

JUN 10 1980

CUI MR-W-80-002

c.2

**CIRCULATING COPY
Sea Grant Depository**

THE TRANSCRIPT OF
"OPENING UP THE GOLDEN GATE"
A WORKSHOP
FEBRUARY 22-23, 1980

NATIONAL SEA GRANT DEPOSITORY
PELL LIBRARY BUILDING
URI, NARRAGANSETT BAY CAMPUS
NARRAGANSETT, RI 02882

TABLE OF CONTENTS

	<u>page(s)</u>
<u>Session I: THE CONTEXT OF THE GOLDEN GATE MARINE CENTER</u>	
Welcome, Ron Caya, Fort Mason Foundation	1-27
Introduction, John Badgley, Marine Center Committee	1
Background/Workshop Format, Mark Switzer, Workshop Coordinator	1-2
"Developing an Ocean Ethic," Dr. Sylvia Earle, Ocean Trust Found.	2-6
Panel Discussion: What does the public need to understand about the marine environment?	7-10
Ron Linsky, Dana Point Ocean Institute	10-16
Dorothy Bjur, University of Southern California	16-17
Erwin Seibel, Tiburon Center for Environmental Studies	17-18
Rudolph Schafer, California Department of Education	18-20
Richard Cunningham, Western Region, National Park Service	20-21
Don Lundstrom, Alameda County Office of Education	21-23
Bruce Stewart, Moss Landing Marine Laboratory	23-24
Floor Discussion	24-27
<u>Session II: THE CONTENT OF THE GOLDEN GATE MARINE CENTER</u>	
"Water Within Walls," Dr. Murray Newman, Vancouver Public Aquarium	28-65
Panel Discussion: Exhibits, simulating the marine environment.	28-32
Dr. John McCosker, Steinhart Aquarium	32-48
Steven King, General Whale Foundation	32
John Dillon, Josephine Randall Junior Museum	32-34
Ron Olson, San Francisco Bay Model Visitors Center	34-36
Dr. Steven Webster, Monterey Bay Aquarium	36-38
Charles Carlson, the Exploratorium	38-40
Gordon Ashby, Designer	40
Dr. Frank Oppenheimer, the Exploratorium	40-43
Dr. Murray Newman, Vancouver Public Aquarium	43-45
Floor Discussion	45
Panel Discussion: Activities, involving the public in the marine environment.	45-48
Bill Noble, College of Marin	49-65
Robert Schwendiger, Maritime Humanities Center	49
Pieter Folkens, Lifeline Marine Research	49-51
Mary Abbott, Bay Chapter, Oceanic Society	51-53
Mia Monroe, Fort Point Historic Monument	53-54
James Brenner, 4-H Program	54-56
Greg Moore, Golden Gate National Recreation Area	56-57
Gary Heath, Lawrence Hall of Science	57-79
Robert Rutherford, Marine Ecology Institute	59-60
Bill Hammerman, Association for Environmental Education	60-62
Floor Discussion	62-63
<u>Session III: THE CONSTITUENCY OF THE GOLDEN GATE MARINE CENTER</u>	
Introduction, Mark Switzer, Workshop Coordinatator	66-69
"The Global View," Dr. Sidney Holt, FAO, United Nations	66
"California's Marine Resources," Kevin Shea, Resources Agency	66-71
Panel Discussion: Involving the users of the marine environment in public education.	71-74
Dr.. Michael Herz, the Oceanic Society	74-93
Bob Williams, Chevron, U.S.A.	74-75
Maria De Santos, Commercial Fisher	75-77
Captain John Pollen, U.S.Maritime Administration	77-79
Kitty James, Yacht Racing Association	79-80
Orville Magoon, Army Corps of Engineers	81
Elaine Anderson, Save San Francisco Bay Association	82-84
John Conomos, U.S.Geological Survey	84
Dr. Milton Kolipinsky, Western Region, National Park Service	85-87
Andrew Manus, Sea Grant Advisory Program	87-89
Senator Milton Marks, Committee on Maritime Affairs	89-91
	91-93

PREFACE

This transcript is of a two day workshop conducted by the Fort Mason Foundation on February 22-23, 1980. Funding to produce the workshop was provided by the Sea Grant College program of the Institute of Marine Resources, University of California, La Jolla.

The workshop was entitled "Opening up the Golden Gate" and was designed to consider the plans and potential for a "marine learning center" at Fort Mason, San Francisco. The proposed marine center would be a part of the new urban park the Golden Gate National Recreation Area.

The transcript is not verbatim. Extraneous remarks and announcements have been eliminated. The transcript has been edited and language added where needed for clarity. However, it accurately records the comments of the participants.

Ronald Caya, Director, Fort Mason Foundation:

Good morning, my name is Ron Caya. I am the Director of the Fort Mason Foundation. I'd like to welcome you here on behalf of our Board and our staff. I was thinking about this program this morning on the way over on the bridge. Several years ago there was an organization who had a purpose of clothing animals. Fortunately that group really never got too far underway, but I was thinking what would they do with a whale?

The marine center concept is one that is very close to us. Our Board has made a commitment to the concept of including a marine center here at Fort Mason Center. The National Park Service, of course, has also made that commitment. Your pursuits over the next two days will deal with the specifics of exactly what a marine center should be in the Fort Mason fiber.

We're rather pleased with our efforts to date. Fort Mason Center is in its fourth year. We have an extremely active Board. As a matter of fact, our treasurer happens to be sitting here in the front row, Sandy Lowengart, who keeps us fiscally on the ball. He just very successfully balanced our budget for us, making us solvent. But we envision our 13 acres of space here as sort of a large chemistry set, a place where a variety of experimental, innovative, and sensitive activities can take place. There is no end to, we think, the kind of educational development that can take place here at Fort Mason. This very conference center that you're going to be in for the next several hours is a major effort of ours in terms of bringing together all sorts of activities and interests not in the Bay region but in the state and of course in the nation. We are delighted to have you here. I would particularly like to thank another one of our Board members, John Badgley, who heads our Marine Center Committee. I'm sure you're all familiar with John. And I would like to also give particular thanks to Mark Switzer for his very diligent pursuit of bringing us together today. Thank you.

John Badgley, Chairperson, Marine Center Committee, Board of Directors, Fort Mason Foundation:

Thank you, Ron. My name is John Badgley. I'm the chairperson of the Marine Center Committee of the Board of Directors of the Fort Mason Center. Sandy Lowengart is another member of the Marine Center Committee of our Board of Directors who is here, and Ruby Tom is the other member of the Board. I'd like to add my welcome in behalf of the Board of Directors to you to this workshop-conference.

Now, Mark Switzer, who is our staff director for the Marine Center up until this time, has got us where we are now, and we are going to take a reading in this conference and see where we are going. Mark has cautioned me not to take the sea bag off my shoulders and untie the lanyards and dump it on the table, because that would be too challenging, too inspiring, and it would tell you what my concepts of a Marine Center are, and that's not the purpose of this workshop. The workshop is to hear from you and to determine what the community at large thinks the Marine Center should be. The purpose of the conference is not at all to determine whether we shall have a Marine Center, because that's already been determined, but we are to explore and to establish the guidelines, the parameters, and the goals that the Marine Center needs to fulfill. We have a second challenging purpose, and that is to draw from you and from the community a committee, a group--all of those interested people who will serve on the committee and guide it to fulfill its destiny.

Rachel Carson observed in her first wet-awareness essay, called "The Sea Around Us," that of the human species there is not more than three generations in each continuity of life that is born that does not return to the sea from whence our life came. This includes the bakers in the Ukrainian wheat fields, who have carried

on their tradition in dry land, and the people in the depths of the African jungle and the highest Himalayan Mountains, that every third generation some individual of the human species returns to the sea with a great deal of interest. I think that all of us here represent this continuity of the human species, and we are concerned about our marine environment and the establishment of a learning center here.

I'm going to read you a fragment of poetry from "Ultimate Challenge," by Harry Kemp, of Provincetown, Cape Cod. The poem, written at the turn of the century, appropriately surfaced again at the dedication of the John Fitzgerald Kennedy Library at Columbia Point in Boston Harbor last October.

Especially if their lading be a dream
Ships must go lonely if they voyage far,
Filling the upsurge through each brace and beam
Of fuming ocean, top-enshrouded spar
Set to the following of a single star.
There's no safe compass course
When the hidden gleam sits behind clouds,
And when blind tempests stream,
Except the guiding laurels faith would bear,
Bared often by black gales and bursting beams
And sails that fly in rags from broken spars.
There are no charts for ships that follow dreams
And crowd up sails against the beckoning stars.
Don't sign aboard unless you're certain you
Can dare a wreck and deem it glory too.

Mark Switzer, Workshop Coordinator, Fort Mason Foundation:

Thank you, John. I'd like to start by thanking the agencies that have made this workshop possible. Funding for the workshop was provided by the Sea Grant College Program from the Institute of Marine Resources, University of California at San Diego. I've been working with Dale Ingmanson from that office and Andy Manus, who is the local Sea Grant advisor, on the workshop. I'd also like to thank the National Park Service personnel, who have taken an interest and have encouraged us in exploring this idea in this format.

Really, what we're here for today is to talk about an opportunity--an opportunity to establish a center that will afford the public some access to the marine environment, access both physically and hopefully conceptually, because, as we all know from the weather over the last few days, the marine environment is not always the most accommodating. But this opportunity, of course, is determined to some degree by the nature of the Fort Mason Center as it's developing, the nature of the facilities here, and really what is appropriate and complementary to do in the Bay Area.

The guidance that we have comes from a long public planning process that has been an integral part of the development of the Golden Gate National Recreation Area. This park, which is the first urban park so-called, was established in 1972, and the notion at the time was "to bring the park to the people." And in doing that the Park Service and the park planners recognized the extraordinary need to involve the public in the planning process. As a national park it has to serve the national visitor--the tourists that come to San Francisco, and the people from the Bay Area region. But as an urban park it also has to serve the community that it is in. So the Park Service literally conducted hundreds of workshops in different locations throughout the park. A presidentially appointed Citizens Advisory Committee was charged with the responsibility of making recommendations to park planners about the uses of the different areas of the park. Throughout this process, which seems as if it's been going on forever, the Citizens Advisory Committee has had the marine character of the GGNRA consistently pointed out. Groups that are interested in

the potential for marine education and other marine activities in the different areas of the park have consistently advocated using these facilities for such programs. As a consequence the Citizens Advisory Committee incorporated these ideas in the draft recommendations.

Perhaps the most ambitious, or one of the most imaginative proposals that was made, catalyzed the notion for a "marine learning center" at Fort Mason. That proposal really came from several groups, but the main imaginative proposal came from a group called "General Whale Foundation." General Whale, who I think probably many of you are familiar with, had a concept for a whale museum here at Fort Mason, and they came up with some conceptual plans for it which you'll be seeing a little bit more of later on. In conjunction with that idea this site with all its quarter of a million square feet of floor space, three major piers, and other facilities, was an obvious location to conduct marine activities. The Oceanic Society and other groups involved in marine education programs in other locations in the park developed a concept for a conventional education facility, which is actually underway at Fort Mason now. In Building E the Park Service has renovated one of the floors, and the Oceanic Society's local chapter, the Bodega Bay Institute, Greenpeace Foundation, Lifeline Marine Research, and other groups are conducting classes and educational programs.

But what really is the nature of the GGNRA that creates this mandate to interpret it as a marine park? The Golden Gate National Recreation Area is, with adjacent park lands and the Point Reyes National Seashore, the largest national park adjacent to a metropolitan area in the world. There is more than a hundred thousand acres included in this area, some 90 miles of shoreline, two major islands, and of course as you can see here and throughout other units of the park, there are very extensive waterfront facilities. When the recommendations from the Citizens Advisory Committee were complete, they were incorporated into the General Plan, which was adopted in December 1979.

The specific recommendations for Fort Mason were for the establishment of a "Marine Learning Center," and I stress the title Marine Learning Center. We don't have much guidance on what that is supposed to be, but those three words, I think, at least give us some parameters. In making the recommendations the Advisory Committee went on to say:

With a primary focus on San Francisco Bay, marine ecology programs should include interpretation of marine wildlife, tidal dynamics, the San Francisco watershed, ecological balances and bay pollution, weather patterns, shipping and navigation. Programs could also include historical and social aspects of the Bay Area, who traveled where, on what ships for what purposes. Activities should focus on visitor participation (I think that that's a key phrase to remember) in learning experiences, although some museum presentations may be included. A large pier building in conjunction with one or two warehouses should be devoted to marine ecology programs. (This is in reference to Fort Mason of course.) Space for docking appropriate vessels relative to these programs should be provided at the pier.

Having made those recommendations, that is the extent of our guidance of what really the most effective use of these facilities for marine programs is. Hopefully this group today, people that are directly involved in or have a special interest in marine affairs, will be able to refine that idea--those very limited guidelines that we have.

I would like to just expand a little bit about the nature of the Fort Mason Center, because that is the immediate context in which the Marine Center will be developed. The Fort Mason Center has a mission to develop these facilities for

programs in education, recreation, ecology, the humanities, and the arts. The center has been in existence for four years now, and is well established in the arts, educational, and recreational communities. It has become, in fact, the center of community programs in San Francisco. In September of 1979, the center sponsored, with funding from the National Endowment for the Arts, an architectural master plan competition which five architectural firms participated in. One was selected as a result of the competition and is now refining an architectural master plan. These drawings against the wall, which you'll be able to look at at our coffee break, will give you some idea of the vision that the winning firm had. There is also a model here that will show the position of the Liberty Ship and the ferry terminus that is proposed. Once the architectural master plan is complete, a capital fund drive will be undertaken to implement the plan, and of course at this time the marine center concept could be very quickly and integrally developed along with the rest of the center.

I'd also like to just have you consider for a moment this notion of an urban park. This is public property, and this is a public park. It happens to be in the middle of the city, which is kind of nice, but it also, being in the middle of the city, dictates a certain approach to what happens here. Certainly whatever program occurs here has to be either free or reasonably priced so that the larger community can participate in it. The facilities here should involve the largest number of people possible, given the limits of the facilities. It happens that the Fort Mason unit of the park is the heart of the GGNRA. The headquarters for the system is up on the hill, and the Fort Mason Center here is really the cutting edge of the experiment of an urban park. Can we make a community center that uses groups that are involved in their own program to serve the broader needs of the public? That's sort of the challenge here. I think that any marine center that is established must not only serve the needs of people that are interested in marine affairs and involved in them, but it also has to serve the needs of the public. What the needs of the public are is what I hope we will be discussing.

Just very quickly I'd also like to mention some of the other developments that are going to occur or have occurred that relate to the Marine Center. The National Park Service is establishing the Curatorial Service Center for the Western Region of the national park system in the bottom floor of Building E. This facility is designed to store and manage the artifacts that the park has or collects. Happily, it happens that many of these artifacts in the collection are related to whales and whaling. On the top floor of Building E the Park Service is going to establish the library of the National Maritime Museum of San Francisco. This library, along with some other acquisitions that the Park Service has made, is one of the four pre-eminent maritime history libraries in the United States. The Park Service has also just recently acquired the Barbara Johnson collection, which was the largest private collection of whaling art.

Those of you who are from the Bay Area have probably followed the progress of the "Jeremiah O'Brien," which is one of the last unmodified Liberty Ships, that is being transformed into the National Liberty Ship Monument. This ship will be moored at Pier 3 here, and it will be transformed into a museum on the history of American maritime enterprise. The projected opening date for the Liberty Ship is Maritime Day, which I believe is May 22nd this year.

Also, we must of course account for the developments in the Aquatic Park unit. Of the 58 million dollars in the development budget for the GGNRA, 25 million of those dollars are allocated for the Aquatic Park, which includes the development of the National Maritime Museum, the restoration of the historic ships, and the Visitors Center in conjunction with the Maritime Museum. This will be the major maritime history area on the West Coast.

Also, in the considerations today we should bear in mind the developments planned at the Army Corps's Bay Model. The Army Corps of Engineers has a San

Francisco Bay model in Sausalito, and they're involved in the development of a visitors' center there which will allow for interpretation of the bay.

And, of course, John McCosker, the director of Steinhart Aquarium, will be concerned and interested in exploring how this center can complement the experience that the visitor has at the California Academy of Sciences.

So with that pack of information, which I'm sure will be difficult to digest, I would like to again try to delineate a little bit, if it's possible, the thrust of what we should do here. I think that the key word in the Citizens Advisory Commission's recommendations was "learning." In writing the proposal for the funding for this workshop, somehow in a government form, I had to describe what percentage is research, what percentage is recreation, and so on. I suppose I was drawing figures out of a hat, but my idea in any case is that really about 95 percent of what we're talking about is public education. I think that there is some room for some research activities here. It might be interesting at some time to explore the idea of public research in the same sense of public education. Certainly recreation is possible here. Sports fishing happens to be the largest recreational activity using the bay in the area, but the facilities here, as far as boat launching and that type of recreational activities go, are difficult. I think we also will have a responsibility to deal with the political issues involved in the marine environment through seminars and the like. But primarily I think our thinking should be focused on the idea of public education.

The opportunity here, it seems to me, is unique--to accomplish something in public education that is not occurring. Last year I had the opportunity of visiting some 50 institutions that in some way or another involve the public in the marine environment, including maritime history museums, aquariums, oceanariums, environmental education centers, and the like. And I'm convinced that while there is a great deal of interest in the marine environment I don't think that there is any one institution that is successfully presenting the marine world in a comprehensive way. Perhaps that is a challenge for us here.

So, the objective of this workshop, first of all, is to bring you people together, people that presumably and hopefully are interested in this notion, that have some experience in marine affairs, some interest in marine education, and to begin the thinking.

The program today is a bit ambitious, and we'll try to keep it a little clipped, but I hope that if nothing else we can come away from it with some kind of consensus of the best use of these facilities. I think one of the most ironic things about the developments here is that the potential is so great that it's almost scary. I think that it's such a mouthful to be bitten off that no one could ever chew, and I think that's why a lot of groups that are willing and able to develop these facilities have been a little bit in a quandary as to how to proceed.

How we are going to proceed is, after this meeting the Fort Mason Foundation will be appointing a so-called "Planning Group," and we hope that the participants in the meeting will have some suggestions on who should serve in this advisory capacity. The Marine Center Committee of the Fort Mason Board will work with this group in developing more detailed and specific plans on the Marine Center's development. We have submitted several proposals for planning dollars for a planning period ranging from a year to two years, depending on the funding agency. The foundation will hire, when those funds are obtained, a planning staff. And hopefully, the detailed plans for a marine learning center will be accomplished in conjunction with the capital fund drive for the Fort Mason Center.

I'd just like to make a couple of quick announcements about the logistics. We have this morning some changes in our program from the original program brochure. If you'd just refer to the blue one-sheet program, that is the schedule as it's revised. The main changes are due to the fact that Willard Bascomb will not be coming tomorrow to make summation remarks. But Senator Milton Marks, who is the

chairperson of the Senate's Select Committee on Maritime Affairs, will be doing that. And also we've pushed back the afternoon session on activities by fifteen minutes to 2:45. We may run a little late with the exhibits portion because I think that that's going to be one of the more interesting and more important sessions. I would also like to encourage people that are not on the agenda to feel free to make comments. I would encourage you to look at the program and try to identify the best time for your comments. People that are interested in this site as program space should make their comments at the end of the program session in the late afternoon. People that are interested in exhibits, of course, during the exhibit portion immediately after lunch, and I think that people who are interested in the recreational and political activities here perhaps might save their comments for the panel discussion tomorrow morning.

The boat trip that we hoped to take looks a little "iffy" right now. We only have, I think, fifteen people signed up and have paid their money. We need about 65. There is a sign-up sheet out here on the registration desk, and fortunately the boat owner is willing to hold the boat until late this afternoon. So if anyone is interested, please sign up during lunch time and leave your check, so that we can run the program if the weather is good.

Well, I've tried to keep it brief, but I've already run over my time by quite a bit. I would like to introduce someone who has inspired me and many of the people in the Oceanic Society that have been interested in this notion that we have a responsibility to get the public involved in marine affairs. In considering what it is that inspires me about Dr. Earle, I think it's just such a thorough commitment to her work, her life, and the marine environment as an accomplished scientist, diver, and spokesperson for the oceans. I think there is no better person to keynote this session, and it's really a great pleasure to introduce Dr. Sylvia Earle.

Dr. Sylvia Earle, Curator of Phycology, California Academy of Sciences:

Thank you, Mark. I had the great pleasure last evening of dining with the gentleman who has just escaped from the back of the room--and he's now somewhere in your midst--who conveyed to me an observation about the present time, this generation. It appears, based on a lot of observation and some evidence, that we've passed straight through from barbarism to decadence without a stop for civilization. But based on what we've been listening to this morning from Mark, and also I think some other aspects of what we might observe about what humanity is up to at this point in time, that maybe there is some hope for us after all.

Certainly, the rules and regulations that are supposed to guide our lives, sometimes perfectly, most of the time imperfectly, are not quite enough, and thus the need, I suppose, is for something like a code of ethics that transcends formal written rules and regulations. The Oceanic Society has certainly taken a strong lead in terms of trying to develop an ocean ethic, and it's been great fun to witness the shaping of this and to in at least a small part be a part of it.

All of us, just by our very existence, will have to be a part of what happens, good, bad, or indifferent. What I've chosen to do for the brief time that I have to be with you this morning is to use you all as guinea pigs, and I hope you don't mind. But during the past year I've had the tremendous fun and the exercise, in a way, of reviewing the past and the present and the future of underwater exploration for two things: a book that I've been doing with Al Giddings for the National Geographic Society called "Exploring the Deep Frontier: The Adventure of Man in the Sea" and also a film that will come out in May of this year that will cover the same ground in a two-hour ABC television special.

For the book I found myself in the position finally--after having done many chapters--of having to write an epilogue, accompanied by some rather nice illustrations, largely those taken by Al Giddings, but really drawing from people from around the country and around the world, for visual complementary images. So what

I'm going to do is to review this epilogue for this look at the history of where we've been and where we might be going under water.

I'm aware that much of what I'm going to say is old news to many of you, but I take this as the kind of thing that probably we must reach into in terms of trying to translate that which we know and care about for the rest of the world who may not understand nor see quite what we do, and that this was really intended as a stage-setter I suppose, so some vast generalizations are fair game for the next few minutes. And I really would appreciate some sounding-board kinds of comments on this general summing-up of our underwater exploration and what it means to us. And in fact, the title of the epilogue is "An Ocean Ethic."

I think I can punch buttons on my own, can I not? (Turns on slide projector.) Let's see, we're going to experiment with nature in this well-illuminated room. Let's see if we can actually catch some good glimpses. First-time visitors to earth, curious to know the character of the planet, might logically choose to explore the ocean before considering the continents, because the sea is easily the earth's most conspicuous feature, and within its broad expanse and great depths lies the most complete record of life available anywhere.

To dive in the ocean is to immerse yourself in living history, to see and to touch and to know the ephemeral creatures whose ancestry spans hundreds of millions of years. Most of these beings are sustained by a solution of elements similar to the saline stream that courses through our veins as well--a reminder that we carry around with us all the time the kinship that we have with other life, and certainly with the sea itself.

The young King Arthur, whom Merlin called "Wart" in T. H. White's "The Once and Future King," said once rather wisely, "I wish I was a fish," and wizard Merlin obliged, turning the boy into a slim, swift creature with fins and scales. And for a while Wart felt the delicious pleasure of swimming among the water weeds and getting acquainted with resident snails and mussels and fish. To envision the world as Wart saw it, White advises, to imagine another horizon of underwater, spherical, and practically upside-down, he points out that the surface of the water sometimes acts partly as a mirror to what is below. Wart, as a fish, was not earth-bound anymore, pressed down by gravity and the weight of the atmosphere. He could do what men have always wanted to do, and that is, to fly.

To feel what Wart felt, to be lifted weightless from an earthbound view into that other dimension, we all know here now that no magic is required, that a mask and flippers will achieve the same effect for those willing to step into the sea and to let go and glide into the watery atmosphere that encompasses and gives substance to most living things, that we live in a time when scuba and submarines and other mechanical devices provide sophisticated access to the sea. And all of these things have their place as we explore these new frontiers, just as microscopes and cameras have opened another significant perspective, one that Merlin automatically gave to Wart when he made him small. We now have these other dimensions as well.

The world, by and large, is populated by micro-beasts, and we're giants by comparison. Again, looking to this visitor to earth, who is in an imaginary sort of way closely inspecting life on the planet, he might come to the conclusion that the most successful organisms here are less than six inches long and have no backbone, that the invertebrates are overwhelmingly in the majority in terms of numbers and species, including some 65,000 kinds other than insects. And even if we were half our present size, we would still dwarf most plants and animals. But with a lens we can take ourselves into the midst of things such as the soft tentacles of an anemone or climb among corals and go side by side with nudibranchs, and get down to the basic facts of life with starfishes and sponges and discover the inner workings of cells.

And it's only with this perspective, this close-up view, that it's possible to comprehend how dozens of strikingly different species can compatibly occupy a few square inches of reef space, or for example how a single blade of kelp can host

under certain circumstances as much as a hundred thousand small plants and animals of diverse species.

Various technological creations have enabled us to discover that a few species are enormously abundant. Trillions of certain kinds of bacteria, billions of small squid, millions of the six or seven species of fish known collectively as tuna. There are about 200 kinds of primates including human beings, of which there are now about four billion individuals. A few of these people remember when there were two times four billion passenger pigeons in North America, and the fact that there are no passenger pigeons today, and haven't been any since 1918, suggests that there is no security just in numbers, and that the end for a highly sophisticated species may come quite suddenly.

Our destiny is certainly linked to the fate of the oceans, and in turn the future of the sea will be determined by our actions in the next few decades. It will happen either consciously through intelligent choices or by default through ignorance or inaction. One way or the other, this generation is going to have a magnified impact on the course of civilization. We can still make choices that will be denied another generation concerning wilderness land and sea.

In the past century we've already closed certain options and have changed the oceans more during this time than in all preceding human history. We in the same time have set in motion consequences that future generations will inherit, like it or not.

I think it's ignorance, not malice, that has made the sea a receptacle for deadly chemicals and pesticides, nuclear wastes, and has caused us to get into the situation described by our friend somewhere in the audience, Dr. Sidney Holt, who is one of the most respected and knowledgeable fisheries biologists in the world, who said in 1979, "Efforts to achieve a condition of sustainable use of living marine resources, by and large, have been unsuccessful, so far that nature has given us some sharp warnings in recent years." And he cites as examples the collapses of the herring stocks in the North Sea, the recent precipitous decline of capeland stocks in the northwest Atlantic and similar patterns for cod and haddock, and naturally you can look at whales for other examples.

The whole business in a sense, and what we might do about it, can be summed up in a fortune cookie that I had the great delight of watching being opened at a San Francisco restaurant not too long ago. The fortune cookie said very sagely, "Sinners can reform, but stupidity is forever." We still have much to learn about how natural systems work and about how we can develop a harmonious, sustainable place for ourselves on this planet.

Biologist Lewis Thomas remarked in his lovely little book "The Medusa and the Snail," "The only solid piece of scientific truth about which I feel totally confident is that we are profoundly ignorant about nature."

It is this sudden confrontation with the depth and scope of ignorance that represents the most significant contribution of twentieth century science to the human intellect. We are at last facing up to it. We're getting glimpses of how huge the questions are and how far from being answered. But we are making a beginning, and there ought to be some satisfaction, even exhilaration, in that.

It's a very different attitude from that expressed half a century ago by Archie, the literate cockroach who was created by New York newspaperman Don Marquis. It was Archie who encountered a self-satisfied toad called Wartie Bliggins, and Archie goes on to say that Wartie Bliggins considers himself to be the center of the universe. The earth exists to grow toadstools for him to sit under, the sun to give him light. And then Archie goes on to say, "If I were a human being, I would not laugh too complacently at poor Wartie Bliggins, for similar absurdities have only too often lodged in the crinkles of the human cerebrum."

But since Marquis and his six-legged colleague mused about human nature, there has been a beginning of a shift that Sidney Holt has equated to something as significant as the Copernican revolution centuries ago that determined once and for all

that the earth was not the center of the universe. The astronauts looking back on the earth and aquanauts looking upward from the sea below have, after four million years or however long humanity has been in existence, changed the perspective of mankind, and it really has been within this generation. Perhaps for the first time we are seeing ourselves as a part of, rather than apart from, the tapestry of life on earth.

As a child I used to sometimes wish to be able to step into H. G. Wells' magnificent time machine and to zip back, like a thousand years, and to be able to walk softly in places that are now carpeted in concrete, or, on the other hand, to be able to leap ahead and to be able to whisk off for Mars, like tomorrow afternoon, if we chose to do so, or perhaps to plan a meaningful expedition to some place really distant, such as Alpha Centauri. But in fact our present era is what I regard as the most exciting time, perhaps the most significant time in human history--a pivotal and decisive era--and if I really had a choice about it, knowing what I do know now about the past and the present, and what I can project about the future, I think I'd choose to be around right now, because I think now is when the action is, that we are going to make a bigger difference, just by our presence. Either it will be a positive or negative difference, but we're going to make a difference just by being here, either through action or inaction or whatever.

But now is the time, that never before has a generation been faced with conscious decisions such as the fate of the great whales or the mining of the deep-sea floor, undisturbed up until this point in time. Never before have we had the opportunity to study such sea creatures as dolphins in close detail, and to learn about them and learn from them. Shall we continue to regard fish as simply a source of food, or shall we look for other values that may cause us to protect the wildlife that naturalist Henry Beston refers to as "other nations caught with us in the net of life and time, fellow prisoners in the splendor and travail of the earth"?

It actually goes much beyond that (which is more of an ethical consideration in itself) there are selfish ones, that our interdependence as living creatures on the other living creatures that share the earth, that if we are to survive we have to understand our dependence on their survival. So for very selfish as well as altruistic motives it's important to acknowledge this, and find out ways of protecting the natural living systems.

Many countries around the world are now grappling with the fate of one of the most numerous creatures on earth, that brilliant red species of krill called Euphausius Pacifica. An estimated quadrillion of these small shrimp-like creatures swarm in the nutrient-rich waters surrounding what is regarded as the coldest and the driest, the highest and the windiest and the least accessible of all the seven continents, Antarctica of course. Disrupting the populations of krill is likely to disrupt an entire system that requires krill for food and includes, of course, whales and seals and sea birds and fish and squid. It also, in its final analysis, includes us. Jiggling that cornerstone of krill is rather like taking the edge out of a large building. Some estimate that some taking of krill can be safely done, in fact that by taking some we might safely double the protein removed from the sea by concentrating on krill alone, but others feel that removing any piece of what may turn out to be a precariously balanced system could jeopardize not only the likes of whales and penguins, but also might affect the stability of the entire southern ocean.

It seems rather clear--certainly the Oceanic Society has made a point of acknowledging--that the time has come to combine the wisdom of science and the sensitivity of art to mold attitudes that will transcend written laws. What is needed is an ocean ethic. Traditionally the sea has been regarded as a common heritage for all mankind, but now its care must be acknowledged as a common

responsibility as well. It's in the best interest of all of us to develop international policy that recognizes this interdependence of life and the need for nations together to maintain the basic elements of life support.

A century ago the ocean was a wilderness. Al Giddings has called this "the sea of Eden." Before we are gone we may choose to keep what remains of that sea of Eden, or cause and witness something that you might refer to as a paradise lost. It's really up to those of us who know something and who care something about the sea to apply ourselves to the challenge of developing an ocean ethic. It's certainly not going to happen by itself. The laws of the sea that are currently being developed, even if they were being developed along the lines that some of us feel are more representative of the present needs, would not of themselves be enough. For the rules and regulations require a basis in human behavior, and if human behavior were developed along proper lines, we probably wouldn't need the rules and regulations. Thank you.

Switzer:

This panel discussion is called "What Is Important for the Public to Understand About the Marine Environment?" We're going to be talking about marine education, how we have been doing it, how well we have been doing it, and perhaps get some ideas on how we might attempt to do it here. Moderating the session is Ronald Linsky, who has pretty much been involved in the gamut of marine education. He was involved somewhat in the development of the Marine Ecology Institute in Redwood City, but he's mainly known for his work in Orange County. The school programs in Orange County are the most active in the state. The development, which was Ron's idea, of the Onshore Laboratory is probably the single most successful marine education program. We have representatives from different groups that are involved in marine education that will be serving on the panel. So, Ron Linsky.

Ronald Linsky, Consultant, Orange County Marine Institute:

I am very impressed by the fact that they painted the place, because 12 years ago it did not look like this at all. First of all I want to thank the organizers of the workshop for inviting me here to participate and also for allowing me to share a platform with such distinguished personalities. Mark called quite some time ago, and he caught me in between going to the Philippines and some place else, I forget what it was, and he gave me a title to work towards. And he gave me 15 minutes to try to discuss the meaning of ocean education. That was a challenge unto itself. And then he said, "Why don't you speak aiming at the past, present, and future?" And then I was overwhelmed.

But I think the best way to go about doing this in the short minutes that I have before the panel begins is to give you a little of my own parallel experience in marine education, because indeed I think I've gone through the wars with the people up here over the last 15 years. Bob Branderbury, the fellow across the river over here at San Raphael, and Stan Dedarian--people of this nature from many, many years ago, who were what we call pioneers in the business--they had no government support, they had no Fort Mason, but they had a lot of ideas.

