



OCEANIC ENGINEERING SOCIETY

NEWSLETTER 

EDITOR: HAROLD A. SABBAGH

JUNE 1983 (USPS 420-910)

PRESIDENT'S COMMENTS

The new era has begun, we are now the Oceanic Engineering Society (SOE), a full fledged IEEE Society. As in the beginning of any new era, there are great challenges before us and the future holds bright promises. We now have the opportunity to do things as a Society that we could not do previously under the old Council structure. The principal opportunity, and the prime mover in our becoming a Society, is the ability to have members and to organize local chapters, thereby developing a grass roots community with interests in oceanic engineering. Active chapters will provide us with local organizations which can help run the OCEANS Conferences and allow the locations of these to continue to move around the country, and beyond. They will allow us to meet with our professional colleagues on a more regular and informal basis and receive the awareness, stimulation and personal growth that flows from that.

And with the opportunities come responsibilities. Many are clearly implied in the above challenge to organize local chapters. Beyond that, we must clearly establish ourselves as a Society, with distinctives which are clear and clearly communicated. We must work through the new relationships with the other IEEE Societies, especially those who previously sponsored us as a Council. While we are in one sense launching out as a new Society, we must remember that oceanic engineering is multi-disciplinary. Changing our organizational structure does not change that; we still need the other Societies and they continue to need us. The ocean is an environment in which the disciplines represented in the various IEEE Societies will continue to be applied. As a Council we had a natural linkage to the Societies which sponsored us. While they no longer sponsor us, we must maintain that linkage, for our benefit and theirs. Perhaps we need technical committees which parallel the Societies; perhaps these committees should be joint-society committees.



These and many other issues and challenges need to be worked out as we establish ourselves as a Society. This is a time in which we need everybody's involvement. I hope you see the challenge and the opportunity for you to participate with us. If you are not currently involved in SOE activities and would like to be, please contact me or one of the other officers of the Society.

A handwritten signature in cursive script that reads "Stanley G. Chamberlain".

Stanley G. Chamberlain
President

OCEANIC ENGINEERING SOCIETY

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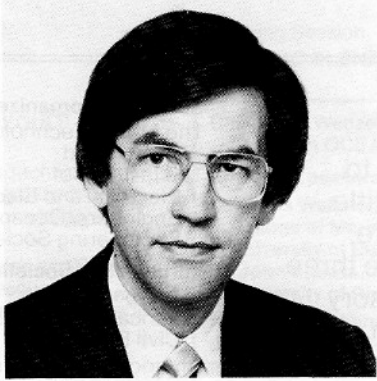
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OCEANIC ENGINEERING SOCIETY PRESIDENT



Stanley G. Chamberlain, born in Boston in April 1937, has been a lifelong New Englander except for four college years in the Midwest. He received a B.S. degree in Physics from Wheaton College in Illinois in 1959 where he was also a member of the 1957 NCAA (College Division) National basketball championship team. He received MSEE and Electrical Engineer degrees from Massachusetts Institute of Technology in 1962 and 1963, respectively. Simultaneous with his graduate program he was a teaching assistant and later served as business manager of Guillemín Networks, Inc., an electronics research laboratory newly formed by his thesis advisor E. A. Guillemín. Upon graduation, he joined the Raytheon Company where he has remained to date. While there he was awarded a Raytheon Advanced Study Fellowship to pursue a Ph.D. program in Engineering at Brown University. This he completed in 1969 with a dissertation which applied stochastic differential and discrete game theory to pursuit-evasion type problems.

Dr. Chamberlain's research interests have been in the application of mathematical modeling and systems analysis techniques to oceanic environment and sonar systems problems. His work has included development of numerical methods to predict acoustic propagation in the ocean and application of signal processing approaches to problems in sonar. He has applied analytic modeling and simulation techniques to aquatic environment processes, including river, estuary and coastal hydrodynamic circulation and water quality dispersion. His interests include optimization theory and the statistical theories of signal detection, communication, estimation and control.

Since joining Raytheon's Submarine Signal Division in 1963, he has held a variety of positions in the Applied Research Department, Marine Research Laboratory, Oceanographic and Environmental Services Department, and Systems Engineering Laboratory. Currently, he is a Principal Engineer in the Systems Engineering Laboratory, where he is responsible for performing and/or supervising sonar systems analysis and computer simulations for advanced sonar systems.

Dr. Chamberlain has published and presented over forty technical papers and reports. Publishing journals and professional society conferences include those of the IEEE, Acoustical Society of America (ASA), Society for Industrial and Applied Mathematics, Mathematical Analysis and Applications, Institute for Environmental Sciences, Great Lakes Research Association and the American Water Resources Association. He is a member of IEEE, ASA and Sigma Pi Sigma. He recently served as General Chairman of the IEEE/MTS OCEANS '81 Conference and is currently President of the IEEE Oceanic Engineering Society.

Superconducting Electromagnets For Vessel Propulsion

Researchers at the Kobe University of Mercantile Marine, Japan, have completed scale model studies on a ship propulsion system which does not need propellers to convert mechanical motion into thrust. The new propulsion system utilizes the reaction between a super-cooled electromagnet and electrically-charged seawater to produce thrust.

The "engine" would consist of a pipe, which runs length-wise down the ship's hull, that is surrounded or straddled by a superconducting electromagnet which uses liquified helium at minus 269 degrees Celsius to create a very intense magnetic field. By passing an electric current through the water in the pipe, the researchers say that the seawater is forced back through the pipe, causing the vessel to move forward.

Satisfied that the theory works in real-life and encouraged by scale model results, the scientists plan to build a 10-meter long prototype ship equipped with a 1.4 meter diameter, 3.2 meter long "thrust pipe" for conducting tests at sea. Blue prints have even been drawn up for a 10,000-ton commercial submarine tanker which would employ the Superconducting Electromagnetic Thrust (SET) system.

There are still several problems to be solved, however. The largest obstacle the researchers see is the by-product of hydrogen and chlorine gases which are created when electricity is passed through seawater. The hydrogen is no problem, the scientists say, but chlorine gas could create serious pollution problems.

oceans '83

conference & exhibition

August 29-September 1, 1983
Hilton Hotel • San Francisco

MESSAGE FROM THE CHAIRMAN

It is with great pleasure that I extend a cordial invitation to you to attend the OCEANS '83 Conference and Exhibition. This year's title, the theme of OCEANS '83, "Effective Use of the Sea—An Update," describes the objective of the Conference, which is to update the three historic reports of a decade ago: The President's Scientific Advisory Committee's report, "The Effective Use of the Sea"; the Stratton Commission's report, "Our Nation and the Sea, A Plan for National Action"; and the NAE Marine Board report, "Towards Fulfillment of a National Commitment."

