

Dr Cronis — Chancellor of Rice

16 Invt. Future
2400
NOTES FOR VICE PRESIDENT'S REMARKS AT 4:00 P.M. MEETING
(With Gulf Universities Research Corp. and Other
Ocean-Related Interests)

Cam

Thank you for your cordial welcome to Houston.

As you know, on previous trips to Houston I have focused my attention on the Manned Spacecraft Center and the supporting activities to that important element of our national program in space.

Today, I am glad to be with you who are concerned with the better understanding of our marine environment and with the development and use of the sea's resources. We have great potential opportunity to improve the quality of our life here and throughout the world through fuller application of science to this frontier.

The Congress passed and the President signed the Marine Resources & Engineering Development Act of 1966 less than a year ago. I am Chairman of the Council established by that Act, which includes the cabinet members & agency heads concerned with ocean-related activities of the Federal Government. Dr. Wenk, whom many of you know, is Executive Secretary of the Council. We have acted with vigor to start fresh programs; one on Food from the Sea and one on Seagrass Colleges, for illustration. The Administration

also proposes to strengthen other Federal activities giving promise of practical returns from the oceans in economic or national security terms. The first steps during these months are described in the President's Report to the Congress:

"Marine Affairs in Transition," copies of which are available to you here. The Act also provides for a national public Commission to give attention to the longer run national program in oceanology. It will recommend the appropriate organization of the Federal Government to give effective leadership and co-ordination to national efforts in this field. Dr. Richard Geyer is Vice-Chairman and Mr. Leon Jaworski is a member of the Commission, which has started work on those challenging assignments early this year.

I regret the necessity for telescoping my time in the Houston area; I hope to see your ocean activities on a later visit. I have asked Dr. Wenk to carry through the schedule planned for tomorrow, and to brief me on it on his return to Washington. For now, I am eager to hear of the work of your Gulf Universities Research Corporation and of State and industrial drives in these fields.

Rico
WOTAP

[Transcript]

G U
R C

RECEIVED
Gulf Universities Research Corporation

1967 MAY 8 AM 8 48

227 System Building
College Station, Texas 77843

May 5, 1967

BOARD OF DIRECTORS

GROVER E. MURRAY
Texas Technological College
Chairman

CAREY CRONEIS
Rice University
Past Chairman

ARCHIE W. STRAITON
University of Texas
1st Vice Chairman

HORACE R. BYERS
Texas A&M University
2nd Vice Chairman

JOSEPH M. REYNOLDS
Louisiana State University
3rd Vice Chairman

JOSEPH R. CRUMP
University of Houston
Treasurer

EUGENE H. MAN
University of Miami
Secretary

CARL H. OPPENHEIMER
Florida State University

JAMES H. STONE
Gulf South Research Institute

JAMES E. BROOKS
Southern Methodist University

ANTON L. HALES
Southwest Center for
Advanced Studies

JAMES M. SHARP
Southwest Research Institute

E. LEIGH SECREST
Texas Christian University

FRED R. CAGLE
Tulane University

ALEX S. POW
University of Alabama

GEORGE K. DAVIS
University of Florida

PRESIDENT

JOHN C. CALHOUN, JR.

The Honorable Hubert H. Humphrey
Vice President of the United States
Washington, D. C. 20506

Dear Mr. Vice President:

Attached is a transcript copy of the material that we taped on Tuesday, April 24, when you were in Houston.

This material is essentially as it came from the tape with only minor deletion of superfluous conjunctions and with our interpretation of punctuation as we thought it was intended. Copies are also being sent to Messrs. Geyer, Moore, Hocott, and Croneis.

We would like to duplicate this transcript and distribute it to others who were present at the briefing session and to members of university faculties at GURC member institutions. If we have your permission to duplicate, we will be very happy to make any corrections that you would like to specify in the transcript.

Thank you again for being with us and for the complimentary remarks you made about our activities.

Sincerely yours,



John C. Calhoun, Jr.
President

- cc:Dr. Carey Croneis
- Dr. Richard Geyer
- Dr. Claude Hocott
- Mr. Joe Moore
- Dr. Edward Wenk

attachment



*Transcript of Program on
MARINE RESOURCES AND ENGINEERING DEVELOPMENT
April 24, 1967, Houston, Texas

Special Guest, Vice President Hubert H. Humphrey

Dr. Wenk:

Mr. Vice President, let me introduce the Chancellor of Rice University and the former Chairman of the Gulf Universities Research Corporation, Dr. Carey Croneis.

Dr. Croneis:

Mr. Vice President, I have the honor and pleasure of welcoming you to this splendid group of gentlemen. More years ago than you will remember, I had the opportunity of welcoming you to Beloit, Wisconsin at a time when you had great potential as a statesman. You've fulfilled that now, and we welcome you here as the Chairman of the National Council on Marine Resources and Engineering Development. This group has asked me to thank you very much for the energy and the direction and the foresight that you've brought to this extraordinarily important assignment.

I want to tell you in just a moment of the interest we have in this region in oceanography and related fields. When Harold Geis and Morgan Davis and Marvin Hurley, who are here in this room and whom you know, got out a questionnaire in this area to see how many people were interested in oceanography, believe it or not, over 4,000 replied. And at the first banquet where we prepared for 350, 850 came and at least 200 were turned away. This is substantial interest any way you count it. The American Society for Oceanography, of which Mr. Geis is the President, in 18 months has 1800 paying members from coast to coast with chapters formed and forming on the west coast, the east coast, and the Gulf. The Gulf Universities Research Corporation, which comprises 16 institutions, including most of the major universities from Miami to Texas Tech has been in operation for about 2 years, and our concern is as broad as the skies, and as deep as the ocean. We have at our door the Gulf, which, as the banks put it, is not too big and not too small. It's a perfect outdoor oceanographic laboratory.

Those of us who are in university work like to think of you as a man who has had teaching experience in a number of schools -- L.S.U., Minnesota, Macalester, I believe, and we know that you received your masters degree from one of our constituent universities, L.S.U. Now we think of ourselves as somewhat "have-nots" down here, but we are "haves." We have a lot of interests. We have a lot of ability. We have a lot of people in this particular field. We'd like to have you and Ed and others working with you, such as Leon Jaworski and Richard Geyer, help us get some more. Welcome, Mr. Vice-President.

Mr. Humphrey:

Thank you. Thank you very much Dr. Croneis. Thank you for your generous and kind remarks, and I want to say that I'm going to do my best to curb my great desire to make a speech before such a wonderful audience. Any audience over three sets me up you know.

*This transcript is based on a tape recording. Minor editing was performed to give clarity and continuity to the written text.

