same basis (Reference 30).

NOTE 21. The amendments to S. 944 (a) changed the title to "Marine Resources and Development Act of 1965"; (b) expand the definition of "marine sciences" to include engineering and technology; (c) expand the definition of "the marine environment" to include the oceans, Continental Shelf, Great Lakes, seabed and subsoil of the Continental Shelf provided for in the convention (Note 18); (d) a major amendment would authorize the President at his discretion to establish an ad hoc study commission which would serve under the Council, similar to that proposed under H.R. 9064, H.R. 9483, and H.R. 9617.

PART III

Federal support of oceanography, by agency and functional area, fiscal years 1960-66

[In millions of dollars]¹

	1960	1961	1962	1963	1964	1965	1966
Agency:²							
Defense.....	32.0	31.6	42.1	55.2	54.6	65.1	68.0
Commerce.....	6.2	11.4	23.6	24.0	23.3	19.9	13.3
Interior.....	6.7	8.7	14.3	16.1	16.5	20.0	16.9
National Science Foundation.....	7.8	7.9	17.3	18.2	19.6	19.3	30.0
Atomic Energy Commission.....	1.7	1.7	4.1	5.4	3.8	4.0	4.6
Health, Education, and Welfare.....	.3	.7	3.1	4.1	2.9	3.5	4.4
Treasury.....	.1	.1	.1	.5	1.2	1.8	2.1
Smithsonian.....	(3)	(3)	.2	.4	.6	.9	1.7
State.....	(3)	(3)	(3)	(3)	.6	.6	.6
Functional area:							
Research ⁴	26.6	31.6	41.0	51.0	62.0	72.5	85.0
Surveys.....	13.4	14.9	17.4	18.5	24.1	27.1	30.6
Instrumentation.....	.9	3.0	6.6	6.4	8.8	8.2	8.2
Ship construction.....	13.5	14.0	34.0	38.1	25.5	20.7	13.4
New shore facilities.....	1.4	.4	8.9	9.2	5.1	6.0	4.4
Data center.....	.1	.3	.5	.6	.9	(3)	(3)
Total.....	55.0	62.1	⁵104.8	124.0	123.1	135.1	141.6

¹ Excludes classified applied oceanography programs of Navy, and Navy ocean engineering research on deep submergence search and rescue systems initiated after loss of the *Thresher* in April 1963; also some programs such as Mohole, categorized under earth science. Years 1960-64, obligations; 1965, estimated obligations; 1966, obligational authority requested in President's budget. Detail may not add to totals because of rounding.

² *Defense*: Navy and Army Coastal Engineering; *Commerce*: Coast and Geodetic Survey, Weather Bureau; *Interior*: Bureaus of Mines, of Commercial Fisheries, and of Sports Fisheries and Wildlife, and Geological Survey; *Health, Education, and Welfare*: Public Health Service; *Treasury*: U.S. Coast Guard.

³ Not explicitly identified.

⁴ Includes International Indian Ocean Expedition and ship operation costs.

⁵ Jump in funding from fiscal year 1961 largely due to supplemental budget request of President Kennedy in special message of Mar. 29, 1961.

Sources: 1960-63, "Oceanography—The Ten Years Ahead," Federal Council for Science and Technology, 1963; 1964-66, "The Budget of the United States Government," fiscal year ending June 30, 1966.

PART IV

Summary of congressional actions related to oceanographic bills, 86th, 87th, 88th, and 89th Congresses

Bill	Purpose	Action ¹
<i>86th Congress</i>		
H. R. 6298 S. Res. 136	Provide NSF support for oceanographic facilities and students. Establish national policy in support of oceanography at funding levels recommended by National Academy of Sciences, with new Federal coordinating mechanism.	Hearings, HSA. Passed by Senate.
S. 2482 and H. R. 8611	Remove geographical limitations on Coast and Geodetic Survey.	Public Law 86-409, Apr. 15, 1960.
S. 2692 and H. R. 9361	Establish national policy and 10-year authorization for program in oceanography at funding levels recommended by NASCO.	Passed Senate, Hearings, HMF.
H. R. 10412	Establish public policy and Coordinating Committee on Oceanographic Surveys.	
H. R. 12018 H. R. 12700	Establish Data and Instrumentation Centers in Coast and Geodetic Survey. Create program planning and coordinating body under NSF Science Board.	
<i>87th Congress</i>		
S. 901 H. R. 4276	Similar to S. 2692. Establish Cabinet-level National Oceanographic Council to develop and coordinate national program in oceanography.	Passed Senate July 28, 1961. Hearings, HMF.
H. R. 4340, S. 1189 and H. R. 6845. H. R. 12601	Expand functions of Coast Guard to include oceanography. Assigns responsibility for developing and coordinating program in oceanography to Office of Science and Technology.	Public Law 87-396. Passed House and Senate as S. 901, but pocket vetoed.
<i>88th Congress</i>		
H. R. 13 H. R. 6997	Similar to H. R. 12601. Establishes national policy in oceanography with coordination by President with OST assistance.	
H. R. 10904	Establish National Oceanographic Agency to develop and sponsor Government-wide program.	
H. R. 11232 H. R. 11419	Authorizes NSF study of legal problems on ocean resources. Authorizes Coast Guard study of legal problems.	Passed House Aug. 5, 1963.