We had people like Ed Hogendoer out of Florida, who in 1959 developed a mobile marine laboratory that provided educational experiences for migrant farm workers' children in the middle of Florida--and Ed literally traveled the farm migrant circuit. You've probably never heard of that. You've probably never heard of E. Ray Roberts in Florida, who was very, very strong in developing the caring process of the ocean and literally in the north part (north of Miami going up towards Hollywood, Florida) helped save that beach through public education. Some of you, and I think Elmer, might remember a fellow by the name of Frank Sorensen out at the University of Nebraska, who passed away a couple of

years ago. Frank was the father of ocean education in America. Now, none of you remember Frank Sorensen because Frank lived in Nebraska. Frank got the State of Nebraska to adopt ocean education as a mandated curriculum in public schools in 1956. He was better known for his 12-volume "Space Education," that Time-Life and a few other publishers picked up, and that's where he made his fortune, so to speak, in space. There's an awful lot of people that put ocean education on the map, and I really don't have enough time to tell you all that they have done. Your own Earl Herald, who was my hero, was a delightful colleague in many adventures up here. Some of you recall we put an old PT-boat out on the bay out here and developed a floating lab back in the late 60's. Earl and I used to commiserate across from the academy at a cantina over there. Some of you still go there I hope, and it's been that great place for Margaritas, but there's a hell of a lot more ideas came out of that cantina for ocean education than did drunks, I'll tell you that.

The National Marine Education Conferences on Catalina Island, where we had 100 people show up and ferried them over by plane to spend a solid 24 hours of trying to figure out what ocean education is. Well, I started trying to figure out what it was in 1962 when I began my career as a professional teaching high school biology in Southern California, and I found out very quickly that the word "enthusiasm" was the first key to a successful marine or ocean education program. I'd like to first of all say right now, I don't like the word "marine." I did a marketing survey for the institute I'm helping out in Southern California, and 80 percent of the 300 people I interviewed defined the word "marine" as in association with El Toro, Santa Ana Marine Corps Air Station, or Camp Pendleton. That meant 20 percent of those people knew what the word "marine" meant in relationship to the water.

So I've changed my thinking very rapidly and changed the name of the foundation to read now "The Dana Point Ocean Institute Foundation." The ocean has a more global context. We had breakfast this morning with Murray (Dr. Murray Newman), or last night I guess or this morning I explained that for some reason after you get out on your own as a consultant you become very globally or galactically oriented. And now I'm very globally oriented so I take the word "marine" and shift it out in the out-box and put "ocean" in, and it somehow seems to sit better now. The ocean is what we're talking about. We're not talking about the Marines. We're not talking about this--(gestures to buildings) we're talking about a world that Sylvia this morning showed you, and that's one of the things I think we're lacking--is a perspective.

Well, in those early days you really had to high-grade a lot of ocean activities in schools. You had to literally politic your way through the morass of educational bureaucracies, which is probably the most inane bureaucracy in the world to work with, but I found it very profitable to investigate the hobbies of principals and the interests of school board members, and then to key in such things as fish and sailing, and I'm very fortunate in the five years I was in public education to have 100 percent unanimous votes on anything that I was trying to get done in the marine education business.

About that time somebody started calling me a bio-politician, and I don't think I've given up that moniker over the years. Another characteristic you must have in marine education, called "ocean education," is idealism. It's very definitely a strong prerequisite for getting things wet, because you can take one teacher's idealistic enthusiasm, and you get the ball rolling then. That's how we used to get things done.

In the last 13, 15 years we've had more and more overlays of bureaucracy, and I'm afraid, as somebody described this morning, when they filled out all the forms to get a piddling amount of money to do this program, they had to decipher percentages of what you were going to do. I know, I was a director of a Sea Grant

program both here in the state at USC and in the University of Hawaii for eight years, and I know all about those God-awful forms. And I'll tell you a little bit more about that later on. But that seems to be one of our problems in this business, is we have too many forms and not enough substance. I found out later that what the pattern was that I was involved in--enthusiasm, idealism, naivete--is pretty much how the other people across that nation got things done too, and towards the middle of the sixties ocean activities became a little bit more visible. And our program development was a little bit easier to accomplish.

However, in those early days, ocean education began to follow a typically cul-de-sac pattern. We tried to make oceans a separate and independent subject in the milieu of education, and to a major degree this led to all the difficulties that we have had in the seventies. For a decade or more--at least that much time--ocean education has appeared more like a tenacious barnacle adhering, although unwanted, to the noble ship "U.S.S. Education," than as it should be--an integrated part of the educational process.

This definitely was an early mistake. In the sixties the ocean enterprise was packaged in the finest Madison Avenue glitter, glamor, and sex appeal, but it suffered from a lack of a strong constituency in the Congressional area of Washington, D.C. We did not and could not sustain the momentum that we were building, and the ocean movement literally, both nationally and locally, faltered in the early seventies, because I think we failed to develop a national policy. Yes, we had NACOA; yes, we had the Stratton Report, but that's all we had. We did not have the constituency that we needed.

Concurrent with that problem we had the space movement. An oceans enthusiast not only had to contend with the space movement, but then we had to contend with the emerging environmental movement. The public became, and to some degree continues to be, obsessed with pollution. Pollution is not very well understood even today, and neither are the environment nor its ecosystems. We don't understand what pollution is, and I will stand on that after many years of working in the business. And during this period of time there were very few minds in the country, or in the world for that matter, that were looking for solutions.

However, what did emerge from that period in the sixties, the late sixties, was an adversary policy development. The late sixties and early seventies introduced the idea that if anything was to be done in the United States, it could only be done after analyzing alternatives in an adversary manner. The framework for setting up the Environmental Protection Agency by the National Environmental Protection Act was not based on constructive solutions, but only the interminable arguments intended to prove the rightness or wrongness of original decisions. This type of thinking spawned the age of analysis to the point of overkill.

Today we have little procedural opportunity for generating alternatives. Analysis of alternatives is seldom undertaken in the spirit of engineering design and of scientific theory and experiment. We need much more systems synthesis than analysis, more careful and imaginative generation of possibilities, more laying out of alternatives and their consequences, with feedback from analysis, to the construction of new alternatives. Current methods of preparing decisions lean too heavily on adversary process. What we generally get is a half-baked system analysis of poor alternatives. In my opinion we need to start generating more system synthesizers, idea generators, and designers. We need more of those people than we need systems analysts.

As an outgrowth of this kind of thinking, education today has in many respects taken the same adversary position in matters dealing with the environment, which to me reflects again a lack of understanding regarding the environment. Many cases of environmental damage were produced by a lack of knowledge in the application of technology rather than in the incorrect use of technology. In both situations the difficulty usually derives from a lack of a broad, global, galactic consideration

of the totality of this world we call "the planet Water," or "the planet Earth." In some respects we have become fault-identifiers, not solution-promoters. Who knows, maybe historians will some day recall this era as McCarthyan environmentalism.

I continue to firmly believe that public awareness of the importance of the ocean to life in general and mankind in particular is vital. Scientists develop facts and careful forecasts on which environmental decisions are based. But the decisions are made by Federal, state and local legislators, boards and commissions, rather than by scientists. Since these decision-makers, and in some instances we can call them indecision-makers, are either elected or influenced by the electorate, public education, not the little red schoolhouse but public education, in ocean affairs, including its science and technology, is clearly important.

Although we are bordered and interlaced by great oceans and major seas and vast lakes, Americans remain a society which conducts its daily life with a land perspective. This is most readily seen if one reviews the paucity of materials available to elementary and secondary educators regarding the legacy of our maritime history. The wealth of American colonial society was based upon fish and trade across the Atlantic. The 1800s' wealth in America, including the North American Rothschilds, including the Gettys, and can be traced through the Kennedys, was based upon whale oil. Nowhere do we find that in the materials that are presented to children.

Americans still do not yet understand the ecological implications of this water planet, nor have they appreciated the complexities of critical ecological situations, nor have they been translated to inform the citizenry and to help it understand the impacts and interactions of environmental conflicts. These cannot be passed off just as pollutions of bays and estuaries and oceans themselves. There are serious lackings in our American educational enterprise.

Today all of you have heard the statistics that we have 115 million people or 50-some percent of our population living along the coastal borders, and it's been projected by 1990 that we'll have in excess of 60 percent of that population--of our total population--living along the shoreline. The shoreline is going to be faced with continually expanding needs. The resources found in the coastal area of our nation are receiving an overwhelming demand by this increase of population. The most dramatic increases happen to be for recreational purposes. Commerce is increasing. And we now have living space as a developing problem. Thus there is a choice that confronts us. We can wait and react, as we have so often in the last decades, or we can begin to educate people, that what we thought in 1970 was going to be the future--we can educate people to say there is no future.

Marine-related knowledge can easily become a part of the learning process. Both young and old can become aware of the changing perspectives of the world in which they live. To date, however, there has never been a national statement which identifies clearly the oceanic needs of our nation and relates it to its importance for the daily life of people. While this statement is yet to be clearly promulgated, we can thank Congress at least in '72 and '76 for passing national Acts such as the Coastal Zone Act, such as the National Fisheries Management Act, which certainly took steps in the right direction on a national enterprise. But the problem we have today is that the youth of our country really do not comprehend what those two Acts have done. We passed the Act with little knowledge called the Coastal Zone Act. Ten years later, and probably 5 billion or 50 billion dollars later, we're finally saying, "Hey, that Act hasn't done what it was supposed to do." Somehow there are amendments being made to it. There are changes being made to it.

The Fisheries Act--which is a very interesting thing if you follow fisheries very closely--you will find that even the National Fisheries Act, with its 200-mile limit and its GIFFAs, which are the governing international fisheries license, etc., are going to be in great difficulty.

We do not travel this spaceship planet by ourselves. We travel with 3.8 billion people. We have to ask the question, "What do they care about? What is their perspective of the ocean?"

But what is marine education? Aha, group one, what is it? What is ocean education? Ocean education is a continuing process involving any education, formal or informal, which deals with the aspect of the world of water. I disagree with all the other very pedantic definitions, but that's what it is--very simple. Why is it important? Murray asked this same question at breakfast this morning. What the hell do you want to teach ocean education for? Why are the oceans important? Well, good geography teachers, good chemistry teachers, good history teachers, and good biology teachers know and should explain at least to youngsters that this is "Planet Water," and indeed the very existence of the planet is dependent upon the ocean, not on the Hoover Dam, nor on the mountains with snow. You know, snow is the cheapest ocean water there is. So is the rain. This water did not come from the Petaluma area. This water last night came from out there. But we don't teach children that weather starts there. We always teach children that weather starts somewhere over here--the land. Weather is out there. (Gestures toward the ocean.) Weather is there. This is high-grade desalinization, right here, but we don't teach it that way.

Marine education is a general policy term which includes all types of human activities that yield increased individual or collective awareness, knowledge, and/or understanding and enjoyment of the sea or its interactions with human activities--a very pedantic, professional education statement. But, such education should not be limited to the traditional approaches of science or humanities or social studies, but should be included as a component of the integrated, multidisciplinary approach to water-centered problems.

Now Dottie Bjur, who is going to be on the panel, has some very interesting comments I hope on that multidisciplinary approach. Outdoor education is an integral part of ocean education. In addition to traditional academic and professional activities, vocational training is a part of the ocean enterprise.

My wife and I just read a marvelous article in the L.A. Times--it's the first time in 10 years I have seen it--there was a huge ad, on the sports page of all places, for marine engineers. They wanted, I don't know how many, I guess 25 or 30 marine engineers to go immediately to Saudi Arabia, a great place, because Saudis are going into a massive ocean program right now. In fact, they are one of my clients. I just figured out the next five years' equipment for the ships for Aramco. They're going out to the Gulf, Elmer, in big swatches. They're looking for ocean engineers. First time I've ever seen an ad to that effect.

There should be opportunities available to all people of all ages to increase their awareness, their knowledge and understanding of marine affairs. A range of options should be available to each age level to accommodate a wide latitude of individual interests and abilities, including those of the physically and mentally handicapped. Dottie Bjur will also comment on that. She's the only person I know of who has a physically handicapped program now in ocean education--funded. (Comment from audience.) Somebody else has. Great! When did you start? (From audience:) "Started about a year ago. We have a blind divers' program." Yeh! Super! See that? Now you get together with Dottie Bjur, and we'll take care of the blind kids, all right?

Of course I'm always interested in the average kid. There's always money for the handicapped; there's always money for the mentally gifted; there's always money for the mentally retarded; but the average guy like me with a hundred I.Q.--there ain't no money for me. We've got to do something about that too.

Well, what kind of goals should the ocean education business establish? These are my goals--you love 'em, you like 'em. If you don't like 'em, don't worry about

'em. First, I think we should develop a marine-literate society, aware of the significance of the oceans, the marine environment, and the reasons for that significance. A society that understands the interdependency and inter-relatedness of the land to the bodies of water on our planet, a society able to understand and participate in public and personal decisions affecting or affected by America's needs in the sea, inland waters, shorelines, and seabeds.

To encourage marine-oriented professionals and technicians, America's sea people if you will, educated and trained to carry out the nation's complex marine missions through multidisciplinary programs of the marine studies in our colleges, universities, in the public and private sector of our nation--that's my plug for academics.

Three: to develop in the coastal regions and near the great inland waters a public awareness to better equip our citizens to use the aquatic environment for recreational purposes, and with greater understanding, for safety and enjoyment, along with a new appreciation of the fragility of the environment and for its need for protection.

I did a survey many years ago in Orange County of all the sixth-grade kids in the class of 1968. Over 70 percent of those kids could not pass a swimming test; yet a hundred percent of them went to the ocean. Well, that didn't shake me up too much until I was at the University of Hawaii. The University's Sea Grant program ran a swimming test for surfers. Seventy percent of the Hawaiians couldn't swim in the ocean or pass a basic Red Cross test which is only 50 yards, or tread water for two minutes. Incredible! It's like those people in Southern California trying to figure out what do you do with 22 inches of water. You lose your house. You know what those folks are going to do next year? They're going to build the house on the same hill. Year after year. Not very bright.

We need to develop a new breed of public managers, whether elected, appointed, or career professionals, able to make decisions that recognize and insure a proper balance among America's needs and interests on the land and sea for the maintenance and preservation of the national resources, as well as their proper and timely use--going back to my earlier comments about the whole age of the adversary.

And Americans must also understand the significance of marine systems in order to support, encourage, and change society's use or values of the ocean environment. That's very tough, but it has to start somewhere, and it must start with education.

This marine education process needs no new curriculum nor development of major resource materials. Rather, it calls for the identification and the aggregation of those materials, and experience is already available, yet unrecognized. The knowledge base, in large part, already exists. However, they have never been articulated in a national statement which clearly states the importance of the land-sea interface. It is here that this interface, where we are today--we congregate and we live and work here, but the determination of how we can successfully live and work amidst the marine system is the key to a successful and productive future for the nation and its people.

And I believe, in my own perspective, that that's what this congregation of the workshop today is: bringing together of people to determine where you want to go, what you want to do, what is this animal here called Fort Mason? If you can define the animal, then you can define what it can do. There's an old game we used to play in school. I remember, with my kids, that we used to have on the table, spread out, 50 different kinds of parts of animals. Cut 'em up, and the goal was a creative exercise in "create an animal that can live anywhere." Create a fish out of these parts. Take bones of 50 different animals and lay them on the table. That's what you're doing here--you're creating a Fort Mason marine center. What should it do? Where should it go? Where is the money coming from--that's the important part. Of course that's the easy part, really.

Okay. Well, enough of this pedantic talk. Let's bring our panelists up: Rudy Schafer, from the California Department of Education; Dorothy Bjur, from the University of Southern California; Dick Cunningham, the chief of interpretation of the Western Region, National Park Service; Don Lundstrom, of Curriculum and Services, Alameda County schools office; Bruce Stewart, public education coordinator for the Moss Landing Marine Lab; and Irwin Seibel, the director of the Tiburon Center for Environmental Studies, from San Francisco State University.

Now what I'd like to do, ladies and gentlemen, is to ask a question and in turn have you respond (and we're very chauvinistic so ladies will go first)-- I'd like to ask the panelists in maybe two or three minutes, "What is the major concept that they believe the public must understand about things wet--the ocean, the marine environment?" What's the one most important thing the public should gather or have an opportunity to understand? For instance, high-seas fisheries-- is that an important issue that people in the San Francisco area need to know about? If it is important, on a scale of 1 to 10, is it 1 or is it 10? Come up above 5 and think about the first five important issues that people should understand. If you use pollution, you're off the panel, right? And with that I'll leave it over to Dottie Bjur from USC to lead off the obvious gentlemen panel.

Dorothy Bjur, University of Southern California:

I'm Dottie Bjur, and I'm director of the marine education programs at the University of Southern California, with Sea Grant and with the Institute for Marine and Coastal Studies. This morning at breakfast Dr. Newman was asking me, "Well, what do you mean, marine education?" And when I finished telling him, he said, "It sounds to me like a religion," because I had a missionary zeal about it, and the reason was that I feel that it's very, very important. If I didn't feel that it was important, I wouldn't even be doing the job.

My feeling about marine education and marine awareness is that it is imperative that we understand and effectively use the resources, both the renewable and the nonrenewable resources, that are available to us in our marine environment. I also recognize that many times those that are closest to the problem are the most oblivious to the needs. For example, I think Ron mentioned this morning that in Nebraska--he mentioned a gentleman up in Nebraska--that in Nebraska they have a mandatory marine education program. And people say, "Well, why in Nebraska?" Because they recognize that the marine environment affects all aspects of our life. It can't be categorized any longer, boxed into a science. It's much more. It touches every aspect of our life, from the physical, emotional, intellectual--all aspects, and so we must understand that in a multidisciplinary way, that it is more than a science--it is history, art; it's our past, it's our present, and it's our future.

Sylvia this morning said she was happy to be part of today. Well, today is our time to prepare for tomorrow. And if we don't--if we don't use our resources properly, if we don't educate our citizens properly, then we might not have a future. And this is our concept of marine education, that to create a marine-aware society, one that produces knowledgeable decision-makers of the future, sometimes it's hard to teach an old dog new tricks.

People make decisions once they're adults on a rather selfish basis. How is it going to affect me today? But if our children understand that the knowledge that they have, the things they understand about the marine environment today, are going to affect them tomorrow, and they are going to affect their children, they're going to make wiser decisions than we have made in the past.

I think Ron mentioned that he wanted me to talk a little about the multidisciplinary aspect. At USC we've developed a program which is completely multidisciplinary in its approach. In fact we don't mention science. That's the reason we call it "marine education," because we feel that it is much more than a science. And this multidisciplinary approach is bringing the marine concepts into all disciplines--into the arts, into our history, into social study, into the sciences, into

mathematics, into every aspect of our education. We recognize for example in California that the mandated curricula are so heavy that there's no way you're going to have another added responsibility on the teachers. But the marine environment is as important, and a much larger environment than is the land environment, and it should be part of our environmental education, part of all the disciplines that we teach within our schools. It's nationally and internationally important.

I just recently put on an international workshop for nine Latin American countries in marine education. I was in Mexico and talking to the director of the Science and Technology Association there in Mexico City, and I was telling him my philosophy on marine education and he got all excited and he said, "You know what, Dottie? You just might be the person that can bring the Americas together." Now, that was a big task. But he then explained. He said, "In the past we've focused on technology, on the hard sciences, the sciences common to our countries, and they do their research, they write a paper, and it doesn't affect our people. But what you're talking about is that aspect that touches the lives and the hearts of each human being, and can affect their style of living." And that's what we want to do. We want to bring the nations together into a more holistic viewpoint on life, one that includes all of the aspects of the human mind and thought, and that includes his way of living, which is living with his marine environment.

Linsky: Well, Erwin, I can only go to my next closest friend.

You sure?

It's a hard act to follow.

Dr. Erwin Seibel, Director, Tiburon Center for Environmental Studies:

I've been involved in this game for about 12 years now, and I'm the director of the Tiburon Center for Environmental Studies of San Francisco State University. I've been an inland dweller for a long time, and that means I came from Michigan. When I came to San Francisco for the very first time, I was sort of led to believe that environmental awareness was a real thing out here. I was a little bit shocked, because I don't think it's really true. And with that kind of a background I'd like to make a couple of very brief comments about what I think we need to do (and again these are philosophical statements) and they come down to three basic points.

I think the first one has been identified by Ron Linsky. The decisions that we live by are made by those people most distant, very often, from the information. And because those decisions are made by those people, very often the decisions do not please all of us, because very often those decisions are subjective rather than objective. And therefore I think that the main purpose of marine education should be to identify what the public really wants to know about the oceans first. Once we identify what the public wants to know, find out whether or not we have the information available to provide it to them now. And we can provide it to them in a real way by utilizing the existing structures of elementary education, secondary education, and the media. I don't think that as educators or as scientists or as researchers we make enough use of the media to educate the people about the marine environment. So that's really our fault. Okay?

The second comment is that there is an awful lot of information available about the oceans. There's an awful lot of information available about the bays, the rivers, the Great Lakes, and I know it; a lot of my colleagues know it; some planners know it; some legislators know it. But if I were to ask a question of the general public, I'd get an answer, "I didn't realize that you've been working on this for the last 10 years." And because of that particular element I think what we need to do is take the data that we now have about oceans, about bays, about rivers, about lakes, and have somebody translate it from the scientific jargon that we all use (many of us use), and translate it and provide it to the

public in simple, understandable--because it can be made understandable--terms, and allow the public to decide what is important to them in the long run. Okay?

And last but not least, all of us have been talking about "our public." I object to that. I am part of the public, and I would like to be educated by those who have more knowledge about some other subjects than I, and therefore as a member of the public I want to know as much as possible, so that if I object to a politician's decision, I have the facts available to me to criticize him or her. That is my philosophy.

Linsky: Thank you, Erwin. Rudy, do you have some ideas?

Rudolph Schafer, California Department of Education:

I'm Rudy Schafer. I'm with the state Department of Education. I'm somewhat of a pragmatist, and perhaps what I will do for you now is give you some ways and some means and some thoughts about transforming some of this obviously religious fervor into something you might be able to do something with.

First of all I'm concerned with programs that affect the elementary and secondary schools throughout the State of California. My first observation of what Ron asked earlier, what might be some important things for you to think about, is that I hope that you will see yourself as a part of something rather than as something all by itself. Because truly the whole world is--everything is connected to everything else, and as Ron said earlier, you cannot separate the environment into little pieces and deal with them separately because it all fits together.

You will look in vain through the California Education Code for any mention of marine education. It's not there. As Dorothy said earlier, the legislature in its infinite wisdom and mercy some years ago decided to clean up the Education Code and to tighten it up and to do as much as they could with it to make it simple and easier to work with. As a result of that we have 19 required subjects, and they're spelled out in various state frameworks, courses of study, and whatever, and it happens that marine education is dealt with under the heading of environmental education. I really think this is a good idea, because as I say we cannot separate anything from anything else. It's all part of the whole.

There has been recently produced a course of study. The county superintendents worked together to do a course study. I have the environmental education section of it here, and I have additional copies, not enough for everybody, but those of you who want it can look at it. And there are five goals spelled out in this course of study for environmental education. First of all, the course of study, in terms of what youngsters should be able to do, asks that, by the time a youngster graduates from high school, he would have some idea and some direction to choose a lifestyle which supports a healthy world environment, and which respects the environmental rights of others.

The course of study further specifies that youngsters should develop some skills and some commitment to get involved in solving problems--very simple little things like turning off a dripping faucet clear up to world involvement, worldwide problems and concerns, as Ron has laid out to you earlier.

The course of study requires that basic ecology and resource technology should be part of the goals of environmental education.

Further, the course of study indicates that the youngsters have to understand the relation of individual and social values as they work through our political, social, and economic system to produce various kinds of environments. In other words, if everybody wants a Cadillac to go 90 miles an hour down unlimited freeways forever and ever and ever, that's going to produce certain kinds of environments. Perhaps environments that we wouldn't like, but anyhow this is part of what we're in there for.

Another very important part of the course of study spells out that youngsters should respect life, all forms of life, that they should have an appreciation for natural beauty, that they should value pleasant human surroundings, the built environment if you will.

These five goals are part of this course of study, and I believe if you will study them that you will find that marine education fits in very well, not as something separate but as a part of the whole.

We are taking that course of study a little bit beyond the philosophical, you know, in the state. Don Lundstrom and the Alameda County Office of Education and some other people are working with us to develop some nine o'clock Monday morning materials. How can we take these grand statements and bring them down to curriculum and materials? Dorothy Bjur is going to be our marine education expert. Don Lundstrom too, because he's had some good experience in the field, but we are going to include this in our environmental education program.

One of the things that we have at the state level is a grant program. You know, religious fervor, philosophy and everything are great, but there comes a time when you need some bucks. There are some funds available for environmental education through our statewide sale of personalized license plates. Money is raised and we use some for environmental education. Of course I have a list of the projects we've funded this year. Interestingly enough, project grants can be made to nonprofit citizen organizations as well as school districts and so forth. The Environmental Volunteers, Audubon Nature Center, and some other people are people that we have made grants to.

There are problems and concerns which you should know about, because once again the world can slide out from under you while you're sitting there feeling good about all the things that you feel good about. First of all, we have on the horizon "Jaws II," or "Jowls II" as I call it, which is going to have a rather serious effect on our state funding situation if this thing passes. We have been asked to produce 20 percent budget cuts, 30 percent and 100 percent budget cuts in our own situation. I have no idea if the grant funds will be there for next year. Right now the money is in a special protected fund, but if Jarvis II goes through, the legislature may wipe out all those special funds and throw the money into the general pot. So we are very concerned about what's going to happen with the environmental education money in the months ahead.

We are also concerned with what is called "sunsetting legislation," in which the legislature is giving itself the option of wiping out environmental education by the end of 1981 unless action is passed the other way. I don't feel too threatened by that because I feel that the things that we've done, the progress we've made, stand the test of close scrutiny, and I don't worry too much about that. But maybe I should, I don't know. I feel that, you know, if you don't like it, okay. We've done the best we could.

At the Federal level we have a U.S. Office of Education, which in a few weeks will become the Department of Education. Right now there is a transition task force working in the Office of Education, and thus far they have done nothing, absolutely nothing about environmental concerns in any of their planning. There was an Office of Environmental Education. Dorothy received some funds for the program that she is doing from that office. That office has zero funding for this year and for next year. There was an energy action center. That has been wiped out also. I have written letters, I have called, and I have done everything I can, but at the present time the visibility in the new Department of Education--of course we don't know what the final shake-out is going to be--but right now there just doesn't seem to be a thing that relates to environmental, marine, or any of the concerns that we have.

So what I'm saying now is that there are some darn hard, practical, real-world things we have to get busy on and be concerned about, and if you want your area to

fit in with these other things and to make some progress, we've really got to get busy. So I'll be glad to go further on some of the grant programs and the other courses of study and whatever, but that's enough.

Linsky: Thanks, Rudy. Dick Cunningham, the chief of the interpretation, Western Region, National Park Service.

Dick Cunningham, Chief of Interpretation, Western Region, U.S. Park Service:

About 10 percent of the areas in the national park system are marine oriented, marine related. Some of these areas are some of the prime jewels, I guess you could say, of the national park system. Others, perhaps, to the general public may be not as well known. But areas all the way from places like Acadian National Park in Maine, Cape Cod National Seashore (a place I spent six years at before I came here), Everglades National Park, Buck Island Reef, Virgin Islands National Park; areas here of course that are on the West Coast: Redwood National Park, Point Reyes National Seashore, Golden Gate National Recreation Area, Channel Islands National Monument, and several other places in Hawaii--all of these have very, very prime marine resources.

These areas of the national park system are no different from any others, the Park Service having a legislative responsibility, a mandate if you will, for the preservation of those areas, the resources there, the natural, ecological, and cultural resources, and also at the same time the mandate for the public use of those areas. A part of the public use of those areas gets down to what we have been talking about in marine education, which in the National Park Service on a very broad perspective we call "interpretation."

Interpretation in the Park Service, whether it be in a marine or a terrestrial area, has been going on now for almost 60-some years. In the 1920's interpretive programs began. All of the areas within the national park system have some form of interpretive programs. Those of you who live in the Bay Area perhaps are, I hope, well aware of some of the programs here at Golden Gate. Greg Moore, later on, will be talking about those programs. Others of you probably have participated in some of the programs, perhaps up at Point Reyes National Seashore.

But along with these two almost conflicting mandates, for preservation and use, the emphasis in the interpretive programs has been for a very basic understanding of those primary resources for which that particular area had been set aside by the Congress of the United States. Given that, the types of interpretive programs that have been developed in the national park areas, in our marine areas, are very, very widespread. Some are very traditional-type programs--the guided walks, the campfire programs, the auditorium, amphitheater-type programs--traditional programs that you could find in an inland area such as Yellowstone or Yosemite, Sequoia-Kings, places like that.

But also, because of the environment, some very specific and very unusual kinds of programs have been developed. The Virgin Islands and Buck Island Reef are two very good examples where you can go on a guided interpretive snorkel tour to an underwater nature trail. A possibility perhaps exists at some point in the future of having an underwater nature trail down at Channel Islands National Seashore--about to become Channel Islands National Park. Glass-bottom boat trips in some of our areas--Fort Jefferson National Monument in the Dry Tortugas, Florida (which is another place I spent some time), Everglades National Park, the John Pennycamp Coral Reef State Park (not part of the national park system) off of Key Largo, Florida, depend upon glass-bottom boats as a means of interpretation of their resources.

I can give you an example of how we have used and are using public education through the interpretive programs in a park. I can go back in my own experience at a place like Cape Cod. Because they're utilizing things like guided walks

through salt marshes and marine estuaries and along the beach, talking about beach dynamics and ocean processes, and of course the marine environment itself. All the way, we do things like shellfishing, surf-casting demonstrations, and historical-type talks on whaling (a primary historical resource at a place like Cape Cod), lighthouses, sea rescue, surf, and maritime shipping.

We interpret resources through publications at all the parks. As you go into the visitors center, there is an area set aside for the sale of publications, either professional or commercial publications, or publications produced by the park staff or associations.

We interpret resources through seminar programs. Point Reyes has a very fine seminar program as a part of their education program. In the spring of 1978 they had seminars on seashore life, a nature workshop for teachers, migrating shore birds, "seasons of the seashore," the undersea world of Point Reyes Peninsula, the ecology of Point Reyes birds, tide pools, and many other terrestrial-type seminars in the program.

Cabrillo National Monument is an area that's basically set aside for historical purposes as a commemoration of Juan Cabrillo. It is a very small park and an urban park (just as urban as Golden Gate is, being right at Point Loma in San Diego), but it has very, very outstanding marine resources, part of which are the tide pools. We have a very definite concern on public use and understanding of those tide pools. Another major active use of Cabrillo National Monument is in connection with the migration of the California gray whale. It is one of the prime places for observing gray whales from the shore in the State of California.

Many of our national parks, particularly those in the marine areas, have museum exhibits. We'll be talking about exhibits later today, but many of those museum exhibits relate to marine resources, along with the natural, cultural, and historical resources of the park.

We've been talking about environmental education. Some of the parks have very specific environmental education programs, sometimes for day use, sometimes where school children come in and spend about four or five days at a time. Point Reyes has a program that's been going on for several years now.

The final thing I would like to mention shows the value of interpretation. Before my experience in Cape Cod, and even before my employment in the Park Service, I was a research biologist in the National Audubon Society, and so birds certainly are my field. We had a very serious problem at Cape Cod of a conflict between people and nesting tern colonies on some of the beaches designated for recreational use. We had the very active support of the local bird club in delimiting where the bird colonies were, keeping people out, and keeping dogs out. At the same time, through a very active interpretive program in that park, through things like guided walks that went near the tern colonies, through evening programs, through special publications, and through special exhibits, a set of rules was publicized to protect the terns. We now have a set of guidelines for all areas of the national park system and for fish and wildlife refuges used by other agencies in the Department of the Interior.

So by using interpretation we were able to reach and educate a lot of people in the relationships between gulls, terns, and human beings. I think that is a primary responsibility of the national parks. Through interpretation comes understanding, and I hope that through understanding comes appreciation, and then appreciation becomes preservation. Thank you.

Linsky: Thank you, Dick. Don Lundstrom, of Alameda County.

Donald Lundstrom, Curriculum Services, Alameda County Office of Education:

I'm Don Lundstrom, Director of Curriculum in the Alameda County Office of Education. I also am the project manager of the Marine Ecology Research Project,

which is a two-county project in Alameda and Contra Costa County, and which is available to any student--public school or parochial or private student--in the two counties, grades five through twelve.

The program started out back in the early seventies as a high school program, and basically was interested and involved in the marine sciences aspects of secondary teachers, biology teachers especially, and those teachers who were involved in teaching marine sciences. Over the last number of years we have broadened that. We now have a junior high curriculum developed, and we are in the process of finishing up a guide for grades five through six. We're starting this next month on a "MER-mobile," which will be going to school sites around the two counties, on an appointment basis. Some of the funds for that particular project, that we're finishing right now for the elementary schools, came from the license plate money that Rudy mentioned, because we use that not only for workshops for the elementary teachers but also to outfit the van and to get other materials for that.

The program has been, I think, very successful over a number of years. We've had our ups and downs at different times, but I think mainly it's been successful because it's been teacher designed. From the very, very beginning, even though we got money from a variety of sources, all the way from foundations to NSF grants and now to ongoing tax money, it was teacher designed, and the teachers have not only built the lab but also designed the program. They wrote the materials, and they are the workshop leaders. Now that we have a workshop for elementary teachers, we have teachers teaching other teachers. The materials that have been developed are developed by the teachers and are tried out by them. So we have things which come directly into the classroom, and because of that I think we have a lot of support from those teachers who have been involved.