But, lets proceed so that we can get down to some of the discussion that we need here. First, as you know, I'm privileged to have with me -- I believe all three of the Congressmen came in -- Congressman Casey, Congressman Eckart, and Congressman Brooks. Jack is here. Where is he? Yes, right here. And I want you good friends here to know that these men have been very, very helpful to us in making possible the activity of the Federal Government in the field of oceanography or marine resources development. Quite candidly, we wouldn't be having the program we have today were it not for the initiative of the Congress of the United States. As one who served for sixteen years in the United States Senate, I've never believed that the Executive Branch had a monopoly on either virtue, or wisdom, or all encompassing knowledge on matters of national importance, and in this instance with the initiative of the Congress, and the cooperation of the Executive Branch, we have what I think is a going proposition at the Federal level of government in the field of, well, to put it simply, oceanography, or marine resources and engineering development. May I just respond to the generous introduction by saying that when I walked through the lobby -- as I mentioned going down the line here -- I thought I was at a faculty meeting, or a university seminar of some sort, because I noticed that the foreign students are meeting here with all of the university people that are working with the foreign students who attend our universities. Quite candidly, I said "Gee, how come I didn't get cut in on that meeting?" Because I just love to go to meetings, and I like to go to meetings particularly where there are students and university people, but I'm afraid I'm going to have to miss that one, and I'm going to have to get along with this one, lest we miss everything that we came here for. Sixteen institutions, am I right Dr. Croneis? Sixteen institutions and you've been together now for two years?

Dr. Croneis:

A little more than that.

Mr. Humphrey:

A little over two years. I think what this tells us is that there is a whole new spirit in our university circles as to the necessity of cooperative endeavor and interdisciplinary activity as well as intra-mural and inter-campus activity in the fields of research and science, technology, and technological development. I have two or three assignments that are very engaging. I just left the Mayor's office -- Mayor Welch's office of Houston. I'd been there with a number of the mayors of this part of Texas. I serve as the Chairman of the President's Council on Youth Opportunity. This is another coordinating mechanism that we've established in government. I'm a political scientist by academic profession, and a pharmacist as a sort of what we call a "reserve." I graduated from pharmacy first. I keep my license up because this politics is rather a precarious business. I like to have something I can fall back on and there is a shortage of pharmacists in the country. They're paying better now than they used to and I keep my dues up. But the Vice President's Office is being used more and more as an office to coordinate a number of activities that are somewhat related. And it's also being used as an office to work with other offices outside the Federal establishment. For example, I now have the responsibility for liaison between the Federal government and the local government on all programs related to local government. I love that job. Because I was once Mayor of Minneapolis, I think I have some appreciation of the problems a local government goes through. And as a refugee from a classroom, I think I do have a little appreciation of what goes on at a university and what government can do to help you, and

what it can do to disturb you. So I come in the spirit of helpfulness and as a tranquilizer. I trust that at least this will be the case here.

Now on my previous trips to Houston I focused my attention on the Manned Spacecraft Center, as you know. I'm Chairman of the Space Council. I jokingly say that whenever Congress gives the Vice President anything to do by statute it's either out of this world in the infinity of space or in the bottom of the ocean, such as in the program on oceanography. I can't make up my mind whether Brooks and Eckart and Casey had anything in mind there other than just this assignment or whether I'm to read something into that. But I've enjoyed my work in the space program. I'm not an expert. We have experts. What's that old axiom -- that experts should be on tap and not top. I have tried to act as the political layman co-ordinator on policy matters relating to our space activities. I have exactly the same role now in this new endeavor, or should I say in this newly co-ordinated endeavor of the Federal Government in the field of Marine Resources. And I'm glad to be here with you today to share your interests, and to hear a little bit from you, as well as you listening to me these few moments.

Congress passed this act, the President signed it less than a year ago, and we've been hot on it ever since. Imagine what we had to do with the Federal Government. We had to bring in all of these many agencies, the Coast Guard, the Commerce Department, the Navy, the National Science Foundation, the Atomic Energy Commission, the Defense Department, and many others. We had to bring them all in together and to try to get them to pull together as a team. Each one of them have their specialized interests -- The Department of Interior, the Bureau of Fisheries, the Department of Health, Education and Welfare, the Food and Drug Administration, on fish protein concentrates, for example. I've been working on that for years, and finally we've been able to pull together a program, because of this wonderfully good man that's here with me, Dr. Edward Wenk, whom I consider one of the outstanding scientists in public service in the government of the United States. And we were able to pull this together and get a program moving, to get a budget. We even had a special message for the President. We got out our first national report, copies of which I'm sure you've seen. Now Dr. Wenk, as I've mentioned, is Executive Secretary of the Council, and I'm going to ask him to stay on, and have asked him to stay on to pick up the schedule that I have to forego. You have no idea how sorry I am, but we didn't know that the President would have to go to Germany, and they say it isn't really very good to have both the President and myself out of Washington at the same time, even though I think the country may feel a little better if I'm away. There're some folks that think I ought to be there and I had serious doubts whether I ought to be here today. But we had such a jam-packed program with the State Legislature and the mayors on projects that I needed to take care of and then I wanted to see you so we capsuled it into this one day. Dr. Wenk will be here. Frankly you're lucky. I don't know much about this program. He does. And you'd have more conversation from me and less information. You'll get more information from him and less conversation, so you're mighty fortunate. Now we have set up a list of priorities and Ed, when you have a chance, you can discuss these. We've put down the priorities that we want the Federal Government to have at the top of the agenda. You can't do everything, you know. We don't have that much to do with. And, we've also, as you know, tried to make it crystal-clear that this program of oceanography depends to a large measure upon state, local and private cooperation. One of the top priorities of our selection is the food from the sea. Another is a whole new

endeavor in the Sea Grant Colleges programs. Now we just got a little tickler on sea-grant. We don't have much and there haven't been any grants made yet I guess. But there will be some. But we made the break through and I predict the sea-grant college program will have a tremendous economic impact on this country as well as a great input into the academic and scientific and professional life of this country. The first steps taken during these months that the Council has been active -- the Council of Oceanography -- are described in the President's report to Congress in what we call Marine Affairs in Transition. I see that you have that. If I may say so, it's a pretty good report, and I might add that we put a lot of work into it. It isn't just one of these that someone just threw together. We had to clear this with every department. We went over it time after time, and I used to want to throw Ed Wenk out of the office. He even believed I should know what was in the report. That's a terrible thing for an Executive Secretary to have in mind. But I'm proud of the report, and proud of the input that each of us has made.