S. 2552	Exempts oceanographic research vessels from application of certain vessel inspection laws.	Passed Senate Aug. 1, 1964.
S. 2990	Establish Cabinet-level National Oceanographic Council to develop and coordinate interagency program.	
<i>89th Congress</i>		
H.R. 153	Provides for establishment, under the National Science Foundation, of a National Science Academy; Section 13(a) would provide for establishment of specialized institutions, including one in oceanography, as a means of advancing science and research activities of the Academy.	Referred to HSA.
H.R. 921	Identical to H.R. 10904 (88th Congress)	Referred to HMF.
H.R. 2218	Identical to H.R. 6997 (88th Congress)	Do.
H.R. 3310	Identical to H.R. 2218 (89th Congress)	Do.
H.R. 3352	Identical to H.R. 2218 (89th Congress)	Do.
H.R. 3419	Exempts oceanographic research vessels from the application of certain vessel inspection laws.	Do.
S. 627	Identical to S. 2552 (88th Congress); passed Senate April 29, 1965. Reported out of HMF June 30, with amendments.	Passed House with amendments July 14; passed Senate July 20 with House amendments. Referred to SC.
S. 909	Authorizes Secretary of Interior to initiate program for conservation, development and enhancement of Nation's anadromous fish in cooperation with several States.	
S. 944	Establishes a National Oceanographic Council and provides for expanded research in the oceans and Great Lakes (similar to S. 2990 of 88th Congress, but with expanded scope). Reported out of SC July 15, with amendments.	Reported with amendments from Senate Commerce Committee.
H.R. 3954	Prohibits fishing in the territorial waters of the United States by vessels other than vessels of the United States in order to expand the definition of the term "fisheries."	Referred to HMF.
S. 1091	Provides for a program of marine exploration and development of the resources of the Continental Shelf to be planned and conducted by a new operating commission-type agency.	Referred to SC.
H.R. 5175	Provides for a study of the legal problems of management, use, and control of the natural resources of the oceans and ocean beds.	Referred to HMF.
H.R. 5654	Provides for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council. (Identical to S. 944, 89th Congress.)	Referred to HMF.

Summary of congressional actions related to oceanographic bills, 86th, 87th, 88th, and 89th Congresses—Continued

Bill	Purpose	Action ¹
<i>89th Congress—Continued</i>		
H. R. 5884.....	Provides for a program of marine exploration and development of the resources of the Continental Shelf. (Identical to S. 1091, 89th Congress.)	Referred to HIIA; re-referred to HMF.
H. R. 6009.....	Provides for a program of marine exploration and development of the resources of the Continental Shelf. (Identical to S. 1091, 89th Congress.)	Referred to HIIA; re-referred to HMF.
H. R. 6457.....	Provides for comprehensive, long-range, and coordinated national program in oceanography.	Referred to HMF.
H. R. 6512.....	Provides for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council. (Identical to S. 944, 89th Congress.)	Do.
H. R. 7301.....	Provides for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council. (Identical to S. 944.)	Do.
H. R. 7320.....	Provides for exemption of oceanographic research vessels from application of certain vessel inspection laws.	Do.
S. 1778.....	Provides for establishment of Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife Service.	Referred to SC.
H. R. 7798.....	Provides for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes. (Identical to S. 944, 89th Congress.)	Referred to HMF.
H. R. 7849.....	Provides for development of ocean resources, to provide for economic development of the Continental Shelf, to provide for expanded research in the oceans and the Great Lakes, to establish a National Oceanographic Council, and for other purposes.	Do.
S. 1954.....	Provides for implementing the Convention on the Territorial Sea and the Contiguous Zone.	Referred to SC.
Reorganization Plan 2 of 1965.	Consolidates Weather Bureau with Coast and Geodetic Survey into a new Environmental Science Services Administration in Department of Commerce.	Referred to SGO HGO.

H.R. 9064-----	Provides for establishment of a National Commission on Oceanography-----	Referred to HMF.
H.R. 9483-----	Provides for establishment of a National Commission on Oceanography. (Identical to H.R. 9064, 89th Congress.)	Do.
H.R. 9617-----	Provides for establishment of a National Commission on Oceanography. (Identical to H.R. 9064, 89th Congress.)	Do.
S. 2251-----	Provides for a major Department of Marine and Atmospheric Affairs-----	Referred to SGO.
H.R. 9667-----	Provides for establishment of a National Commission on Oceanography. (Identical to H.R. 9064, 89th Congress.)	Referred to HMF.

¹ Key:

- HSA: House Science and Astronautics Committee.
- HMF: House Merchant Marine and Fisheries Committee.
- SC: Senate Commerce Committee.
- SGO: Senate Government Operations Committee.
- HGO: House Government Operations Committee.
- HIIA: House Interior and Insular Affairs Committee.

PART V—SELECTED BIBLIOGRAPHY

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2. "Education in the Field of Oceanography," hearing before the Subcommittee on Earth Sciences, House Committee on Science and Astronautics, 86th Congress, 1st session (on H.R. 6298), August 25, 1959.
- [3. "Oceanography, 1960-1970," National Academy of Sciences; 1958-59, 12 volumes.
4. "Oceanography in the United States," hearing before the Special Subcommittee on Oceanography, House Merchant Marine and Fisheries Committee, 86th Congress, 2d session, Part II, February 9, 1960.
5. "Marine Science," hearings before the Senate Committee on Interstate and Foreign Commerce, 86th Congress, 2d session (on S. 2692), April 20, 21, and 22, 1960.
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10. "Oceanography 1961—Phase 2," hearing before the Subcommittee on Oceanography, House Committee on Merchant Marine and Fisheries, 87th Congress, 1st session (on Project Mohole), May 22, 1961.
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