Our biggest problem, just as with any other group, has been that we do not always have the input into the decision-makers that we need to have. For example, can we put money into field trips so people can come out to the marine lab? Can we supply money to buy the lab books, or can we supply money for other kinds of things? So sometimes I feel we're missing the boat on influencing decision-makers, but I think in some cases we've been very successful in that part, because we have involved other people in addition to the teachers in the program.

The program has changed over the last number of years. We still have a large number of classes coming out to the marine laboratory on the Point Molati site at Richmond, California, but we also are getting more and more elementary and junior high school classes coming out than we used to.

I think that's a good thing, because I think the program has become more general in nature and deals not only with the sciences but also the relationship between the social, the cultural, and the scientific, so we're dealing with a more interdisciplinary kind of program. The materials which have been written for the elementary group reflect that.

Ron wanted to ask us about the kinds of things that we feel are important in the program. I felt that the success of the program has been from the grassroots approach of the teachers and students that have been involved. That's been very successful.

But, in addition to that, there's a reality that you have in curriculum-building or in instruction. You have several movements in the country now--the basic skills movement, proficiencies, school improvement, and other kinds of things like that. All of those kinds of movements in education affect what happens, and unless you are able to fuse marine sciences or ocean sciences or environmental education into a total curriculum, I don't think it's going to last. It can't be, as Ron mentioned, a barnacle on the outside. It has to be inside. I hope that as we develop Project MER we will integrate it in that way. We are very fortunate that the February 1980 issue of Science Teacher contains a brief article about our program. I have some copies of the article. It went out

nationwide and describes very basically what we do. Within the last week I got my copy of the Science Teacher, and I already have a dozen letters from all over the country on the program, so I think there's interest out there.

But there has to be support from people who have decision-making responsibility, whether administrators of schools or principals or legislators or anybody like that. It can't happen alone, just with this kind of group here, you know, only talking to ourselves.

Linsky: Thank you, Don. Next is Bruce Stewart from the Moss Landing Marine Laboratory.

Bruce Stewart, Director of Public Education, Moss Landing Marine Laboratory:

My name is Bruce Stewart. I am involved in our public education effort at the Moss Landing Marine Laboratory.

The lab is a research facility that is run by a consortium of state universities. The staff is half associated with teaching activities and half associated with research activities. It is small but very active.

Almost from the inception of the lab we've had some interaction with the public in terms of an annual "open house." It used to be a one-day affair. About three years ago we got a response of about 6000 people in one day through a lab that's, well, quite a bit smaller than this whole pier area here. A room this size might have three times the number of people that are here now. So there's clearly a need being expressed to know more about marine science in that area.

We expanded our public program with the help of Sea Grant. We implemented a visitor day program for local school kids, and after three days of advertising it the first year, the situation was completely full, with 850 kids signed up, and half the spaces were filled for the next year. So once again we were nowhere near saturating the need or supplying the demand in the area.

Well, along with the open house, which has been expanded to two days, and the visitor day's program in which graduate student docents will show students through the lab and answer their questions at a number of stations, we've implemented many courses on request from local teachers. We have a limited number of tours and some out-visit situations available.

There is currently an internship program going on at the lab, where on a pilot basis six high school students are out in the field with one of our faculty researchers studying marsh plant ecological interaction. We also go out and do career talks.

Stemming from these activities and from feedback questionnaires, some of the needs that the public has identified are hands-on experiences and interaction with experts in the field. I really emphasize the latter, because at the open-house situations people are much more into an exhibit that has a researcher standing there who's willing to explain what he's doing, whether it be electro-reception in ratfish or as specific as a certain species of phytoplankton that someone may be working on. People have a broad variety of interests and curiosities, and they really want that personal interaction.

Another commonly asked question is, "What are the researchers doing at the marine lab?" I think evidence that people are very concerned with what's going on, with research specifically, is indicated just by this incredible response that we get, being a small marine lab.

People have asked for teacher training and also some sort of a central clearinghouse for curriculum activities, and I understand there are projects going on now to collate those materials. People have requested special programs for adults and special programs for kids that are geared especially at each of those age groups, or even broken down further.

I think the main question that was asked is "What's important for the public to understand about ocean science?" I think it's all important, and certainly

people's responses at open house--being interested in any and all aspects that you're willing to talk with them about--indicate to me that the main thrust ought to be to encourage an overall awareness and to encourage a curiosity and an acting upon that curiosity as regards marine science.

I think in work that we've done with kids this is really aided by hands-on experience, allowing the kids to formulate their own questions and have experiential ways of solving those questions.

For example, the question was asked, "Is the fisheries problem important?" I think once a kid relates to a tuna--an animal that's doing a certain job in the ocean and relating to other animals, having to avoid predation and having to find food, an animal that has its interrelations with man--that certainly it's real easy to start talking about a tuna fishery or any specific problem. So, stimulating that curiosity and problem-solving through first asking a question, which is just simple scientific process--hypothesis and procedure--is very important.

A question that was brought up in the background materials for this panel was, "How can you interest researchers in relating to the public?" Very simply, researchers depend on the public. Their whole job depends on what the public thinks they're up to. In many cases I've had people write on feedback questionnaires that we shouldn't be involved in research if it's not something that they care about or at least something that they can know about. And I think, second, researchers can learn a lot from dealing with the public and from dealing with kids.

At our visitor day program we've had as many as 20 graduate students involved in dealing with kids, and there's just a real high energy around the laboratory during these activities, so just the fact that it's a lot of fun is a real stimulus for researchers' becoming involved in dealing with the public.

In developing this marine science center, you should be aware that there can be a two-way interaction between researchers and the public, and that it can benefit both.

Linsky: Thank you very much. That leads us to the end of the panel.

We have time for some interaction with the audience, and we would like to have some questions either from the panelists to the panelists or from the audience to the panelists. Do we have any questions from anybody in the audience, please?

Gwen Taylor, South Bay Conservation Group:

My name is Gwen Taylor, and I'm secretary of the South Bay Conservation Group in Morro Bay. I would like to direct this question to Mr. Schafer, please. Is it at all possible, and I feel from being a parent as well as a grandparent that it is most vitally important, that education in our problems with the ocean begins with the kindergarten. Instead of seeing children say, "Jump, Jane, jump," and be a cow or a horse or something, to have something that would interrelate with the ocean and the problems that we are now seeing in the ocean. Is this a possibility?

Schafer: Yes, it's not only a possibility, it's part of the state education code. The code says that awareness of natural resources and the protection of the environment (which should include the oceans) shall be taught in all appropriate grade levels, in some areas "K" through twelve.

It doesn't say there shall be a sixth-grade course. You know, energy concerns, pollution concerns, natural resources, the oceans, our devotion to other living things--all these things have to be part of the curriculum, and it's not just in the separate time; this ethic needs to pervade everything. We talk about environmental rights, that we have a right to enjoy natural beauty, pleasant surroundings, that we have a right to live in an environment which is healthy, a right to share in the resources of our country and our world. We're going to try to bring these ideas down at nine o'clock Monday morning, so that teachers

can begin to use this.

And, you know, what is more basic, as Don said, we have these fashions in education--basic skills, that's a big thing now. What is more basic than to learn to live in harmony with the environment in which we are living, in which we find ourselves? So this needs to pervade our teaching. I quite agree with you, and I hope that we can do something for your youngsters and your grandchildren and all the rest of them out there. There's 4½ million of them in California schools. We have got our work cut out for us.

Simone Dangles, East Bay Regional Parks:

My name is Simone Dangles and I work for East Bay Regional Parks, and we're opening a marine visitors center down in Crown Beach. One of the things I've found is that when teachers come to us and bring their children on a trip, they are constantly feeling sort of intimidated by a scientific, you know, thing out there.

Basically we work with elementary school teachers, and I find most of them were English majors in college and know nothing about biological sciences or anything to do with the ocean or anything else. They feel intimidated about it, and I'm wondering if there's any move now in teacher education programs in the universities to increase the familiarity of elementary school teachers. I think high school teachers aren't quite as bad, but with elementary school teachers, we need to increase their familiarity with environmental issues and environmental education. Is the state doing anything? It wasn't doing it when I got my credential, and I'm hoping that's changed.

Linsky: To answer that you would get seven different answers. Let me start, for openers. I've been in teacher workshops for seven years up and down the State of California, and we've had probably eight to nine thousand teachers go through them. That was back in the Neanderthal days in the late sixties and early seventies. One of the things we were talking about this last night with Dottie Bjur--one of the things that we must keep in mind--is that what you describe is 90 percent of our problem. Good workshops develop a sense of security if you will--that oceanography is not as mystical as all these film producers would like you to believe it is. It's a real live thing. You have to build self-confidence in people. That's probably the most important thing any workshops do--is make people believe in themselves, that they can really handle the subject, because they are totally, totally scared of a field in the oceans.

First of all you get seasick, and who wants to study something you get seasick with? I guess that's one of the attitudinal problems that we have. But this is a very major problem. You will always have it. It will go on incessantly. Personally, what I would do is wipe out all the colleges of education. We don't need them. That's a bold statement to make, but that's what I would do, and then start with subject matter content, to let people understand what the real world is. That's what you really want to do, is to retrain people. Now Dottie's going to react to this answer, because she loves the programs for training teachers down there.

Bjur: I was just going to mention one of the programs that we have at USC, which is an NFS-funded teacher training course, through the department of education at USC. The program that we have developed is a multidisciplinary approach. Beginning with the idea that the teacher knows nothing about science, give her enough information that he or she will be comfortable with the marine concepts without being a scientist. The materials that we have developed are developed with this in mind.

We have one guide that has six units, and each of the units begins with an introduction in layman's terms. For example, the physical ocean. What is the

physical ocean? What's the ecological sea? What's the biological sea? What's ocean management? And it starts with an introduction that endeavors to make the teacher feel comfortable with that concept before she gets into the lesson plans. Then the lesson plans are also written in such a way that she would feel comfortable with them, because we recognize this is the problem, and that's the reason it isn't mentioned too often. Teachers think of it as just a science, and when they say, "I'm not a science teacher," then they just avoid even mentioning it. If they understood that it was like the land environment or any other environment, that they can understand it in a layman's terms, they would be comfortable with it.

Schafer: I'd like to make a further comment on the teacher trainings. First of all, we are now faced with declining enrollments, and many of the teachers that are there are staying. We're closing a lot of schools, so the action has to be, mostly, if you're going to spend the money, you have to put it with in-service, or the teachers that are already working.

There are mechanisms for doing this. Throughout the state there are teacher centers. Don Lundstrom operates one through his county office of education. We have the phenomenon that everybody wants to get hold of teachers and do something for 'em, with 'em, to 'em, or whatever, and, you have the harmonica players, you have the basketball bouncers, and everybody is competing for that teacher's time.

Normally, teachers go to the things they feel the most comfortable with, not the things that they need the most. And so the teacher's center is supposed to provide in one place a lot of services, materials, and resources to help teachers with the things that they are not only strong in but weak in, and all the rest. So that's another good way to go, is go to this teacher's center program and get some help that way. And I'm sure Don is doing something in that. But if I had to, if I had a limited amount of money, I would put my bucks with in-service training. This isn't to say that pre-service isn't important, but more of the action is with in-service.

Linsky: I think this gentleman here had a question.

Sam Taylor, Lawrence Hall of Science:

Thank you. My name is Sam Taylor. I'm at the Lawrence Hall of Science, and I'd like to direct this to Bruce Stewart, who mentioned the importance of hands-on experiences for children in arousing their curiosity. I wonder if you could go a little further and describe the kinds of hands-on experiences which can be provided for great numbers of people. You said that as many as 800 students would be coming through your laboratory in one day. What are the kinds of hands-on experiences which you can provide in situations like this?

Stewart: Well, one of the more popular things that happened was a touch-tank situation, where hardy intertidal animals were offered up to a number of kids. They were under fairly close supervision--there was a lab docent per 10 kids--and it just took its own course. For instance, a kid would pick up a starfish and immediately wonder where its mouth was. Or, you could turn the starfish over on the back of the kid's arm and they go, "Well, what's that for? Why did it do that? Is it poisonous? Will it hurt me? Can I eat it?"

That to me is hands-on, having a microscope set up with a variety of sediment types, so that kids can see that there are spaces between sand grains in which organisms might live, or simply different types of rocks have been broken up to make these things, and that even kids as young as kindergarten age can handle microscopes with sufficient supervision. We've yet to lose a piece of equipment to that sort of thing.

By "hands-on" I think also of other circumstances where the kids have a little more time at each station. You can supply them with, for example, a

number of bowls of different types of organisms and have them group those things in a variety of ways, sort of getting their own handle on taxonomy--classifications, just simple observations of animals and trying to figure how they do what they do. Put some meat beside an aquarium with an anemone in it. Kids love to just experiment on their own. There are quite a number of things that can be done. Those are a few.

Linsky: Yes, sir?

George Taylor, South Bay Conservation Group:

Yes. George Taylor from Morro Bay. I'm wondering--Mr. Schafer, I'd like to address this to you. I'm wondering--we that live on the coast are very ocean oriented. We have in our area a lot of influx of tourists from the San Joaquin Valley, and I'm wondering, is the ocean environment portion of the environmental program, is it, does it have any emphasis in the inland areas?

Schafer: First of all, the programs vary from place to place. We have 1100 school districts. We have 180,000 teachers, and we don't propose to have a uniform course statewide. Now, some interesting things are done in the inland areas. The state Fish and Game Commission, which required collecting permits for educators, spurred a lot of education in this area. In some of the inland counties (Fresno, which has some good things going, comes to mind offhand) there are some good things going. We hope to emphasize this, as we develop curriculum materials, that we all do relate to the ocean. It's certainly part of it.

Linsky: Thank you very much. I would like to thank the panel members for contributing and participating in the discussion. I'd like to thank the workshop attendees for participating, and we will now officially adjourn for lunch. We'll see you all back here promptly at one o'clock.

Switzer:

The session this afternoon is called "The Contents of the Golden Gate Marine Center." We hope that we can focus a little bit more on this site and what is possible to do here. There are two different sections of this session: the first will be on exhibits, and the second, probably about 3 p.m. (because we're running about 15 minutes late in everything), will be on activities and programs.

The session on exhibits will be introduced with some remarks by Dr. Murray Newman, who is the director of the Vancouver Public Aquarium. If any of you have ever visited the Vancouver Public Aquarium, you know that it is a gem, a very concise and beautifully managed facility, and Dr. Newman has been involved in the development of the aquarium since its inception. So, Dr. Newman.

Dr. Murray Newman, Director, Vancouver Public Aquarium:

Thank you very much. I brought a series of invisible (referring to the bright room) slides to show you and to fascinate you with. Actually, before the aquarium was built, I was a student here in Berkeley. I worked in the Steinhart Aquarium on my Master's research. I've always been interested in aquariums as an institution. For me it has been a hobby turned into a profession, and so I guess what I'm here to tell you about today is simply, what is an aquarium? And thinking about your marine center, what is your marine center?

I was very interested in some of the comments this morning which I listened in on, such as that 95 percent of the work here should be public education. There should be some research. You should make the best use of these facilities. There are 65,000 species of invertebrates, not including insects. We should serve the needs of the public, and we should provide access for the public to the ocean.

Why don't we turn on the slides? I guess I'll just go through them without looking at them. To begin with, the purpose of an aquarium essentially, and the way the aquarium evolved, is to show the fish.

The first public aquarium to be developed in the Western world was the London Aquarium, I think, which opened in 1853. It developed in conjunction with the technical developments in glass--you know, when it became possible to develop a pane of glass which would support water, then it was possible to exhibit the living fish.

I think the success of aquariums since that time really has been in developing a life support system to keep these animals alive, and the technical aspects of developing their exhibits.

There are five main public aquariums in the United States, starting with the Steinhart Aquarium in San Francisco, which opened in something like 1923. It's a classical aquarium where great effort has been made to provide the life support systems which are necessary in order to maintain aquatic specimens from all over the world in good condition. This is extremely difficult.

Shedd Aquarium in Chicago is described as the largest public aquarium in the world. Again, it's a classical public aquarium which has monumental architecture, and attempts to present the representatives of living aquatic species from all over the world. It has a magnificent reef tank within it, and inside the reef tank they have divers--they represent artificially a coral reef in the Caribbean.

The most modern public aquarium in the United States is the New England Aquarium, which is located on a dock in downtown Boston, very close to where the Boston Tea Party took place. It is essentially a great concrete block on the end of a pier within which very modern, very architectural facilities make possible the exhibition of marine and freshwater species from all over the world. It has a great central spiral around a central cylindrical tank within which

there are sharks and various other large fishes, mainly from the Caribbean. On the tray in the bottom there is water, and in that area they are now exhibiting penguins. They are very successful in breeding penguins. I might say that is another thing that zoos and aquariums are concerned with, not only keeping their animals alive, but being able to breed them. This is more and more taking place in these facilities.

The New York Aquarium was, I think, opened in 1957--the New York Aquarium at Coney Island. Actually, it succeeded the old aquarium which was in the Battery in the south end of Manhattan. However, one of the most successful municipal public aquariums ever developed was the old one in the Battery. The new one at Coney Island, because of its site, makes it very difficult for the public to reach. It's been less successful from the standpoint of attendance. It, in a way, is a kind of regional aquarium. However, it has pioneered in the collection and the life support systems of marine mammals. I think it was the first public aquarium to successfully exhibit belugas from Alaska. And, again, it has made a great contribution to aquariology.

The newest public aquarium to be opened is the one in Seattle; built on the waterfront, again it involves the reconstruction of an old pier--a dock area, not dissimilar to this except it's in downtown Seattle. The new portion of this is very modern. One of the things that they were interested in was a dome under water. And the first idea was to actually have it beneath the harbor surface. Then the architects, in the development of the design, decided it would be easier, because of the great amplitude of the tides, to develop this within a pool. So you go through an acrylic tunnel into this area, and then you look up and see the fish of Puget Sound swimming around you in--a very interesting tank. We find that aquariums, as they are developed, are emerging with particular themes. The main theme of the Seattle Aquarium is the water of Puget Sound, and they make an attempt to exhibit the animals there. Also, they are interested in such things as sea otters, which existed originally along the coast of Washington, and they've done extremely well with the sea otters. They are breeding the sea otters in captivity. They are marvelous animals to look at, and they are very successful with them in Seattle.

Going on with the slides, we contrast the American aquariums with the Japanese aquariums. This is the Kushimoto Aquarium, which we visited last summer. It is located on the Kii Peninsula just south from Honshu. It's a fascinating aquarium, built right on the ocean. It's highly thematic, and it's highly regional. The main idea of the Kushimoto Aquarium is to present the warm Kuroshio Current and the animals associated with this warm current which comes up against the Honshu. They do this with very interesting graphics, and with magnificent displays of living specimens. They're technically very excellent. They have a very keen sense of aesthetics, and they have a strong appreciation for the ecology of the area. They have some magnificent new tanks.

The Japanese, I guess, were leaders in this field of acrylics, and I guess, here in the States, these very new modern acrylics are being developed whereby you can develop new tank sizes, new dimensions, new depths of water, with a very thick acrylic. This is one of these tanks with these magnificent acrylic panels around it, and behind it is a coral reef representative of the ecology immediately off Kushimoto.

So, we'll take you to the Vancouver Aquarium, and I'll tell you just a little bit about our activities there. We visualize that an aquarium is a cultural institution. If you're asking yourself, "What is the marine center?" we visualize that aquariums, like art museums or natural history museums, are cultural institutions. Ours is owned by the city of Vancouver, but it is totally autonomous and operated by a society, the Vancouver Public Aquarium Association. We have an attendance of something like 700,000 people a year, and we visualize that these 700,000 people coming into the aquarium receive an aquatic experience. We're there to

teach them about our animals as well as we can.

Now, if people are coming through your institution on a one-time basis, what can you do for them? Well, first of all, we believe that the aquarium should be exciting--visible. We deal with different kinds of publics. We believe that staff is very important. We believe that the institution should have a mood of excellence. You should carefully select your staff and what you want to accomplish. If you want to deal with children, then you hire people who are gifted in dealing with children. If you're interested in developing university programs, you hire people who are qualified to put on university programs. So your staff selection is extremely important in terms of what you want to achieve.

We believe that an institution like this really must serve the public and must serve the school public. And so how do you serve the school public? Well, this is a challenge for you. It depends upon what your materials are and how you develop them, but we believe that you use your exhibits as a resource for your school program, so you develop your school program as imaginatively as possible. You present your exhibits as skillfully as possible, using the most gifted people you can find around you. In fact, here we have taken the theme of the waters of British Columbia, and we attempted to show a sequence from the open ocean to the straits of Juan de Fuca to the shores of Vancouver, and finally up the Fraser River to the headwaters. You do this by simply collecting in these habitats and plunking the specimens into the appropriate tank, and then treating it graphically.

Then we develop our school programs around these exhibits. Of course, the school programs can be arranged according to what's available to you at a particular season, or what's available to you on the pilings beneath your pier, or what the great regional story you have to present is, or what the components to San Francisco Bay are, or what the Farallon Islands are, or what kind of animals live around here, and what it's all like.

To an outsider, it's all brand new. And of course, the San Francisco area is an extremely exciting and wonderful thing. We try to do this with the animals and environment we have available in Vancouver. Again, the graphics are so important, and you have to select the graphic artist, select the theme, select the subject matter, and then develop your programs.

This is our salmon program, that has developed around the spawning of the salmon. The spawning salmon are collected in the autumn. We put them into our tanks after they have altered their shapes and are ready to spawn, and they spawn in the tanks. We bring in the school children. We organize the program around this. We get the fisheries association to give us the props, and then we net the school children to show them what it's like to be a salmon. We give them canned salmon to let them taste the fish. We let them touch the eggs. It's not just looking at the fish in the tanks that matters; it's all your senses, and trying to excite and inspire the people who use your institution.

The non-British Columbian section of the aquarium is there to allow us to see the rest of the world. We believe that an institution like this should be exciting for the staff as well as for the public. And if you hire a first-class staff in an institution, you have to provide your staff with the inspiration and excitement and with interesting things to do. One of these has to do with travel. We believe in representing interesting places in our aquarium, so we travel to different places. This was our Captain Cook exhibit. For it we organized a trip to the South Pacific so we could gather the specimens seen by Captain Cook's biologists to exhibit in our aquarium. We also did this to go to Nootka Sound, on the west coast of Vancouver Island, to see the things that his biologists missed.

We have a large membership. We have 17,000 members. We organize programs. We try to have the components within our facilities so that we can work with all of these people. Our education staff teaches our docents to teach the school

children who come into the aquarium. We try to do a little research.

I notice you're going to do 5 percent research. Well, we do 5 percent research, or maybe 3 percent research, but we think that research is very important, and to do research you have to have researchers. Your docents don't do the research. So, again, you have to think about what you're trying to accomplish. You have to give it more than lip service. You have to have the right people to do the right jobs. This is one of our research associates. We try to save a little bit of money to give to promising students or promising young research workers that we name "research associates" of our place. We have these located in different places in the world. They give us entree to those interesting places like the Amazon or Hawaii or maybe San Francisco Bay.

We have sponsored a certain amount of whale research in association with the University of British Columbia and the University of California.

Think about private aquariums as well as public; I've been telling you about the work of public aquariums. The first oceanarium was Marine Studios in St. Augustine, Florida. It was opened as a movie studio rather than as a public exhibit, and it was this institution in Florida which drew to the attention of the whole world that marine mammals, particularly the dolphin, were fascinating animals in captivity and worth something more than just plain slaughter.

We feel that one of the great roles of the public aquarium is to bring to the attention of the world the fact that animals are here for something other than to be slaughtered. We feel that really it was the private aquariums that, through their interest in exhibiting these animals to make movies originally and then to make a profit, were really the ones that brought to the attention of the public this matter that dolphins were worth something more than making shoelaces or whatever they have used them for before then. And, of course, today the oceanariums have developed to a very great extent, and there are extremely interesting things to watch.

This is out of Sea World, Florida, one of their marine buildings, where they have an enormous tank showing sharks and various other things. I think the private aquariums have led with these pools. Of course, we have a magnificent tide pool in the Steinhart Aquarium that has been developed in accordance with their fish roundabout. But, aquariums today are looking at new things to do--new ways of reaching the public concerning marine activities.

This is the enormous killer whale pool in Sea World, Florida, with its huge backup system for life support activities.

This is the new shark exhibit in San Diego, which essentially is an aquarium devoted to sharks.

Finally, just a few slides on South America. One of the latest things that has interested us in Vancouver is showing a thematic exhibit on the Amazon. So we organized a little trip down to South America last fall, and we visited Machu Picchu, and we saw the beginning of the Amazon and the Urubamba down the mountain, and then we followed tributaries of the Amazon down to Manaus. So we are thinking that maybe in our new Amazonian display it will be a South American trek, and this idea of treks is being developed in the zoos.

For example, Minnesota is developing the new \$50 million zoo which is called--I've forgotten--but I think it's called the Northern Trek. It takes you from Asia around to Minnesota, showing the animals that you encounter on that trek. So this idea is to take you through South America with the appropriate species of plants, birds, mammals, fishes, reptiles and amphibians.

This is the series of slides that illustrates this trek down the Amazon. At any rate, this shows you all of the different animals. However, I think that here the quality of what you are endeavoring to develop depends upon the quality of the people that you select to think it out. It depends, to a great extent, on clear thinking--really good utilization of your site. You have a magnificent site here.

What was mentioned this morning--something about the fact that decisions are made by people at a distance--really one of our great problems in life is that we build walls around ourselves so that we can't see outside. We've become a bunch of bureaucrats, and we're sitting in our offices. No matter what we are, our dream is to develop the greatest marine center, which is going to be the most exciting, the most marvelous, thing ever developed. And what do we do? We develop an office for ourself without any windows, and all we do is shuffle through a whole bunch of papers all the rest of our lives. The real problem is developing an institution which perceives and utilizes its site, and communicates that perception, that brilliant perception of San Francisco Bay--that regionalism, the great things that exist here--and conveys that to the kid from Nebraska. And how do you do that? Thank you very much.

Switzer:

I handed out scripts to everyone, and I haven't read my own script, but neglected to introduce Dr. John McCosker, who is the Director of the Steinhart Aquarium, who will lead the panel discussion.

Dr. John McCosker, Director, Steinhart Aquarium:

Thank you, Mark. We heard a brilliant and illuminated discussion by Murray. Murray is very well respected in the aquarium world. I have a great fondness for Murray. He's wearing his Steinhart Aquarium tie, and I'm wearing his institutional tie. Some day we may both be wearing a Fort Mason tie. I look forward to that. I think the keynote point is: What is possible? Mark said exactly that--what is possible? Murray said we need great perception; we must utilize the site. That is, of course, what we are here for. Let's not lose track of that.

The panel that Mark has very wisely selected includes individuals from the Bay Area who have institutions or are involved with institutions that have something to add to this experience and can complement this experience. This experience is certainly determined by the bottom line, and that is what is possible. How much is it going to cost? And should there be overlap? Well, certainly not. We should all complement each other. Our institution, the Steinhart Aquarium, part of the California Academy of Sciences, looks forward to this opportunity. We have all learned from the mistakes of the past and don't want to repeat them, and I think that we can share a lot of knowledge in terms of exhibit experiences and in terms of channeling information from us to the public. The panel that Mark has selected includes Dr. Frank Oppenheimer. Dr. Oppenheimer is, of course, Director of the Exploratorium. We all know it. We all want to learn not from their mistakes but from their successes, and they are numerous. Frank, you are a panelist; I see you in the audience but didn't have your presence at lunch, I'm sorry to say.

We also, on this panel, are fortunate to have Gordon Ashby. Gordon is an exhibit designer, and has been responsible in large part for the innovative things that were accomplished at the Oakland Museum and the new, improved Coyote Point Museum.

Contributors will be Steve King, who is Program Director of General Whale; John Dillon, who is Natural Science Curator of the Josephine Randall Junior Museum, and also Ron Olsen, who is with the San Francisco Bay Model and the visitors center in Sausalito. Also there is Dr. Steven Webster, who is the Project Coordinator of the new and upcoming Monterey Aquarium; and Charles Carlson, who is also with the Exploratorium. So first let me call upon Steve King.

Steven King, Program Director, General Whale Foundation:

I think we'll just come up here in succession, and, as you say, learn from the mistakes of others. I didn't bring slides. I brought some illustrations that have been floating around for a number of years. I couldn't help but think of my father schooling me as a younger man, saying that as part of my educational appren-

ticeship--which I'm still serving--I should immerse myself in the company of acknowledged masters. So it's very special for me to be here and witness the sharing of ideas and the birth of this concept of a marine center here in San Francisco. I just want to thank you all in advance for the experience as it develops this weekend. My enthusiasm is rededicated on attending such an event.

About two years ago we gathered together for similar types of discussions, but in that instance to stave off ideas which would have had the center here, or the pier area here, given over to such purposes as tennis courts and ice skating rinks and other recreational purposes. It is really something to see things totally turned around, and have this vision that was shared by what seemed like a handful become a growing and enlarging and, hopefully, fulfilling dream.

Part of those presentations was General Whale's idea of how we could fit into our own ecological niche of the greater ocean environment, our specialty being that of the Cetacea--of the whales, dolphins and porpoises. What we wanted to convey was that these buildings and spaces here could be devoted to something other, or not dominated so exclusively by recreational uses, and that educational purposes were the most appropriate use.

We took one example, that if we were given charge of the whole domain, what we would do. Well, that has changed. Just as whales are the largest creatures in the seas on the planet as a whole, they in no way dominate their environment. Now I think we look forward to fitting in with all that's being proposed and all the sound types of programs that will come.

This illustration tried to build a mental picture of what we're talking about and what we envisioned in using Pier 3 or some of the pier space to literally interact with the ocean that's right here at our side. It's a great opportunity to gesture, and not gesture against an empty wall or against the slide on the screen, but on an ever-changing vista of weather, marine traffic, and whales passing southward on their migration to the lagoons in Baja. We just saw it as an outstanding opportunity to use the whales as a vehicle or a catalyst to bring the public in, to create attendance and interest, to have that enthusiastic staff share what the ocean realm is about and whales' particular role within that realm.

Speaking in terms of educational programs and exhibits and museums, I think not too many years ago we thought of museums as a place where you quietly browsed about and mused. I think we've seen that turn around. Within a stone's throw of here, we have one of the grandest interactive experiences in the sciences anywhere on the planet, and we'd like to see something similar happen for the ocean sphere. What we depicted here was a whale hall as part of a marine exhibit. In this building, and particularly Pier 3, you would have the opportunity to depict whales by size, and so as a centerpiece for this we envisioned building a 100-foot-plus blue whale. There are gangways in this structure that were once used to load troops to journey off to war, and those same overhead viewpoints could be utilized to see this whale in its full grandeur and beauty. There is literally enough space where you could depict all 70 species of Cetacea life size, either as murals on some of the wall spaces that exist, as ground drawings as we do in our school programs, or as life-sized models in sculptures.

One analogy I've used in trying to speak of a whale museum at Fort Mason is that it would have something of the relationship and excitement that the Aeronautical and Space Museum has to the larger institution of the Smithsonian. I think that if the opportunity does develop, we would approach it with that sense. I think whales are particularly appropriate.

In our discussions earlier, we talked about this web of which we are all a part, and whales are certainly world citizens and symbolic of this global perspective which we all realize that we need. They feed, or are part of, a very short food chain, and can serve, and do serve, as barometers of the vitality of the seas. Just as coal miners needed canaries in cages to warn them of deadly gases,

I think we need systems and feedback mechanisms whereby we can monitor the consequences of our civilized activities, and whales represent just such an opportunity.

As well as being educational, they can provide a way for us to monitor our own welfare and all the other planetary inhabitants. A quick example is that in the Mediterranean, in waters that border industrial outfalls, we are seeing all sorts of strandings and lesions and high heavy-metal contents in fin whales. Similarly, recently in Japan scientists have picked up levels of mercury in sperm whales (which feed primarily on squid) which exceed by several times the minimum standard for consumption, and these are the same sperm whales and other whales that they feed Japanese children as part of their school lunch program. So, whales can serve many roles, and we see them doing that.

On a practical note, Fort Mason is somewhat isolated from one of the largest tourist areas in the world. Something like 10 million people visit Fisherman's Wharf and its outlying areas, and we'd like to see something that would draw people over the hill to Fort Mason. I think the inspiration and just the sheer magnitude of whales represent something of a drawing card, and that the attendance and any associated fees with that would help offset the daily expenses of running such an institution.

I promised Mark that I'd keep this under five minutes. I might mention that people wouldn't have to just come to whales, but at General Whale we've developed many programs to bring whales to people, and that our exhibits have visited something like 30 states and six foreign countries. We recently acquired an inflatable blue whale, such that we can take a life-sized vision of a blue whale to Modesto or wherever. Everywhere we have traveled, the interest in the oceans and whales as representatives of the oceans--as ambassadors of the watery realm--seems to work. They're magnetic in their attraction, and we look forward to the opportunities at Fort Mason as they develop, and certainly plan to be a part of it. Thank you.

McCosker:

Thank you, Steve. I can only second what you've said. The sheer magnetism of a life-sized whale is indescribable. John Dillon will discuss his proposal. John is, of course, with the Randall Junior Museum.