Much has happened since these reports were written, and the objective of the OCEANS '83 technical program will be to evaluate our technical progress against the goals and objectives laid down in these three historic reports.

You will note from the details of the Advanced Program that plenary sessions will be held which update and critically assess the status of ocean science and technology. The technical sessions are organized so as to focus on the five major resource areas identified in the above reports. Emphasis will be placed on important technologies, technology assessment, applications and programs in each of these areas.

The program will be of equal interest to the scientists, engineers, and managers from Academia, Industry and Government. We are particularly proud of the number of participating societies and organizations which are joining with the IEEE Oceanic Engineering Society and the Marine Technology Society in organizing this Conference.

In addition to the technical sessions, there will be an extensive exhibit area where the latest in marine products, services and systems will be displayed.

Social activities are planned for both the participants and their families. San Francisco, its harbor, bridges, museums and parks make it an ideal summer-end vacation spot. I hope to welcome you there on August 29th.

James G. Wenzel
Vice President
Lockheed Marine Systems Group
General Chairman-OCEANS '83

Conference organized by:

The Marine Technology Society and
The Institute of Electrical and Electronics Engineers/Oceanic Engineering Society

Participating Societies & Organizations:

American Society of Civil Engineers
American Geophysical Union
American Society of Naval Engineers
Center for Oceans Law and Policy, Univ. of Virginia
National Energy Resources Organization
Acoustical Society of America
New England Estuarine Research Society
American Institute of Aeronautics and Astronautics
The Society of Naval Architects and Marine Engineers
National Ocean Industries Association
Shipbuilder's Council of America
American Oceanic Organization
The Society of American Military Engineers
American Association for the Advancement of Science
American Petroleum Institute
Geological Society of America
National Association of Corrosion Engineers
European Association of Remote Sensing Laboratories
Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V.
Center for the Study of Marine Policy, Univ. of Delaware
Marine Board—Nat'l Research Council
U.S./Japan Cooperative Program in Natural Resources
National Advisory Committee on Oceans and Atmosphere
Engineering Committee for Ocean Resources

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MONDAY

Morning Session OPENING PLENARY

PROGRAM SCHEDULE EXPLANATION

The OCEANS '83 Technical Program has been organized around the following major categories of ocean activity:

- Mineral Resources and Energy
- Non-Mineral Resources
- Civil/Military Ocean Engineering
- Transportation
- Ocean Science

The program begins with a plenary session on Monday morning with two major addresses which will review the status of our knowledge of the ocean and oceanic issues.

On Monday afternoon, in five concurrent sessions, each of the major categories will be introduced with an overview paper, followed by a series of papers covering emerging and important technologies and issues in the field.

The Tuesday program will consist of ten concurrent sessions covering major technical subjects within each of the categories.

On Wednesday, the technical program will offer five concurrent sessions in the morning, and a closing plenary in the afternoon. The morning sessions, organized around the five categories, will deal with major ocean programs and projects. In the afternoon closing plenary session, a report by members of the Blue Ribbon Panel, updating the PSAC, Stratton Commission, and NAE/COE reports, will be presented. In a concluding portion of this plenary, representatives of Congress will comment on the panel's report and discuss possible implications for Congressional action.

The schedule to the right highlights the session organization and content. An effort has been made to minimize conflict between sessions of similar technical interest. The last page details the field trip and spousal activities.

POSTER SESSIONS

As a result of the unique requirements of many of the presentations, poster sessions will be an important part of OCEANS '83. The poster sessions topics will be organized around the five major categories of the conference, and presented out-of-phase with the program segments in order to eliminate conflicts.

**Chair: J. G. Wenzel,
Chairman OCEANS '83**

Keynote Speakers

**Dr. Ferris Webster,
College of Marine Studies,
University of Delaware**
**Dr. John Knauss,
University of Rhode Island**

Mr. James G. Wenzel, Vice President of Lockheed Ocean Systems and General Chairman for OCEANS '83, will open the conference with a welcome to the attendees, followed by an introduction of the Blue Ribbon Panel. This panel, organized by the Marine Board of the National Research Council, will attend the technical sessions, and will review the conference and update the PSAC, Stratton Commission and NAE/COE reports at the closing plenary session on Wednesday.

Dr. Knauss will review the status of marine affairs since the historic reports were issued; Dr. Webster will review the advancements in ocean science over the past 10-15 years and the outlook for the future.

OCEANS '83 & IGARSS '83 JOINT REGISTRATION

The 1983 International Geoscience and Remote Sensing Symposium (IGARSS '83) will be held August 31-September 2, 1983, also at the San Francisco Hilton Hotel.

The symposium is sponsored by the IEEE Geoscience and Remote Sensing Society and the U.S. National Committee of the International Scientific Radio Union (URSI).

Technical sessions will be coordinated to provide comprehensive program stressing the problems and perspectives of the geoscience disciplines, instrumentation systems, data processing techniques and sensor-target models. For further information contact Mr. Mike Buettner, M.S. L-156, Lawrence Livermore National Laboratory, P.O. Box 5504, Livermore, CA 94550, tel: (415) 422-7888.

The OCEANS '83 and IGARSS '83 have arranged for joint registration, with reduced fees, for persons wishing to attend both conferences. You may register for both conferences by completing the appropriate section of the registration form and enclosing the additional registration fee.

Afternoon Sessions OVERVIEW/ IMPORTANT & EMERGING TECHNOLOGIES & ISSUES

MINERAL RESOURCES & ENERGY

**Dr. Claude R. Hocott,
Gulf Universities Consortium**
**Dr. J. Robert Moore,
Marine Science Institute,
University of Texas, Austin**

Doctors Moore and Hocott will jointly introduce this category. Dr. Moore will review the status of marine mineral resource development, and Dr. Hocott will provide an overview of ocean energy.

The session will continue with a series of papers that highlight the emerging and important technologies and issues in this area. These will include papers on deep ocean instrumentation, compliant structures, Federal programs in poly-metallic sulfide, and investigations of the Reykjanes Ridge.

NON-MINERAL RESOURCES

**Dr. William S. Gaither,
College of Marine Studies,
Univ. of Delaware**

Dr. Gaither will introduce this category with a paper that reviews the development and present status of knowledge regarding marine non-mineral resources.

Dr. Gaither will then chair a session dealing with the emerging and important technologies and issues in this area. It is expected that the topics will include bioengineering, mariculture, waste disposal, water quality, and recreation.