Now the Act that set up the Marine Resources Council also provided for a national public commission to give attention to the longer run national program in Marine Resources and Engineering Development. Can I just show you the difference? The Council is working with what we have today. The Council, of which I am the Chairman, is trying to co-ordinate what we have available now. We're trying to get the most out of the tax dollar that we appropriate to the field of oceanography. The Council is trying to harness the private sector and the public sector as we see it now. The Commission has an open hunting license. They're supposed to look down the road. They don't have to worry whether they get along with the Secretary of the Interior or the Vice President. Nobody worries whether they have to get along with the Vice President. That's not a problem. But that office is one filled with responsibility, gentlemen, and very little authority. I thought you ought to know how I describe it. But the Commission, I think, really carries with it the possibilities of a great new thrust in the field of Marine Resources and Development. This Commission will recommend the appropriate organization, for example, for the Federal Government to give effective leadership and coordination to national efforts in this field. In other words, it has the mandate to do what it wishes in terms of organization. Some people think we need a so-called "wet NASA." Other people think we need a different kind of organization. Well, I'm not choosing up sides on that. I'm leaving that to the Commission. And Dr. Richard Geyer is the Vice Chairman. He's here with us and we're very proud to have him. And Mr. Leon Jaworski is a member of the Commission, so Texas is well represented on this Commission. This Commission had its first meeting a few weeks ago. I attended it. Dr. Stratton is the Chairman. We are working together, Council and Commission, not as adversaries but as co-operators. Each of us trying to stake out our own area of work and, if I may use the terms, there is cross-breeding at staff levels and constant consultations at the Council and Commission level.

Now I am eager to hear of the work of your Gulf Universities Research Corporation. You may be interested that I helped develop what we now call the North Star Research Corporation up in Minnesota. We had a long time that we didn't do anything like this. And what we're learning, what we've learned out of space if we haven't learned anything else is that if you really want to do a big job, something that really confounds the human mind in terms of its complexities and its dimension, you can't do it with any one segment of the economy. I

don't care how big a university you have, it isn't big enough for the space program nor is it big enough for oceanography. I don't care how big an industry you have it isn't big enough for the whole program of space or marine resources development. Every major problem that we face today, gentlemen, requires a partnership of effort. It requires a co-operation of effort the likes of which we've never known. That's what I told your legislature today. The day of pitting one group against another or the day of getting up here and saying the Federal Government is your enemy and the local government is your enemy and it's only the state government that's your friend, or vice-versa; all of those days are over. I must say quite candidly, that is for people who are really not serving the public too well. And we have to recognize that in the field that we're here to talk about right now, if we're going to explore the depths of the oceans, we're going to need capital, we're going to need the federal government, we're going to need state governments. We're going to need every resource that we can bring to bear and we're going to have to do it in concert. And we're going to have to have our own university people inside universities understand that the departments are not separate autonomous bodies with membership in the United Nations, that we're all a member of a family. I've been a professor long enough to catch on that you can serve and still feel independent. Well, you wouldn't cure many heart cases today if you didn't have engineering and medicine working together. We've learned a great deal about inter-disciplinary activity and co-operation. That's what I'm here to talk to you about, and I want to thank our friends who are in private industry who are so deeply involved.

I happen to think that oceans are going to be the richest resource that we've ever tapped. Now I kiddingly said to the President the other night -- we were having dinner together Saturday night at the White House -- and he asked me what I was going to be doing down here. And, I said "One of the things I am going to be doing, Mr. President, is in this field of oceanography." And he said, "Oh Yes. That's right," he said. "Well," he said to the group that was there -- a couple of senators and others, "I've got Hubert in charge of space and oceans." He said, "That ought to keep him busy." And I said "Yes, Mr. President, you know the part that I'm in charge of, the oceans, is 71% of the earth's surface. You have the other 29." And, I said "I think my fish make less trouble than your people, if you don't mind my saying so." And I said "I am, according to your discussion here, in charge of all outer space, and so far there hasn't been as much trouble there as there has been on this terrestrial ball, either." So I'm the man of tranquility and of peace and of the future, you see, looking into the oceans and into the space. But really, the minerals, the fish life, the protein, the vegetable life that's there -- the opportunities that we have in the oceans are unlimited. And I venture to say that we will learn an awful lot about life itself. We'll learn a lot about human health. We're going to learn a great deal about weather. We're going to learn a great deal about the environment in which man lives. I'm a man who believes that we ought to know about the house in which we live, and that house in which we live is the solar system on the one hand, on the one dimension. That's why we ought to be in space. We ought to know about our environment just like we ought to know about our neighborhood. And the other part of that environment is the earth on which we walk and live and from whence we draw, in a very real sense, our sustenance. That earth also includes the seas, because just as surely as we're in this room breathing the air that comes in this building, the waters of the seas, the tides, the currents, and

what happens in those seas affects our lives just as much as the sun itself, and we have to know about all of it. That's why I'm really all fascinated with this subject. Now I will turn it over to you. Thank you very much.

Dr. Croneis:

Thank you Mr. Vice President. It's now my pleasure to introduce to you, sir, Dr. John Calhoun who is the Vice President of Texas A&M and also the President of Gulf Universities Research Corporation. And may I say before he takes over that there's a great deal of talent in the Gulf universities and interests in oceanography, and most of it at the moment is centered at Texas A&M whose work and development in oceanography has not been as much appreciated in other sectors of the country as it should have been.

Mr. Humphrey:

I got that message.

Dr. Calhoun:

Mr. Vice President, Congressmen. We are indeed honored that you have scheduled the time to hear about ocean and water resources activities in the Gulf region and in the state of Texas. In order to use your time most efficiently we have scheduled three topics for presentation. They'll be approximately 15 minutes each, as we have them outlined. The first will be on oceanographic programs of the university community, and I will present part of that and Dr. Geyer the other part. The second will be on water pollution control presented by Mr. Moore and the third on oceanographic research of industry is presented by Dr. Hocott. All of us are prepared to answer your questions at the end of the presentations but we hope that you will ask for clarification at any point along the way where it is needed.

First, let me tell you a little bit about the program of the Gulf Universities Research Corporation. This is a group formed to do the big jobs that might be done in this region. Our particular first emphasis is upon the Gulf of Mexico. It is our intent to work in parallel with programs of the educational institutions, government agencies, and industry. We have no intent to compete with any of them. We think we can perform a unifying role. As has been mentioned, there are 16 members at the moment in this corporation -- three from Florida, one from Alabama, three from Louisiana, and nine from Texas. We hope to have an application soon from the University of Mississippi and we have an inquiry from the University of Mexico. Here today with us are Dr. Crump representing the University of Houston in the Corporation, Dr. Straiton representing the University of Texas, Dr. Croneis representing Rice University, and Dr. Geyer representing Texas A&M.