John Dillon, Natural Science Curator, Josephine Randall Junior Museum:

Perhaps my relationship with the Oceanic Society is more pertinent to my being here. I've known about Steve's General Whale ideas for the last two years. I'm very excited about them. I was then, and still am, so nothing that I'm about to say should be interpreted in any way as lacking in respect or excitement for that approach to the use of the Fort Mason Center. But I want to present another possible approach to exhibits here. I don't have any graphics. In fact, it occurred to me, maybe I could use this (mounts blank page) as my graphics, because it's pretty much a blank piece of paper, although I have just hung outside the windows here during the lunch break the other backup that I think is essential to a marine center here.

What I want to try to do first is a little difficult, judging from our lunch discussion. And that is to describe the perspective that I see for this center. I don't think we need another museum of the seas--that sort of general concept of the seas. I don't even know if "another" is right; I don't know if there's the first example yet. I also don't particularly think we need a regional museum; that is, a museum on the San Francisco Bay Area. Rather, what I would like to see is a museum that is focused very much on this place and this time, but looks out through that Golden Gate, which is our portal to the world's ocean, that looks out to the Gulf of the Farallones, through our slice of the continental shelf, past the Farallon Islands (our oceanic island), out to the open sea which connects with the globe's seas.

Now, this is the gateway concept. It's the concept around which I think the Golden Gate National Recreation Area focuses, at least in some ways. To the extent that there would be a structure in this exhibit center, I would propose, say, a half-dozen or so thematic groupings (sort of arenas)--exhibit areas which would be based, though, on specific places. I'm going to outline those briefly. In fact, maybe I should do that now so that this doesn't drift off.

The first and most important locus for exhibits would be, on entering the center, this place right here--the water that is below my feet.

What is the water temperature right now, right below your feet? What is the salinity? What are the tides doing? What are the currents doing?

The next locus or center of exhibits, I would suggest, would be that gateway, the place where ocean and bay meet.

Beyond that, there should be, I think, a locus which is the edge of the sea--the shores. But here, rather than one place, I would suggest perhaps two: San Francisco's ocean front (the Great Highway area), which is a sandy beach, side by side in a thematic sense with Duxbury Reef, which is a rocky intertidal area. Beyond that another arena for exhibits could be off the Gulf of the Farallones, our slice of the continental shelf. Next, the Farallon Islands, as an example of oceanic islands. Beyond that, then we are to the open sea.

The guidelines for exhibit techniques, I would suggest, would be based on the following kinds of assumptions. I would expect the exhibits to be diverse; that is, they would include a variety of techniques. The large, static graphics I think are going to have to be used, as well as small, interactive exhibits, discovery boxes, explainers, lecture demonstrations, in-progress exhibits--all of the variety of techniques that have been developed elsewhere, but trying to focus on the concrete rather than the abstract. Now, I don't want to make too fine a point on that. Obviously, the conceptual process is important in any museum, but I really think we've got to focus on things that are accessible to the senses.

Another important guideline, I think, is that the exhibit should be built in-house, that the process of the creation of the exhibit should itself be a part of the educational learning experience of the museum. The Exploratorium, of course, is very much the guiding light in that kind of approach.

Let me very briefly--in fact, I don't know if I'm going to be able to do much more than just sample some of the ideas that I have in mind--go through these half-dozen or so loci.

The first one, which I see as very crucial, pivotal in a sense--the beneath-your-feet concept--I would suggest (besides this idea of digital readout so that you know what's going on in that environment) to be a substructure to the pier, that people can get underneath the pier on a floating platform and see the pilings, that in fact perhaps we have retrievable pilings or other surfaces that are suspended in the water that can be brought up, perhaps grabs, coring devices, or plankton nets to sample the organisms that live there.

We discussed this a bit at lunch time. I don't see any way to avoid having one medium-sized aquarium. But this aquarium, as I see it, should be intimately related to the place that it sits in. The water should come from underneath the pier--should flow back underneath the pier; the public should be aware of that. The organisms in the tank should be organisms that live beneath their feet. The process of capture, transfer, and eventual release of these organisms should also be part of the public consciousness, part of the program content of the museum. There could be areas with microscopes, micro-projectors, micro-theaters to look at some of these living organisms.

The next proposed locus, the Golden Gate, which is our portal to this world ocean--I think that we really should have a functioning radar screen, and perhaps some binoculars so people can look out. In fact, being able to look out is something I think is absolutely necessary to get the feeling of a sense of place, to get a visual check between a radar screen and your naked, or even optically aided eye. Also, a public log of what these vessels are. When you see a vessel come in, the public should know where that vessel is coming from, where it is going, what

it is carrying, what its size is, who owns it. These are very important things about this place and our relationship to that world's ocean.

I think we should have a functioning weather station with a continual radio broadcast using satellite imagery. There are other kinds of models that can be tied into that locus--the shore, the edge of the sea arena, the contrast between the low-diversity transient aspect of the sand beach and the stable high-diversity aspect of a rocky intertidal. The key to this, though, would be understanding of the waves--a good wave model. Somewhere you need a good wave tank. I really don't have time to go into any real detail.

Quickly, we'll move on to the Gulf of the Farallones. As a locus for exhibits, the feeling here is that it is our slice of the continental shelf. We don't need to have a museum that treats the world's ocean as a generality--the continental shelf as a generality. We have one just at the edge of our vision here, in a sense at the edge of our experience. As a part of this locus, I would suggest, among other things, exhibits built around navigation. I think we should have functioning foghorns, functioning lights and bells, that are examples of the actual periods of illumination and sounding and frequencies that exist out here. The idea occurred to me--and I don't really know how to pull it off, but it shouldn't be all that difficult--to have a fog room, or perhaps it's just a dark room in which kids and adults can find their way through the channel, the Golden Gate or whatever, with the actual light sequences and the actual sounds that occur out here. I would like to do it. I don't know if anyone else would, but I would like to. There must be good ways to model what fog is--sedimentation. Perhaps a real fishing vessel with real equipment and a real fisherman or two to talk to about their craft.

The other locus, the Farallon Islands, is a very special place. For those that may be from out of town, that's a group of islands that are just 10,000 miles offshore from here. But again, we don't need to talk about the generalities of oceanic islands. We have one, or a group that we call one. I think there are quite a few exhibits that can be based around that. The whales' migration, the birds' migration--all of these phenomena can be brought into that locus.

Finally, the open sea. There is a long list of things that could be done there. Let me just suggest one or two. It seems to me that more than any other image the one that most intimately captures or is associated with the sea is the wave. I think there are probably several ways to do an exhibit on waves that really capture the imagination. I don't have time to go into the approach I have. I'll briefly say that I see waves as ghosts, and that most people are confused in thinking that waves are a mass of water moving by. Waves, of course, are not made of water. They're not made of anything. There must be good ways to capture that understanding about waves. There could be a great sea bake-off, for instance. Why not have a liter of sea water we take here, bake off the water and show people what's left, and get a real understanding of the volumetric relationship between the things other than water that are in the ocean? You say, "Three-point-five percent," and people don't grab that so much. Let them bake off water and have a chance in one small focused area of observation to see just about everything there is in the world, at least on the periodic chart.

These are just some ideas. In the couple of weeks that I have been working on this, I didn't spend much time trying to describe in elaborate detail the exhibit approach that I can imagine, and which I think others might imagine, but I think it might serve as a basis for some interchange, and I wish I could stay to hear that interchange. I have to leave right now for the airport, unfortunately, but thanks for your attention.

McCosker:

I now introduce Ron Olsen, who is with the San Francisco Bay Model. Ron?

Ronald Olsen, Park Interpreter, San Francisco Bay Model, U.S. Army Corps of Engineers:
I've got a couple of graphics here.

I'm with the Corps of Engineers on the interpretive staff for the Bay Model. For some of those people who may be unfamiliar with the Bay Model, it is a hydraulic research simulator that mirrors the bottom of the San Francisco Bay--the bottom topography--and is capable of creating tides and currents and also the mixing of fresh and salt water.

I will use this graphic to briefly outline that. It consists of 17 miles of the south bay, the central and northern bay, and the San Pablo Bay and delta area. It's been in existence since about 1956, and it has had a lot of what we think is traditional appeal for educators in the San Francisco area. We know that, primarily because many of the adults and teachers who come to the Bay Model once came there first as school children on a field trip to study the geography and geology of the San Francisco Bay.

One of the things that we think the model does very well is help people make a connection with where they live and the rest of the bay. There has been some talk today about how we should be thinking in terms of our specific region. The Bay Model is a very nice teaching tool for that purpose.

To begin, I'd like to go over how the facility is laid out, and then explain a little as to the exhibits and design. It is located in Sausalito. We front right on San Francisco Bay. We have a 350-foot pier that will be accessible to the public at most times of the year. The ship that is depicted here is an ocean-going dredge that ties up at the model during winter. We also have a floating dock area where Corps boats are tied up now, and we are to have in the near future a floating dock for public and educational boats to tie up.

The entrance to the model is on the bay side, and these people visiting will ramp up to a second story elevation. The first part of the model will go through an orientation session on water. Now, there has also been talk today about the water world, and I think that's very appropriate for what we're doing here. This first portion deals with the evolution of life in relation to water, right up from single-cell organisms to the present day. In this orientation theater is a standard 15-screen projector operation, where people will have an orientation both to San Francisco (the natural and social history, encapsulated of course) and to how the model functions and how the Corps of Engineers fits into the bay.

After going through the orientation session, they will come out and see the first overall view of the bay and model. The model will be highlighted, and the rest of the area will be darkened. We hope that way we can emphasize the various points of interest a little better. A lot of times when people walk into the Bay Model as it is now, they look at it and they see a large expanse of water and they say, "What is this?" We hope by getting people up to a higher elevation the points of interest will become that much more clear.

Then people will be able to walk down to a lower observation area. This lower observation deck will still be above the height of the model, and you will be able to see all the various features of the bay.

We also have this center, a central display area. In that area we will have a water-resource computer game which identifies some of the major water projects in California, where your water comes from, some of the processes involved in getting it to you, and so forth. We also have a wetlands panorama which will make clear to you why marshes are important in San Francisco Bay. We will also have a couple of small miniature models of how dredging works, so people can manipulate and move it, and also a little navigation model where you can design your--I haven't seen this particular exhibit yet--where you can steer it and move through the channel.

After people have wandered around they can ramp down and come out through the delta area. They will come back through the gallery area before they go back outside. In the main gallery area we hope to have a reflexible space where organizations can display the types of things that they're doing in relationship to the bay. Also, we hope that other agencies such as the Coast Guard, which are doing interesting things in research, will display out here so people can get a sample of what's going on here.

Now, coming back to this, here is the outer area, which is depicted in yellow. We'll come out through an outside observation deck again with immediate access, which is not possible at the present time. There'll be a picnic area, a grassy area where people can meander and walk around and just generally enjoy the bay. We hope to eventually use some more outside interpretive programs that would emphasize some of the various aspects of the bay such as we mentioned--floating organisms underneath the dock, plankton studies, and many of the things that other speakers have mentioned before. In no way do we see this as being a comprehensive program in that respect. We would like to include as much as we can at our particular site.

So that, in a nutshell, is the way that the model was set. I'm prepared to answer questions after the other contributors have had a chance to make their presentations.

McCosker:

Thank you very much. We will have time for questions from the audience. We are running late. I will hereby introduce Steve Webster. Steve Webster. Steve is the Project Coordinator of the up-and-coming--as soon as they get their permits approved--what promises to be a very dramatic marine aquarium in Monterey.

Dr. Steven Webster, Project Coordinator, Monterey Bay Aquarium:

Thanks, John. I, like Murray, brought invisible slides, and after this star-studded cast of speakers, find I also have an inaudible talk. I would, however, like to mention a few points that perhaps haven't yet been mentioned, or at least re-emphasize a couple. One is the regional approach for the marine science center that is proposed for this area.

In working on a concept for the Monterey Aquarium for the last two and a half years, we settled on a regional approach early on in the project and as yet have not found a good reason to discard it. Indeed the more we work with it the more we feel it has real potential in a comprehensive marine exhibit context.

One of the wise things we did about a year and a half ago, when we were fairly happy with the concept and some initial architectural design, was to invite Murray Newman down for a weekend to view the site and look over the plans that had been developed to that point. One of the things he impressed us with was the importance of involving the visitor in every way possible with the unique site we have in Monterey, which is one of the old cannery buildings on Cannery Row.

I think that same emphasis should be said over and over again, as Murray already has for this location. It's unique, it's spectacular. I grew up in the Bay Area and have never before in my life been in this location, and I would guess there are several million people within 70 miles of this who could say the same thing. It is an incredible site and I cannot recommend too strongly that you involve people in the site--literally. Get them down under the pier. Put in catwalks among the pilings that would be available during low tides. That's only a small portion of the time, but perhaps on a lesser extent you could get them onto floating docks at other times.

I think the concept that was expressed earlier by John of the wedge-shaped view from this point might be expanded a little bit. It's one of the goals of this center--to increase public awareness and sensitivity about the San Francisco Bay Area. You should include the south bay and delta areas that from an overall systems point of view, planning point of view, human activity point of view, are incredibly important areas, and in which some very crucial decisions have yet to be made in the very near future.

Giving people the information and the wherewithal to reach those decisions--get to the decision-makers in Sacramento and other places--is something you might seriously consider here. The region we are encompassing comes only about as far north as Ano Nuevo Island, at the north end of Monterey Bay. We'd be delighted

to split it down the middle and ask you folks to come as far south as Ano Nuevo Island. There's plenty going on there for both of us to take care of. Certainly out beyond the Farallones. In this regional approach try not to duplicate what's already been done in the Bay Area. I think one water-skiing elephant is probably adequate. I think one wall-size mural of a sea otter eating an ice cream cone is adequate.

You're not going to duplicate Steinhart under any circumstances, and you might as well not even try. Yet I think there is a place for live exhibits in this facility, perhaps primarily of wharf piling critters, but perhaps even a little beyond that, in depicting some of the variety of living communities that occurs, not just within the bay but also outside the Golden Gate.

Don't try and do too much. One problem we've had is that once the public became aware of our project everybody wanted to be involved. We've been asked to provide everything from marine mammal rescue centers to exhibits of the fire-fighting history on Cannery Row. I am sure there is just as varied a history on this site. You'll have to use a good deal of strong filtering in order not to try and do too much for too many.

Two of the more effective exhibits I've seen in traveling around the country trying to get ideas I'd like to mention just briefly and then sit down and look forward to the interaction to follow. One was in a restaurant in Boston, and it relates to a concept that John mentioned earlier. I think it's called Pier 9. Are there any New Englanders here? As you are sitting there dining, looking out the window and a ship goes by, a bell rings in the restaurant and some call comes on and tells you where it originated, how many days out it's been, what it's carrying, what its registry is, and the name of the captain. It's a terrific exhibit. It isn't free. The prices are really high in that restaurant, but it's one that could be done I think at relatively little expense. This site, as we've all seen, would be a perfect location for that kind of thing.

Another was at Planet Ocean, the International Oceanographic Foundation's exhibit in Miami. It's a life-size version of "Alvin," the deep-submersible submarine, and it has a mannequin clad in a sea wet-suit standing up on it. When you go up to the exhibit and push a button, the mannequin starts moving, and his arm moves and his head moves and he starts telling you about the "Alvin" and then right at the end of his very canned speech he asks the little kid who pushed the button where he got his green Argyle socks. This immediately gets the full and undivided attention of the entire group of school kids standing there. How can that obvious plastic dummy know I'm wearing green Argyle socks? Well, what's happened is that the guy who made the canned speech is sitting behind the scene somewhere, and he comes on right at the end of the speech and engages in a conversation with this kid. Then one of the kids finally gets wise and says, "Okay, if you're so smart let me see you scratch your nose," and of course the mannequin up there can't possibly do that, but it provides a medium in which a great deal of exchange can take place in a very short time. It's a terrific way to get their attention almost immediately.

Along with the idea of using this site to the fullest as a staging place for interpretive boat trips, whale watching, and bird watching, various sites of cultural and ethnographic history around the bay should be used to the fullest in that regard.

One last thing. In our fisheries exhibits at the Monterey Bay Aquarium we're going to center them on the theme, "Where did all the sardines go?" A similar entrance into the concept of fisheries and human involvement with the resources of this Bay Area could be done through the context of "Where did all the crabs go and then come back from?" if indeed they have. Where did all the oysters go? Will they come back? Things that the public are generally aware of--and even if there are not pat answers for it, nevertheless it's an excellent way to get into a subject. It's as important for the public to know what we don't have the answers for as it is for

them to know what we do know. There is relatively little we do know, when you get right down to it. Thanks.

McCosker:

Thank you, Steve. Our final panelist will be Charles Carlson, responsible for the natural history section of the Exploratorium.

Charles Carlson, Animal Behavior Section, the Exploratorium:

That's the animal behavior section of the Exploratorium. It sounds to me like there have been a number of ideas presented here. I like the ideas, most notably of those surrounding the bay, doing something with the ocean right here--having a shop in-house. I think all of that would be just absolutely great. The notion of having information about ships that come into and out of the Bay would open up a little bit of the world that not many people know about, which is the marine activities that go on that play a tremendous part in the economic history of the bay, the economic history of the area. Those types of things I think would be just wonderful to do.

I think that the animal life in the bay is also extremely interesting, and most people don't know that you can go out and find animals along a shore if you go on a walk. I think that there are a number of other types of activities that go on, such as studying waves, having a wave machine here. Going into some of the physical aspects that make up our weather in the area--all these types of things I think would actually provide a nice adjunct to this particular area and understanding what goes on. Other than that, I don't have a tremendous amount to say. I think the ideas that have been presented have been good, and indicate a wealth of things that have been going on. It would be real interesting to see this particular area develop with a real intense kind of approach to examining what happens in the bay, and so that's about all I have to say. I think it would be real nice to have live animals and do a lot of physical exhibits.

McCosker:

I think we started late and we're running late, and we'll now have some observations from--as Dr. Newman says, profound observations--by the panelists, at which point we will then open it up to the audience and the contributors for further discussion. Again, I introduce Gordon Ashby, Frank Oppenheimer, and Murray Newman. Perhaps we could begin with Gordon. Can we get your observations on the contributors?

Gordon Ashby, Designer:

I was a little bit confused about what it is that these people were presenting. In terms of the Bay Area Model, is that a proposal that's being made? As a possible inclusion here? (Switzer explains that the Bay Model is not a proposal, but pertinent.)

Well, I don't have much real underpinning to have much comment on what the institute really is, but it seems to me that my experience in coming to these kinds of gatherings (and I must go to about 20 or 30 a year it seems like) of people who get triggered to want to do something, to create some kind of a place, points up some things. I think that for the most part the kind of common thread that runs through that experience is 1) the people have never really assessed the audience, 2) they really haven't defined the purpose, and 3) they really don't have much of a firm perspective about where we are now and in the future.

Now, I suppose that's what these workshops are to find out, but it really makes it difficult for me to respond to the ideas in a real way without more information than I have at the moment. But I think that there are some things which I have experienced in my own work with museums, in designing and planning institutions of this kind. For the most part, right now, they are all in real trouble. Financially, they are all running around trying to figure out ways to survive.

The ways that they come up with all all basically the same. They are all after the same money, and that's generally yours and mine.

I would like to see some attempt made to try to design and create an institution which does not reach into my pocket. Therefore, it's a business. I would like to see people who are part of the institution think of it and see it as a livelihood and a business. I also am kind of working on the solar village, which is an idea about creating a sustainable community in Marin County. I've had access to a lot of high-powered thinking, and I frankly am very scared about the next 10 years and what's going to happen. I really think about getting a garden in and learning how to get some fish to eat and stuff in my freezer.

When I come to gatherings like this and I think about where to begin and how to get from where we are to where we want to be, I get real concerned about ideas and making good models of whales and exhibits and all those kinds of things, because I think there's another level of stuff that's got to be tended to first.

Earlier on, somebody mentioned something about (I think it was Ron) wanting to change the word "marine" in his thinking to "ocean," because "marine" really meant "Marines." I think we need some ocean Marines. We need some people, guerillas as I call them, who really care strongly about the ocean and are up in Sacramento really getting at the people who are making the decisions.

One of the things that I've been trying to do in museum planning is to find ways of reaching the people who make decisions. Specifically, they are men and women between the ages of 30 and 45. They are the ones who really decide our future, and they don't come to places like this. To me, an institute that wants to do something, really do something, has got to get to these people.

I wouldn't build an exhibit at all, because the thing is, how can you take the energy and money and get to them? Because they aren't going to come to you. How you do that is another whole workshop or two. But I think that exhibits basically don't work, or that they work only for young people. They can be very successful within the framework of educational curricula and school systems, but I think, generally speaking, that's not where the problems really lie right now.

I think that if I were setting up a stack of priorities, that would not be where I would begin--with a marine institute. I'd begin to try to address myself to those people between 30 and 45 who are decision-makers. So that sort of has one aspect of looking at an audience.

Another aspect is about technology. I don't have any faith in it at all, and I have used all manner of technology in presenting "stories," which is what I call exhibits. It's just story-telling devices, and I make my living telling stories. Sometimes they become exhibits; sometimes they are films, sometimes they are books, sometimes it's a docent program, sometimes it's a nature walk--whatever, they're all exhibits. They are just ways of getting people in touch with the information, with the ideas. Whenever I have introduced technology it has failed. So as a caution, as a red flag to throw up, I think people are the best exhibits you've got.

I like docent programs that are getting people involved. Getting people sitting down and talking with other people is a better way to move information than spending a lot of money with plywood and paintings and drawings and projections and all that kind of stuff. But I think it's labor-intensive from a maintenance standpoint. It's terribly frustrating and very demoralizing--it's been a long haul. So, caution about technology. I don't like it.

Movie projectors don't work, you know. This is a perfect example. How many times have you been to these gatherings? It is an exhibit. A guy came to show you something, and it's too light in here so you can't see the slides. There are museums like this all over the world, you know. They do exactly the same thing. They want to show a movie, and if the movie really works it has to have a good projector and a good lamp and a good screen and a dark room. Try to get those four things together. Pretty tough. So technology is a thing which I'm very nervous about. When I hear people say, "Let's move in that direction" or "Let's have a radar screen" and all

that sort of stuff, I'm real anxious about it. I don't know.

And I think that one of the hardest things to try to do--I think we're all kind of indirectly talking about it--is how do we as people get other people and ourselves involved in the solutions of our planet? I think for the most part it's crisis oriented. Too bad, but everything that I've experienced in real time is only when it's crisis that really makes it work. I've lived in Marin County for 20 years. Everybody talks about the oceans and beaches and the bays and all that, but when that oil tanker cracked up, all that oil was coming in and I saw more people doing really something about the ocean than I'd ever seen before. It became very real. If I was a PR person trying to think of a stunt to get a lot of people to understand and get some relationship with the ocean, I'd have an oil tanker crack up somewhere, because it works.

The other thing is to charge a lot of money. If you charge a lot of money people will respect the information. If you don't, they just go right on through, like watching "The Little House on the Prairie" or anything else, so I think the whole thing of "getting onto the street," as they call it, becoming real, is to avoid the world of "public suck"--you know, trying to go up to Washington and Sacramento to get some public money to make me run. You have got to start thinking about becoming a business and getting out on the street like every corner market and every laundry and every dry-cleaner and whatever, to try to somehow survive. Simon & Shuster does it; they send messages and books and they make money at it.

The institute ought to set up a publishing department that publishes books and tells people about the ocean and makes money at it, which pays the people who publish the books and write the books, and you close the circle. You know, you close your own circle. Quit sucking off of somebody else's circle. This institute really ought to be a closed circle and get into the game in a real way just like everybody else does.

All the museums that I've designed, and in the last couple of years I've been asked to come and consult with, or whatever, are all going under because there is no money, and they are all doing all kinds of crazy things to try to figure out how to survive. It's the survival thing, and if I think about the future in the next 10 years it is about survival.

That doesn't mean you can't do altruistic things, that you can't do some good things, but I think in planning an institute like this that is the major thing--trying to get an image up here on the wall with just the people in this room. It's what the next ten years are going to be like.

If we can do that, we've got a team, because we all have some common thread or common goal. Then you can begin to start making some moves.

I don't have the clear picture at all in terms of what I have read and what I've talked about with Mark and other people today and in the past. I've been down to this place many times. What's going to happen with Fort Mason? I worked with Roshi Baker on the Greens restaurant of the Zen Center. I worked with Governor Brown on making an assessment of all the state and national parks in the area, went by helicopter with biologists, to Angel Island and Tiburon and the whole GGNRA, all with the question of what to do with these kinds of places, in the last five to seven years. I don't see that we're that much further along in answering those basic questions about what the future of this place is going to be.

I can't really respond to the idea of doing whale museums. It sounds swell, but I don't know what it has to do with my perception of what I think people need to know in order to survive tomorrow and the day after that. When I was listening to the educators, the question I felt like asking was, "How many jobs are there available in marine-related subjects?" That's what people want to know.

We did an exhibition about astronomy at the Hayden Planetarium in New York, and I would say that 60 percent of the people who came to it were Puerto Ricans and blacks. All they wanted to know is where the jobs are. You know, they want to know where you can get a job in astronomy and how many there are and what you

have to learn in order to get a job in astronomy. They aren't interested in the educational--meaning informational--part of it. Unless you can act on the information, it's like "So what?" They want to know what you can do with the information and basically "How do I make a living? How do I stay alive?"

When you talk about 5 percent research, I think it ought to be 60 percent research. It's about how you make reefs out of old wrecked cars. How do you get organisms to live on old wrecked cars? Then you get a bunch of people who have a business called "We Make Reefs Out of Old Wrecked Cars." Then there's 45 people and they have the trucks and all the stuff that you need to do that.

There is a crisis in architecture right now, for example. When they try to do a building, there's nobody that knows how to build them anymore. You go and buy a \$130,000 house and a baseboard falls off the day after you moved in. I mean there's a deterioration of the people who even know how to do that. Architecture, building trades, and so forth have generally in the history of this country been very strong, but there isn't anybody who knows how to build buildings anymore. It's just deteriorated to the point where architects don't try to get something built and have it really be there. I think the same thing is happening in stewardship--you know, in environmental restoration. Nobody knows how to do it.

I'm going to close with this final thing. In Marin Solar Village at Hamilton Air Force Base there are miles and miles of concrete which is in a marsh--could be in a marsh tidal action zone. It's now got a dike around it, a levee around it, and they pump the water out. I've been trying to find somebody for the last six months who knows how to restore that marsh in a really sensible, realistic way. I can't find anybody. I'd like to know how to do that. In museums, people keep wanting to have more murals, more dioramas. There's nobody that knows how to paint those anymore.

Museums do not have apprenticeship programs which teach people how to paint them anymore, and so there aren't any anymore. Mr. Eickner, who is the guy who made all the astrological and astronomical artifacts for the Smithsonian, was 85 years old. He died last week and everybody said, "Oh-h-h, who's going to make those things now?" There isn't going to be anybody making them anymore because he never had any apprentices. I think the institute ought to have a place which is a school which teaches people how to do things which they can make a living at, which at the same time enhances the health and wellbeing of the planet, and forget about exhibits for the moment. Put them on the back burner. Thank you.

McCosker:

I'd like to return to some of those comments, perhaps rebut some, perhaps discuss some. Frank? Your observations, please.

Dr. Frank Oppenheimer, Director, the Exploratorium:

I guess I feel more like responding to Gordon. I think many nice things were said this morning. It wasn't so much everything that one's going to do in the new center here, but I think it's where you're going to start that you sort of have to decide first. Maybe this notion of finding out everything that's going on in the bay--the traffic, the tides, then explaining the tides, explaining things about ships, explaining something about waves--would be the place to start. It seems to me a very nice idea, to get down and look at the water. I don't think people understand the tides very well, but also it would be nice to know why there are high tides, sometimes higher than others. I think you could have a good explanation for these things, so I would say not, "What are you going to do?" but "Where are you going to start?"

I would try and have here a center where people knew what was happening in the bay, how big the waves were, what beaches were being washed away, and get going. The reason I say that is because of what we did with the Exploratorium. We made a long list of what we could do, but the main thing we did was decide where to start.

We started, and the place I think has gradually grown from that.

Gordon Ashby is certainly correct in saying that museums are all in trouble. So are schools in trouble. I don't think that's any reason to abandon the notion of trying to do things which have to do with people learning and feeling confident that they can know about the world. If he talks about the fact that nothing is done very well anymore, I think it's precisely because too much emphasis is placed on making the fast buck and not using social, the entire social wealth, in order to get the really important things done. I believe that schools should be free. I believe that they should be supported by the people. I believe that museums should be supported by people, and that those things which are designed just because they make a lot of money quickly have resulted in many of the ills that he is complaining about.

My experience has been so different from his. I taught in a high school in a section of southern Colorado. It was largely a very poor, largely Chicano section. I thought people would be interested in learning science through things they were familiar with, so we went to the automobile wrecking yard and got differentials and batteries and induction coils, and we talked about the human body. Lots of people around there could bring specimens in of living things. Finally, a little past half way through this general science course, I noticed a kind of dissatisfaction. I explained what I'd been doing, that I tried to get them interested in science by relating to things that were connected with their ordinary experience, with their daily life, which might be connected with a job, and they said, "But that's not what we wanted. We wanted to learn about the stars."

I think if there's anything that excites imagination, excites people wanting to learn, if there is anything that represents the wonders of nature, it is the sea. It's in poetry, in painting, in mythology, and one should capitalize on this, next to the cosmos. When they had a series of lectures at the Palace of Fine Arts (we weren't involved with them), the one that really attracted huge numbers of people was cosmology, and they had to repeat each lecture twice. That's because the stars do attract people. But I think the sea has the same attraction, and one should capitalize on this in planning this institute and give people the conviction that they can understand what's going on and feel great about it.

I'm mad that I didn't get out to Fort Point and see the waves destroy the road there. But I think to watch what's going on around here and to see it and to know what the currents are is an important thing. You can tell people what's happening. You can explain it in great detail. The tides are kind of interesting--why there are two bumps on the chart, why tides happen every six hours rather than every twelve hours. I think these things are nice, and people can understand them easily. The sense that you can understand things then enables one, I think, to have confidence that you can improve the world and influence Congressmen.

This is why I think the Exploratorium is important, although there are many domains which it doesn't touch at all. It's that people have given up the notion that they can understand things.

I read an article in the Wall Street Journal two days ago on recycling OPEC oil money in the bank, and it was the most complicated sort of thing, but because I've been a physicist I have the confidence that if I clip that thing out and read it five or six times and talk to some friends about it, I could understand what this was all about. It was a serious thing and everybody was very scared. The bankers were scared, everybody was scared. I didn't understand it at first, but I have this sense that I have understood a few things.

I am hooked on the notion of understanding, and I feel I can do this. I think the object of any place which is an educational institution is to promote the notion that things can be understood, and therefore people have to want to do that. I don't think anybody wants to understand anything more avidly than they'd like to understand the sea.

I don't know very much about it. I was worried some years ago that if one destroyed all the food cycles along the shore, all the food for fish that developed there, then those fish that bred there would then go out into the ocean and there would be no fish for people, and everything would fall apart. It turned out from talking with people that that isn't true, and I'd be very interested in learning more about it.

Maybe I could do it through a book; maybe I could do it through a film, or a story of what eats what in the ocean. But people now tell me that even if the shore were completely polluted, there would still be a very large amount of food developed in the ocean from the depths. I don't know those things very well, but they're interesting, and I think that if one has something that one knows and is curious about, and can arouse curiosity about it, that's where you should begin.

In terms of exhibits, when the first thing with the whale started, I talked with a man who was a wonderful fellow at the Museum of Natural History when I first started. He kept telling me that exhibits shouldn't be just inside houses; they should be outside--that the great big whale that was in the Museum of Natural History in New York probably should be in Central Park Lake and not inside the museum. You do have an opportunity here to put things outside in the water and on the land.

I certainly was disheartened by what Gordon said, because I think it is only through trying to cultivate understanding and giving people a conviction that they can understand, that they are not going to be pushed around forever, or that they're not going to just try and push other people around.

Dr. Newman:

Well, I think from listening to everybody today that we can see that everybody is very well meaning--everybody is anxious to see that the right thing is done by these facilities, whatever the right thing is. We have heard from our contributors about various possible themes: whales, a transect of the ocean, the Farallon Islands, San Francisco Bay as seen through the model, ship identification, or some other kind of regional presentation. The theme is up in the air.

I am impressed by the dimensions of all of this. I am impressed by the remarks of the economic liability of it. Where is the money coming from? The spaces are enormous, and how can you use them? I am rather interested in the comments on the motivations. What are the motivations for doing this? Is it education? Is it research, or conservation, or job production, or is it business? I think all of these things are good things to think about.

I would assume by the group of people that are here today that the primary purpose is to do something valuable for the community. One of the real problems in this area is that so much has been done by well-meaning people--by the military that developed these facilities, by the people who developed the yachting facilities, by the real estate developers, and by Safeway. You know, the problem is that the environment is no longer here to some extent, so it is all very interesting to think about, and I think that the planners must come to grips with the criteria.

What are the criteria? Where is the money coming from? What is it going to be like 20 years from now? Of course, to some extent nothing is forever, and you might develop something very nice that will be wonderful in 1982 and might be turned down in the year 2000. I mean, that is the way that our society is, and perhaps if you can do something that is outstanding for a period of 20 years, maybe that is pretty good, or even five. So I guess that is it.