CIVIL/MILITARY OCEAN ENGINEERING

**Rear Admiral John B. Mooney
Oceanographer of the Navy**

RADM Mooney introduces this category with a paper which reviews the status of ocean engineering and the interdependence between the civil and military technologies.

RADM Mooney will then introduce a series of papers dealing with the thrusts, achievements and emerging technologies stemming from work supported by the Navy, NOAA and U.S. Army Corps of Engineers. These papers will focus on major topics including offshore and coastal engineering, vehicles, biomedical, and diving research.

TRANSPORTATION

**Mr. John Wing,
Booz-Allen-Hamilton, Inc.**
**Dr. Don Walsh, Institute of
Marine & Coastal Studies,
University of Southern Calif.**

Mr. Wing, assisted by Dr. Walsh, will chair this category. Mr. Wing will present a paper addressing the status, issues, and technical chal-

lenges in the field of marine transportation.

The session continues with selected papers dealing with emerging and important technologies in the area of transportation. It is expected that these will include papers on vehicle and systems design, ice-area operations, and others.

OCEAN SCIENCE

**Mr. Feenan D. Jennings,
Texas A & M University**

Mr. Jennings will introduce this portion of the program with a paper that outlines the future of ocean science and the major thrusts and critical research needs of the main ocean science disciplines.

Mr. Jennings will then introduce papers dealing with emerging and important technologies and issues. These will include papers on satellite remote sensing, acoustic tomography, robotics, stable isotopes, as well as an update on the Law of the Sea Treaty as it affects ocean science.

CHAIRMAN'S LUNCHEON: Speaker: James Curlin

IEEE/OES DINNER MEETING MTS COMMITTEE MEETINGS

EXHIBITS

OCEANS '83 will also feature exhibits from a wide variety of companies and organizations involved in marine affairs.

The exhibit hall will be open Monday, from 9:00 a.m. to 7:00 p.m., Tuesday from 9:00 a.m. to 5:00 p.m., Wednesday from 9:00 a.m. to 5:00 p.m.

At press time the following exhibitors are confirmed:

TUESDAY

General Technologies Sessions—
8:20 a.m. to 10:00 a.m.

General Technologies Sessions—
10:20 a.m. to 12:00 a.m.

PLATE TECTONICS & GEOLOGY
—L. Cathles, Chevron Oil Research Co; N.L. Sleep, Geophysical Dept., Stanford University

- rift propagation & plate tectonics
- hydrothermal circulation & magma chambers of mid-ocean ridges
- volcanic eruption patterns along rift zones • hydrothermal mineral deposit estimates

OFFSHORE ENGINEERING 1
P. Purser, Seale Consortium, Ltd

- safety analyses of dry subsea production systems • measures of breakout resistance of seafloor embedded objects • motion compensation & handling systems
- world-wide wave climate synthesis

OTHER MINERAL RESOURCES
J. Harding, Marine Extension Service, University of Georgia; C. Welling, Ocean Minerals Co.

- mineral dredging development
- OCS mining for manganese nodules, placer, phosphates & construction materials

OFFSHORE ENGINEERING 2
P. Purser, Searle Consortium, Ltd.

- modelling & theoretical studies
- non-linear cable dynamics
- barges moored in wave fields
- TLP analyses • wave hindcasting

RECREATION—T. Morash, Dept. of Rec. & Leisure Studies, Cal. State, Northridge; R. C. Kelly, Cal. Dept. of Fish & Game

- artificial reef technology • specialized waterfront developments
- use-benefit enhancement
- underwater parks

MARINE BIOLOGY—W. Queen, Inst. of Coastal & Mar. Studies, East Carolina Univ.; G. Robillard Woodward-Clyde Conslts.

- benthic monitoring • hard & live bottom definitions • marine resource detection techniques
- biological impacts of heavy metal & organic chemical waste disposal on marine invertebrates & corals

WATER QUALITY
B. Edge, Cubit Engineering, Ltd.

- estuary circulations • pollution & discharge monitoring • protection of estuaries against oil spills • solids distributions near marine discharges

MARICULTURE—F. Conte, Aquaculture Extension, Univ. of Cal. Davis; D. Conklin, Bodega Bay Marine Lab

- biochemical & genetic engineering • salmon ranching • crustacean aquaculture • marine plant culturing & harvesting

OFFSHORE STRUCTURES
R. Cordy, Naval Civil Engineering Lab; M. C. Cheung, MCA Engineers, Inc.

- underwater inspection of structures • scale and numerical modeling • ocean testing of concrete pressure resistant structures
- interaction analyses for deep water structures

MANNED UNDERSEA VEHICLES & HABITATS
R. Cook, Harbor Branch Foundation; D. E. Laxo, Standard Oil Co. of Calif.

- manned U.S. vehicles & habitats
- machinery & materials • hybrid manned/unmanned systems
- batteries & power generating equipment

MARINE MATERIALS & CONNECTORS
G. Berian, State University of N.Y.; H. Herman, Rochester Corp.

- lightweight composite prestressed concrete • titanium alloys
- wood preservations • wet mateable connectors

REMOTELY OPERATED VEHICLES—R. Wernli, Naval Ocean Sys. Cen.; D. Greenberg, Lockheed Missile & Space Corp.

- advanced search systems • ship hull inspection vehicles • acoustic navigation systems • simplified pilot displays & control systems • deep diving vehicles

PORT OPERATIONS—R. Stone, Port of San Francisco

- design & maintenance of ports and port systems with an emphasis

on requirements, inspection, dredging, logistics

ICE AREA OPERATIONS
J. Lewis, ARCTEC, Inc.; R. Potter, Sohio Alaska Petroleum

- estimates of ice floes • use of light-weight concrete • simulation

& engineering in the arctic environment • Alaskan workboats • ice dynamics

OCEAN INSTRUMENTATION
J. Jaeger, Hydro Products; T. Dauphinee, Div. of Physics, Nat. Research Council, Canada

- current profiling • air-launched expendable instrumentation
- 3-D imagery • short-path sensing
- optical systems for particulate measurements

ACOUSTIC REMOTE SYSTEMS
J. Syck, Naval Undersea Systems Center; S. G. Chamberlain, Raytheon Company

- acoustic sensing for sea floor classification • mapping of internal

waves & currents • air/sea interface definitions • fisheries assessment

PHYSICAL OCEANOGRAPHY—W. J. Pierson, City College of N.Y.; R. L. Bernstein, Scripps Inst. of Oceanography

- extreme wave groups • directional spectra measurements • eddies, fronts, jets in the California Current
- tidal characteristics of the Sacramento River • mid/deep-water circulation measurements • applications of satellite altimetry