Why the Gulf of Mexico? Well, there are many reasons but one of the most outstanding reasons is that there's only one Gulf of Mexico and it is in a sense a real national asset. We do have a neighbor to the South who borders on the other side of it and this again is one of it's unique characteristics. Here is an opportunity to embark upon an international effort where you don't have to involve the United Nations necessarily. You can involve the neighbor next door and carry on a dialog rather than a conference. More important, however, is that the Gulf is a unique natural laboratory and it is necessary for scientists to have access to it in many ways. The Gulf is one of the world's best natural laboratories for geology and sedimentary processes. It has a suite of estuaries around its rim that is probably unparalleled and these provide an

excellent base for comparative studies. It is an excellent place for taking a total ecological point of view, wherein biology, engineering, atmospheric sciences, oceanographic work, and the impacts of man are all brought together. Few of us realize over half of the land area in the continental United States drains into the Gulf of Mexico. The impact of man is quite important here. Also, we have a strong industrial investment in the Gulf. We have a headstart here that we don't have any place else and, in fact, what industry is doing world wide today had its origins mostly in the continental shelf of the Gulf of Mexico. The importance of ocean industry in the Gulf was dramatically tabulated in the recent report from the National Council. In the back of that book -- a report that was mentioned by the Vice President -- if none of you have read it, look and you will find that selected ocean related industries are tabulated. The five Gulf states have 27 1/2% of the employment in all coastal states in ocean related industries. Thirty-five percent of the ten thousand four hundred and ninety one total industrial units are from the five Gulf states. The fishery catch in the year that is tabulated was higher for the Gulf region than for any of the other nine regions reported. I don't have to go down the list of resources that we have in the Gulf of Mexico. There are now a number of platforms, stable platforms, in the Gulf and these are available as places from which we could take off and make new measurements. All of these suggest to us that the Gulf should be a first focus for the nation's marine research development program. We have all of the elements needed here for proto-type study. Here, it seems to us we can make our next big step forward in understanding the ocean and using it and then move out from here to world wide applications. We suggest, in fact, that for the national ocean resources program, a comprehensive in-depth analysis and study of the Gulf of Mexico should be this nation's initial goal. We can take our first broad complete planning and programming steps here and use it as a springboard for going on into a wider program.

What are some of the things we think are needed. Well, in the first place, we think an amalgamation of the separate interests are needed. That's one of the reasons we formed this Corporation. There are five states bordering on the Gulf. Each of these states, with its agencies, have an interest. There are a number of municipalities along the Gulf that have a keen interest as does industry, Federal government and universities. The Gulf Universities Research Corporation expects to bring these groups together in order to make a common approach to analyzing the needs for education and research and for satisfying them.

One particular activity in which we engage is to bring together people and existing facilities. We have held one large conference and we held one workshop on Marine Geology. We've placed some of our scientists aboard a Woods Hole ship coming into the Gulf. We've placed other scientists in trial dives of the ALUMINAUT. We have announced that we intend to plan and organize a Gulf Science Year, hopefully for the year 1970. We expect to carry on a number of broader programs many of which are, at this stage, in the dream stage.

What are some of the things we think are needed in the Gulf of Mexico? We think we need a large and broad Gulf Oceanographic facility unit to provide all kinds of oceanographic facilities that are not now available to the scientific community. There is only one ocean-going oceanographic university on the Gulf and that is Texas A&M. Other scientists have to rely upon facilities that can be provided through Federal agencies or existing universities working in the field. We feel there is a need for a comprehensive Gulf measurement network

taking advantage of the existing platforms and of the many people who are working in the Gulf from time to time. We also think there are a number of research laboratories or centers that might be envisioned. In particular, it seems there is a need for Continental Shelf Development Laboratory where one can test and try out new engineering developments within the sea. We think, in particular, that the Gulf is an excellent location for a National Ocean Marine and Estuarine Chemical Center. There is no such unit in existence. Chemistry applies to geology, biology, pollution, and bio-medical work. We think Galveston would be a very logical location for a center for Marine and Estuarine Chemistry.

Of course, there are a number of facilities already in existence along the Gulf devoted to oceanographic work at least of a coastal nature. Florida State has a unit and they intend to acquire an ocean-going vessel. The University of Alabama is building a center in Mobile. There is a center at Ocean Springs in Mississippi. The University of Texas has a laboratory at Aransas Pass, and, of course, there are the facilities at Texas A&M at Galveston. Southwest Research Institute is planning to put up a facility at Corpus Christi. So we have a base to build from. Texas A&M is the largest in the region and it has played a large role in the national effort and I am, therefore, going to call upon Dr. Geyer, Head of the Texas A&M University Oceanography Program, to tell us about that particular effort. Dr. Geyer.

Dr. Geyer:

Mr. Vice President, members of Congress, and guests. This portion of the briefing covers the key phase necessary for the successful development of marine resources, namely, oceanographic education and research. Present activity and future plans of the previous and subsequent speakers cannot be achieved in the absence of sufficiently trained personnel in the many branches of oceanography and ocean engineering. One of the primary institutions responsible for this training function is the Oceanography Department of Texas A&M University. Since its inception in 1949, it has granted 1/3 of all the advanced degrees in oceanography and such majors sub-disciplines as biological, chemical, geological, geophysical, physical and meteorological oceanography. Although it is evident from this that emphasis has been on graduate teaching, it is axiomatic that one cannot be an effective instructor in any graduate program unless he is also engaged in advanced research. In this regard, the annual research budget of the Department of the last few years has averaged about 1 1/2 million dollars per year. These research projects have been sponsored primarily by the Office of Naval Research and the National Science Foundation. In addition, the Atomic Energy Commission, the Army Corps of Engineers and other government agencies together with a number of different private industries have made up the remainder. Many of the research results are directly applicable to problems relating to national defense, fisheries, pollution, exploration and production of oil, gas and minerals, beach erosion control and recreation. Oceanography is truly an international discipline. This is reflected not only in the composition of our faculty but also in our diverse geographic activity. Some of our faculty members come from Argentina, Holland, and the Middle East. The results of our research last year, for example, have been presented in international meetings in Moscow, Tokyo and Chili. One staff member is also President of the Scientific Committee on Oceanic Research, an international organization. Thus, it is not surprising to see our sea-going research vessel, ALAMINOS, engaging in international cooperative expeditions. (The first slide please) It is 180 feet long, requires an operating crew of twenty and carries a scientific complement of sixteen. She has just returned from a three months cruise covering 12,000 miles in the Eastern

Pacific off the coast of Columbia, Peru, Panama and Ecuador. (Next slide please.) Other ships participating belong to the Coast Guard, Bureau of Commercial Fisheries and Scripps. In this expedition, emphasis of the scientific objectives was on a study of oceanographic and meteorological conditions affecting the types of fish in this part of the world used to produce fish meal concentrate which can alleviate the protein diet deficiency existing today in a large segment of the world's population. In addition to scientific results, this cooperative study did much to cement cordial relationships among the oceanographic communities of Peru, Ecuador, Panama, Costa Rica and Columbia. Oceanographers from Peru were aboard ALAMINOS for a major portion of the cruise and the ship was visited by scientists in the various ports of call in these countries. She is currently on a cruise which includes a port of call to Vera Cruz and a Mexican oceanographer is aboard. A&M oceanographers are currently, and have for the past three years, also participated in cruises of the National Science Foundation ELTANIN in the Antarctic and Southern Pacific waters.