McCosker:

Thank you, I will summarize as I see this and then ask for very brief questions. I think we all agree that we have to identify the criteria, the audience, the support or future support for this facility, and the potentialities. What are the strengths of this location? I certainly agree that we should not duplicate pre-existing functions, for better or worse, whatever they are doing--whether aquariums, publishing houses,

museums, or solar villages. I find a lot to agree with in what Gordon says, and I find a lot to disagree with.

I would like to ask that any of you with questions or observations please try and focus on this location. Let's not get beyond this place and what we can do with the Fort Mason concept. Are there any observations?

Ed Morris, President, Seafarers Union local:

Yes, I have a question, because we are talking about the environment. I am a labor union representative with the Seafarers National Union. We handle ships. We found, through the years now, that quite often we are put at odds with the environmentalists about the use of waterways, coastal developments, and the utilization of these waters. I came down here because I am also interested, as my colleagues are, in which direction this is going to go.

We wish everyone success. We would like to participate. I phoned our Washington offices and our schools in Maryland. They have indicated that they would like to help by assisting with exhibits, help out in publicizing, and doing what they can. But we hope that this will not be just another attack upon the maritime industry. Of course we consider San Francisco to be important in the maritime industry.

McCosker:

Sir, we must say in the strongest terms that that would not be the intent. This is not an attack by environmentalists. We are all in this together, and we would encourage your participation in pointing out what in fact you can contribute, and what the role of Seafarers is. Are there other comments or observations?

Dr. Michael Herz, Executive Vice President, the Oceanic Society:

I just want to respond to the comment that you just made. Tomorrow morning we have a session that is going to focus on the various user groups who are the ocean users, and we would like to see representatives in the marine center and certainly your organization, along with the fishing industry, sailors, all recreational users--any user group that we can think of. If we have neglected anyone it was out of ignorance, not intent. I hope that you can join us tomorrow.

McCosker:

Other observations or comments?

Stewart:

I would like to say to Gordon that, like Dr. Oppenheimer, I believe I have seen instances where simply educating people or making them aware of, for example, the marine environment and the interactions that go on there have apparently resulted in more of an effort to change things politically to what I believe is for the better. I would also like to make a comment that has to do with the shipping industry.

One of the things that is going on in San Francisco Bay is that there is a great number of introduced species. That might be an important thing to point out and a tie-in with the whole radar thing--the announcement of what ships are coming in and so forth. It might be interesting to emphasize the fact that there have been species introduced because of shipping. That is one of the things that has happened since the earliest years of shipping. We have seen somewhat of a species shift in the bay. It might be a good way to get at certain ecological interactions and help tie it all together.

McCosker:

Yes, Mark?

Mark Gibson, science writer:

In my endeavors as a marine science writer and teacher around the Bay Area

for about five years, I have bumped into a lot of groups, schools, and organizations. I am distressed by one major thing, that there seems to be a competitive attitude. Early this morning there was mentioned organizing to consolidate our efforts to really drive this thing home. I think that this is really an important issue. I happen to know that in the groups that I am involved with consistently there is a lot of banging of heads together, a lack of cooperation, perhaps jealously competitive attitudes. That is not going to drive the point home to the public as long as we can't work in a consolidated manner--coordinate our resources to get them all together. I think this is one point that we are going to have to work towards, to let the public know what is going on out there.

The other thing is getting the individual involved, demonstrating the importance of marine resources to them. We want the people in California to know that we have isolated antiviral compounds from oysters, abalone, and red algae. Now, these organisms grow in our environment right outside the bay. However, these waters are polluted to the point where we can't cultivate any food there. If the individual could be made to understand that there is tremendous potential here for food and medicine in the resources that we have right out the Gate here, then I think they could come to understand the reason why we have to deal with environmental issues and be realistic to solve them. Otherwise we are cutting our own throats, and that is a fact. So an individual can understand the importance of, let's say, algal extracts--things like that--because we can cultivate the seaweeds in the laboratory where people can see them. People can learn that extracts are used in dental work. Then people start to see a personal tie-in. They can make a connection, and the importance is understood.

McCosker: Yes?

Bruce Heyer, Bodega Bay Marine Laboratory, University of California:
(Initial comments not recorded)

I think we ought to have at least some sort of advertising kiosk informing people what other facilities are available in the area and even outside the area that are of particular importance.

Also perhaps a general board that will consolidate the efforts of the different marine education groups, perhaps starting on the California coast or something like that. The progress in one area can be the progress of the whole--for all.

McCosker:

Not only do we look towards complementation within the planning of this; we look towards a follow-through where all the various northern California organizations will continue to work together. This is going to be a dynamic and changing organization and will be working with these other organizations as they change. We hope that in this way we can certainly make some of the parts much greater. I certainly expect that that is the case.

I would like to add one final observation that agrees with Gordon entirely, and that is, is this going to be cost-effective, and is it going to affect the decision-makers? I think our goal is the same.

As an educator, I think the way we are going to do it is through education. I certainly hope that for the limited amount of resources we have available we can educate the greatest number of people, and thereby I think have great effect upon the decision-makers. I agree with you; they won't be coming here to see the center, nor will they have the time and energy to see all of the exhibits and understand them. But I think that by educating the visitors to this institution we will have a greater effect upon them. This is a debatable question, but I hope that I am right in that regard. Gordon?

Ashby:

Well, my comment was that the one did not exclude the other. You people are

certainly doing a fine job in making people aware of those things, and maybe your program can be expanded to talk about more of the physical aspects of the world. When I think particularly about the ocean, I think about the institutions that don't exist. It's the one that is going out and being a little more aggressive to get something to happen, which is a little bit different than the educational process.

I have a tendency to think that education is a fairly long gestation period before people finally act on the information they take in. I just don't have that faith, so to speak, in the process. I think the deterioration rate is greater than the educational rate, and I think we need to have something done fairly quickly and dramatically now. I just don't know where the focus for that is going to come from.

I would like to see a place like this be the spearhead of that idea. I think it can also be an educational institution, but I think that what is really needed is someone that has a little bit sharper position about it, goes after it in a little bit more aggressive manner than public institutions, because they are public. They have a tendency to just not be able to be as quick to move, not to be as focused in their perception. They are just diluted by all the other kinds of perspective which happen.

I have just been involved in a court case, for example. It was a simple little thing of a drunk driving charge. I have been there probably five days; they are trying to set the jury. It all has to do with, is there a black on it? Is there a Chicano on it? You know, I just want to go home. The legal system, in my mind, is kind of caught up in the same thing. Thank God you are not one of those people who just got pulled over to the side of the road in a drunk driving thing, because those people are still there waiting to have their case heard, and four days have gone by, trying to set the jury. My time is used up, the guy's time is used up, and everybody is kind of getting wired about it. Politically, I just see that involved in so many of these instances where the public is involved.

McCosker:

I would like to entertain one more comment.

Barbara Steinberg, Marin County Office of Education:

My name is Barbara Steinberg. I am an educator, a public educator. How do we get the public to take responsibility? I think that the first step is to educate, yes, but I have a question as to how effective that is. How do they translate that into responsibilities in their own lives to do something about this, instead of continually feeling like George is doing it for me? In other words, the schools are taking care of the kids; the hospitals are taking care of the sick; and the marine institute will take care of the ocean.

McCosker:

I think we can raise more questions than we can answer. I think we are going to take a break. Mark?

Switzer:

Yes, I would like to take a 15-minute coffee break. I think what we are learning is that we have a lot of work to do on this idea, so let's take a break for 15 minutes and try to come back and get more ideas.

Switzer:

This panel discussion is designed to consider the kind of marine programs that are and should be conducted here at Fort Mason.

Bill Noble, the director of the Marin Adventures program at the College of Marin, will moderate the session. Maybe Bill will just run down the list of the panelists and take it from there.

Bill Noble, Director, Marin Adventures, College of Marin:

We are going to do a couple of nasty things to you. First of all, we are going to change the order and ask the contributors to speak first, and then the panelists will do their thing.

The other thing we would like to ask you to do is, we really want to focus this session. We want to be brisk and quick and to the point. This is the last one and we have all been sitting on our bottoms for a long, long time. We want to be very concrete and talk about Fort Mason and talk about specific things that would be good to do.

One thing I would like to ask people to do, if you would, would be to move forward a bit and not hang out in the back of the hall. Stand up and find one of the chairs up in the front if you could. Sit up close and let's really try to open this up to discussion. It is the key thing that we could accomplish at the end of the day here. As soon as we finish with the formal presentation and comment, we will go right into the wine and cheese and you will actually get to talk with real live human beings face to face, instead of all these people sitting behind microphones at a distance.

The people on the panel are: Jim Brenner, who runs, believe it or not, a 4-H program in San Francisco for Cooperative Extension at the University of California; Greg Moore (you should wave as I mention your name), who is Chief of Interpretation for the Golden Gate National Recreation Area of the National Park Service; Gary Heath from OBIS, Outdoor Biological Instructional Strategies, from Lawrence Hall of Science over in Berkeley on the hill; and next to him, I must confess to a terrible sense of disappointment because my understanding with Mark was that I was going to be on a panel with Robert Redford, and I discovered that actually it is Robert Rutherford, who is the president of the Marine Ecological Institute down the peninsula; and the last person at the end of the line is Bill Hammerman, who is from San Francisco State and the Association for Environmental Education.

I think that we are going to start right off and ask some of our contributors to say their piece. Is Bob Swendiger here? Ah ha, would you like to let loose?

Bob Swendiger, Advocate, Maritime Humanities Center:

Okay, I will try to be brisk like Lipton Tea, and as brief as possible. Fort Mason in cooperation with GGNRA is sponsoring a proposal that is now in to NEH to establish a maritime humanities center. The history of the concept is about eight or nine years old. It was submitted in partial form to the California Department of Parks and Recreation, which operated the historic ships at the Hyde Street Pier. Some of you that are as old as I am can remember, in fact, that Parks and Recreation approved the project, but its budget was cut by about 10 million dollars. It was Governor Reagan who cut it at the time. Three weeks before work on the project was to begin, result: "project stillborn."

Another approach was the "Humanities of the Sea" lecture series, which was given in 1976 to 1977, sponsored by the Oceanic Society. They were five presentations that were held throughout the San Francisco Bay Area. However, the concept was resurrected again and given fuller meaning and direction last summer as a result of the Festival of the Sea.

The center would be dedicated to the history, and I emphasize human history, literature, folklore, and social sciences of the sea. Its program would include an annual Festival of the Sea, a three-day celebration to commemorate the activity of numerous populations who through their involvement in our multiple heritage of the sea contributed to life on the West Coast. The festivals will utilize a variety of presentations, oral history panels, and, to give you some examples: "Life and Labor at Sea"--to explore life and labor at sea as experienced by people of the sea, and the profound changes that have taken place over this past century; "Realities Afloat and Ashore"; "The Black Experience"--to recall and recognize the contributions of black people in sea-related occupations over the years; "Immigration"--leaving, voyage, and arrival (this time it would be the Russian experience; this past year we had the Italian experience); and so on.

There would also be panel discussions; for example, one panel that we conceived of for this coming year would be "Unions at the Crossroads." "Technology Afloat and Ashore"--people from various occupations afloat and ashore will explore the profound changes that have taken place as a result of technology. Another is "West Coast Shipping"--the gradual decline of American flag ships. Representatives from labor, industry, and state government will explore the consequences of the steady increase in foreign flag ships.

There would also be lectures; for instance, "Jack London's Pacific World." Also many conferences--one example would be "Women of the Sea, Yesterday and Today," which is planned for this coming year--an exploration of roles that women have traditionally played in relation to the sea and the changes taking place in the modern period.

"Concerts of the Sea" would also be given--music by representatives of the many ethnic communities in northern California and the West Coast as far as the Canadian border. Demonstrations of the arts and crafts of the sea. Sea literature, poetry and plays. Films and slides and exhibits.

As a continuing project the center would develop monthly forums, establish a maritime humanities consortium of educational institutions, historical and cultural societies, journals and newspapers, labor unions, and shipping-related industries. The center will afford a vehicle for scholars, specialists, and enthusiasts to expose new developments and research through its festivals, forums, and publications of small monographs.

It would help to stimulate maritime studies of the West. It is hoped that a core of courses will be established by January of 1983; for example, "The Maritime History of California," "Folklore of the Sea," "Literature of the Sea," and "The Pacific Experience,"--not necessarily nor particularly directed to the average student at the university level, but to the wider community--those who do not necessarily want to take courses for the sake of getting credit to end up with a degree, but would like to experience non-traditional or traditional ways of presentation of these courses, acquire knowledge, and learn a little bit more about themselves and their community. The center plans to produce a newsletter and selected tape-recorded activities.

The West Coast has been, to a great extent, a stepchild to the enormous activity of the East Coast in the history and research produced over the years. The center would be dedicated to the West Coast experience. The Pacific slope has gone through a unique development historically, and its tradition includes, among others, Native Americans, Filipinos, Russians, Portuguese, blacks, Italians, Irish, English, Germans, and Scandinavians. Their activities have been distinctly related to the Pacific geographically, sociologically, culturally, technologically, and economically.

I suppose that, if the physical plant does evolve in the way that I hope today and more meetings and planning make it evolve, the maritime humanities center could use a hall like this, that does exist already, and perhaps a classroom. I am not thinking about a physical plant for the center. When I say, "I," I am really speaking

for others: Fort Mason Foundation, especially people at Historic Ships--Steve Hastings in particular, the supervisor of Historic Ships, and Charles Seaman, who is the folklorist for National Parks. The three of us have written this particular proposal. I taught literature of the sea years ago, and used the old ships of Hyde Street as my classrooms. They were perfect. They served my purpose. Perhaps if the Fort Mason Center does evolve, with classrooms and a lecture hall and so on, this center could use them.

I do feel, however, that should the humanities center develop (and it will in one way or another I hope) the interaction between the center that is created out of discussions like this today and future ones, the interaction between this center and that one will be dynamic, and that they will complement each other. Because when we talk about the human element, the profound influence of mankind over the centuries on the sea is well known. We have sung about it, we have cursed it, we have written about it, we have shown it graphically, and of course we intend to do more with it by way of mining, and we go on and on with oil and so on. If individuals can understand the sea a little more through their human relationship, I think we can help in the long run save the ocean and its creatures. Thank you.

Noble:

Thank you very much, Bob. What we are missing today--and I am sure Mark won't let me do it--is a song from Bob. Okay, the next contributor is going to be Pieter Folkens, from Lifeline Marine Research.

Pieter Folkens, Director, Lifeline Marine Research:

Good afternoon, everybody. We were organized about four years ago in 1976 and became a part of the Golden Gate National Recreation Area in 1978. We were initially established at the Presidio over at Crissy Field. Late last year we moved to Fort Mason, and that move has slowed us down, unfortunately, primarily because the development of the pier area is behind schedule. We were told in 1978 that that summer Pier 3 was going to be developed as a marine center and that we could move in there. They didn't even have the painting done in Building E until after we moved in. Such is the government, I guess.

We have two basic program thrusts. One is a display-oriented interface between the public and the marine environment, dealing especially with marine mammals, prehistoric marine mammals, the history of West Coast whaling, and contemporary extinction. By that I mean animals that have gone extinct in the last 150 to 200 years.

The second thrust is field programs, which include prehistoric marine mammal excavations in the Santa Cruz Mountains and in the San Joaquin Valley, and also, within the environmental involvement, programs on our research vessel. We have been greatly involved in the past with educationally disadvantaged children, especially with the juvenile authority in Santa Clara County, and also the Omnibus program in San Jose. We have also operated as a cooperative organization with other groups, providing them with a vessel when they did not have one, and also interpretive programs.

Most of our programs, other than the field activities, rely heavily on our displays. Some of those displays are whaling artifacts, which include a whaling ship and all of the accouterments. Pre-historic marine mammal fossils and the illustrations of our extremely rare animals are important in our displays.

In our move from the Presidio our display space was curtailed. At the development, even the temporary development, of Pier 3 and the "Jeremiah O'Brien" as a public-access museum for the use of displays of this type so we could get interpretive programs operating very quickly, even though the complete concept of the marine center is not finished.

I am hoping that the design will reflect a diversity of ideas, so that all the marine environmental organizations will find a place, so that the marine center will not be in itself an autonomous program. I hope it is made up of all the different involvements.

The target of the marine center need not only be directed towards the people; the environment itself could be a separate recipient of attention. We could have, say, a 50 percent thrust for educational programs, a 45 percent thrust for research programs, and maybe the balance for the animals themselves--the environment itself.

A specific idea that I have thought of and tossed around a little bit was that the water between Pier 2 and the Liberty Ship may be useless to other vessels in the event that the four-point mooring system of the Liberty Ship makes it impossible for a ship to move in to the other side of the slip. On this topic I have raised the admittedly far-out idea of using that water as a great whale rehabilitation facility, when it is needed. There is no facility for the rehabilitation and study of injured animals that are too large for the accommodation and efforts of a marine park like Marine World/Africa U.S.A., which has in the past taken mammals as large as killer whales and used their veterinarians and tried to rehabilitate them. In the event of, say, a sperm whale or a gray whale being beached and being refloated, there is no place for these animals to go. This was found in San Diego when Gigi, a juvenile whale, got too big for the tanks and they had to release her. I can see this water between Piers 2 and 3 not being used for the ships. With a moderate amount of modification the needs of these animals could be attended to. Although beached whales have beached themselves for a specific reason and the success rate of endangered or sick animals that have beached themselves is very, very low, the experience and information would be invaluable, not to mention the public interest and response to that program.

Another program that we have, which is very important to us regarding the actual waterfront uses of piers, is our ship. Our ship has been here several times in the past, and we have spent collectively several weeks tied up to various parts of the pier out here. We have a good amount of experience on what goes on down there with the ships. It has become evident very quickly that only large boats can handle the pier. Any boat smaller than about 100 feet, say under 300 tons, would have a very difficult time lasting more than just a few hours. Our ship is 136 feet long and even that large a boat has problems with the pilings, the surge, and what-have-you at the pier. Our boat is typical of a small, open-ocean research vessel in that it is a sister ship to Cousteau's "Calypso," and these piers can not berth any vessels smaller than ours, we feel.

The pier itself is quite high and the surge presents precarious off-loading problems, rocking of the boat, and slamming against the piers. This has nothing to do with the pilings that are out there now, basically falling apart. Without too much extra money they could probably develop those piers to accommodate moderate-size vessels. If they were going to do anything for smaller vessels they would probably have to do an extensive modification. Nevertheless, it presents a great possibility as a home for vessels of resident organizations, as a temporary berthing for visiting research vessels like the "Regina Maris" and the "Calypso," and as a loading point for whale watches, bird excursions, and other on-the-water participation programs.

Our ship also carries the ironic distinction of being the last American whaling ship. We intend to retain its historical value with the harpoon cannon and other artifacts so that her place at Fort Mason, should it come about, will be more than just a berth for an old boat. Once she is too tired for continued open-ocean service we would like to set her up as a historic attraction here at Fort Mason, possibly even donating it to the National Maritime Museum. Set it up as a whaler in its former life with interpretive displays, and maybe go as far as firing off the cannon at noon or something.

Other problems with the berthing here included the loading of fuel. The Coast Guard has strong recommendations regarding that, and because of the surge problem it could pose in itself a major environmental hazard. There is also a lack of available 220- and 240-volt shore electric power, and difficult passenger access.

But at this juncture all of the functional problems are workable and incidental, provided that the facility be administered properly. At the very outset of this I see the administration of a marine center as a problem. Neither the Park Service nor the Fort Mason Foundation has the wherewithal or the experience of accommodating the needs of vessels in the 300- to 7,000-ton range, which are most appropriate for the organizations that will be using the pier area.

The Fort Mason Foundation and the Park Service have chosen a marine center board. I was told by members of the Park Service that the main intent of establishing the marine center board was to have it made up of "heavyweights" for the distinct purpose of enhancing the funding proposals, with the actual administration being conducted by the Fort Mason Foundation. It is my hope that the noted members of the board utilize their collective wealth of experience and knowledge to assure the design of a strong, comprehensive facility without compromise.

Considering this same administrative problem relative to the specific topic of this session; that is, the activities involving the public, the question arises as to the most appropriate audience. I have some very strong feelings on this. Philosophically there is no most appropriate audience. The marine center participants as a whole should want to reach the broadest base of population. They should approach the greatest number of audiences, not the audience with the greatest numbers. There currently exists here at Fort Mason a numbers ethic. Basically an activity is judged valid if it draws the greatest number of people. Such is the effect of the "Mork and Mindy" mentality of commercial television.

In developing a program I would like to see a parabolic-type development, where it is not limited to the greatest number of people. Those other programs that are, say, either esoteric or specialized are not left out simply because the main thrust of the marine center is going to be toward the greatest number of people. At the outset of developing the marine center I would like to see its efforts begin with a broad base, including the esoteric, and as we grow let it develop to accommodate the needs of the different groups and public. Eventually we will have a very comprehensive, broad-based program that will satisfy the needs of everyone.

We should accommodate a person looking for information about an animal that went extinct 200 years ago, or a person who just wants to come down on a weekend for a diversion from other programs here in San Francisco. Thank you.

Noble:

Thank you, Peter. The next contributor will be Mary Abbott, the Executive Secretary of the Bay Chapter of the Oceanic Society.

Mary Abbott, Executive Secretary, Bay Chapter, the Oceanic Society:

Well, I have just made a few notes here about some of the programs that we have done, but I also thought that Fort Mason might possibly consider something that grew out of the Education Commission--the Roth Commission--that was held here, where they started something called the San Francisco Educational Fund. The purpose of this is to collect monies, either from corporations or foundations, into one central point. The teachers in the schools throughout the Bay Area send in a proposal, and then the Fund decides on whether it is valid and/or whether they are going to fund it. Just recently it was announced that they gave something like 10 or 15 awards. This in turn enables the particular teachers in the schools to do something really innovative where they can't get money from the Board of Education or from state or Federal sources. So it seemed to me that the Fort Mason Foundation might consider something like this because they have so many good groups within the area.

In Brooklyn, New York, there are "Friends of the Library," who collected money and are now running a sort of semi-tutorial system where kids in the schools who were having problems with their homework can call the Brooklyn Public Library. There are three or four persons in different areas who are on call at certain hours to help the children with their homework. I guess this has been quite successful for some of the more disadvantaged children whose parents don't have the background to help them.

Well, the Friends of the Library are located right here in Fort Mason. There is so much trouble with the libraries, which are having financial difficulties, that perhaps Fort Mason and Friends of the Library could get together and work with the public library system in this city.

There are two programs that the San Francisco Bay Chapter of the Oceanic Society has done in the past year that I'd like to talk about. Sea Camp, in which we had about 80 children, is an environmental education program we started last summer. We didn't really have any funds to start it, but we went out to a number of corporations and a foundation and got funds to get it underway. We were able to give "camperships" so that we didn't have to have all the children come from a set economic background. The transportation costs were really very, very high, and we would like to do something to solve that this year if possible. But we are going to set up funds again this year and perhaps expand the program.

We also received funds from some foundations for an educational program that will help supplement the schools as far as marine education is concerned, in which we will try to attract a number of volunteers interested in the marine world who would like to be trained in it. We would have audio-visual aides and go into the schools and give a lecture and then follow up with a field trip, which is something that is being done in the Petaluma area and also down in Palo Alto in the field of land use. However, this would be the first one that would be marine oriented.

In connection with this program we have made an application to the Maritime Museum Association here to see if they will fund the audio-visual component that we need for this program. I think that is about it.

Noble:

We have one more contributor that I didn't know about, Mia Monroe, who has somehow or other made her way past the broken seawall at Fort Point and arrived intact and relatively dry.

Mia Monroe, Park Interpreter, Fort Point National Historic Site:

I work at Fort Point National Historic Site. We consider ourselves at a very strategic location, being right underneath the Golden Gate Bridge there, right where the watershed of California meets the ocean. We really try to capitalize on that setting.

The program that we operate to interpret this wonderful setting is the Environmental Studies Program. It is actually a secondary consideration at Fort Point, where our main feature is the historic fort, but we really try to get across that the environment is a working whole, that the fort was built there because of its strategic setting right at the tip of the peninsula. It is right at the funnel there of this watershed. And so the whole thing works together. Our Environmental Studies Program focuses on the marine environment, the natural environment of the fort, and man's involvement through history in this area.

The Environmental Studies Program is worked around a thing called the "Eco Walks Program," which has its history in the San Francisco schools. The Eco Walks Program is a series of walks along the bay shore, the Golden Gate Promenade. These walks are mostly for San Francisco and Bay Area students. The walks include a series of discovery activities, some problem projects, and also some time in the classroom that we have set up. Last year we reached 17,000 students in the Bay Area.

At Fort Point we are part of the Golden Gate National Recreation Area, which is a national park set in an urban area. We realize that one of the primary goals of the GGNRA and Fort Point is to develop an environmental literacy in the people

that live in this area. So our whole program is meant to focus on this urban population, which for the most part doesn't even know that this national park exists. To my continual amazement, they don't even realize that the bay, the Golden Gate Bridge, and the ocean are here. I had 120 students today and I asked how many of them knew where the Pacific Ocean was. Fifteen had seen the Golden Gate Bridge before. Only eight had been across it. These are kids that come from right here in San Francisco.

So our program is entirely focused on reaching out to the Bay Area community, to the people that live in this area, making them aware of the resources that we have here, of the ways they can use it, and through the use of it, making them respect it.

When we get our kids out there we not only show them how to identify a sea-star or some marine algae, but also we show them some things that they can come out and do with their families and their friends, such as how to fish out there, how to put a rock back after they look at it, or how to identify a tanker or submarine or helicopter. All of our kids and almost 90 percent of our people came on public transportation last year. I went to almost every school that participated in our program, and I went there by bus. Now, I am sure that that took up a little bit more Park Service time--your Federal tax dollars, but when that teacher said (who had never taken a field trip in her life), "I can't do that, it takes too long to get to Fort Point," I said, "Well, it only took me 20 minutes on the bus so you can do it," and of course, they are there within the next few months.

It is this kind of active outreach, I think, that any program that operates in the GGNRA should have. I certainly think it should be a component of the Fort Mason Center here, because we are in an urban area. We have to reach these people who don't know anything about the area if we are ever going to get them to respect it.

Another thing I want to point out is that we estimated that 25 percent of the participants were what we call "special populations." By this I mean people who have physical or emotional disabilities, people who do not speak English (and there are more and more of those in San Francisco and the Bay Area), people who have problems with the law--just all kinds of people. You have to make special efforts to reach these people. They just will not come here, and that means really innovative programming. It means active involvement out there. The Fort Mason Center cannot just be here; it has to be out there as well; then people will come here. So that is sort of my call to the Fort Mason Center.

We really emphasize at Fort Point the fact that we are part of the California watershed, that we are part of a whole working environment. We teach the kids how to identify ships. We teach the kids about the military history. I show them how to load cannon; I show them how to fish. I show them all of these things because we are part of a working whole. I think that is how Fort Point could get the most out of the Fort Mason Center--by being a complement of a marine education center, being part of a whole network of marine facilities.

One thing I was looking forward to today is getting to know a lot of other people who are out there in the field. I want to see the Fort Mason Center put me and the people I work with and the people who come to Fort Point in touch with all of the exciting things that are going on, whether that be through newsletters or public radio programs or a library--I don't know what it could be--but I really would like to see this place become sort of the focus and the spoke of a wheel of programs that are going on throughout the Bay Area.

So many people come to Fort Point. We maintain a high image. They come to us for all kinds of information. We would like to be able to know what is going on and refer them to other things out there. If we are going to get people into our GGNRA and have them respect it, they have to have multiple experiences through life that will give them that respect. So, I really have a lot of hope for this

center and I hope that we can plug into it really well. Thank you.

Noble:

Now, I think we are going to go on and have the panelists talk, and again we would like to ask people to be very brief and to allow as much time for all of us to discuss as possible. I think I will just start out at the end here, the easy way, and have Jim Brenner begin if that's okay.

James Brenner, 4-H Program, Cooperative Extension, University of California:

Well, essentially my experience and training are those of a practitioner in bringing young people and adults into the outdoors. I don't have a lot of experience in the marine programs. I have some insights. In saying that, what I mean is that I can't really decide on a lot of these programs in regard to the specifics, but I do have some insights about how different activities can be implemented and the types of activities.

I think Mia's presentation really hit on a lot of points that I wanted to make, and I will just reiterate them briefly. One is that the programming should have a strong affirmative-action effort. As I look around the room right now, there are probably two or three minorities that I can see--maybe I am wrong. The population in the city and the Bay Area is certainly not reflected here, and those people should be reflected in the planning process. If you are going to attract different populations you have to involve them in the planning.

I think that the outreach has to be made in the neighborhoods. Mia mentioned the fact that she goes to the schools; this is an important component. The most successful programs that bring new populations to the park and to new experiences are ones that start out in their own communities. You can't just build a center and expect people to come. People are not used to coming. They do not know the bridge is here; they do not know the bay is here.

So I think the affirmative-action component of involving low-income, minorities, seniors--people that are normally not used to using these types of facilities--has got to be in from Day One. Adequate resources need to be allocated, and I don't know where the resources are coming from for this, but they have to be allocated to deal with this problem. It is a difficult one. You have to think--realize that it is going to be difficult and it is going to take time and there are going to be frustrations. Maybe you won't be able to get to all of the high-level academic stuff for a while, but I think the affirmative-action component is very important.

The other thing that I feel very strongly about--and there was a lot of comment about it in the different programs today--is that things should be experiential. People should have an opportunity to become involved. If they are just going to observe, they are probably not going to learn as much as they would if they can actually participate in an activity, become involved in it, have a stake in it--even in the planning of it. I believe Mia goes out to the schools and the kids help to plan the activity and it gives them more of a handle on actual ownership of the project. So I would really want to promote and provide activities that are experiential, learn-by-doing type things, which is the 4-H motto.

A specific one that I think would work well is continuing projects where people could learn practical skills, such as boat building, sail making, fishing--different types of practical skills. I think the boating is an excellent one. Boating is an excellent way to get people to keep in touch with the aquatic and marine environment. It is very threatening at first, but with a minimal amount of training it works.

We had an experience this summer with a program that was done through the Golden Gate National Recreation Area with some Urban Initiative money in which urban kids were brought down to Aquatic Park and did canoeing. For many of them

this was the first time they were in the water using a canoe and a paddle and having life vests on and all. It was a tremendous experience, and it is a good way to start to immerse people in that marine environment and let them get in touch with it.

I think small boats as well as large boats should be used. Small boats can develop more teamwork; that is, rowboats or kayaks or canoes, which develop a little more confidence than a large boat. On a large boat you are usually a passenger, whereas in a small boat you are really actively and immediately involved in the process.

Another thought I had about programming was kind of the old adage (I don't know where it came from), "Give me a fish and I eat for a day; teach me to fish and I eat for life." I think the program should focus on training staff, not to provide a staff that's here to do all the programming. I think there should be an emphasis on training not only school teachers but other agency staff. There is a lot of other youth-serving agencies and other service agencies where they have staff people and volunteers that need skill training, specific competencies that they have to develop, but they can and will develop these. The training should be a real top training, and it should cover obvious things like safety and content, but also the teaching process.

I think the adequate training of staff, whether they are paid or volunteer, really gets to the heart of the quality versus quantity. You really can't have either one without a real good staff, and I think other people have touched on that today.

One other thought I had was concerning making the programs small, simple, and manageable, using available resources before going out and developing a whole multi-million-dollar grant or something to develop a whole new entity.

Staying sensitive to the needs of people, not getting so locked in--again, this is another thing that was mentioned today. I think it is important to be flexible with the programming so that it can change and it can be vital and it can adapt to the needs of the community and beyond the community for that matter. Bill had mentioned earlier about the tourist population. I think my perspective is more in trying to serve the people who are already here living in San Francisco and the Bay Area, but we should be sensitive to all of these needs.

One of the questions, which I thought was actually rhetorical in the abstract which it came out in, was, "Should there be programs?" Yes, there should be programs. They are needed, they are wanted, and I think they meet a lot of basic needs that exist in this community.

One other thing that Mia touched on and other people have too is that I don't think duplication should occur, another Steinhart be built, or et cetera. To develop a resource-center, clearinghouse approach so that the people can find out what is going on through this program and to let them know what is going on in the Bay Area--that's it.

Noble:

Thank you, Jim. Greg, would you like to speak next?

Greg Moore, Chief of Interpretation, Golden Gate National Recreation Area:

My name is Greg Moore. I started with the Golden Gate National Recreation Area about five years ago. At that time I was working in an office up on the hill. We had one office building, four staff, some pencils and paper, and a piece of legislation that said, "You are now going to develop one of the largest urban parks in the country."

It was a formidable and challenging task. It was one that could have never been accomplished without the participation of tremendously enthusiastic people throughout the Bay Area. I think back to the time when we began discussing the Fort Mason Center. We were in the Hall of Flowers at a public meeting with about

50 different people with 500 different program ideas trying to determine what we were going to do with a bunch of vacant military buildings on the waterfront at Fort Mason.

People's ideas didn't agree. There was a lot of enthusiasm, a lot of conflict, a lot of discussion that is very reminiscent of what was going on today in thinking about the marine center and the direction of the programs here. I guess what I am trying to indicate is that I think today--what we are going through and trying to talk about, the programs and activities, the purpose of the marine center--is something I have seen happen time and again in this park, and in each case the result was way beyond what we originally expected. The Fort Mason Center I think is a prime example of that. The park itself, the original idea of a few people looking at Alcatraz, East Fort Miley, and the Marin headlands, and building that into a hundred-thousand-acre park today, pre-eminent in urban parks, is another example of that.