DATA ACQUISITION INSTRUMENTATION
J. Jaeger, Hydro Products; T. Dauphinee, Div. of Physics, Nat. Res. Cncl., Canada

- distributed micro processors
- bubble memory recorders • in-situ data compression • error detection & correction for acquisition & telemetry systems • deep ocean transceivers

ACOUSTIC SIGNAL PROCESSING
J. Syck, Naval Undersea Systems Center; S. G. Chamberlain Raytheon Company

• 3-D underwater tracking • bearings only tracking • transmission of video information • ranging & probing of sound channels • broadband ocean noise & propagation losses

AIR/SEA INTERACTION & CLIMATOLOGY
B. West, La Jolla Institute; J. A. L. Thomson, Physical Dynamics

- non-linear wind-wave growth
- synoptic wind field properties
- sea surface temperature & atmospheric stability • geomagnetic measurements in global ocean climate studies

POSTER SESSION

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Albany International—
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Bathy Systems
Battelle New England
Marine Research
Laboratory
Benthos, Inc.

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General Technologies Sessions—
1:20 p.m. to 3:00 p.m.

General Technologies Sessions—
3:20 p.m. to 5:00 p.m.

POLYMETALLIC SULFIDES 1
P. Rona, NOAA/Atlantic Labs;
R. A. Koski, U.S. Geological Survey
• overview & evolutionary history of deposits • PMS discoveries on the East Pacific Rise, Atlantic Ocean, Indian Ocean & Juan de Fuca Ridge
• Atlantis II deep project

U.S OCEAN THERMAL ENERGY CONVERSION
J. Vadus, OTEC Program Man. Off., NOAA; L. Vega, EG&G
• pilot programs and plans • large cold water pipe tests • heat transfer experiments • Hawaii's 40MW pilot plant • 160MW plantship for methanol production

POLYMETALLIC SULFIDES 2
P. Rona, NOAA/Atlantic Labs;
R. A. Koski, U.S. Geological Survey
Additional papers on polymetallic sulfides including motion pictures of Atlantis II deep operations
INTERNATIONAL OTEC
J. Vadus, OTEC Prog. Man. Off., NOAA; L. Vega, EG&G

• reports from France • Japan • the Netherlands • Sweden • Russia • United States

EXPLORATORY DRILLING—R.E. Haring, Exxon Product Research Co.; R. Geminder, Eng. Analysis Group, Hughes Offshore
• ice-breaking drilling barges
• safety aspects of offshore drilling
• squinch joint analyses • dynamic behavior & fatigue analysis of marine risers

WASTE DISPOSAL
W. Lee, Roy F. Weston, Inc.; C. Chen, SYSTECH Engineering, Inc.
• multi-media management of disposals • discharge permit program techniques • dredge material siting strategies • bioassays of contaminated soils • solids distributions near marine discharges

FISHERIES
R. Edwards, Northeast Fisheries Center, National Marine Fisheries Service
• application of engineering & technology to the fishing industry • shellfish & shrimp fisheries • testing of fishing trawls • management of seafood processing wastes

UNDERWATER ENGINEERING
H. Talkington, Naval Ocean Sys. Cen.; I. Lemaire, Naval Ocean Sys. Cen.
• shear modulus measurements
• instrumented sea-bed penetrators
• flow energized electrical generators • cathodic protection devices

DIVING & LIFE SUPPORT SYSTEMS 1
T. Odum, Naval Coastal Sys. Cen.; R. Garrahan, Sub. Dev. Grp. 1, USN
• diver thermal protection • helium speech unscrambling • heart & lung problems in diving • decompression sickness/air embolism therapy • CO₂ scrubbers

MOORINGS—R. Swenson, Ocean Technical Div., National Space Technology Lab; N.D. Albertson—NCBC
• deep water compliant structures • tension members • cable dynamics • fibre rope technology • mooring maintenance systems

taminated dredge materials • OTEC pipe foundations • laser hydrography

DIVING & LIFE SUPPORT SYSTEMS 2
W.I. Milwee Jr., Milwee Associates, Inc.

• government regulation of scientific diving • physiological diver monitoring • surface supplied equipment • microprocessor in a hyperbaric environment • CO₂ sensors in high pressure environments

SHIP DESIGN—M. Davis, Lockheed Missiles & Space Corp.; R. Potash, Giannotti & Associates, Inc.

• ferries design • swath & salvage ships • model testing of advanced amphibious vehicles

SHIP SYSTEMS
W.A. Skinner, Lockheed Ocean Systems
• marine propulsion systems
• motion compensation systems

• level indicating systems
• fouling in heat exchangers

OPERATING & ENGINEERING INSTRUMENTATION
J. Jaeger, Hydro Products; T. Dauphine, Div. of Physics, Nat. Res. Cncl., Canada
• sea stress & hydrodynamic pressure measurement • time domain reflectometry • oceanic fouling forecasts • air deployment of moorings • free fall oceanographic vehicles

unmanned, untethered vehicles
• learning systems
SATELLITE REMOTE SENSING—J. Gallagher, Naval Undersea Systems Center
• sea surface temperature measurement • synoptic wind fields • measurements of ocean internal waves by synthetic aperture radar • marine applications of the ARGOS system

DATA MANAGEMENT & RETRIEVAL
K. Hughes, National Oceanographic Data Center, NOAA
• ocean pollution data information • Canadian oceanographic data system • NOAA satellite data system • techniques for marine data entry & acquisition

• ship-board data communications
• directional spectra bouys

OTHER REMOTE SENSING
W. Plant, Naval Research Lab.
• CODAR measurements of storm currents • new technique for two frequency spectrometry • Lagrangian coastal processes • remotely sensed non-linearly wind waves

ARTIFICIAL INTELLIGENCE
A. Rechnitzer, Naval Observatory; P. Bridger, International Search
• introduction to artificial intelligence • supervision and control of

OCEANOGRAPHIC SHIPS & PLATFORMS
R.P. Dinsmore, Woods Hole Ocean. Inst.
• deep water towing technology
• gimbal-type sheave development

POSTER SESSION

Gould, Inc.—Defense Electronics Division
Heckerman
Hydro Products
Institute for Marine & Coastal Studies
Instruments, Inc.
Interocean Systems, Inc.