In addition to conducting research in the classical phases of oceanography, the Department is also interested in exploring new and promising frontiers in this field. For example, it is engaged in a pioneer cooperative research program with NASA and the Naval Oceanographic Office in spacecraft oceanography research, headquartered here at the Manned Spacecraft Center. The objective is a study of the feasibility of using remote sensing instruments in aircraft to study the movements and other key parameters of the sea. (Next slide.) Slides have been made of the Mississippi Delta using conventional photography, infra-red, ultra violet sensors. This shows the plot of one of the flights. (Next slide.) Observations at the ceiling altitude of a Convair was the first step and here we see the dramatic result of a picture taken showing the very well defined demarcation between two masses of Gulf waters. You also see some of the off-shore drilling and producing platforms on this slide. This has been followed by photographs from high altitude airplanes on the order of 50,000 feet. Next slide. Here we see one of the distributaries of the Mississippi River, South Pass, through the Delta area. At the conclusion of these feasibility studies we will then be in a better position to recommend the use of certain of these sensors in satellites to solve a variety of oceanographic problems, particular of a synoptic and surveillance nature. (Next slide.) This is a picture also taken during the Gemini 9 mission showing the Mississippi Delta and contiguous areas. And again you see the difference in the color of the water masses as you saw dramatically from the airplane.

The research emphasis by the Department has and will continue on studies in the classical oceanographic disciplines to expand the frontiers of our knowledge in this field. However, of equal importance in the future will be the development of information in applied oceanography. This will also necessitate training oceanographic engineers and technicians who can translate the results of pure research into more direct applications to solve practical problems confronting our society in this day of expanding population concomitant with higher standards of living. With this in mind, the Department is fortunate to be able to participate in the development of new facilities on Pelican Island in Galveston. (Next slide.) This area in here, off shore of Galveston Bay. This results from a most generous gift by a private benefactor of a hundred acres for use by Texas A&M University to develop in the broad field of marine resources. In addition, the Moody Foundation has made a grant of one million dollars.

In addition to the availability of this area to the Marine Academy, the Department of Oceanography and the Marine Laboratory components of the Texas A&M University, it is an excellent site for a facility which could be devoted to achieving objectives of the Sea Grant College Bill. Here the emphasis would be on the tripartite objectives of: one, field training for personnel in applied oceanography and ocean engineering; two, conducting applied research projects in these fields and; three, providing a center to disseminate information to potential users, to help solve specific problems in such diverse fields as pollution, beach erosion control, fish culture, fish protein concentrate production and similar activities.

In conclusion, I would like to emphasize the critical need for additional funds to train the oceanographic personnel who will be required in every increasing numbers and diversifications and without which most of the objectives discussed in this and subsequent presentations cannot be achieved. For example, less than one half of one percent of the National Oceanographic Program budget is directed specifically toward oceanographic education and training programs. Similarly additional help from industry in the way of fellowships is imperative, particularly from the standpoint that it will demonstrate to the oceanography graduate student that industry is tangibly interested in this field. As of now, our source of fellowships is from the universities and various government grants including NSF, NSA, and NDEA Fellowships. Industry has a long history of being most generous in giving fellowships in all the various branches of engineering and basic sciences at Texas A&M and, of course, at other universities. But at the moment, we have only one industry fellowship in the Department of Oceanography in support of our 65 graduate students. We must, therefore, look to expanding our human resources if we expect to meet our goals in developing the national resources of the oceans. Thank you.

Mr. Humphrey:

That picture from Gemini 9 was taken with a conventional type camera too, wasn't it? Out of the capsule? Imagine what we would have been able to do if we'd had real telescopic photographic equipment. Well, we have this manned orbiting laboratory that we're talking about and into which we are pouring hundreds of millions of dollars. I think this is something into which we should get our input because that will be a tremendous opportunity for oceanographic detection with the use of the many sensors we have to pick up information.

Dr. Calhoun:

Our next speaker will be Mr. Joe Moore, Chairman of the Water Pollution Control Board, State of Texas. But before he comes up here, I want to tell you that in Texas we do have some cooperation among universities. Four of the leading universities of the State, public universities, are now working under a cooperative agreement in the whole area of water resources and it is through this cooperative group that we have been able to give Joe some of the back up that he needs for some of his problems in water pollution control. Mr. Moore.

Mr. Moore:

Mr. Vice President and Congressmen. In order to get in perspective the activities in which we are presently engaged in the Galveston Bay area I would like to briefly review the organization in Texas for water problems. There are three major water agencies at the state level. The Texas Water Rights Commission composed of three full time quasi-judicial Commissioners who have a staff of 45 engaged primarily in the determination water rights to

surface water. We have in Texas both the appropriative and riparian doctrines of water rights. The Texas Water Development Board is composed of six part-time members and has a staff of 185 employees. Its primary responsibility is in the area of planning, data collection and ground water studies. In addition to being Chairman of the Texas Water Pollution Control Board, I am also Executive Director of the Texas Water Development Board. The Texas Water Pollution Control Board is made up of representatives from four agencies and three appointed members. The four agencies represented are the Texas Water Development Board, because of its statutory responsibility for the prevention of contamination of ground water; the Texas Parks and Wildlife Department by its Executive Director because of the interest in fish and wildlife and its bearing on water quality; the Commissioner of Health, because of the Public Health aspects of Water Pollution control; the Chairman of the Railroad Commission which in Texas is charged with the responsibility of regulation of oil and gas production is also on the Texas Water Pollution Control Board because of the problems of water pollution resulting from oil and gas activity. The three appointed members represent agriculture, industry and the public. This seven member Pollution Control Board then elects its Chairman and I am serving at present as the elective Chairman.

Texas has been engaged in a massive and comprehensive development of a Texas water plan to the year 2020 largely instigated at Governor Connally's request in 1964. In connection of the development of the Texas water plan there are five reports that have dealt specifically with water quality problems. First, a compilation of the physical and chemical quality of all the surface waters of the state, river basin by river basin and stretch of river by stretch of river. In addition, because of our determination that Texas will face a water shortage beginning in the year 1990 to 2000, we had a special study done of the waste treatment needs by the then 21 standard metropolitan statistical areas and that study shows that these areas will have to spend approximately a billion dollars by the year 1990 in order to assure adequate water quality for multiple use. Since we did project a water shortage we had to give consideration in terms of sources of supply to return flows from upstream uses in each of the river basins. These return flows were projected in time by volume calculated on the basis of the anticipated population projections and the industrial development of the state. Because these return flows in large measure will also flow into bays and estuaries of the state, a special study was done of the impact of return flows on these bays and estuaries.