More specifically, in thinking about the programs for the marine center and the ideas that have come up today, my mind still has to go back to the subject of goals. I don't think we have really refined yet what we hope the marine center should do. I don't think we can do that in a day. I think it will take a number of meetings like this, again and again, with smaller audiences and more participants, to determine the goals of the center.

My basic notion in looking at a program idea as it is developing is, first you decide the goal, then you look at the audiences, and then you determine the programs. I kind of view programs as the last step. I think we are still struggling a little bit with the goals. We have an indication of the audience and how incredibly vast it is. There are five million people in the Bay Area where a hundred years ago on this shoreline there were maybe one hundred. We certainly have a perspective of the growth that has occurred here and man's interaction, as Bob brought up, with the shoreline environment, with the marine environment.

I think in discussing the programs that are going to occur in the marine center we have to very specifically look at the different audiences in the Bay Area and the very different nature and needs of each one of those audiences.

At GGNRA we have experienced quite a bit in programs--some that you would call "outreach," working with different city communities, and some in Marin County and wealthy suburban areas. In each situation making a successful program depends on points that were brought up time and again here. You involve the participants in setting the goals. You involve the participants in completing the program and follow up with that group to make sure that your program has reached the results you had hoped that it would.

I think that with the marine center we have to be careful to realize that the residents of a community like Chinatown, which is ten minutes from here, and the two million people that get off the cable car at Aquatic Park each year will have very different expectations, very different levels of awareness, different understandings about what we are trying to accomplish.

I think we are all united here by perhaps a love for the ocean, an appreciation of it, and out of that appreciation we are hoping to convey information to more people so that they will share that appreciation.

I think the programs at the marine center have to be enjoyable. We have to get people to enjoy the ocean in the same way that I think most of us do, before we can give a level of appreciation or understanding or a concern for preservation, as Dick Cunningham brought up this morning. So I am concerned that in the initial phases of the marine center we start really small. We have had some very big notions of filling up Pier 3. That certainly is a scary task, if any of you have ever been in Pier 3 and realized how large it is. That is not something that is going to occur overnight.

I would suggest that the next task in determining programs for the marine

center would be to set some very specific goals for programs we can operate out of this location within the next year, to have an experimental phase. Mia's programs at Fort Point, the Oceanic Society's programs, and programs throughout the Bay Area might benefit from this location, which happens to be sitting next to the last remaining natural piece of shoreline in all the city of San Francisco, of bay shoreline--a little bit of symbolism there.

In closing, I would hope that our program direction from today is one of optimism, one of looking at our audience a little bit more carefully, refining our goals a little bit better, and attempting to do something quickly and simply with all the resources, intelligence, concern, and dedication of people like the people who are here today.

Gary Heath, Lawrence Hall of Science:

Let me briefly fill you in on the Lawrence Hall of Science. Some of you may not be aware of it. At the University of California there is a great number of research institutions, and one of them is the Lawrence Hall of Science. It is above the campus, up on the hill. It has three prime goals. One of them is to act as a science museum and interpret science for all ages of people, from two- or three-year-olds all the way up to college students to adults to senior citizens. We do that through a variety of different programs and exhibits. The two other prime goals of the Lawrence Hall are teacher training programs relative to science and curriculum development relative to science. OBIS, the Outdoor Biology Instructional Strategies program, is one of the curriculum development programs at the Lawrence Hall of Science.

Programs, as we are starting to get an idea here, are incredibly--or should be--incredibly diverse. Programs for the marine center should reflect San Francisco. San Francisco is one of the more diverse cities in this country. As those programs are developed, I think we need more meetings like this, not only among professionals but also among the people those programs are going to serve. That is, if you are going to develop a program for some teachers, then you'd better involve those teachers in the development of the program or the program won't work. It won't work in that it is not going to happen in the classroom and it won't work financially.

I am just going to focus on one little aspect of programming and that is, very briefly, programs for young children. By "young children"--I am going to be a little bit more specific--I mean kids that are two, three, four, five, and six years old. When we think of centers, I think most of the things we talk about or have heard talked about today are exhibits or programs for older kids, or for adults or for high school students. We have also talked quite a bit about influencing these people, affecting their attitudes and their knowledge. I don't think you can find a better subject for shaping knowledge and attitudes than the very young child. There is a demand from these kids, from preschool when they are kindergarteners, and from first, second, and third graders. Also when they are at home, when they are two years old or three years old, their parents are eager to take them out to places where they can learn.

The marine center I think is a wonderful idea right now and a wonderful place for taking those kids to. Just briefly, it is very difficult to work with those kids in an exhibit kind of format. We wouldn't ask an adult and a three-year-old to read the same kind of book, but in many instances we ask that child to go into a museum or science center and look at the same kind of exhibit that an adult is going to look at, and it just doesn't work. So you have to provide programs that are led by teachers. I think those teachers cannot be simply teachers but have to be marine teachers, marine experts who are also good at teaching, so you have to come up with a quality staff.

Programs for children of this age I think belong as much as possible outdoors.

That is the kind of environment we are trying to teach the kids about, so I think we should take them out there and involve them in interactive kinds of exhibits wherever possible. A lot of ideas, such as the pilings that go up and down in the water, or organisms that kids can handle and interact with, are super ideas and they belong in this kind of program.

There has been some discussion about supporting these programs. In our experience at the Lawrence Hall we have been able to support a variety of programs on their own legs. We don't get tax money for our programs; we depend on schools to pay for programs and we depend on the public to pay for programs. I think programs should be self-sufficient, and I believe that they can be.

I mentioned briefly the idea of creatures, which is something that throughout the Bay Area people talk a lot about. Do living things belong in interactive museums? Do they belong in the classroom? It is a very difficult thing. I think we all have a variety of horror stories about kids coming up to the starfishes and handling them roughly. Pulling ears on rabbits. I think there is a great deal of damage that can happen to creatures in that kind of situation. But I believe that most of the time the benefit the kid gets from actually touching the creature, from smelling it, feeling it, or sometimes--if you are dealing with young kids--tasting it, you can't get in any other way. That kind of firsthand experience can be really important to that child 15 or 25 years later when he may happen to vote in a ballot on whether or not to save a particular environment or a particular kind of habitat. I think before I go on too far I will stop right there. I would like to have some questions later on. Thank you.

Noble:

Thanks, Gary. Bob Rutherford, would you like to say something?

Robert Rutherford, President, Marine Ecology Institute:

Thank you. I've been asked to speak more directly about boat operations. The Marine Ecology Institute, as some of you may know, is now just about 10 years old, or will be in June. We do operate the research vessel "Inland Seas"; we also have three other operational research vessels. We happen to be berthed in Redwood City.

We have been here in San Francisco; we have been in and out of Fort Mason, and we don't like it here. I will tell you why. The surge is terrible. You heard someone mention a little bit ago that vessels should be at least 130 feet. The "Inland Seas" is 85. Only 111 tons. We were berthed down here once at Pier 43½ for Harbor Tours. It was a beautiful Friday afternoon, we went in, and the Harbor Tours were nice hosts. "Don't worry about a thing. We have a night watchman; everything will be fine." About 11 o'clock they called and said, "There is a freak storm. You better get down here; you have already got one hole in your boat." Thirty thousand dollars and six weeks later we had the boat operational again.

The same thing happened earlier this week. You saw on television the marina right here--boats being torn loose from their moorings. This is a very hostile stretch of water. When we pulled out of Pier 43½, which is just a little way down the road from here--you could walk there very easily, we were taking ten-foot seas over the stern just to pull out of that slip. This kind of storm can come up like that. (Snap of fingers.) The surge can pound a smaller boat to pieces. We have enough broken equipment to prove that. You have to think about these conditions when you are operating a boat in a program and storms suddenly come up, or when you have so much rough water that you just can't work.

I am not talking about being seasick. But it is awfully hard to see something under a microscope if what you are looking at is going like this (gestures) just because the boat won't hold still. So if you are working out of San Francisco

you throw away at least 25 percent of your time because of weather. We don't have that problem in Redwood City. These are the kinds of constraints.

We too get no Federal or state funds. We have tried to get some. I am not opposed to having some, but we depend on schools and our other fund-raising efforts to keep the institute going. So a smaller boat (and sometimes the "Inland Seas" doesn't seem that small) is not an operation that I would suggest be considered here.

The emphasis of Jim Brenner, an earlier panelist, was a very fine one. Because kids do have to be able to get their hands wet. They have to be able to hold the critters. There is nothing better than that in the marine environment, in a marine instruction situation.

Then there are the hidden operations of a boat. If you are going to be working with young people, try to buy the insurance for the thing. You are talking about several millions of dollars and maybe \$20,000 to \$25,000 premium costs. Who is going to pay for this? Again, if your operation must be self-sustaining you have got to consider that.

Another consideration is people. We talk about the tremendous advantages of being able to go out to the Farallones. Fine. As soon as you have crossed that bridge you have got to have two qualified crews on board. I mean licensed skippers. You are not going to take 35 or 40 people out and have your skipper eat a tuna-fish sandwich and get a stomach-ache and wonder who is going to bring them home.

I know that different people say, "You cost too much to charter the 'Inland Seas' for a job," but that is why--the insurance, the crew. I am not here to plug the way we operate, but those are the realities of trying to operate with a boat. So if you can find some way for people to get their hands wet in the real world without being entangled that way, consider that.

We are still going to continue to operate the "Inland Seas." We do enough other things, and we do enough of what we do that we can live with it. Yet we are talking about whether we should duplicate other services.

Another question has come up, and that is marine science education in regard to jobs. One of the problems that you will have in bringing young people in, letting them see the invertebrates and the plankton, is that they are going to find a world that they never knew existed and it will be fascinating. Many will say, "Gosh, this is great. I would like to be working in this field." There are no jobs in marine biology. And if that is not a true statement it is close enough. I recognize some very fine marine biologists in this room, and they are not working as marine biologists. I think that they would like to be. It is a field in which there is no national priority. A lot of talk but no jobs.

A moment ago someone mentioned minorities. After having worked with somewhat more than 100,000 students in the last ten years, hear me out before you criticize the way I am saying it. I think there are three general groups of students. One is the minorities, one is the regular kids, and one is the gifted. Now having said that, I know there are gifted kids in the minorities, but they haven't been identified. They haven't had the opportunity to come forth. Working with minorities--and I am not talking about just blacks; I am talking about inner-city minority kids--it is a whole different world.

There is a tremendous opportunity for this center to tailor some preparation as well as activities for them to do, in addition to what would come from Galileo High School and some of the others. We have had a lot of ideas on this. I have presented them to the state, I have presented them to the Federal government, and nobody cares about funding them. So you are going to have to work that one out yourself. There are some very real needs here.

Some of the trips have had to be aborted because they were unmanageable. We are talking about junior high and high school age. I have asked, "How much science did they learn?" hoping in effect that the teacher would say, "Well, not

much, and we won't be back again." But they say, "We don't know, but we do know this, that after they get back in the classroom they are easier to work with in other things, and doing the things that they did has opened up more communication links among the kids and between the kids and the teachers than anything else we have ever tried. Help us next year; we will double our budget."

There is a real need there if you can find a way to work with them. I don't mean that they are strange. I think it can be done, but it is going to take a different approach. It might be a project that could make an awful lot of sense because San Francisco has those kinds of people and there are others not very far away from here that could make good use of this program. I have some other general observations, but I will save those and perhaps just respond to questions as they might come up.

Noble:

Thank you very much.

Bill Hammerman, The Association for Environmental Education:

Do you really want me to go on, Bill?

Yes, definitely.

I am looking at the watch as some of my former students are in the audience, and they know Hammerman's first law of learning is that the brain can absorb only what the seat can endure. This group has to be congratulated because you are enduring quite a bit. I guess one of the advantages of being the anchor person is that you can say to your fellow panelists, "I agree with everything that you have said; I think it's beautiful and great," and I think that no one will disagree with me.

I perhaps do not have that much more to add because I believe Greg and Jim hit the high points that I had in mind. Maybe, Bill, I can begin a transition and instead of responding as a panelist respond as if I was on the other side of the table as a member of the audience. I am glad I came today and I have been scribbling like mad--primarily thoughts that were racing through my mind in reaction to what I heard various speakers say throughout the day.

As Mia gave her commentary on what some of the school youngsters in San Francisco were asking or reacting to, a quote from Edmund Way Teal went through my mind which I think is pretty paramount to my thinking, and that is, "The strangeness of the familiar is too familiar to be observed." It's a play on words. "The strangeness of the familiar is too familiar to be observed." And also you might add parenthetically perhaps, "to be understood."

There are some concerns which I guess I still have. I think there has been a shift of some of the thoughts expressed in the latter part of the day. This shift moved from what "we" as the center can do for "them," for the people in the Bay Area, to whether maybe we should pause and find out what they out there want from a marine center. I mean, do we know what the actual needs are? Do we know what the priorities of these needs are? Who is taking an inventory of the present programs as to what they are doing, the audiences they are serving, and the accomplishments to date? My hope would be that we would not rediscover the wheel or try to reach an audience or part of an audience that is already being reached and served quite well.

Towards the beginning of the day, Mark said that they could envision perhaps 95 percent of the program being public information. I more or less have a hypothesis that most public information programs fail in what they are intended to do. And I say "fail" because they really only reach--(this is my hypothesis; I don't have the data to support this) they fail to reach a large majority of the citizenry, in the territory that you are concerned about.

I guess I am concerned, as other speakers have mentioned, about how do we reach all the people in our community or a large majority of them. My observation

over the past decade or two has been that concern about the environment, concern about environmental issues and the quality of the environment--conservation if you please--is an elitist position, or tends to have created an elitist image. I am not so sure that that will be the right direction to go in. We will be poorer for it if it continues to maintain that kind of image.

I think in this way we have something to learn from the Peace Corps efforts in the line of community development, or how you help people learn how to help themselves, rather than going in and determining what they need help in. Therefore, I hope this use of the word "center" is still a concept where every portion of it is not chiseled in granite. In addition to being a physical space here at Fort Mason, it also includes other dimensions, other extensions to existing programs, extensions yet to be created or developed, dimensions of a program. There are a lot of existing groups out there, and perhaps the center might be viewed conceptually as an umbrella. Exploration of a cooperative effort or synergistic effort should take place so that we make the most efficient use of the available time, effort, energy, and money.

If, indeed, an effort is made to reach out to the community besides the sectors that have been identified--the kids, the young adults, the handicapped, the senior citizens--this outreach effort can take advantage of existing groups. I am thinking of the church groups, the youth-serving agencies such as YMCA, Campfire Girls, Girl Scouts, and recreation departments. The schools have been mentioned. There are civil organizations and homeowners' organizations. They can all be used as a source of input of what they think such a center might provide. Of course, you run the risk of getting the answer, "Gee, we don't know. Why don't you tell us?" But I think that we should give them the opportunity. Even a random survey. I don't know if any of your organizations have gone to a shopping center on a weekend and stopped every 10th person and taken a survey on a face-to-face basis on what they may identify as a critical issue, or in this case how they would like such a center to develop.

I guess my biggest concern, as we take a look at either a centralized program or a decentralized program, is that it be interactive, experiential, and creative. Perhaps it will involve drama and music. But I am concerned that we come up with a program that will reach the "left-outs" that we have in our community, so that they will not become the "drop-outs." I hope that in this manner we will remove the strangeness of the familiar.

Switzer:

I would just like to get a sense from the audience of whether you want to stay in a formal session like this and ask questions or whether we should break and have wine and cheese and do it informally. I think we have really imposed on your time today. Is there anyone who feels that there is a need to continue in a formal way like this? No? Five minutes, fine.

Noble:

Is that agreeable to the panelists that we open it up for questions? Let's have it be more than questions. How about discussion? And to facilitate that suppose all of us move out from behind the tables and sit around front. I think we can function without the mikes. Do come in some more. There aren't that many of us in the room that we can't do that. We do have mikes here and I believe that they are live. Are those the ones you are doing your taping from? Okay.

Switzer:

Greg, I would like you to comment about the park's transportation plans. I think that one of the questions that at least I have is about really getting down to the neighborhoods, the inner-city neighborhood. Is the park's transpor-

tation plan really going to bring these people to the Fort Mason Center?

Moore:

What Mark just asked is a very large question, and I will try to answer it as quickly as I can. The National Park Service, when we started the GGNRA, recognized that one of the most critical situations we would be facing was transportation to this park, from the standpoint of making it accessible to people who don't have cars and from the standpoint of protecting the park from the impact of automobile traffic within it.

The legislation for the park set up a travel study, which is a multi-agency look at this specific park and transportation solutions to the traffic problem and to deal with the question of access to the park for the communities living nearby. A number of recommendations came out of that study, some of them directed to the municipal railways system, some to the Golden Gate Transit, and some to the National Park Service.

Recently with the passage of legislation for a park called "Chattahoochee" in Atlanta, which is a park much like this in the city of Atlanta, the Park Service was given authority for the first time to spend money on transportation systems which go outside of its boundaries. Before this time we had been specifically prohibited by legislation to fund any transportation system that didn't go around in a circle inside the park. Anything outside the park was viewed as the responsibility of local transportation agencies. However, a portion of that legislation said no money may be spent on charter systems. In other words, you may spend money to extend the Muni line that doesn't quite make it here, or to get a Golden Gate bus line out to Point Reyes, but you cannot, by legislation, specifically take groups of people from one location to another with this money as part of a charter system.

What that ends up with is some progress in some places and some problems in other places. As a result of the transportation study the Muni system has placed a very high priority on bringing the streetcar line along the waterfront through this tunnel and terminating right here at the Fort Mason Center. That is one of the proposals that is high on Muni's priority right now. We have the ability to assist in funding like that.

Another proposal that we are hoping to get funded is for a shuttle system along this waterfront that would connect all the lines that come close to Fort Mason but don't quite make it here. This will solve some of the problem, because people who can deal with public transit as it now exists and are comfortable using public transit, with the transfers and things that are involved, have much better access to Fort Mason.

I don't think it solves, Mark, the question you were referring to, and that is the problem of taking specific groups of people from one location to another by funding a bus that is for that one audience. That is a problem that we have not resolved by funding. We have on special occasions gotten some funding through various programs to do this but only on an irregular basis. I think at times the community is very confused about our ability to help them with this problem. The Municipal Railway system regarding bus chartering is extremely reasonable, but even though they are reasonable for destinations within city limits they are many times beyond the budget of the community organizations that are trying to put the programs together. I don't know, does that answer your question? It seems like a long answer.

Leslie Dierauf, California Marine Mammal Center:

I think that one of the very important things to do is to be sure that we don't duplicate things at this center that already exist in the Golden Gate National Recreation Area. How are we going to use the information that other organizations

in the GGNRA have? That would be the most important thing to do today. Everyone who has spoken has had wonderful ideas, but they already exist somewhere in the system right now.

Noble:

Planning it! I am going to betray my own prejudice right now. I am not sure that a moderator should do that, but maybe I am no longer the moderator. I don't have a lot of faith in the planning process. I see perhaps in this culture generally only two places where it works. One is in the business world, where only the most simple-minded, restricted kind of planning is done. Planning that works towards profit is one dimension of many, many, many dimensions that public planning has to have. Public planning for the most part does not work except for other very simple-minded things like purposes of war. Planning seems to work to some degree there. And the inefficiencies can be forgotten about.

With social planning we have a lot of problems. I am not sure that there is any place that has ever worked in this culture, where we have planned a new city or a housing development or a recreational facility on a large scale and the planning has contributed in some major way to the success or failure of the project. Paul Valery said, "The great travail of the modern age is that the future isn't what it used to be."

Fort Mason is one of the few outstanding exceptions to that that I can think of. There is an extraordinary plum here. Nothing like this has ever been given to people like us to chew up before, and nothing like this will be available again to do this with. It is unique in all of North America and something extraordinary ought to happen here. It won't come, with all due respect, from the Park Service. And with all due respect I don't think it will come from the Fort Mason Foundation. I think that Mark's proposal for the marine resource center here is an extraordinary one, and I don't know where the genius of this place is going to rise up. I hope that is one of the seeds, but it is going to come from people just deciding that this place is important and somehow beginning to do it, within or without the planning process.

Switzer:

You lost your role as moderator, but you neatly summed up for me and finished my work. I think enough is enough and I really appreciate some nine hours of sitting and discussing.

Thank you very, very much for your participation. I encourage you all to stay around and have some wine and cheese and discuss.

Saturday, February 23

Switzer:

The sun would have to come out today and make us all anxious to go outside after about ten days of rain. Yesterday was a very busy and hectic session, and I hope that today, with a little smaller crowd, will enable some people in the audience to be a little more involved in the discussions. The session this morning is entitled "The Constituency for the Golden Gate Marine Center."

Yesterday, I think, we clearly established that the essence and the major thrust of what we should do at Fort Mason is a public education facility that serves the casual park visitor as well as the community. However, if a public education facility is to work and tell the message that is important for the public to understand, the people who are actual users of the marine environment and involved in marine affairs have to be involved in this institution, and this institution has to have benefits for them. So today we are going to be considering that.

I would like to set the tone of what I hope the discussions are about by quoting Dr. John Isaacs, whom I am sure you are all familiar with. He is one of the most interesting spokespersons for the world oceans and the marine environment. He said, "There are great and ever-growing funds of scientific and technical knowledge and understanding of humankind and the planet. One of the most active is the understanding of the sea, of human influence upon it, and of opportunities for human betterment from its resources. Knowledge and understanding of the oceans encompass a span between the broadly fundamental and the sharply practical. This wide range of knowledge of the sea clearly possesses great potential for important guidance for the direction of human activities. Yet its influence has been less than its potential. Most legislative and regulatory actions have been little influenced by what is known about the sea and reflect the failure of the research scientist, the public, and those in industry and government to communicate." I think that perhaps the opportunity that we have here at Fort Mason is the opportunity to establish an institution that will facilitate that kind of communication.

I have a few announcements regarding program changes. Huey Johnson is not able to attend this morning. The assistant secretary of the Resources Agency is here, Mr. Kevin Shea, and he will be talking after I introduce the first speaker who is not on the program. The speaker who is going to start off this morning is a person I originally thought of by way of trying to convey the extent and meaning of the marine resources of the area and the world. At the time that I tried to contact him he was out of town. So I wasn't able to line it up, but he came out of his own interest. Dr. Sidney Holt works with the Food and Agriculture Organization, and I think is recognized by many as one of the leading experts on the world's marine resources. He is also an instructor at the University of California at Santa Cruz. I think he has a twinkle in his eye and some idea of what he is going to say. I haven't talked with him about it, but--Dr. Sidney Holt.

Dr. Sidney Holt, Food and Agriculture Organization, the United Nations:

Mike Herz has correctly identified this as my security blanket. (Holds up a world globe.) We will come to that a little later. I really hadn't expected to speak until I was asked last night. I am not really sure what useful things I can say to this group. I don't know anything about California except that it is a lot wetter than I thought it was, as I've been discovering recently.

I thought the most useful thing I could do in a few minutes--I hope it is useful anyway--is to say something about my own experience as a scientist; that is, as one of the users of the marine environment. We usually don't think of ourselves in that way, but we have come to realize that that is just what we are--one of many competing users in the marine environment. I wanted to share

with you some of the conclusions that I have reached in recent years trying to do what John Isaacs was asking in the quotation that you just read, and in doing so try to pick up a few of the themes that Sylvia Earle threw at us yesterday morning.

For millenia man has looked out from this planet at the external universe, but when he spoke about the world he also meant some small part of the world. When the Greek spoke about the world he meant the eastern Mediterranean. He used the word "world" just as mankind, talking about mankind, until very recently always meant a small part of mankind--particular races, sexes, age groups, or whatever. I think that it is only now--and this is where I agree with Sylvia--that we are at a very fascinating period of history. It is only now that a world view is truly possible. The planetary view is truly possible. We have to become convinced and convince others that it is truly necessary. Not only for our own survival and wellbeing, but because of our particular powers as a species for the survival and wellbeing of every other species.

Among scientists with whom I mix mostly, or have done until recently, oceanographers are, I think, the group who have come closest to a true world view. I discovered this in the late 1960's for myself when I went to work with UNESCO in Paris for a while in an organization called the Inter-Governmental Oceanographic Commission, which was set up to coordinate oceanographic programs on a regional and worldwide basis. I had mixed until then with fishery scientists, and they tend to be pretty parochial, with perhaps the sole exception of the Russians, who have for a long time taken a planetary view. This has been translated into a fishery industry on a planetary scale as a deliberate decision based to a large extent upon that view of the fishery scientist. But with that sole exception, the fisheries people are parochial in comparison with the oceanographers.

I began to see in those two or three years in UNESCO that to an oceanographer, and now to me I think, not only is the planet mostly water--and we always see the figure 70 percent or whatever it is quoted at us, but really for practical purposes it is all water. The land masses we are so impressed by are really just bits and pieces in a geological sense floating around an earth surface, never even in the same place for very long, floating about, breaking up, and joining together again. For the physical oceanographer and also for the climatologist those land masses are merely a nuisance disturbing an otherwise perfect globe for which they can make models which will predict currents, predict climate and its changes. This is a new view of the world that has come into being in the last couple of decades.

When I went to join UNESCO and work with the IOC, the Oceanographic Commission, the great password then was training. Developing countries had just begin to join that commission, which until that time had essentially been a club of the big oceanographic powers. They wanted training and they were talking about specialist education. That is really not what we are dealing with here, but I had to go through the phase of being involved in that for awhile.

At the same time, Arvid Prado raised in the United Nations General Assembly the whole question of the law of the sea. The UN began to get into the law-of-the-sea business, the discussion of which is still going on and may be finished this year. We have had just about a decade of negotiations and a new law of the sea.

In 1970 we were faced with a situation in which a number of diplomats, later several thousand diplomats and their expert advisors, were discussing what to do with the seabed, and no one had ever seen it or had any real idea what it was about. I remember Peter Thatcher, who is now the deputy director of the environment program, but who at that time was in the State Department here on the UN delegation. He had the idea right at the beginning to take a lot of the foreign diplomats in batches down to the Caribbean to a submerged habitat, if only to 30 meters, and show them the seabed.

The impression that this made on the delegations from many nations impressed on me the need, first, for direct experience, and second, that we must not forget that when we talk about public awareness we are not just talking about a homogeneous mass of men and women in the streets or even the large subgroup of children, but all sorts of subgroups of the population who come to get involved with the sea in some different and special aspects. This included, as one very special group for example, diplomats and lawyers, who are negotiating a new law for us. There are many other groups of this kind for which arousing awareness calls for specially directed actions. I think I have learned that lesson many times in the following years.

After a stint at UNESCO I went to Malta for two or three years and started working on a very different scale indeed, with school children for whom we tried to organize international training courses and do some of the things which are perhaps much closer to what you might be doing through this center. I remembered the lesson of direct contact, and at that time we tried to choose the activity which would give the practical experience from which all other things could be derived. Because Malta is in a nice, warm climate, we chose scuba diving and taught children of 13 or 14 years of age from all countries in the Mediterranean to dive. Not just see the animals but to experience the sea the way that Sylvia mentioned yesterday morning. When we gave them some oceanography and talked about thermoclines, we knew that they had felt the thermocline by having their feet in cold water and their head in hot water. This made an impression of a quite different order from the classroom experience that they had been used to.

We also felt--and I see that in what is being talked about here--that it was absolutely necessary to get away from the idea that science of the sea was mostly marine biology and looking at animals in tide pools. We tried to organize courses that talked to even quite young children not only about biology but physics and the way that the continents move about, about law, about politics, and about resource economics. We discovered that all of these things can be, if you think carefully about the methods, taught quite effectively to children of 12 years old and more. I think this is a challenge that we need to meet.

We also found that there were practically no teaching materials that we could effectively use for that kind of purpose and we had to make our own. We went back to UNESCO and said, "Please have a look and see what these kids are getting in school. What do their textbooks show?" So a survey of textbooks used in about 20 countries was made, not nextbooks about marine science or about the sea but simply textbooks about geography and history. We looked to see what place the sea was getting in those textbooks, and we realized how enormously undervalued the sea was. We looked at the geography textbooks, physical geography that started with the discussion of world climate or regional climate and weather. We could find only one out of 80 textbooks that had one or two sentences which told the children that the weather and the climate were essentially determined by the heat exchange between the ocean and the atmosphere, and by the consequent water exchange. Textbooks of geography--I don't know what they are like here in California now--but textbooks of geography in countries we looked at simply do not recognize the fundamental daily importance of the ocean. One big problem that we perhaps still have is to see how this can be changed.

Since that time my life has been devoted almost entirely to research on and the conservation of marine mammals, especially whales. We are used to thinking that the threat to the whales was the excessive hunting of them and that the way to correct this was either to restrain hunting, restrain whaling, or to stop it completely, either on grounds of uncertainty about their survival or on ethical grounds which have become, perhaps, the dominant thing in the environmental movement as far as it is directed towards whales.

But we are beginning to realize that there are bigger threats. As far as education is concerned, if hunting is the threat then our problem is to show people that the resources are finite and not infinite. This problem we have met throughout the world in fisheries, to get a real conviction that the resources of fish as well as the resources of whales, if they are to be regarded as a resource, are limited. This is a concept that has taken two generations to get more or less commonly accepted. But now we are seeing very different threats. The real threat to the blue whale now is not hunting. We can reduce it, we can deplete it--there is unofficial whaling going on, but we are still not exterminating it. But fisheries that are starting in the Antarctic for krill, the little shrimps that whales live on, are in fact turning out to be a much greater threat; at least that is so if the models we are now building are anything like reality. A relatively small amount of the whale's food that is taken away would lead to a possibly irreversible decline to extinction of the blue whale and other large baleen whales.

This leads us to a slightly different problem in public education and awareness. That is not so much a discussion of limits but the realization of true interconnectedness of everything on a planetary scale. Another challenge of education--and certainly to which the scientist should be contributing--is the means to get over that idea and to illustrate it. How to get this idea over to the fishermen who want to get rid of otters and dolphins and so on which are eating "their" clams or "their" fish. How to get it over to the yachtsmen and to other seafarers. I may say that in Malta when we tried (and perhaps the experience is very different here and I would be interested to hear about it this morning) when we tried to interest yachtsmen who visit Malta and base themselves there, many hundreds, thousands of them, we found it extremely difficult to get them to take an interest in the sea on which they were sailing. This really surprised me. I thought, here is a constituency that will respond. In fact we got very little response. Perhaps that was the nature of the Mediterranean yachtsman, I don't know.

Another thing that has been revealed to me, at least through attempts at education, is the special role of scientific research. We have got used to hearing that what is needed is research to provide the basis of knowledge, and then you kind of merely translate that knowledge in certain ways to make a wider population aware of it. I think that the reality is somewhat different. What we found again and again and are finding right now in an attempt to develop a public awareness program on a worldwide scale about marine mammals and the threats to them, is that the attempt to do that itself reveals what research is necessary. To have a public awareness program that is effective you need in fact special research programs which give you the particular information that you need to have to convince the constituency. I think that we have not thought enough that way. We've thought about hierarchies and knowledge and then expressing it through media. It isn't like that; it works both ways, this process.

We are also beginning to see, as our attitude to the ocean changes, and it is changing very gradually--an ethical change and a use change, that other kinds of research are needed and other approaches are needed. We are seeing this with respect to marine mammals as far as whales are concerned. We are trying to see how we can do what I call benign research. How we can find out about whales and their life without interfering with them in a way that changes them. This is a challenge to scientists, but it is also something in which we are finding that many other kinds of people than scientists can get involved and need to be involved.

Well, I started out by saying that I discovered that physicists and meteorologists and geophysicists took a world view. I discovered that ten years ago. One of the things that has happened since is that biologists and chemists have

begun to take a truly planetary view. We used to have the idea that there was a planet which was a dead planet and had certain conditions and life somehow developed on it and evolved. Then we began to see that life had changed that planet, that the composition of the atmosphere is as it is because life is there. Perhaps now, that thought has come to its greatest development in what is called in the books "the Geier hypothesis," in which the planet is seen to be not something that in some respects resembles an organism, but is an organism. That what has happened is that life has changed the planet and then has evolved to suit itself to the environment which it itself has created. The ramifications of that idea are enormous, and they affect particularly the approach to marine education. I know I am talking on a grand scale, but for me at least, the broad framework is necessary as the basis for discussing what we do to show, say, a particular group of children in San Francisco something about the sea.

The planet for these reasons is perhaps as a whole not so fragile as some of the environmentalists--and I count myself as one--have thought. It certainly is fragile in some ways, and our big problem is to learn how to worry about the right things and not worry about the things to which the planet will in fact be responsive in a positive way.

I said that scientists are a category of users of the sea. I think some of us, particularly biologists and people concerned with conservation of fisheries and the conservation of whales and so on, are rediscovering a humane quality and that is the quality of humility. I've just been through years of working with the International Whaling Commission, in which scientific groups have been constrained to reanalyze every year the data about whales and come out with better and better estimates of how many there are and what the threats to them are doing. What we are finding is that contrary to the old idea that the more you know the more certain you are, we have found clearly that the more we know, the more uncertain we are. We somehow have to learn in expressing our ideas to non-scientists to emphasize our growing uncertainty--something that Sylvia mentioned yesterday--and yet at the same time not to give the idea that scientific research is useless. It is very easy in fact for that idea to come out of expressions of uncertainty.