JMR Instruments—E.S.A., Inc.
Klein Associates, Inc.
Krupp Atlas Elektronik
Lebus International—Heckerman
Lockheed Missiles & Space Co., Inc.
Marsh McBirney, Inc.
Military Sealift Command

OCEANS '83 BANQUET Speaker: Athelstan Spilhaus

Motorola—Government Electronics Group
Neil Brown Instrument Systems
NOAA/NESDIS/Satellite Data Service Division
Ocean Data Equipment Corporation
Philadelphia Resins Corporation—Heckerman

Raytheon Ocean Systems Co.—Heckerman
RD Instruments
Schonsted Instrument Company
Sea Bird Electronics, Inc.
Sea Data—Heckerman
Sea Grant Marine Advisory Program

WEDNESDAY

Morning Sessions FOCAL PROGRAMS

MINERAL RESOURCES & ENERGY

Dr. Claude R. Hocott,
Gulf Universities Consortium
Dr. J. Robert Moore,
Marine Science Institute
University of Texas, Austin

Improvements in the understanding of environmental effects on off-shore production systems; programs for the near-term development of OTEC.

Programs dealing with development of cobalt-rich crusts, marine placer mining, and ocean-bottom imaging systems.

NON-MINERAL RESOURCES

Dr. William S. Gaither,
College of Marine Studies,
University of Delaware
Dr. Carolyn A. Throughgood
Asst. Dean, College of Marine
Studies
University of Delaware

Papers on genetic engineering and nutritional biochemistry programs important for the advancement of mariculture.

CIVIL/MILITARY OCEAN ENGINEERING

Rear Admiral John B. Mooney,
Oceanographer of the Navy

Large and important ocean engineering programs being conducted by Navy, NOAA and Army Corps of Engineers laboratories.

TRANSPORTATION

Mr. John Wing,
Booz-Allen-Hamilton Inc.
Dr. Don Walsh,
Institute of Marine & Coastal
Studies, University of Southern
California

Papers reporting on programs geared towards improving and modernizing the merchant fleet and facilities, including marine transportation research and development, port rationalization, intermodal transportation, productivity improvement.

OCEAN SCIENCE

Mr. Feenan D. Jennings,
Texas A & M University
Large-scale programs within the category of ocean science, including programs in physical, chemical, and biological oceanography as well as sea floor science.

PRESIDENTS' AWARDS LUNCHEON

Seimac Limited
Simplex Wire & Cable
Company—Heckerman
Sippican Corporation—
Ocean Systems Division
Sonatech, Inc.
Tracor Marine, Inc.
TSK America, Inc.

Afternoon Session CLOSING PLENARY

Chair: J. Wenzel,
OCEANS '83 Chairman
Blue Ribbon Panel:
Mr. Dayton L. Alverson,
fisheries consultant
Mr. Neil Brown, Chairman,
Neil Brown Instrument
Systems, Inc.
Dr. John Byrne,
Administrator, NOAA
Mr. John E. Flipse, President,
Texas A & M Research Foundation
Mr. Ronald L. Geer, Senior
Mechanical Engineering
Consultant, Shell Oil Co.
Prof. Ben C. Gerwick, Jr.,
Consulting Structural Engineer
Mr. Jon Lindberg,
Mariculture Consultant
Dr. George Mechlin, Vice President,
Research & Development,
Westinghouse
Prof. William H. Menard,
Scripps Institute of Oceanography
Mr. Allen E. Schumaker, Chairman,
American Hull Insurance Co.
RADM Edward Snyder,
U.S. Navy, Ret.

The closing plenary session will bring the entire OCEANS '83 Conference into focus. This session will provide the framework needed to update the historic PSAC, Stratton Commission and Marine Board reports that dealt with national and global efforts needed to explore, understand, and develop the oceans.

The update will be accomplished through presentations by members of the Blue Ribbon Panel. The basis for their update will be the papers presented in the preceding sessions of OCEANS '83, together with their knowledge of marine science, technology and affairs.

In a concluding portion of this plenary, representatives of Congress will comment on the panel's report and discuss possible implications for Congressional action.

CONFERENCE TOURS

BAY MODEL TOUR—SAUSALITO
Thursday, September 1, 9:30 a.m.-
12:00 p.m., \$12.50/person

A bus will be provided to take registrants to visit the San Francisco Bay Model. Built and operated by the U.S. Army Corps of Engineers, this dynamic model simulates the various flushing and tidal actions which influence the San Francisco Bay and Sacramento River delta system.

**TOUR OF THE
GLOMAR EXPLORER**

Thursday, September 1, 10:00 a.m.-
4:00 p.m., \$45.00/person

A tour of the Glomar Explorer including a visit and lunch at the California Maritime Academy has been arranged for a limited number of participants.

**SELF-GUIDED TOUR OF
OCEANOGRAPHY/
METEOROLOGY CENTERS**

Thursday, September 1,
9:00 a.m.-5:00 p.m., No Cost

Ocean Routes, Inc., of Palo Alto, will hold open house for participants from 9:00 a.m. to 11:00 a.m. The Fleet Numerical Oceanography Center at Monterey will be open to participants to visit from 2:00 p.m. to 5:00 p.m. Maps and directions will be provided at the OCEANS '83 registration desk.

OCS NON-ENERGY MINERALS WORKSHOP

On September 1, 1983, immediately following OCEANS '83, a workshop will be held on OCS Non-Energy Minerals. The workshop is co-sponsored by the Minerals Management Service, U.S. Bureau of Mines, U.S. Geological Survey, and the Committee on Economic Potential of the Oceans of the Marine Technology Society.

The workshop will examine the needs and options available in setting discretionary terms and conditions for operating OCS hard rock leases under a new program announced by the Secretary of the Interior which will permit exploration and development of a wide variety of non-energy mineral resources located throughout all U.S. offshore areas.

If you are interested in the workshop indicate your interest on the registration form or contact Dr. Michael J. Cruickshank, OCS Non-Energy Minerals, 646 National Center, Minerals Management Service, Reston, Virginia 22082, tel: (703) 860-7471.

SPOUSAL TOURS

VICTORIAN HOME TOUR
Monday, August 29, 1983, 1:00
(4 hours) \$24.00/person

Visit original Victorian homes and mansions that show the pride of tradition long past. Meticulously maintained and beautifully refurbished, these homes provide a glimpse into the past of wealthy Franciscans who came to California from all walks of life. Tour includes guide or docent as well as tea and cakes served at one of homes. 30 person minimum

SONOMA WINE COUNTRY
Tuesday, August 30, 1983, 8:30
(8 hours) \$36.00/person

Touring into the famous California wine country, expert Dennis K explains the fine art of wine making from the effects of the climate, geography to the grape variety and production techniques. There will be visits and tasting at three wineries plus a catered buffet in one winery's picnic area. The tour concludes following a stop at Sonoma's Historical Town Square where one may visit the Mission, the shops surrounding the Square. 30 person minimum

**SHANGHAI EXHIBIT/
DIM SUM/CHINATOWN**
Wednesday, August 31, 1983,
8:30 a.m. (4 hours) \$30.00/person

Experience the unique exhibit "Treasures from the Shanghai Museum: 6,000 Years of Chinese Art" with a docent tour conducted during hours the Asian Art Museum is closed to the public. This exhibit featuring two hundred and thirty-two objects, each considered an artistic treasure will be shown only three U.S. cities. Follow the museum tour, a brunch will be served in a Chinese restaurant featuring a variety of dim sum (Chinese pastries) for everyone to select and enjoy. An experienced guide will explain the highlights of the town during the brunch after which you may enjoy the optional self-guided walking tour of Chinatown. 30 person minimum—
pre-registered purchase only

Tours not meeting 30 person minimum are subject to cancellation.