The Texas Water Planning effort as it is currently being undertaken, has for the first time given considerable consideration to the need for fresh water inflow to the bays and estuaries of Texas to assure the proper salinity for the development of fish and marine life. In addition to these activities by the Texas Water Development Board, the Texas Water Pollution Control Board has also undertaken the development of water quality criteria for all waters in the state. Although the Federal Water Quality Act of 1965 requires that this be undertaken only for interstate water, the Texas Water Control Board is adopting water quality criteria for both intrastate and interstate water. These criteria have been subjected to thirty public hearings in the state and a plan of implementation to meet the requirements of the federal act is presently being developed. This plan, incidentally, will cover not only interstate waters, but also intrastate waters. Since Texas is large and has a large amount of river basins this has been a monumental undertaking.

With regard to the Galveston Bay system itself, and if you will address yourself to the map here, just to get you positioned in terms of the Galveston Bay, it is located at the lower end of the Trinity River Basin which flows or stretches all the way back to Dallas-Fort Worth. There is also a small river basin, the San Jacinto River Basin, at the lower end. The significance of these two river basins is the fact that in the Trinity River Basin we find the Dallas-Fort Worth metropolitan area at the upper end and then in the San Jacinto River Basin, which also discharges into the Galveston Bay, we find the Houston-Harris County metropolitan area. These large concentrations of people and industry then result in substantial discharges into the Galveston Bay itself. This shows the configuration of the Galveston Bay, with Houston at the upper left, Texas City further down, and the city of Galveston on the Island at that point. The Galveston Bay system covers approximately 318,000 acres. It averages six feet in depth and has only two openings to the Gulf, one at the upper end of Galveston Island -- at that point -- and one at the lower end of Galveston Island, -- at that point. It is through these two openings that both the discharges and the tidal action occur. Thirty percent of the nation's petroleum refining is located either on the Houston Ship Channel or in the Galveston Bay system area and 80 percent of the fish taken along the Texas Gulf coast, 80% by weight, are spawned in the Galveston Bay system itself. The port of Houston, located at the upper end of the Houston Ship Channel, is the second largest port in the nation by volume and some 2 million people live within 75 miles of the Galveston Bay area. That population is estimated to be nearly 9 million in the year 2020.

Interest in the water quality in the Galveston Bay began in 1951, with a study by the Texas State Department of Health and that study was then upgraded beginning in 1962. A special report was made to the Texas Water Pollution Control Board by the Center for Water Resources Research of the University of Texas in 1964 and from that study and studies of the staff available to the Texas Water Pollution Control Board, the Board addressed itself and will continue to address itself to the problem of water quality in the Galveston Bay area. Its first attention was directed to the area of Clear Lake in the vicinity of the NASA installation because of the limited tidal action within Clear Lake itself and because a large number of small metropolitan plants discharged their waste directly into Clear Lake itself. The Board assisted in the creation of the Clear Creek Basin Authority and has directed itself toward a program of surveillance of the various municipal waste discharges in that area.

The Texas Legislature created in 1965 the Pollution Multiple Use Study Committee and Senator Criss Cole, a member of the Committee from Houston, led in the formation of the Texas Air and Water Resources Foundation, a private foundation in the Houston area intended to support water resources research particularly directed towards the problems of water pollution and air pollution. This Foundation presently has among its membership a wide segment of the various interests in the Galveston Bay area. In December of 1965, culminating its activities in a hearing, the Texas Water Pollution Board adopted the so-called Houston Ship Channel Order -- Order #65-9, which zoned the Houston Ship Channel and indicated various areas of water quality. At the same time the Board initiated a program of upgrading all waste discharge permits held by municipalities and industries discharging into the channel itself. The municipalities, for example, have committed themselves to sizeable expenditures for improving waste treatment facilities. The city of Houston will spend some 65 million dollars in the next several years upgrading its own municipal waste discharges. The major portion of the Houston municipal waste is discharged

into the channel itself. There are some 141 industries which discharge directly into the Houston Ship Channel and the Board has to date upgraded 45 of the permits that represent 90 percent of the total volume of industrial waste discharged into that area. It is our estimate that industry will probably have to spend in the vicinity of 100 million dollars to improve waste treatment for the quantities and quality going into the Houston Ship Channel itself.

Simultaneously, with the adoption of the Houston Ship Channel Order, the Water Pollution Control Board committed itself to a comprehensive long range study of the Galveston Bay system itself. Under a grant of the Federal Water Pollution Control Administration and the Coordinating Board, Texas College and University System, \$55,000 was made available to three of the four higher educational institutions now in the Inter-University research group. These are Texas A&M University, the University of Texas and Texas Technological College. The activities of these three institutions culminated in the Galveston Bay Workplan -- I have a copy for you --- that was released in Governor Connally's office in January of this year with Commissioner Quigley of the Federal Water Pollution Control Administration present. This outlines a study to be undertaken over the next three years that will cost an estimated 2 1/2 million dollars. As most studies go, it will probably take longer and cost more. It is intended that this study be supported by financial resources from state, local and federal governmental agencies as well as by private contributions channeled through the Texas Air and Water Resources Foundation. In releasing that study, Governor Connally made four points with regard to the Galveston Bay system. These are: (1) the acceleration of the Texas Water Pollution Control Board program of permit review and waste treatment facility modernization for both industry and cities discharging into the Houston Ship Channel; (2) vigorous initiation and rapid progress of the Galveston Bay study proposed by the Texas Water Pollution Control Board in concert with the Federal Water Pollution Control Administration; (3) creation of a Houston, Galveston Bay Water Quality Authority by the 60th legislature to provide the means for implementing the action program developed through the study; (4) reliance upon the Texas Air and Water Resources Foundation as the entity to provide an immediate means for coordinating and financing the study locally and implementing and supporting the authority in its action program. The statute creating the Galveston Bay Area Authority is presently being developed by the legislative delegations in both the Senate and House in this general area, and hopefully will be introduced and passed in this session of the Texas legislature. This authority, incidentally is modeled after the Emscher River Basin in Germany, which tackled a similar problem under the circumstances then existing in that country.

And in the event that Governor Connally did not have an opportunity today to give you a copy of "Water for Texas," I have one here. This is a publication we just recently put together. I sent him two copies this morning in the hope that he might be able to make one available to you. We just got them put together yesterday afternoon. They are intended for another purpose but they summarize the preliminary Texas Water Plan and deal with some of the problems we have with regard to water in the state of Texas. Thank you very much.