What we are all learning--some of us at least are trying to learn--is to communicate. We have forgotten how to communicate with ourselves. I can't read Science or Nature magazines properly anymore because I can't understand any of my fellow scientists in fields marginal to my own. So it is no wonder that we have difficulty in communicating with what we condescendingly call the general or lay public. We have to learn how to do this. I want to see scientists doing this more.

These are the main thoughts I have had overnight. I don't know if they are of any use, having communicated them to you. Sylvia talked about conveying the wonder of the ocean to people. I think about that but also about conveying the meaning of what we see to people, at least insofar as we can divine that meaning. We have to understand from seeing the sea what the qualities of it are that are so different from the land. We have made some mistakes about that. Cousteau talked about the "silent world," for example. This is the classic one. We know darn well that it is far from silent. It isn't cold either and it has movement, but perhaps these are not the important things. Things that we see now are, again as Dr. Earle mentioned, the lack of gravity we experience. The fact that the surface of the sea, which for us is something that is difficult to look through, for those in it is in fact the mirror that reflects back everything that is underneath it. The fact that light here comes from up there, but light in the sea is made by the animals themselves. There is light everywhere and nearly every animal is luminiscent in deep water. We have to try to see how to express the qualities of the sea of the planet which really make it another world for us land animals.

This sort of thing, when we have decided what to communicate, can be communi-

cated, I think, by shock tactics. If this had been a group of young children, in my experience many of them would already have had their hands up or interrupted me and said, "But you have got the world upside-down. (Gestures to 'up-side-down' globe on table.) You have got it wrong." I would say, "No, for me as an oceanographer that is right because that is where the water is, there, and that is the top of the world." That little demonstration can show 10-year-old children that the view of the sea, about the sea, is in some ways different and in an important way different from our view from the land. We have to try to find the tricks, the ways of communicating to different groups of people, to approach them at their level with their particular kind of understanding. Thank you.

Switzer:

Yesterday I thought after listening to the session that, my God, we have a lot of work to do, and after listening to Dr. Holt we have a lot more.

I would like to introduce Kevin Shea, who is the assistant secretary of the Resources Agency for the State of California. He will be talking about California's marine resources and perhaps the context or the substance of what the users of the marine environment in this area must address. Mr. Shea.

Kevin Shea, Assistant Secretary, California State Resources Agency:

I would like to preface my remarks with two or three points. First of all I would like to express Secretary Johnson's regrets for not being able to be here this morning. I know he looked forward to this particular workshop. But I can assure you that there is a lot of business being transacted in Sacramento these days. For the last couple of months and for the next few months, the various agencies will try to anticipate what is going to happen if the other shoe drops in the form of Proposition 9. The calculators are blinking away far into the night to try to figure out what we are going to be faced with should Proposition 9 be successful.

The other thing that I would like to say is that there seems to be an epidemic of surprises this morning. When I arrived home yesterday evening and informed my wife where I would be this morning, my daughter, 11 years old, said, "Gee, Dad, you must feel a little bit like Lawrence Welk after he has been asked to substitute for the Rolling Stones at a rock concert." I didn't have time to really plumb her thoughts on that particular remark, but perhaps it has some merit. Yesterday evening I tried to put myself into Huey Johnson's mind, which is not altogether an easy thing to do. We had a very short time to talk about what remarks I would make today, but I tried to formulate yesterday from what I know of Secretary Johnson's attitude on all resource issues what he might say this morning. I will try to as faithfully as possible paraphrase at least what I think would be on his mind this morning.

I think one thing that would certainly be a major part of what he would say is that like all other resources, California's marine resources are going to play a greatly increased role in the future of the economic health of this state and in fact probably the economic health of this nation. On the other hand the general public issues that are now beginning to shape and will have a greater force in shaping resource policy are changing very rapidly. I don't think the changes are transitory. I don't think that they will wax and wane as some issues in the past that have shaped resource policy. I think that they are permanent changes and profound changes. They will affect the way we look at the entire natural resource base that we are dealing with.

I think also that there is a great unease and disenchantment in the general public in terms of how we are going to deal with natural resources in the future. There is a rather disturbing general feeling among the voting public and citizens in general in California that they have been led down the primrose path. I think

that we have had a long and fanciful romance with the idea that we can have what we want when we want it and in what quantities we want it. At the least the general public has perceived the use of natural resources in that way. But I think there is a growing distrust that this is going to continue into the future. This distrust is certainly well founded.

On the other hand it is not altogether an unhealthy condition. That will be determined sometime after June, I suppose, but what has happened is that distrust has been translated into an attitude which is going to force all resource managers into taking a very hard look at what policies they have been formulating in the past and how they are going to formulate policies in the future.

We are going to have to justify the decisions that we make more carefully. We are going to have to explain the programs that we devise much more precisely. I think one of the recurring questions that we all hear from the general public is how we got into this resource mess, particularly the problems that we are now experiencing with non-renewable energy resources.

I think that voters--when I say "voters" I guess that is sort of a bureaucratic way of looking at the general public--I think the general public feels that they have been led down the primrose path and that there is a great deal of frustration out there which has been translated into some fairly serious political processes. Certainly Proposition 13 is an indication of that malaise, if that is what we can call it. Proposition 9 is another one. So for that reason I am particularly pleased that the main issue of this session is how to get the various users of marine resources involved in the process of public education, particularly with regard to the nature and importance of California's marine resources. I know that it wasn't too long ago that many resource managers looked upon the marine environment as a relatively untapped source of income for those who had the ambition and the wherewithal to go and get what they could get. That particular attitude is beginning to change, and it is beginning to change in some very profound ways.

Other attitudes are beginning to change as well in regard to how we view the ocean and its resources. I think for a long time we were deceived by the idea that the oceans were a bottomless sump in which we could hide or dispose of the wastes of all kinds of human enterprises. That particular attitude is beginning to change, with the increased number of users of marine resources. It is beginning to change with a clearer understanding on the part of the general public about what it means to contaminate an entire eco-system with long-lived and rather toxic materials. We are seeing this in the paper almost every time we open a paper in the morning. We see where PCB is contaminating penguins in the Antarctic or mercury is contaminating tuna in the open ocean. These things are beginning to sink into people, I believe. So that we have a very complex mixture of feelings that results in this frustration that we are experiencing.

The public is being told on the one hand that the renewable resources basis is being degraded, that oil is running out and at the same time we are contaminating the oceans as well as the terrestrial environments. All together it creates a situation where this frustration is being felt, probably not as greatly in the area of marine resources as it will be in the future, but it certainly is something that marine resource managers are going to have to deal with and come to grips with very soon.

More recently we are beginning to think about problems that have grown out of technology that have been contemplated for the offshore marine environment as well as the onshore marine environment. We are going to have to take a very close look at how our onshore activities affect marine resources and the productivity of marine eco-systems. One perfect example of onshore activities that are affecting the productivity of marine eco-systems is the situation we now find ourselves in with the Pacific salmon and steelhead populations. Certainly the agricultural activities onshore, forestry activities onshore, all kinds of mining, and all kinds of in-stream activities have affected the reproductive habitat of salmon

and steelhead populations. We have to take this into consideration when we begin to analyze just precisely what our marine resources consist of.

I don't think that we have a very good history or a history that we can be proud of in regard to how we have used our marine resources in the past. I certainly don't intend to provide any detailed blueprint of how we can manage resources in the future, but I think that at least I can outline some set of conditions based on what I perceive as the economic realities, the environmental realities that lie ahead that should be weighed when marine resource decisions are in the process of being made. Foremost among those conditions, as it is foremost among all other enterprises in today's world, is the consideration of energy in dollar expenditures. I suggest that in every resource decision that involves the expenditure of large amounts of money a realistic net energy analysis and cost-benefit analysis be made. Most of you are aware that the oceans have been considered for a long time as sources of renewable energy systems. Ocean currents and temperature differentials have been studied in this regard, and in many parts of the world the energy of tides has been considered and used as a renewable energy source.

Each of those potential energy sources has very high capital and energy start-up costs. While most of them are not feasible at this time, they certainly will become feasible as energy from fossil fuels becomes far more expensive. What we need to do in each of these cases is make very careful analyses of how we are going to approach putting these energy systems into use and analyze them in such a way that the analysis can be adjusted for the rapidly changing economic conditions that we are seeing today.

The second condition that must be foremost in the minds of those who formulate marine resource policy in the future is that the living resources of the sea, like all other earth-bound renewable resources, can be exploited beyond their ability to sustain their productivity. Dr Holt touched on that issue; that is, the finiteness of the living resources of the sea. It is my view that the overriding goal of any renewable resource management scheme is to continue the flow of resource materials to sustain our economic health without permanently damaging the resource base.

In the case of our ocean fishery this will require cooperation, understanding, and, as Dr. Holt pointed out, a great deal more research. For unlike many other natural resources, marine fishes cannot be defined within political boundaries. They cannot be surveyed. They are difficult to analyze in maps, as we do for our agricultural land and our forests. They freely move across international boundaries. Their life histories are little known and in many cases their abundance and reproduction potential are little known. It is true that over the past few decades we have broadened our knowledge of the physical and biological limits of the marine environment, but we are still in need of increasing our knowledge so that we can manage our fisheries over the long run.

Today the waters off the coast of California yield somewhere in the order of one-half billion pounds of fish and shellfish, which are distributed rather unevenly over 80 or so species. If you add to that the nearly 200,000 tons of kelp that are harvested annually, you have a significant contribution to California's economy. The question at this point is whether or not the yield can be sustained or perhaps increased over the long run. But given the growing importance of this particular resource, it is a question that I think requires very serious consideration before we go much further in the exploitation of the ocean's living resources.

A third major consideration of the management of marine resources is the increasing potential for conflict among resource users. Over the past few years we have seen this problem erupt into major political battles in almost every quarter of the United States--in Maine, Maryland, especially the Gulf states, and in the Pacific states. The issue of resource management and marine resource sharing and use has become one of the political battlegrounds. Many of these battles, in fact

most of them at this point, have centered on the exploration for the production of petroleum. I think that we can expect these conflicts to heighten in the near future. It is also a certainty in my belief that these conflicts will continue as user numbers increase and as the variety of uses increase, perhaps even in ways that we can't anticipate today. Mineral recovery is likely to increase. As I mentioned earlier, so will the attempts to establish renewable energy systems in marine waters. There has been also planning in a rather substantial way for the establishment of offshore floating nuclear reactors. I think the Department of Energy has sort of backed off of that particular issue in recent months. We have heard a great deal of talk by the Department of Defense of the possibility of deploying sea-floor missile systems. I believe that if we keep track of the situation that is now developing in Nevada with the possible deployment of the MX missile system we might hear more talk of deploying missiles on the sea floor. The issue over there is another resource issue; namely, the availability of water. Nobody knows where all that water is going to come from to mix all that cement to build \$33 billion worth of missile sites.

I doubt that anybody at this point can anticipate how all of this will be sorted out in the future. But one thing is certain: if we do it in a piecemeal way we are simply going to work our way from confusion to chaos. Perhaps what we need really is a sort of grand master plan for the orderly use of California's marine resources. I know that resource managers in other areas are beginning to develop such plans. In fact, lately they have shown some signs of really beginning to understand what the word "stewardship" means. Federal land managing agencies, for example, are beginning to develop under Congressional mandate a long-range resource management strategy for onshore renewable resources. It remains to be seen exactly how these will sort themselves out in the future, but believe me, the intention at this point at least is having a very salubrious effect on resource managers throughout the United States.

Finally, I think that we all have a comprehensive responsibility for the character and quality of this country's and this state's natural resource base. I think to meet those responsibilities in the area of marine resources will mean coming to grips with some very difficult scientific--as Dr. Holt mentioned--and social issues. In that regard, Secretary Johnson and of course his staff wholeheartedly endorse the public outreach effort that is being discussed at these workshops this weekend. I assure you, from my experience in the field of resource management and environmental concern, that an informed public is the best ally of any resource manager when it comes to making the tough decisions that are going to have to be made in the next 10 or 20 years.

Switzer:

Thank you very much. I think that we have some good information on which to base the panel discussion which I hope will get a little bit more specific on how user groups can get involved in marine education. Let's take a coffee break, and we will reconvene in about 15 minutes.

The title of this discussion is "How Do We Get the Users of the Marine Environment Involved With Education?" I don't think we are going to solve that problem; it is a difficult one, but we definitely need to address it if this center is really going to serve the public. The moderator of this session is Dr. Michael Herz, who is the executive vice president of the Oceanic Society, and Michael will introduce the panelists and call the contributors.

Dr. Michael Herz, Executive Vice President, the Oceanic Society:

Thank you, Mark. I am going to state a few biases to open this session to keep people from falling asleep perhaps. The Oceanic Society has been involved with the concept of the marine center for about four-and-a-half years. We began

saying at the first public hearing that there has to be some water-related use of this beautiful water-related space, and it shouldn't be used as an ice-skating rink or a tennis court, which were some of the plans which were seriously being considered. Similarly, I think that as the concept has evolved--and it has gone through a lot of incarnations--one of the guiding philosophies has been something that is really an Oceanic Society philosophy, and that is that we are trying to facilitate communication and interaction of the user groups. As we see it, the user groups primarily are: businesses and industries that are involved in the marine environment, the various government regulatory agencies which are involved in regulating industry and commerce, and then the educational and environmental communities, and recreational interests as well.

Just to go quickly through a list of users, we've got various industries like oil, like fishing, and we hope some day like the shellfishing industry; we've got seabed mining; we've got shipping, recreational users, boaters, recreational fishing, swimming, tide-pooling; we've got the research community (which I think as Sidney Holt indicated is reflecting the fact that they are being more aware that they are users than they used to be), and then there are the industries which view the ocean as a disposal medium--municipal and industrial waste dischargers. There is a plan also that the Department of Energy is working on right now for the disposal of high-level nuclear waste in the seabed. Then there is a group of government regulatory agencies, and a few examples are the Environmental Protection Agency, NOAA, the National Marine Fisheries Service, the Corps of Engineers, the California Coastal Commission, the Fish and Wildlife Service, the California State Department of Fish and Game, and regional agencies like the Bay Conservation and Development Commission. That is just sort of a smattering.

This morning we are going to look at some of the user groups that we haven't looked at before and change the order a little bit and have the individuals who are referred to as contributors be the first ones to come up and talk a little bit. I would like to see them talk about two things at least. One is, what are your needs for telling your story? We think that the concept that we are evolving is to develop a format where all of these user groups that I just referred to can tell their stories. Very often, particularly the industry and the regulatory agency groups have not had the opportunity to tell their stories. We want to know what you need to tell your story, and what the story is that you want to tell. Finally, let's reflect a little bit on how particularly the agency people view the notion of accountability to the public, which is something that often goes overlooked, and I think it should not go overlooked. So to start off, Bob Williams, who is the public affairs manager of the Richmond refinery of Chevron. Bob?

Bob Williams, Public Affairs Officer, Richmond refinery, Chevron USA:

It is always nice to follow a biased speaker because then you at least know where you stand. Oil companies are users of the environment in several ways, and I just want to touch on some of those and make some general comments and general observations here. Then perhaps there will be a chance for some questions later on, or maybe I can respond to some things afterwards.

Some of you might think that it is rather bold for an oil company to show up here today and to talk about information and use of the marine environment. It is pretty important that the use of the environment, as we see it and I think as a lot of other people see it, be brought in front of the public, and so I want to touch on those things here.

We use the marine environment in several ways. We do use water out of the Bay Area, out of San Francisco Bay--water that comes down the Sacramento River. We use water for transportation. Obviously you have seen the tankers coming in and out of the bay bringing oil that is converted into products that each one of us uses in our everyday life. So it is a transportation link for us. We also have an interest in exploring the marine environment for resources that are not

readily apparent; that is, the oil that would exist in underground formations. Again I am getting a little bit bold, because I am talking about drilling for oil off the California coast. We have done it for a long time. The oil companies think that there is a good chance we will find other deposits of oil off of California. So I will touch on that subject a little bit also.

Our success so far as a company or as an industry probably hasn't been very good because most of the time we respond to requests for information about what we do to the environment or our part of the environment. I guess there is a pretty good reason for that. I can relate to it directly because, as a public affairs manager for the refinery, I have spent a good part of the time the last several years trying to get people to come out and see what a refinery is about and what the oil industry is about. Except for high school students who come to find out a little bit about a refinery, people will not come out to visit the refinery because they don't have an interest in it. However, this last year because of the Iranian situation we were a very popular item. I threatened to hire police dogs to keep the newspaper people away, because everyone wanted to come to the refinery at that point.

I don't think our ability to go out and give people information is ever going to be very effective. I think the place that it is probably the most effective is responding to people who have a direct interest in a particular topic that our industry might be involved in. Most of our information has been disseminated in response to an outside request. We welcome all visitors. If anyone here wants to put together a group and find out what our refinery is about, feel free to call the refinery. As part of that tour we also talk about our use of the marine resources at the refinery. We will be more than happy to welcome you there.

I think that an information center involving marine resources, in my estimation and I believe in the company's estimation, should probably center around establishing information and not emotion. There is a tremendous amount of emotion directed toward marine resources and also around most issues today. I guess if our company and if I personally were to use an information center, talking about marine resources, I would like to make sure that it was channeled in a direction that would answer some of the emotional charges that are being made. It is very easy for most of us with little information to form a point of view. I think that is unfortunate because many times the emotion behind that determines public policy, and that is probably not always the wisest.

Two issues that we can highlight here very quickly are, first, supertankers. That brings a lot of negative response in people even though they may know very little about supertankers and about their effect on the transportation of oil throughout the world. The other one is OCS development, or Outer Continental Shelf drilling offshore. There are a lot of ways to look at that topic. When I think of OCS I always think about Exxon. They had a drilling rig off of the Santa Barbara Channel. They explored, found, and tapped an underwater reservoir of oil, and when that reservoir played out they cut the offshore drilling rig off of its legs. Now you can look at the spot where that drilling rig was and it is no longer there. Nor is there any effect of that drilling rig's having been there. So I look at the development of oil underwater as an interim land use. I think the word "interim" is important because it doesn't go on forever. Once you have produced the resource and everyone has used the resource, then things can return to their natural state.

If there is to be a center to give information to the public--as a personal bias, a little observation I had on the way over here--I think it ought to address the issues. I think we could probably put together a center that would give us a lot of fantastic information about the reproductive organs of the Pismo clam, and I think that that would be marvelous for those who are interested in that thing. But it would probably serve the public better to evaluate what the effects are of

waste on the marine environment or development on the marine environment and on the marine resources. We ought to channel ourselves away from some of the specific areas and perhaps direct ourselves to the general issues that the public is emotional about. Those are the ones that we should be addressing and dealing with, to see that at least an adequate amount of information is available so that they can make their decision on facts.

I will just close with the comment that I think that any information center ought to stress the multi-use of any resource. There are very few resources in this world that can be used in just one fashion. There are a lot of interrelationships and a lot of people depend upon different resources for different reasons. If any one of you went to the bathroom here during the morning or are planning to later on, you're impacting on the marine resource here in San Francisco Bay. So think about it--there are a lot of uses for any resource. So I think the multi-use aspect is a very important one. Thank you very much.

Herz:

Our next user group is one that contrasts somewhat with the previous one. It is the fishing industry. Rather than the person who is listed in the program, we are in for a treat because we have a real live fisher who is going to speak. Maria De Santos is the only woman doing commercial fishing in the Bay Area, and she has been doing so for eight years, quite successfully she tells me, and so she is going to talk a bit about that user group's perspective. Maria?

Maria De Santos, commercial fisher:

I want to grab the first minute here to respond to some of the educational philosophy that I feel coming down here, although I am not an educator. That is, the water is right there and the people are right there and I can't believe that it takes money and a conference and, you know, yet another institution to bring them together. I would like to challenge everyone that you, on your own, individually could accomplish everything that was brought up yesterday with two telephones and five hundred dollars.

All you need is a couple pieces of paper and stick them in the typewriter and it comes out and it says, "Hello, all of you enthusiasts, educators, club-goers, and issue orientators. Here are a thousand and one great ways that you can get into the ocean cheap.", And then you just list them all and you have to stop at 1001. You just call Ted at Pacific Boat Works and ask him when they are hauling the next big tug. He loves kids and he likes to explain how the prop controls the rudder. Then you list 10 people who will show you around the tide pools for \$35. If you want radars and lorans and real radios you don't have to spend the money, because there are a lot of people who are willing to show them all to you and do a song and dance at the same time, believe me. If you want to catch a 100-pound shark you can do it for a dollar and you can do it right off the pier over here and I can tell you which tide to do it on. Just go all the way through to 1001 and then go back to your telephone and wait. Put a big number at the bottom, tell them to call you. You tell them you will help to arrange it. You go back and you listen for the phone calls. If none comes you grab the other telephone and you start calling people and you say, "Hey Jim, you wreck another \$30,000 net yet? Oh good, I mean that's bad, but would you like some kids to help you repair it?" Then you call up a teacher and get everything lined up, you coordinate and you make a lot of education happen for nothing.

It just seems to me that a kid doesn't have to see the whale to appreciate sea life, any more than I have to go to the moon to appreciate the universe. If an idea costs a lot of money I would throw it overboard, because there are 1000 other ideas that don't cost anything. When you get into big money you get into big compromises and you get into big organizations and you don't tend to get things done.

Fishing. The fisherman and the fishing community is probably the most untapped source of information about the ocean--about the tides and the movement of the fish, the beauty of the sea, and the lore of the sea. That is because the fisherman lives out there--and not only that--the time that he spends out there. If he is not judging the ocean correctly, if his insight and perception about the ocean are not correct, he is not going to eat. It tends to make you a powerful observer.

If you think that jellyfish don't come in cold water and you put your net out in the water overnight and pick it up the next morning and there are six ton of jellyfish in the net, and you have to shovel them overboard all day long, and you sting all over, you are not likely to ever think again that jellyfish don't come in cold water, no matter how many books tell you they don't. If you think the salmon disappear when the water gets hot, so you say, "I will go albacore fishing," and you go in and rerig and you come back and go out 125 miles offshore and your buddies are catching the salmon like mad, well, you no longer believe that the salmon don't live in warm water.

The conditional paycheck, where it is "no fish and no money," makes the fisherman the best naturalist there is on the ocean. He is learning fast and paying attention. I guarantee you that if you ask them to your meetings and your policy-making meetings, and if you ask him to teach you, you will be richly rewarded with tremendous new information.

The second thing I think the fisherman can offer a marine institute is real physical resources. Our boats are small and very sturdy, with the latest electronic gear, the latest hydraulic equipment, and all for hire. You don't need to buy your own research boats. If you go out on these boats for just a day you can probably get any one of these boats for \$300. There are 1000 good research vessels right here in the bay.

Another thing that I think the fishery community can offer the institute is a tremendous amount of raw research data. Every time the fishing fleet comes in this information goes unlooked at, and it is not expensive to process. I can think of two examples right now. There are probably 10 or 15 very unlucky crab fishermen who have had their gear on the San Francisco bar out here during these last storms. They can tell you exactly where it was before the storm. They are going to be going out and looking at it now. If you are at all interested in how the bar shifts during the storms, some of these pots are going to be under 20 feet of sand. Some have rolled around because the sand has been taken out from under them. Talk to the fishermen for about five hours and you will probably get a pretty good picture of what happens to the sandbar outside the Gate in a series of bad southerlies.

Right now on my boat I have about four rolls of meter paper that I am going to throw overboard or in the waste basket, and they represent four weeks of every high water, three hours before high water and one hour after, running around the bay looking at very specific areas for herring. This is two high tides a day. If somebody would sit down with that paper for awhile or roll it out, I am sure that they could make some pretty astute observations about herring and how they move with the tides. How can the marine institutions help the fisherman? Eat fish. Promote fish. Understand the nutritional value, understand why we don't eat fish. I mean the beef-eating American mentality has just robbed the American stomach of the best food that there is, the only wild food that is left. Even organic vegetables come from a tampered-with seed. We won't touch herring and we won't eat anchovies, we won't eat Pacific whiting, we won't eat butterfish, we'll only eat albacore if it comes mashed up in a can, we won't eat bonita--it's all great food. Shark too--very good food. People should be educated to this. It is inconceivable the marketing problems that the fishing industry is having at this state of the game in the world. It is just inconceivable! Can't sell the fish--people won't eat it. The freezers down here are just exploding with

all kinds of good fish. We can't get rid of them.

Finally, and possibly the most important thing that I want to say, is another way the marine institute, any marine institute, can help the fisherman. The issues that are confronting the ocean, the crises that are confronting the ocean are overwhelming. The fisherman is more aware of this than anyone and more saddened by it too. The crisis in marine legislation is even worse. The first thing I want to ask is, don't believe everything that everybody tells you--Fish and Game and fishery agencies. There are no fishery experts. Nobody knows how many herring come in the bay. Nobody knows where the salmon go when the water gets hot. Nobody knows the answers to any of these questions--many, many questions--and a lot of people are claiming to. Be careful. Barbara, I am going to quote you because you said it well and it explains the big fear that the fishermen have. She said, "My biggest nightmare is a Friends of the Herring society." I think there has been as much damage done by good conservation intentions to the ocean and the fish as has been done by pollutants. I may be exaggerating slightly, but it is incredible what misunderstanding, misinformation, and not being careful can do. So be careful, but get on with it.

Herz:

I am going to tear up my card in the Friends of the Herring immediately. Is Captain Pollen here? Captain John Pollen is the Regional and Port Intermodal Development officer for the U.S. Maritime Administration.

Capt. John Pollen, Regional and Port Intermodal Development Officer, U.S. Maritime Administration:

Thank you, Mike. I don't know if you have ever felt about this small if you are not a good public speaker, but I mean, to follow Maria--that is going to be a challenge. I am John Pollen, as Mike said, and I am representing Mr. Thomas J. Patterson, Jr., our Western Region director of the Maritime Administration here in San Francisco. Mr. Patterson was asked by Mark over here to attend, but he had another conference that he already had a commitment to speak at. I know he would much rather be here today.

Before I tell you a little bit about our thoughts on the marine center, I think I better tell you a little bit about the Maritime Administration. With this group, I don't think you have probably even heard of our agency before. The buzz-word for the agency--every Federal agency has a buzz-word--is MARAD. So I will use that in some of this terminology. MARAD is an agency of the U.S. Department of Commerce, and it administers Federal laws designed to promote and maintain the U.S. Merchant Marine capable of meeting the nation's shipping needs for both domestic and foreign commerce and also for national security. The Maritime Administration is actively engaged in such key maritime programs as financial assistance, operations, commercial development, and maritime training development. Now since many of the workshop speakers have spoken about education, I think that I should mention some of MARAD's training activities.

The Maritime Administration operates the U.S. Merchant Marine Academy at Kings Point, New York. Just like the navy has an academy at Annapolis and the army has West Point. Ours is strictly civilian, but we do have a school where young men and women are educated to become leaders in the maritime industry, as ship's officers or in shoreside management positions. The four-year course leads to a Bachelor of Science degree and a license as third mate or third engineer. The Maritime Administration also supervises Federal grants, student aid provided to state maritime academies in Maine, New York, Massachusetts, California (we have one up here at Vallejo), Texas, and Michigan.

In addition, specialized training courses are provided by the Maritime Administration for regional offices, like here in San Francisco. We have a regional office

in New Orleans, New York, and Cleveland. In each one of these regional offices we have training programs. Experienced seamen are receiving navigational training, including loran-C systems, gyrocompass, collision avoidance, and radar. Now this one is very important because our agency does everything humanly possible to try to cut down on this human error with ship collisions, which all conservation groups are very concerned about. We also have fire-fighting and damage control instruction at the agency's facilities, which is also important, so if you do have an accident you can do everything possible so that you will not have oil leaks and so that you won't pollute the ocean. Our radar school in San Francisco is presently located right here at Fort Mason.

Now to talk a little bit about the Golden Gate marine center. My boss, Mr. Patterson, is very active with the National Liberty Ship Memorial Committee. This organization is presently restoring the last true Liberty Ship, the "S.S. Jeremiah O'Brien." The "S.S. Jeremiah O'Brien" is presently down at the Bethlehem shipyard being restored. The "Jeremiah O'Brien" was officially placed on the national register as a historical object and declared a national monument in July of 1978. Due to generous contributions of the U.S. maritime industry, maritime labor unions, allied organizations, and hundreds of individuals throughout the nation (a lot of these individuals were people who sailed on Liberty Ships during World War II and afterwards), and also through a matching grant of a little over \$436,000 from the National Maritime Heritage Program, the restoration of this ship was made possible. The "O'Brien" will be shifted to Fort Mason at Pier 3 in May to be permanently berthed here in the Golden Gate National Recreation Area. You probably notice the model over here of a ship. I think that is the "S.S. Jeremiah O'Brien." It is hoped that the ship's five cargo hold compartments will sometime in the future house maritime exhibits including a portrayal of the Liberty Ship era and the accomplishments of the eventual maritime industry and the history of the U.S. maritime labor movement.

Now the National Liberty Ship Memorial Committee is comprised of leaders of the U.S. maritime industry; almost every president of every U.S. flag carrier is involved. All of the maritime labor unions of the country are members. Also there are ex-officio members hailing from interested governmental agencies such as the National Park Service and the Maritime Administration. This working group is under the direction of the national chairman, Thomas B. Crowley, chairman and chief executive officer of the Crowley Maritime Corporation here in San Francisco.

I think that the Libery Ship will be a big attraction for the marine center, and I think that you will be able to count on the marine industry and labor to support the marine center heartily. I think that it is important, so that this center is not on the tax rolls, to get the support of industry and all segments that are interested in this center. I think that the marine industry will certainly be able to do its share.

There was one other thing that Mr. Patterson has asked me to mention. He feels that it would be very beneficial to devote part of your land-side facilities to a trade center. I noted in the San Francisco Chronicle a couple of Sundays ago that next September there will be a trade exhibit at Piers 2 and 3 from the People's Republic of China. We think that this is a wonderful idea and we hope that the exhibit will be successful. Our agency, since we are in the Department of Commerce, is interested in promoting water-borne commerce. Since San Francisko Bay is a major trading center, I think that it is important to expose the public and the many San Francisco visitors who come here every summer (it seems like throughout the year now) to the importance of California's international trade.

Our agency stands ready to work with the sponsors of this center to work with you in any way possible. These are just some of our ideas to consider.

Herz:

We had hoped that perhaps you would make mention of the radar school which is down on Pier 1. We thought that there may be a way where, ultimately, if it

could be tied into the marine center it might make an interesting exhibit. Someone suggested yesterday having a radar screen in the center which would give us information on the ships coming in the Gate.

Pollen:

That is entirely possible.

Herz:

Good. Kitty James from the Yacht Racing Association. Are you here, Kitty?

Kitty James, Secretary, Yacht Racing Association:

Thank you, Mike. You are one of the few people that could talk about yacht racing better than I could. When people hear about the Yacht Racing Association the first thing they think about is wealth. The term "yacht" has come to mean that, but it is really not true. Almost anyone can buy a boat for a couple thousand dollars and race it. But I would really like to speak more about--instead of the racing yachtsman or boater--the boater in general.

I had the opportunity the other night to meet with the Bar Pilots and the Inland Pilots. One of the things that they were concerned about is that the increase in yachting on San Francisco Bay, and boating in general, is so great that in four to five years we are looking at restricted areas for boating. The main ship channels will be totally restricted. We are going to try to work with them to make sure that this does not happen. One of the main things that we are tossing about with the Bar Pilots and other members of the commercial fishing and shipping industries is whether we can set up some kind of educational program that serves the boater and the commercial interests to keep this bay open and free for everybody's use. This is an educational program of the kind that, I think, can be part of the Fort Mason Center, where you are educating the general public, whether they are actually boaters or not, about what goes on on the bay as to the movements on the surface of the water. We are willing to participate in this. We are trying to kick it off now on a very low-key basis.

There is legislation up, and it is being discussed by the Coast Guard right now, to get these designated areas pushed through not just in California, not just in San Francisco Bay, but throughout the United States. If we get into a situation where there are restricted areas, I think that the general public is going to lose a great deal of the benefits of the bay and the approach areas--the general public being not only the people who own boats but people who go out on boats or are interested in buying boats in the future. We are getting to the point where sailing is an inexpensive hobby.

The cost of fuel means that such things as auto racing, such things as power-boat racing, are probably going to be cut to a minimum. That will become an expensive sport, if it is not now. Sailing will continue to be less expensive because you are not dealing with fuel costs, you are not involved (with new boats) in finding a berth for it.

The thing that the Yacht Racing Association would like to do and can contribute to Fort Mason would be to help in this general education area. We will be willing to work on boating safety courses and also just on the general surface use of San Francisco Bay. If there is anything that we can do to help, any suggestion that you have, give us a call. We would like to help coordinate it. Thank you.

Herz:

Thank you, Kitty. I think that another thing that YRA could help the marine center with is to try to facilitate access to the water through developing programs on member clubs' boats. There are an awful lot of people that live in the Bay Area that have never been out on the water.

James:

We are this year seeking approval for the first time, and we will see how that one goes.

Herz:

Great. Next up is Orville Magoon from the Corps of Engineers.