OCEANS '83 ADVANCE REGISTRATION FORM

To register for OCEANS '83 and all of the associated events complete this form in full. We strongly suggest that you photocopy the completed form and retain the original for your information. Send the completed form with payment to:

OCEANS '83
P.O. Box 70970
Sunnyvale, CA 94086

The conference staff will not be able to confirm all of your requirements for the conference unless the advance registration form is postmarked by August 12, 1983. Register early!!

Registrant Information

A separate form must be completed for each registrant. Spouses will be welcome to the technical sessions and exhibit area. Please **print** your name and address and your spouse's name so that your identification badges are accurate. Indicate whether you are a session chairperson, speaker and your membership(s) in a sponsoring and/or participating society or organization.

Registration Fees

Advance registration fees are indicated. Registration fees at the time of the conference will be \$15.00 more. Regular registration includes the conference proceedings which will be produced and mailed after the conference. The package registration includes both the proceedings and admission to all of the social functions for the registrant. Joint registration for OCEANS '83 and IGARSS '83 (technical sessions and IGARSS '83 record only) is an additional \$60.00 over and above the OCEANS '83 regular or package registration fees. You may register for a particular day of technical sessions. Students with current enrollment cards may register for one day or all three days of the technical sessions. Joint registration for students to OCEANS '83 and IGARSS '83 is also available.

Social Functions

Spouses and attendees with regular registration must indicate which of the social functions they plan to attend. The fees indicated are for each person. Tables for 8 persons may be reserved for any of the social functions.

Conference and Spousal Tours

The prices indicated for tours are per person. These tours are contingent upon the number of participants that register in advance. Signups may be possible at the time of the conference, but to insure your space check the appropriate box indicating the number of people in your party and include payment with this form. If any tour is cancelled due to lack of registration all fees will be fully refunded.

OCS Non-Energy Minerals Workshop

You may reserve a space for this workshop by checking the appropriate box at the right.

Memberships

You may begin or renew a membership in the Marine Technology Society and/or the IEEE Oceanic Engineering Society by including the appropriate annual dues with your payment to OCEANS '83. Be sure to indicate which membership you are paying for by checking the appropriate box.

Totals

Total all of the items for which you are enclosing payment. Make checks payable in U.S. dollars to "OCEANS '83".

Conference Registration

The OCEANS '83 registration table at the Hilton Hotel will be open during the following hours:

Sunday, August 28, 4:00 p.m. to 8:00 p.m.
Monday, August 29, 7:30 a.m. to 4:00 p.m.
Tuesday, August 30, 7:30 a.m. to 5:00 p.m.
Wednesday, August 31, 7:30 a.m. to 2:00 p.m.

People wishing to register in person should do so the day before the session or event they are interested in. Advanced registrants must check-in with the OCEANS '83 registration table to pick up their conference materials.

Hotel Reservations

All participants in OCEANS '83 will be responsible for making their own reservations for hotel accommodations at the San Francisco Hilton and Tower. To make reservations call your local Hilton Reservation Service Office (consult your white pages) or see your travel agent. In order to obtain special OCEANS '83 room rates, be sure to emphasize that you are registered for OCEANS '83.

Name: _____

Company Affiliation: _____

Street: _____

City, State, Zip: _____

Telephone Number: (_____) _____ Current Membership

- Session Chairperson
 Speaker
 Presenter
 Spouse to attend

- IEEE
 MTS
 Both IEEE & MTS
 Participating Organization: _____

Spouse's badge to read: _____

Regular: Member @ \$95 Non-Member @ \$120 \$ _____

Package: Member @ \$135 Non-Member @ \$160 \$ _____

Joint OCEANS '83/IGARSS '83 @ \$60 \$ _____

One day only: Mon. Tues. Wed. @ \$60 \$ _____

Student 1 day: Mon. Tues. Wed. @ \$13 \$ _____

Student—3 day OCEANS '83 @ \$25 \$ _____

Student—OCEANS '83/IGARSS '83 @ \$35 \$ _____

Chairman's Luncheon, Mon. 8/29 # _____ @ \$15 \$ _____

OCEANS '83 Banquet, Tues., 8/30 # _____ @ \$25 \$ _____

President's Award Luncheon, Wed., 8/31 # _____ @ \$15 \$ _____

Bay Model Tour # _____ @ \$12.50 \$ _____

Glomar Explorer Tour # _____ @ \$45 \$ _____

Oceanography/Meteorology Center Tour: # _____ Res. _____

Victorian Home Tour: # _____ @ \$24 \$ _____

Sonoma Wine Country Tour: # _____ @ \$36 \$ _____

Shanghai Exhibit Tour: # _____ @ \$30 \$ _____

Reserve # _____ for OCS Non-Energy Minerals Workshop

MTS: New Renewal @ \$35 \$ _____

IEEE & OES New @ \$80 Renewal @ \$65 \$ _____

Amount: _____ Check # _____

Date: _____ Cashier: _____

Total \$ _____

For office use only.

Refund Policy

Refunds in full will be made for any reason until August 12, 1983. All refunds requested after August 12, 1983 will be subject to a 10% administrative fee. No refunds will be made after the conference commences unless for medical or other emergencies, at the sole discretion of the conference committee.

Program Changes

This advanced program is based on the best information available at the time of printing (4/83). All changes to the program will be reflected in the Final Program which will be available prior to the conference. For the latest program and registration information contact the OCEANS '83 office at the address above or telephone (408) 742-3104.

SAVE ON AIR COSTS

Special airfares for OCEANS '83 can be obtained on regularly scheduled airlines by booking through AIRCORP. These airfares are lower than supersaver and excursion fares. Call AIRCORPS toll free at 800-526-0110. In New Jersey call 201-488-9330.