Dr. Calhoun:

Most of us on the Gulf Coast are quite familiar with the large investment the oil companies have made in off-shore production but sometimes it isn't known outside the Gulf coast region.

We are very happy to have with us Dr. Claude Hocott, Vice President of ESSO Production Research Company to tell you about the work of the oil companies in oceanographic research. Dr. Hocott.

Dr. Hocott:

Mr. Vice President, members of the Congress. It's an honor for me to be able to present you these briefs about some research being carried on by the petroleum industry, which we hope is making some inroads to the frontiers of knowledge in this very important area of oceanography. The oceanographic research and development programs of major oil companies cover a broad spectrum of physical sciences and engineering with general goals that encompass all of the operations necessary for successful exploration, production and transportation oil and gas in the world wide ocean areas. Now each of the participating companies contributes to publication of results in the belief that the industry will benefit and that the nation will benefit from an interchange of non-proprietary technical information in these areas.

I would like to illustrate the research program with these briefs by reviewing first some of the recent activity in offshore geologic research. For a number of years the petroleum industry has conducted extensive research in near shore and continental shelf deposits in order to understand the nature of oil and gas occurrences. But as our ability to drill wells has extended further and further from the shore into deeper and deeper water, we have felt the pressure to extend our understanding and our basic knowledge of the ocean bottoms and the sediments that are deposited in the continental slope as well as the shelf. And this extension of geological knowledge and basic understanding, we hope, can lead us more rapidly into the deeper parts of the ocean as we recognize the commercial importance to our nation. Since early 1966, four companies; Chevron, Gulf, Mobil and Humble have conducted a cooperative survey of the northern Gulf slope and outer shelf ranging from Brownsville, Texas, to Key West, Florida. Their immediate goal was to gain this fundamental knowledge to broaden our understanding of the nature and makeup of the continental slope. To do this approximately 12,000 nautical miles of seismic profile, geophysical profile, was run on a closely spaced grid pattern. (First slide.) You will notice this pattern of black lines, the grid lines that run around the slope. These are the pattern of the seismic profile. This network of surveys extends seaward 50 nautical miles from the 50 fathom depth line. Now, in addition, 42 core holes illustrated by these black dots around the perimeter of the Gulf have been drilled in water depths ranging from 667 to 4,777 feet, with a penetration of sediments ranging from about 300 feet to about 1,000 feet. We hope to extend this program to the Atlantic slope of the United States in 1967. Shell Oil and Superior Oil in conjunction with other oil companies have similar programs underway and all of these programs have been approved by the U.S Geological Survey who have been given full access to all the basic core data. Through analysis and interpretation of the data obtained from these studies we hope that great advances will be forthcoming toward a better understanding of the origin and geologic history of the continental margins for further oil development, or for other development programs of interest to the nation. For example, we should be able to contribute to a better understanding of the origin of such features as the outer shelf breaks and mechanisms of sediment transport and deposition on the continental slopes.

The impetus of data gathering of this kind and of the research that is being carried on leads to a great many different small innovations and I would like to illustrate one of those with a little development that all of the companies have been engaged in to try to get a nonexplosive marine seismic source. You see all those extensive network of geologic surveys that we were talking about. Traditionally, seismic impulses in geologic surveys are generated with dynamite explosions, and in the early days, quite naturally, this technique moved into marine exploration. But sensitivity to the hazards, to the vessels, to personnel and to marine life has led all the companies engaged in this activity to try to develop alternate sources for the generation of seismic signals. The next slide illustrates an example of a nonexplosive seismic source. This one was developed in our own laboratory of ESSO Production Research. It consists of a perforated metal cylinder here covered with an expandable sealed rubber sleeve. This device derives its energy from combustion inside of this sleeve portion here. A mixture of oxygen and propane is metered into the chamber and then it is ignited by means of a conventional spark plug. It is an internal combustion device and in the combustion process this expanding sleeve is rapidly expanded to several times its diameter, giving the seismic impulse. And then the burned gases are vented to the surface through a snorkel tube on the deflation cycle of this expandable sleeve. This development we consider, of course, as both a conservation and safety measure.

I would like to turn next in this brief review to one of the major industry activities in the producing operation, that is the technology related to the design of seaworthy off-shore structures. Now, the design of competent off-shore facilities requires a basic understanding of ocean waves and the dangers they pose and the hazards that come about particularly in storm seas. The main phase of this activity is concerned with accurate measurement of such parameters as storm intensity, the wave height and profiles, wave frequencies, ocean currents and the attendant forces that go along with them. Initially, when the oil industry went into the off shore area, measurements were severely handicapped because there were no accurate instruments for measuring these forces in an ocean environment. Consequently, all the oil companies themselves and the service companies which provide a lot of the services and equipment began to develop means for gathering the needed data. Now we stepped right out and built on the best information we had, early structures, and our first measurement were naturally tied closely to these permanent structures. But recently, attempts to extend the scope of our information have led all of the companies involved to try to develop equipment that is relieved of this limitation. Our next slide shows a schematic diagram of an instrument installed on location. This is a completely self-contained portable instrument that we can put out and anchor below the surface. Over here is a tape recorder with a magnetic tape along here. All these sensing devices along the anchor rods measure currents and forces. Inside of this main bouy here is part of the electronic sensing equipment that makes it possible to take an instrument like this any where we want to ahead of a storm. It can be towed out or can be dropped from an aircraft and then operated completely unattended for periods up to thirty days. A device like this with multiple channel recording devices can greatly expand the data collection capability necessary to do a better job in the oceans.

Industry research programs in this area have consisted basically of a two pronged attack. First, we have conducted research to improve our ability to predict the size and shape of ocean waves that would be generated in very hostile seas, winter storms or hurricanes and second, we have