Orville Magoon, U.S. Army Corps of Engineers:

Thank you very much, Michael. I would like to start off by mentioning first that we have heard a lot about the oceans; we have heard about factors that come from the deep ocean; and we have not heard a lot about the coastline. Most of you here know, but perhaps some of you don't, that 1980 is the Year of the Coast. Many of the nation's conservation groups felt that what had happened to our coastlines had gotten them into such an endangered point, and we really were not giving them the consideration that we were four or five years ago. The idea of the Year of the Coast, sponsored by the Friends of the Earth and some of the folks in the Sierra Club, was endorsed by President Carter's last environmental message. So the year is so designated. I would like to talk about the coast and its importance and the Corps's role in the coast, and lastly what some of the things are that we can do to make good decisions in the field of coastal zone management.

Just as an aside, I would like to say that through the Friends of the Earth there will be a coastal stamp, a coastal heritage stamp. I would like to suggest that you support a stamp on our coastal heritage. I will furnish Michael with information about what you can do to support a stamp on our coastal heritage. It takes about two to three years to get a stamp going, but people are working on it at the present time.

Now a little bit about the coast. Depending on how you count it we have between 1400 and 1700 miles of coastline, and our California coastline goes from a very rocky type of headlands, very bold coast, to very mild coast and calm water areas, offshore islands, bays, and estuaries. All of us here, if we were to envision what should happen on the coast, would probably have a somewhat different idea. The reason is that the coasts are shaped by many factors. Of course the environmental factors we think of first are the currents and the waves. We have the response of the coast with the regional geomorphology to these factors.

If you ask a scientist something about the currents offshore of California, most of them would be very hard pressed to describe the currents in detail. The concerns are that we really don't know what the current pattern looks like. Here and there are a few current measurements, but very few detailed studies of our coastal currents offshore.

The second area is that of waves. In the case of waves there are very few studies of how big the waves are, what they look like, and what are the greatest waves that occur right offshore. If one is thinking of designing an offshore facility or traversing a ship coming into San Francisco, what is the largest wave that can occur? We know that in February of 1960 waves broke across the San Francisco bar. Those of you who were here might recall that the "Angelo Petri," a wine ship that was proceeding through the bar channel, suffered a great deal. The waves were large enough to break over the ship, come back down through the smokestack, and swamp the engine, stranding the ship.

So part of what is going on in the Army Corps of Engineers right now is a data collection program to measure and quantify some of the waves. I am sure that some of you who have been out to sea have seen the one-meter-diameter buoys that are anchored offshore. They have a little whip antenna and a flashing light. We are sending this data back to a central processing facility at the Scripps Institute. We have this hooked up to remote terminals. Anyone here can simply plug in the right numbers, pick up the waves, and measure the waves at various places along the coast.

Now I think that one of the things that can be done would be to have this kind of learning about the coast. It is this hands-on learning that I think that you have been hearing about. A lot of people see something like this in a book, but you have got to look at it in the ocean. We have got a tremendous amount of coastline; people can simply go to the coast and take a look at it. I think Ron Olsen mentioned yesterday something about public access. There has to be a mechanism for the public to have access to the water, but at the same time they have to understand it. So I think that at a facility like we are talking about here today--you simply have to have a vehicle for people to understand what they are seeing. It is one thing to go out and take a look at it, but to try to interpret that I think is one of the things that the center would be able to do.

As for accountability to the public, that Michael wanted discussed a bit, many of you who know the Corps of Engineers in California have noted a tremendous change in what has been going on in the Corps. I think you have seen a large number of public hearings and response to public views in the decision-making. One of the fortunate things is that in California we do have a very strong coastal plan, which sets what is desired and what some of the things are that the Federal government should be trying to work towards.

In that regard there is a large number of needs, including public facilities to go to the beach and recreate. These are in the jurisdiction of the Corps of Engineers. Also commercial fishing harbors, and construction of these harbors. Also the general navigation features, which include breakwaters, jetties, and that type of thing are projects the Corps of Engineers is involved in.

For deep-draft navigation we actually maintain the channels for the large vessels to come in to shore. The question, of course, is more channels or fewer channels. Where do you put the harbor--in an estuary, on the coast, or offshore? These are the things that the public must understand. I believe that it is only through understanding that these really good decisions can be made.

I would just like to talk about a couple of issues. Energy from the sea was mentioned. For those of you who have looked into this, this is a very interesting subject. The tidal hydroelectric power plant in Denard, France, is one of the striking examples. This is actually operating. President De Gaulle was very much a devotee of power from the sea. He originally tried one in Algiers and subsequently one in France. It is working, producing power. The Russians are attempting one near Vladivostok. I don't know what the status of that one is. I believe that there is one planned or in the making in North Korea. In some places these do operate and work.

Perhaps the power from salinity gradients and temperature gradients are real possibilities. I think that you have seen a large amount of OTEC and those types of developments. There is a lot going on in that area. Power from the sea by waves has been my own personal hobby for a large number of years. A number of investigators has been working on this subject and there are up-coming conferences in that regard.

I would like to mention that one of the major conferences, where many of these issues that come before the public will be considered, is called Coastal Zone 80, which will be held in Florida in November of 1980. If any of you are interested in that, it is sponsored by a large number of organizations. I am very proud that the Army Corps of Engineers is going to be involved.

Concerning "what we need to tell our story," I think that you are all well aware of the San Francisco Bay Model in Sausalito, which is one of the bits and pieces that tell the story of the bay. If you are not fortunate enough to get out on a fishing boat you can take a bus over to Sausalito. Perhaps you will see the currents work in the model and understand a little bit about what is going on in the ocean. I think that we should have exhibits and classes that teach us about how to understand our coastal processes and currents. How does

the sand move? How large do waves get? How fast is our shore eroding or how fast is it accreting? Thank you, Michael.

Herz:

Thank you, Orville. You won the prize. I was not going to mention the Year of the Coast. I hoped that someone would mention it this morning. Now that it has been let out of the bag, I think that we should mention that we have an office downtown. The coordinator of that office is here. Barbara, do you want to stand up? We are in the process of putting out a calendar which will focus on all the events that have to do with the marine environment and educational efforts over the next few months. Anyone who has not been contacted by the Year of the Coast and has programs in the next few months, please get in touch with Barbara. The first calendar is about to go out next week. Next we have Elaine Anderson, who is the program coordinator for the Save San Francisco Bay Association.

Elaine Anderson, Program Coordinator, Save San Francisco Bay Association:

Like the Oceanic Society, the Save San Francisco Bay Association has long felt that Pier 3 would provide a unique and marvelous opportunity to give the public a facility where they could learn more about San Francisco Bay. If any of you have read Harold Gilliam you know that the story of the geology of this beautiful estuary is a dramatic one. It is one that could be made available to the public in a national park such as this one. The role of our Association is principally an educational one. We correspond with our approximately 20,000 members through a newsletter that goes out at least quarterly. We carry on a program of public education in schools and for organizations that request our materials. We have slides. We have films. We send out great quantities of printed material, a teacher packet, and other kinds of brochures and fliers. These are available free of charge. We reach about 40,000 people annually through the use of films.

I do not know precisely how our organization would use a marine center. We operate out of a very small office in Berkeley. We go to the public, rather than invite them to our offices. But we would certainly support the idea of a marine center. We would publicize it to our membership. We have an annual meeting in December. We have held it in the past at places like the California Academy of Sciences, the Officers Club here at Fort Mason, and at the Bay Model in Sausalito. It would be a privilege for our members to come to the marine center for the annual meeting and for a tour. This is the kind of facility that we feel the city needs, and because it could focus on San Francisco Bay it would assist in our educational program. We could in turn assist the center.

We have been involved this year in a program called "Adopt a Shore." Our members have responded to it quite vigorously. They have volunteered to oversee a small portion of the shoreline in their own community and have relayed information, usually about access sites that have been required by BCDC permit. We then relay this information to BCDC in hope of assisting in the enforcement and public access program. I think most of you are well aware of how the shoreline of the bay has shrunk in the past. We would like to see it expanded; we would like to see people have more access to the bay shoreline. A marine center would certainly fill part of that goal. Thank you.

Herz:

We have a number of panelists who will also comment on what their agency or organization has to offer relative to the marine center, and will also act as discussants on the presentations that preceded them. The first person who is a panelist is John Conomos, who is the director of the San Francisco Bay research project of the U.S. Geological Survey.

John Conomos, Director, San Francisco Bay research project, U.S. Geological Survey:

First of all I would like to thank you for inviting me to come. I really enjoy doing things like this, especially on Saturdays. I came to explain briefly what we do and to offer constructive suggestions about how this center could be used. Let me begin by describing our work.

I am with the Geological Survey. We are a Federal agency that is best known for finding faults where PG & E wants to build things. However, I am going to speak about a group of about 25 of us who have been studying San Francisco Bay and the delta for 10 years. Our broad mandate, in fact the mandate of the entire agency, is to interpret the environment. Unlike other agencies that have specific regulatory and monitoring functions, we go in and study an environment. We write scientific papers and give out data to anybody who is interested. Most of those who are interested are consultants. We have a special place in our hearts for universities and colleges. We work very closely with all of the colleges in the Bay Area. We serve on orals committees and have students working for us, and so forth.

Our study here in the bay is an interdisciplinary one in that we study the water movements, the water chemistry, the water quality, and certain segments of the ecology. We study the plankton, the benthos, and we look at the marshes and try to relate one to the other. The thing that we don't do enough of, paradoxically, is study the sedimentation in the bay. That is our weakest point. One of the reasons is that when we started working in 1969 the water diversions came fairly prominently into view. So those of us that were supposed to be studying sediments turned to water quality.

How is our information used? Our primary function, what we are paid to do, where our personal and professional progress comes in, is writing scientific papers. We write the papers, get them published in journals, and in a strict sense you impress the other 200 people in the world that know what you are talking about. We have been trying to, as a side issue (and it is an interest that we all have), get back into writing glossies. Trying to bring it to the attention of the taxpayers. (Sorry about that, taxpayers.) In other words, we basically diffuse knowledge.

Who uses these things? Other agencies that build dams, sell water--they try to use our papers. We have reports that are available at libraries for anyone who wants to use them. We have been talking to urban planners a lot; we have been testifying at public hearings. One of the things that I have been involved with personally is the police departments around the bay. They call us anytime they find a corpse. They want to know where it came from. I have been doing this for about eight years now.

The fourth item that we do is, anytime that an agency writes an environmental impact statement, all the other agencies get copies of it to review. So once in a while we are stuck having to read and evaluate these EIS's for other agencies.

What is our impact on the general public? The Survey is not a good PR group. We are always misspelled in the paper. We don't really like to have a high profile. If we have a high profile we have to start giving talks, and that takes us away from the work that we are paid to do. However, we have appeared under the Nova series once and we do get our name in the papers once in a while. Whether it's because we did something wrong or right, it is in there.

Now, what is the impact of the special interest groups? If I name four special interest groups, I will probably end up naming everyone in here. One interest group is the conservation people. In the past they have used our materials in ways they were intended, but they would overstate their cases. The developers take our data with interests going quite the other way and we get angry with them. The third group is the media. Some of the dumbest people I have ever known are reporters. However, there are some very sharp people in the Bay Area that have done a great job. But reporters will come and interview you, and what comes out in the paper has nothing to do with what you said. It is very frustrating at times. The fourth group is the group like the League of Women Voters, whom I personally have a great deal of respect for, because they come in and they really research things. We talk

to them, they come to our offices, we have outlined things, and so forth. These people have used our information and diffuse it outward.

What we would like to see at a center like this, because it is frustrating to study the bay and put our technical knowledge out and a very small segment of the public sees it, is to have that knowledge diffused. One book that has just come out that we have published with the American Association for the Advancement of Science is the book called "San Francisco Bay: The Urbanized Estuary." It is a series of papers that have to do with the bay. It is written for people who have a background in science. If you have taken a few courses of college science you should be able to get through most of the book. However, we have got to have someone that can take what we know and put it into a form that the general public can understand. I look at a lot of my friends who have taught school and are unemployed now. I think that these people might be a very good group to act as intermediaries to take our information and bring it forth to a place like this.

What I was thinking of personally is that there would be some kind of library here for researchers, but particularly for students and concerned citizens. I will get back to that in a few minutes. Also, you could have a series of displays, pamphlets, or a series of lectures by people doing work in the field, bringing it down to a level that most concerned citizens could understand. I feel very strongly that citizens can do a lot for our society if they understand more of what is going on. There are a few things that I will say here in the form of a sermon. We have been working on the bay for ten years. One of the first things that we discovered is that nothing is known about the bay or how it works. After ten years we are starting to understand what questions we should ask about the bay. When you consider the billions and billions of dollars that are being spent for public works on the bay alone, with complete ignorance and naivete and in some cases malice, it is mind-boggling. The experience that we have had in the decade that we have been working has shown the value of concerned citizens who have come and listened to what we have to say. Here is an anecdote that will help illustrate a few things here.

When we first came here I was just out of school. We saw that the delta discharge came into the south bay and caused it to flush during the high-discharge period at this time of year. Immediately we wrote a report. People in other agencies called our director and demanded that the four of us be fired. We had thrown a fly in the ointment. So our people said, "Look, you guys wrote the report, you have to go out and defend it." In the year after that, we gave about a hundred talks. We went to hearings or anyplace we could think of and gave talks. Two of the groups that I can remember very distinctly--and we got very emotional at the time--were, first, the Milpitas Sewage District. They wanted us to talk because they were combining their sewage with the megapipe in the south bay. We gave them a talk and they went wild. They asked questions that were better than if you gave a lecture to students in college, because students in college are afraid to ask questions because they don't want to appear stupid to their peers. These people were asking all of these beautiful questions and we got all fired up. That was the first group. The second group was when we went up to the San Joaquin Irrigation District, and there were a bunch of farmers sitting around a table with string ties and plaid shirts. They were just out of the field with their bib overalls and we said, "Oh Christ, this is going to be a mess." Well, every one of them must have been a graduate of an aggie school, because they were sharp!. They were asking a bunch of questions, very penetrating questions. At the end of two hours they fired their consultant and met for another two hours and made decisions that had to do with discharges into the delta. These two groups show you that people are very interested in what is going on.

What I would like to see in a center like this is to have a good program so that the general population of concerned citizens can learn more about what we

don't know, about things that people are making decisions about.

That is basically it. One of the things that I would like to put a plug in about is that when we are in San Francisco with our research vessels we would love to tie up here. However, we can't because there is so much swell out here. So if I can ask the Park Service to please correct it... (laughter), it would be a very nice center for visiting oceanographic ships both from the United States and foreign countries. I have yet to see a ship like this that, when they come into port, is not open to anybody to come aboard and see what is going on. This would be a very nice place for that.

Herz:

The next person to be a discussant is Dr. Milton Kolipinski, with the Western Region of the National Park Service.

Dr. Milton Kolipinsky, Regional Aquatic Ecologist, Western Region, National Park Service:

My office is at 450 Golden Gate Avenue. I am with the Western Region of the National Park Service, although I am representing the interest of the Golden Gate National Recreation Area. If some of you are not familiar with our regional office, please come up to our office at the Federal Building. We have a lot of information about the parks in this region which involves four states--California, Nevada, Arizona, and Hawaii. My position in the office is regional aquatic ecologist. My training is in marine resources, but I also do some freshwater work.

We have multidisciplinary teams that we put together out of our office. A lot of our parks, like the Channel Islands National Monument for example, don't have all of the specialists that they would like to have on the staff. So when particular problems come up, we try to get the right teams together to help come up with suggestions on visitor management and/or resources management. In my case I am interested in helping superintendents to manage natural resources. Our big thrust in the National Park Service is to restore natural processes. We think of our parks as vignettes of primitive America. How much we are going to be able to use that philosophy here at Golden Gate, I don't know. Since it is an urban park, we are not calling this a national park. You will notice in the terminology we call this a "national recreation area." So we are doing a lot more things here at Golden Gate.

I know part of the thinking here for the marine center is for research. I would like to comment on how the Park Service would tie in with any research activities here at the proposed center. I shouldn't even say "proposed center;" it is just a matter of when and how it will be. Our research programs in the Park Service are mission oriented. We don't look for proposals from researchers that are unsolicited. We go out and solicit proposals. Part of every research contract has to end up with some kind of suggestions for management. When we understand a process better we can translate the information into better management of the resource. In other words if we have exotic plants or animals, we want to re-establish the native species. As an example, out at Point Reyes we reintroduced a small herd of tule elk. They used to range in this area. They are starting to come along pretty well. When we have exotic plants and animals we try to remove those. Sometimes it is like fighting a losing battle, but this is what we try to do.

But for this center I have been thinking about education. There were a lot of tremendous ideas yesterday about education and interpretation. I would like to see processes stressed. John, you were touching on this. I think what the Geological Survey has been doing is fantastic. We have a lot of good background information. I was just doodling this morning on the blackboard. Although I have lived in this area for seven years now and have been studying marine systems, I am still learning. But I think this center could serve as an interpretive

nucleus for the bay. This may not be the focal point of the center. But in any case, it could serve not only the general public but those of us who are in one way or another professionally interested in the bay, whether we are scientists, engineers, or whatever.

I think that the approach that Howard Odum used would be appropriate. His approach works with resources in terms of energy and dollars. This drawing doesn't do justice to the concept I am trying to throw out here. It is not a new concept. But if we show the system in this way... Somebody mentioned yesterday that we don't have people who can do dioramas anymore. I don't know how this would be presented. Perhaps with different kinds of media. There are a lot of models. People are afraid of models because they think they are mathematical concepts. We have the Bay Model at the Corps of Engineers--there is a model you can look at. If we could show the individual food chains that, put together, are the food web, then you have a focal point. You put man in here and then you find out what the inputs are into the system and what the outputs are. The commercial and sport fishing, for example, are taking out a certain amount of biomass and a certain number of dollars. Then you can see the economics of this. When we put sewerage and industrial waste into the bay, it's because the bay is close and we can save money by doing this. But we also have to look at what happens when you get heavy metals and PCB building up in the bay sediment. What is the half-life in terms of breakdown? Are the crabs here edible? Are they inedible? In other words, try to find energy costs in dollars and cents in and out of the system. You have visitors coming in and out of the bay area. You have had speakers today talking about the boating. So you look at all this in a dollars-and-cents way.

Now that is very complex. I don't know how to do this completely myself. But perhaps the center here could be a sounding board or a focal point where we can try to develop these concepts better. This would also get the community involved and excite a lot of thoughts. I was reviewing a proposal by the Corps of Engineers here a couple of years ago. We were asked to comment on the Corps of Engineers proposal to dump dredged material somewhere off of Alcatraz Island. When I asked some questions about it I understood that currents, instead of carrying off the sediment, bring some of it up here to the GGNRA next to the piers. That just means more government expense to move this material around. So we have got to look at the big picture. By modeling we can perhaps save the taxpayers' money. I am not being critical of the Corps of Engineers, because perhaps with their analysis it suggests that by dumping here the currents will carry the material out. The extra time to carry it further out might cost too much. What is the fisherlady's name, Maria? As Maria said, people that fish know as much about the ecology of this bay as anyone, but there are tremendous blanks and questions about the populations of organisms moving in and out of the bay. My plea would be for the center to develop its thinking along these lines.

We in the Park Service will help as much as we can. I do want to point out that funding-wise, with respect to managing the marine resources out here, our jurisdiction actually stops at mean high water. But as Dick Cunningham, who is also in our regional office, mentioned yesterday, we are very excited about interpreting the marine and intertidal resources. So we can do that. As far as actually conducting research ourselves in the marine environment is concerned, I think that would have to be a relatively low priority, but everyone here working in the center complex can count on us for support.

I had two little ideas. We still want to develop our goals, I think, before getting into techniques and so forth, but one thing that popped into my head yesterday was on the General Whale concept of having a full-size whale. I think it would be exciting if, in designing that, if that happens, you could also have a walk-through area. In other words, let people walk through the whale and see how large the heart is and the liver and some of the other organs. It would be fun

as you walk into the whale's open mouth. Everybody is interested in baleen. It's sort of like a little curtain as you move through the baleen. Has anybody thought of that before or not? I think it would be a lot of fun. And then walking through the intestine, that ought to be fun too. And I guess you'd exit through the anal sphincter, I don't know, you'd have to work that out.

But another thought I had, just sort of a follow-up on talking about having people down near the water--I haven't heard of this developed yet, and maybe it's too expensive, but I think it would really be neat if we could have some kind of submarine-type walk, a tube. Of course it would be very turbid. I don't know how much you'd see here, but certainly if this could be extended down to the bottom, and maybe you'd even have to do a little bit of manipulation to the bottom communities--I don't know--but I think it would be quite exciting. A lot of people never do get to skin-dive, scuba dive, and you're still not in the water medium, but if that could be worked out it would be pretty exciting. Right now the only thing we have around here in California is over in Disneyland, where you know you go for that little submarine ride? And maybe that's a thought too; some kind of a submarine experience with windows would be interesting. I always get a charge out of Disneyland. You know, at Disneyland they have more employees than we do in the National Park Service. But even with our limited staff we're excited about this center concept, and we're pleased to help in every way that we can. Thank you.

Herz:

We're running a little bit late, but we have one more speaker on the panel who is Andy Manus, who is the Sea Grant advisor for NOAA. Andy?

Andrew Manus, Area Marine Advisor, Sea Grant Program:

Thank you, Mike. Just a little clarification on that. I'm area marine advisor in San Francisco and San Mateo Counties, and the marine advisory program in California is in the Cooperative Extension Service at the University of California.

Okay, I'm going to divide my brief presentation into two parts. The first is, I'm going to tell you what I do and who I'm affiliated with, and the second part is kind of to provide an umbrella over how I view what constituency-building ought to be as a result of this workshop. By way of background, just so I can put my biases up front, I am not a marine biologist; I'm a social scientist by training. It's always nice to be the only social scientist on a panel like this, because if they don't understand you you can say that we're just not bridging the gap well enough, and if they do understand you sometimes they get scared with what you have to say.

Sea Grant is a national program which is part of the National Oceanographic Administration within the U.S. Department of Commerce. And here's where the mix-up was--it's run through universities nationwide. The program was created by Congress in 1966 by the passage of the law known as the National Sea Grant College and Program Act. The purpose of the Act was and is to focus national attention on marine resources, as to their conservation, proper management, and maximum social and economic utilization. How has this been accomplished? This mission is accomplished in part by the designation of Sea Grant college programs, of which the University of California is one of some 20 or so universities with Sea Grant college status. Such universities are designated by the Secretary of Commerce in recognition for "sustained excellence along a broad front of marine work and research."

Briefly, a Sea Grant college functions in three areas: research, education and training, and marine advisory services. The last area, marine advisory services, is the area I function in and represent today. This area is characterized by the catch phrase "people helping people." (I didn't make that up.) The marine advisory

program in California consists of seven area marine advisors like myself based in coastal counties, and three campus-based specialists, who are based up at Davis. The Marine Advisory Program is the marine analogue of the Agricultural Extension Service, familiar to most of you, which is now called the Cooperative Extension Service. In fact most of us are housed in county Cooperative Extension offices. My office is very agriculturally based. I'm located at the Cow Palace.

The services of the Marine Advisory Program fall into three broad categories: briefly, the program is an educational program. In our education role, the objective is to translate the research of the University of California and other universities in Sea Grant programs and apply it to local situations. I can sympathize with John--this is no easy task. Oftentimes this is accomplished by sponsoring workshops such as this here today, meetings, or through advisory publications similar to some of the ones I've put out on a table over there, like this. Our methods, I must emphasize, are informal and are focused on trying to meet practical need.

The second area, the second function we perform, is that of providing a channel for marine users to communicate with researchers. This is pretty ideal when you have it on paper. The service is supposed to take public and researchers and put them together so they get a reality check on the type of research they're doing and make sure it's all germane to what's going on. This looks like a fine function and goal on paper, but when you get to work with it it's a little more difficult than just stating it down on paper.

And the last major area of the Marine Advisory Program functions is that of an informational resource. There is quite a bit of public service that goes on out of my office in the Cow Palace through advisory services publications on marine education, questions on recreational boat insurance, tax guides for commercial fishermen, local coastal planning issues with different groups down on the coast side, agricultural land preservation in the coastal zone, and that sort of thing. It's a pretty diverse area and job to work in.

In closing, in this first section of my presentation I'd like to state a few things that the Marine Advisory Program is not, so as not to leave you with the impression that we are designed to do it all. The Marine Advisory Program has no power to regulate marine resources or to make resource management decisions, nor do we care to have that authority. Two, the program is not an advocacy group. Our duty is to serve all interest groups as equally as possible. And lastly, the marine advisors will not work exclusively for any one organization or fund any research projects. The name "Sea Grant" seems to mean that people come to us as a sugar-daddy organization and ask for money all the time. That's not what the Marine Advisory Program is set up for.

Now, for the last part of my presentation on constituency-building, I'm going to end my presentation with a quote. I'll not quote Rachel Carson or any of the other fine biologists who have spoken to the marine environment. Rather, since this is a panel on constituencies, I'll leave you with a quote from Grant McCollum. He's a political scientist and a professor of government. This quote I believe is extremely germane to our purpose here today. This is Grant McCollum talking about constituencies: "The tradition of the small constituency is deeply rooted in America, and the political order is built on an almost infinitely complex design of interlocking relationships, which accommodate a multitude of small constituencies. Although these small constituencies often act as barriers to the realization of much that is best in American aspirations, they are not evil in themselves. Indeed they have repeatedly served to provide the organization and the means by which the demands that might otherwise have erupted dangerously have been satisfied by shares in power, and it would be mistaken to seek their destruction." Now, of course that's social science jargon, and I'm going to have to do a little translation here, for my benefit and that of the hard scientists.

What this quote should illustrate is that the strength in developing constituencies and pursuing a mutual goal is achieved through interdependence. What we heard yesterday was a lot of discussion about natural systems. As natural organisms are interconnected, so are social organizations. I think this is the bridge that has to be made between a lot of social scientists and biologist types. The marine center will succeed if it follows up on this workshop by involving all diverse groups that participated over these last couple of days and the others that didn't. And this process should help in leading to the formal establishment of the center.

This process of involving these small constituencies, under an umbrella without suffocating them, would include the task of defining the goals, who the user groups might be (which we've touched on this morning), and what programs the center might concern itself with. And I think that if one thing comes out of this conference, it would be something that I just sketched down now, and that's from a practical perspective. This conference would mean such small things as putting people like Jim Brenner yesterday, who talked about the urban 4-H program, in contact with people like Maria De Santos, who just talked this morning. I think both of these people have something to contribute to each other, and that they believe that experiencing something first hand contributes a lot more to the education process. Thank you very much.

Herz:

I feel the hook about to pull me off. I just wanted to say that I feel like this session has just sort of whet the appetite for some of the things that can be and will be part of the marine center. Unfortunately we've run out of time. I think that we could go on for quite some time with some questions and answers, and we'll have to just continue that in tomorrow's session. But thank you all very much. Thank you, panelists; thank you, contributors. I think it's been a productive session.

Switzer:

There is going to be some wine and cheese in the next room, and perhaps that will be another opportunity to, at least in an informal setting, talk to the people that presented here today. In concluding this session we have some remarks from Senator Milton Marks, who is of course a local state senator and also the chairman of the Senate Select Committee on Maritime Affairs. Senator Marks.

Senator Milton Marks, Chairman, Senate Select Committee on Maritime Affairs:

Thank you very much. I'm listed in the program as "summing up," which is a little difficult to do because I didn't hear all the previous speakers. So I will not sum up, but I'll talk a little bit about some of the things that I am concerned with. I had the opportunity of hearing some of your speakers, and I appreciate that opportunity to hear their views.

I'm here to talk to you from a little different viewpoint, but related to what you're talking about here today. We talk about maritime affairs. We talk about preservation of a marine environment. In my opinion that must mean that you have to have a combination of the use of the marine facilities which nature has given to us, and you have to do something about promoting the use of the maritime industry. I think you can do both. And I say that by going back in history a little bit, not taking credit for it but to indicate to some extent my participation in this field. Some years ago, when we were concerned (and we're still concerned) with what was happening to San Francisco Bay, a number of us got together and authored the legislation to establish the BCDC. I'm very proud of being one of the authors of that legislation. We were concerned that if we didn't do something about preserving the bay, by making certain that the

bay was going to be here for future generations, that it was going to continue to shrink. It has already shrunk. It was going to continue to shrink.

But we were also concerned that we would be able to develop the bay, and properly develop the bay, so that it could be used for proper purposes. I think it's very important for us to understand what the initials "BCDC" stand for, exemplify, and what is supposed to be done, in my opinion, about the maritime industry, the maritime environment. "BCDC" stands for Bay Conservation and Development Commission. That name was purposely used because it was our belief that we must preserve the bay, but at the same time we must make certain, that under stringent conditions and proper controls, that proper development is permitted. And I think that the BCDC has worked admirably in that regard. We have done something to preserve the bay, which must be preserved and should be preserved, but we have made certain that if someone comes along with an idea which is a good one, which will preserve the bay, but will still add to our economy, that we permit that use. So BCDC means to me a proper partnership between the use, the environmental aspects, and the proper developmental interests of our society.

Having laid that background, let me speak to you as a chairman of a committee which is designed to see to it that in conformity with preserving our environment, we also do something about advancing the cause of the maritime industry. I happen to believe that we can have, and we must have both. There is a myth going around that San Francisco's port is dead. There are those who say it's breathing heavily, but it isn't dead, by any means. But San Francisco's port is changing. San Francisco's port is changing because the people in San Francisco have determined that there's going to be a mix of maritime use and the other use which is not directly related to maritime use. Some years ago, because I was concerned with both the preservation of our magnificent port--and it is a magnificent port geographically--I authored a resolution in the California senate asking for the formation of a new committee called the "Committee on the Maritime Industry." Like everything else, when you do that, as soon as you ask to have something done you're automatically made the chairman.

So I've been the chairman of that committee ever since its institution. What we've been trying to do in that committee is to develop our port. Again, bearing in mind that we must preserve the environment but try to develop our port, so that it will keep pace with the other ports which are in competition with us, both in Oregon and Washington, and believe it or not--I don't know how they get anything in there--there really is a port in Reno, believe it or not. They must fly in ships or whatever it is but there is a port in Reno. One of the things that I have been trying to do, because of the change in the trade aspects and the opening up of the maritime industry as we look toward the Orient, is to try to make certain that San Francisco becomes more modern, that we are able to compete on an equal basis with other ports in the State of California. I think we all recognize that the ports are for all of us, everybody, whether you ever have been on a ship, whether you work on the waterfront, whether you are connected with anything to do with the maritime industry directly, the ports affect every one of us. The vitality of our ports is of importance to us.

Last year, because of my concern about our port, I traveled to Washington with a delegation including Supervisor Molinari, and including some representatives of the fishing industry here in San Francisco, to try to get the United States to finally build the breakwater which has been talked about for years and years, not very far from here. If you think the bureaucracy is bad in state government, you should see it in the national government, but nevertheless we were able to get, I think (I have to say, "I think"), the Federal government to move. I believe that the breakwater will be built very, very shortly, which will add not only to the recreational facilities in the maritime environment of San Francisco, but also will add to the commercial aspects of San Francisco.

Another thing that I have been concerned about is to make certain that San Francisco doesn't have to operate in a different way from other ports up and down the State of California. San Francisco, as many of you may know, was a port that was owned by the State of California for about 100 years. We were the only city that didn't own its own port. As a result of ownership by the State of California I think that we were not as progressive as many other ports. While Oakland was going out and getting 25 million dollars from the Federal government, we didn't get anything. Therefore I wanted to make certain that our port compete on an equal basis with other ports. Last year I authored legislation which took away the provision of the law which required the port of San Francisco and only the port of San Francisco to give 85 percent of its revenues to the State of California, a ridiculous provision. There was no reason for it whatsoever. I am sure we can use it here in San Francisco. Any additional revenue that we are able to collect we can keep here in San Francisco.

There are many other things that I could talk to you about in the areas of the maritime industry. I had an opportunity not too long ago to ride on something, take a voyage on something which is a symbol of the maritime industry, and I'm talking about the "Jeremiah O'Brien," which is going to be berthed not too far from here when it is refitted at the Bethlehem steelyard. The "Jeremiah O'Brien," as many of you may know, is one of the last of the Liberty Ships, thousands of which were produced during the Second World War. Many people felt that we should have a replica, a working replica, of that ship, so that people could see what the maritime industry was able to do in the time of war.

So we all went up to Suisun Bay to get on the ship, which admittedly didn't look very good, but I think that nobody would look good if he had sat there for 35 years without ever having been moved, or even having the engines turned over. We got on this ship and we came down here on the "Jeremiah O'Brien," which came on its own power, which was an amazing thing. Imagine leaving your automobile in your garage for 35 years, never turning it over, and then trying to get it started and move it. This was a ship that had sat there for 35 years. It hadn't moved, and it came down here. It will be here as part of the Fort Mason Center. It will be taken out one day a year to travel around the bay, to show that it still can move and give people an opportunity to see it, and I think this will be a worthwhile addition to the marine environment of San Francisco and of the Bay Area.

So I'm very glad to be here with you to commend you for the efforts that you're making. I look forward to working with you in the future on protecting our marine environment, to make it certain that the marine environment is one that is going to be here not just for us but for generations yet to come. I thank you for the opportunity of being with you, and as I say, I look forward to working with you in the future. Thank you very much.

Switzer:

Well, I really tested your patience, and I think everyone has sat long enough. I would encourage you to stay around. There is some wine and cheese and coffee and tea, and talk to some of the people that have made presentations. Also, the boat trip is going to be departing at 1:30. The boat can be boarded at about one o'clock, and I thank you all for coming.