'TIS A PUZZLEMENT

NEW PUZZLES

Puzzlement Editor: George V. Mueller, 2229 Indian Trail, West Lafayette, IN 47906

PROPERTIES OF A PARABOLIC CURVE

The positive portion of a symmetrical alternating voltage wave passes through the points (0, 0) (90, 100) and (180, 0) while following the parabolic curve $y = C_0 + C_1x + C_2x^2$.

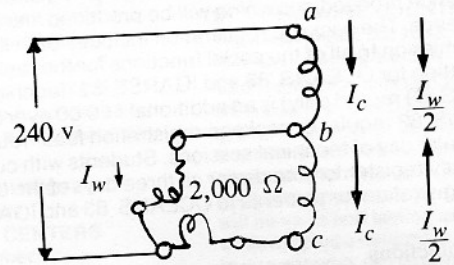
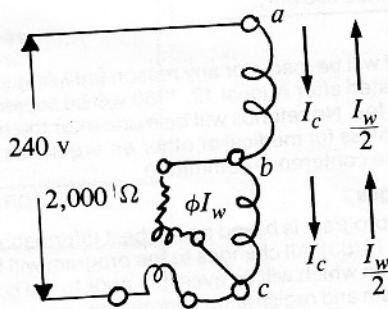
1. Determine the half-period average value of the wave.
2. Determine the rms value of the wave.
3. Determine the values of the fundamental, the third harmonic and the fifth harmonic components of the wave.

PAST PUZZLES

Solution: Transformer Core Loss

A certain transformer winding has end terminals *a* and *c* and a midtap *b*. A wattmeter current coil is connected in series with a line to *c*. The voltage coil has a resistance of 2,000 ohms and is connected between *b* and *c*. An a-c voltage of 240 volts is applied between *a* and the outside terminal of the current coil. The wattmeter reading is 20 w. Compute the transformer core loss. Neglect the current coil loss.

The transformer and the wattmeter are connected as shown. As far as the wattmeter voltage coil is concerned, the current I_w is being supplied by a 2 to 1 stepdown autotransformer. Each half of the transformer has a current component of $I_w/2$, directed as shown. The inphase (or power) component of the exciting current is I_c , directed as shown. Since the voltage coil circuit is largely resistive and the voltage across it is nearly 120 v, then $I_w = 120/2,000 = 0.06$ amp. The inphase current through the current coil is $I_c + I_w/2 = I_c + 0.03$ amp. The power registered on the wattmeter is $120(I_c + 0.03) = 20$ w as given. From this $120I_c = 20 - 3.6 = 16.4$. The core loss is $240I_c = 32.8$ w.



After the shift of the voltage coil connection the connection diagram becomes as shown. Here the inphase component of current through the current coil is $I_c - I_w/2$ amp. The wattmeter reading is $120(I_c - I_w/2) = 120I_c - 60I_w$.

From the previous problem $120I_c = 16.4$. Then the wattmeter reading is $16.4 - 60 \times 0.06 = 12.8$ w.

Solution: Integer square and Cube Roots

Between 1 and 1,000,000, inclusive, the ten numbers whose square and cube roots are integers are $1^6, 2^6, 3^6$, etc. The only one of these numbers that is between 500,000 and 999,000 is $9^6 = 531,441$.

Solution: Properties of a Certain Curve

The curve $y = C_0 + C_1x + C_2x^2$ passes through the points (x_0, y_0) , (x_1, y_1) and (x_2, y_2) , where $x_1 = (x_0 + x_2)/2$. Determine the values of C_0 , C_1 and C_2 in terms of x_0, x_2, y_0, y_1 and y_2 .

By substitution of values

$$y_0 = C_0 + C_1x_0 + C_2x_0^2$$

$$y_1 = C_0 + C_1x_1 + C_2x_1^2$$

$$y_2 = C_0 + C_1x_2 + C_2x_2^2$$

When $(x_0 + x_2)/2$ is substituted for x_1 , and the resulting equations are solved simultaneously, the results are

$$C_0 = \frac{(x_0 + x_2)(x_0y_2 + x_2y_0) - 4x_0x_2y_1}{(x_2 - x_0)^2}$$

$$C_1 = \frac{x_2(-3y_0 + 4y_1 - y_2) + x_0(-y_0 + 4y_1 - 3y_2)}{(x_2 - x_0)^2}$$

$$C_2 = \frac{2(y_0 - 2y_1 + y_2)}{(x_2 - x_0)^2}$$

The area A between the curve $y = C_0 + C_1x + C_2x^2$ and the x -axis between the limits $x = x_0$ and $x = x_2$ is

$$A = \int (C_0 + C_1x + C_2x^2) dx = C_0(x_2 - x_0) + C_1(x_2^2 - x_0^2)/2 + C_2(x_2^3 - x_0^3)/3$$

ANNOUNCEMENT

Proceedings of the IEEE Second Working Conference on Current Measurement are now available. The Conference was held in January 1982, at the Hilton Head Inn, Hilton Head Island, South Carolina, and was sponsored by the Current Measurement Technology Committee of the Society of Ocean Engineering, the Institute of Electrical and Electronics Engineers (IEEE). The theme of the Conference was "Quality of Measurements—How can I collect data of sufficient certainty to satisfy my needs?" The IEEE is the exclusive sales agent for this publication. For information about the Conference contact William E. Woodward, NOAA, (301) 443-8444. To obtain copies of the Proceedings contact:

IEEE Service Center
Single Publication Sales Unit
445 Hoes Lane
Piscataway, NJ 08854
Phone: (201) 981-0060

CALL FOR PAPERS

OCEAN ACOUSTIC SIMULATION MODELING

In April 1984 a special issue of the *IEEE Journal of Oceanic Engineering* will be devoted to simulation modeling of ocean acoustic environments or systems utilizing ocean acoustic sensors. Among the topics to be covered are simulation modeling of sound propagation and reception of target echos, reverberation and noise for signal detection, estimation, localization, tracking, pursuit-evasion encounters, terminal homing, oceanographic/geophysical surveys and bottom mapping. Aspects associated with digital, analog or hybrid simulation for purposes of sonar systems analysis, systems proofing, personnel training and scientific understanding are to be included.

Papers on these or other associated topics are sought. Prospective authors should prepare their manuscripts in the manner described on the back cover of the *IEEE Journal of Oceanic Engineering* and submit them by July 15, 1983 to the guest editor:

Dr. Stanley G. Chamberlin
Raytheon Company—Box 136
Submarine Signal Division
P.O. Box 360
Portsmouth, RI 02871

EXTREMELY LOW FREQUENCY (ELF) COMMUNICATIONS

In July 1984 a special issue of the *IEEE Journal of Oceanic Engineering* will be devoted to communications at ELF in the ocean environment. Among the topics to be covered are the generation, propagation and reception of radio waves, modulation and coding, and noise processing. Papers on these, or other, topics are appropriate provided they are applicable to radio communication at ELF in which at least one terminal is in the ocean environment.