tried to predict the forces exerted by these waves on various production facilities, various configurations of platforms and this has led us directly, as a part of our research program; to predicting the probability associated with waves and wave forces of specified magnitudes. A very important part of the calculated risk we have to take is to determine the probability that a wave of a given size will go by a given platform. Our work characterizing storm waves in the Gulf of Mexico has led to the development of a technique for predicting wave heights and their probability and this work has been published and is available for the scientific community as well as the oil industries and is a part of the package that will be given the staff and for your review to help us properly design off-shore structures. As of the present time, we feel perfectly capable of predicting the forces exerted by ocean waves in the Gulf of Mexico to an acceptable engineering accuracy. However, much more data will be needed as we move into the open oceans and more hostile environment and we are still operating data gathering installations in the Gulf of Mexico. New installations are being put on floating rigs as we explore for oil around the world such as in the North Sea, Norway, Australia, France, etc. Much of the basic data that has gone into this ocean wave predicting package was the result of a joint project carried on by several oil companies in cooperation with the U.S. Navy. The accumulation of oceanographic expertise by members of the U.S. petroleum industry during the past twenty years, a little more than 20 years, that has been in the Gulf, has enabled construction of suitable facilities to permit a free world off-shore oil production of 4.8 million barrels per day in 1965. For the most part, these facilities consist of pile-founded drilling platforms and other types of artificial islands extending out, as I've mentioned, into ever deeper and deeper water. Over 500 of these installations now stand around the world in waters up to about 300 feet depth. Measurement and scientific study of wave action in major hurricanes has prompted a major increase in the strength of these permanent drilling and production platforms and with their legs planted deeply in the sea bed their decks rise high above the calm water level to clear the crest of the highest anticipated waves in the storm seas. Since the productive sedimentary basins, to the best of our ability to predict, will extend many miles off the continental shelf of the world, we must develop our technology which will permit us to find and produce the oil where ever it exists. Studies are now being made of the technical and economic feasibility of drilling in waters deeper than 1,000 feet. The possibility of building, installing and operating completely submerged oil fields is being examined. These futuristic but highly probable submerged installations may be operated and serviced by remote control from the surface of the ocean or may require the development of sub-sea living and working quarters. Novel types of floating platforms are being studied for drilling or production in very remote or in very deep waters. Finally, we must develop the technology sufficient for ocean floor operations to provide the liquid hydrocarbons the world needs in complete safety and reliability. Now all of this will undoubtedly require new material, new methods and technological break-throughs, but should provide the technology to other commercial operations as well as to petroleum. Thank you very much.

Dr. Calhoun:

Naturally, Mr. Vice President, we've hit only the high lights. We wish we had time to tell you more, but we know that you have a tight schedule. We are happy that you're going to leave Dr. Wenk with us and tomorrow morning we have a number of things scheduled for him to hear. We're going to say something about biomedical oceanography. Dr. McKee is going to say something about air pollution. We're going to tell him a little bit about the work our

scientists are doing on fish protein concentrate working with fatty fish. We're going to have a man from LSU tell a little bit about their program and the University of Texas is going to tell us a little bit about theirs. I guess the principal message we have for you is that we think we have a great talent and a lot of investment in the Gulf and in this area for this kind of work. What can we do in this region? Well, we can offer you this investment of this talent, this enthusiasm, this vision, this opportunity, and suggest to you that maybe this is a good place on which to focus the nation's ocean research development program. Thank you.

Mr. Humphrey:

I'm going to take just a minute to say goodbye and thank you. I think that some of you may know that I have another engagement or two tonight. This is one of these days that we telescoped everything into a few hours. This has been a very rewarding period of time for me and I can honestly tell you if I had my druthers, I'd rather stay here and just ask a host of questions. Before we came to this gathering, Dr. Wenk and myself thought through two or three things that we would like to ask you. I am going to ask him to ask you every question that we had in mind that we'd outlined on a little sheet, and on which we hoped to get your observations. I'm very much impressed with what we've heard today. This is just like a whole new world to me, in a very real sense, and it is, I think for all of us, because we've known so little of the seas, except the surface and the immediate shore line. And now we find out there's so much more to learn. I want to compliment the Gulf Universities Research Corporation and its constituent members on your own initiative and I know that you're tying in strongly to private sectors. And I do hope, if I may say, that if private industry will just heap on those scholarships and fellowships because they're really desperately needed and may I say, of course, it's the wisest investment you can make. We need specialists in this area as we've never needed them before. And I believe if we do nothing more at this meeting than to just center on that we would be doing something worthwhile. If the word could go from this place that possibly the greatest investment that could be made for America today in terms of economics as well as in terms of some of the broad aspects of science and technology would be this area of oceanography. All of its related activities and the relationship of a host of disciplines is unbelievable. I mean you can just go on and tick them off one after another.

I want to say that I was not unfamiliar with the work of Texas A&M. I sort of feel a kinship to Texas A&M. I've been down there a few times and like to come every time I get a chance. And Dr. Geyer is an invaluable public servant, not only to this state and the great University, but to our Commission on oceanography and marine resources. We're going to profit from his work.

Of course, we will be taking from him as much as we can. The one thing I've been impressed with here is the willingness of people to share this knowledge. Not only the willingness, the absolute necessity of it. I know of no scientific opportunity or scientific area that opens more opportunity for international cooperation, may I say, than oceanography. It's incredible what we might be able to do. Just the other day we talked about the work of fisheries and fisheries research with the Soviet Union. And while we have all kinds of tirades and political speeches being made by Soviet leaders against the United States and the free world, they continue to work right with us, right along in the field of fisheries research, just as if nothing was going on at all that is abrasive or unkind.

Mr. Moore has given us a splendid, an overwhelming presentation, I might say, on the whole subject of water resources and water pollution control. And when we think of population expansion and industrial expansion as this nation dreams of and hopes for, I guess we've got our work cut out for us. This one staggers me. And yet it's just absolutely essential, this matter of life and death. I guess most people like to survive, so I gather we will do what we have to do.

And to the Petroleum Industry and to you Dr. Hocott, I want to thank you very, very much. I'm sure you know that my great desire is to be able to come down and to actually visit some of these off-shore installations and to acquaint myself with the technology and with the instruments and the equipment by visual observation. I intend to do that. That was one of the hopes I had even on this journey. But I intend to be around a little while, at least for two years, and I will acquaint myself with this field in that period of time. After that, as I have said so many times, whenever I see a number of university people I like to remind them of my academic credentials, just to refresh the brochure on the possibilities of employment. But I thought it was remarkable to see the amount of research that has already gone in to off-shore drilling and off-shore oil production and the innumerable problems that industries face and the fact that much of this technology is public property. You know most of the technology that people talk about as being so super-secret is public property if they only knew where to look for it. Which by the way is the note on which I conclude. We are now making a study of oceanographic data collation -- the coordination, the dissemination of oceanographic data. I think the great need in this country is to be able to simplify the utilization of data. We are inundated with it. We've simply got to find ways to use that computer and to use modern library techniques, and techniques of collation and indexing and abbreviating and information data collection and dissemination that's available through modern technology. It's here. All we need to do is to get at it. We have a study program right now and we hope to be able to present a program to the Congress that will be worthy of your attention.

Now I promised my Executive Assistant that I'd leave here not one minute later than 6:00 and according to my watch, it's one minute to six. What does yours say? Six on the button. Alright, I'd better leave. Will you forgive me, and I'll leave Dr. Wenk in your tender care. I have to perform a mission of mercy for a political cause in just a moment. Thank you all very, very much.



Minnesota Historical Society

Copyright in this digital version belongs to the Minnesota Historical Society and its content may not be copied without the copyright holder's express written permission. Users may print, download, link to, or email content, however, for individual use.

To request permission for commercial or educational use, please contact the Minnesota Historical Society.



www.mnhs.org