Prospective authors should prepare their manuscripts in the manner described on the back cover of the *IEEE Journal of Oceanic Engineering* and submit them by 15 October 1983 to the guest editor:

Dr. M. L. Burrows
M.I.T. Lincoln Laboratory
P.O. Box 73
Lexington, MA 02173

CORRESPONDENCE

April 11, 1983

Mr. Harold A. Sabbagh, Editor
Oceanic Engineering Society Newsletter
Analytics, Inc.
2634 Round Hill Lane
Bloomington, Indiana 47401

Dear Mr. Sabbagh:

Congratulations on your new job as editor. The *Newsletter* is great except for one indiscretion, the uncritical acceptance and reprinting of a piece of journalistic tripe about Tesla.

Tesla was a great man. It is unfortunate that of late he has been taken up by trendy technical incompetents who wade beyond their depth and swallow exaggerations, superlatives, and outright falsehoods as gospel. The piece you reprinted is a junior high school exercise beneath the professional level of IEEE. It is more error than truth and it does disservice to the memory of Tesla.

The AC motor was not solely Tesla's creation. The idea surfaced independently in several places at approximately the same time. Tesla's giant gift to mankind was the polyphase system of power generation and transmission. Though trained in mathematics he apparently never understood Maxwell's equations and electromagnetic radiation, however this shortcoming was overcome by his unbridled imagination and he was still able to create novel and dramatic uses of electricity.

Tesla was a showman and a pet of society. He attracted the backing of people like J. P. Morgan with his pyrotechnics and his grandiose promises of spectacular things to come. Promises they remained and J. P. Morgan soon tired of sponsoring Tesla. As a result Tesla spent the last half of his life in impoverished straits.

When Tesla died at the age of 86 in 1943 the "New York Times" said: "His practical achievements were limited to the short period that began in 1886 and ended in 1903. And what achievements they were! Polyphase currents and alternating current engineering, the induction motor, the use of oil in transformers, remarkable work in wireless, electric arcs, gas discharge lamps. . . ."

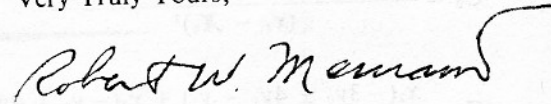
"Yet all this he affected to regard as of minor importance. It was the Jules Verne future that engrossed him, for which reason the last half of his life was spent in the isolation of a recluse. For forty years he lived in a world of fantasy crackling with sparks, packed with strange towers to receive and emit energy and dreamy contrivances to give utopian man complete control over nature. It was a lonely life. Shy of manner and ascetic in his tastes, Tesla always preferred his workshop to society. He never married. He ate sparingly and drank neither coffee or tea. On the other hand he regarded alcohol in moderation as virtually an elixir of life. It was his habit to stay up until daylight and then sleep only for a few hours before resuming his work."

Tesla was tall and lean and preferred to dress formally in cutaway coats. He would never wear a necktie more than once. He had an almost abnormal attachment to pigeons. He also was an egomaniac. In a "Collier's

Magazine" article by Tesla which appeared in Feb. 1901 the word, I, appears 61 times in two pages even though these pages are mostly covered with sensational photos of performing Tesla coils.

For all his strange ways he was a great man; but his feet were of clay like all the rest of us. Please keep things in perspective and do not launch or perpetuate untruths and exaggerations in a publication which carries the very sign of responsibility in its masthead, namely The IEEE.

Very Truly Yours,



Robert W. Merriam, Director
The New England Museum
of Wireless and Steam, Inc.



4 April 1983

Miss Laura Christie
Conference Organiser
Science, Education and Technology Division
The Institution of Electrical Engineers
Savoy Place
London WC2R OBL
England

Dear Miss Christie:

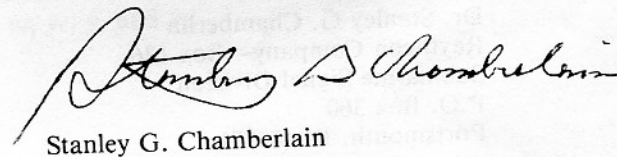
The IEEE Oceanic Engineering Society would be pleased to accept your invitation to cooperate with you in your Fourth International Conference on 'Energy Options—The Role of Alternatives in the World Energy Scene,' to be held in London, 3-6 April 1984.

As a cooperating society for the Conference we will encourage OES members to submit technical papers to the Conference and promote the Conference in our *Newsletter*. To assist in this, I have appointed:

Dr. Joseph R. Vadus
U.S. Dept. of Commerce
NOAA Office of Oceanic Eng.
6010 Executive Blvd.
Rockville, MD 20852 USA
(301) 443-8655

to serve as a corresponding technical representative from IEEE/OES for future contacts.

Sincerely,



Stanley G. Chamberlain

4 April 1983

Mr. A. F. Spilhaus, Jr.
Executive Director
American Geophysical Union
2000 Florida Avenue, N.W.
Washington, D.C. 20009

Dear Mr. Spilhaus:

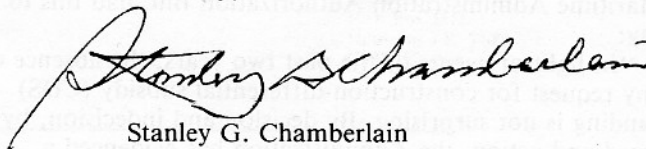
Per your invitation of March 9, 1983 and per my phon-con with Ann Greenglass on March 24, 1983, the IEEE Oceanic Engineering Society would be pleased to cosponsor the 1984 Ocean Sciences Meeting sponsored by the American Geophysical Union and scheduled to be held in New Orleans on January 23-27, 1984.

As a cosponsoring organization, we would publicize the meeting in our *Newsletter* and that we would incur no

further financial obligation. Please provide meeting announcement/call for papers in a form appropriate for newsletter publication. Should you desire membership mailing labels, we can provide them to you at cost. I understand that in return, the IEEE Oceanic Engineering Society would be listed on the meeting literature and program, and that our members would be entitled to the same member registration fee as AGU members.

Thank you for the opportunity to participate with AGU in the 1984 Ocean Sciences Meeting.

Sincerely,



Stanley G. Chamberlain

Antarctic Volcano Shows Unusual Amount of Activity, NSF Reports

Scientists have recorded an unusual amount of seismic activity associated with Mount Erebus in Antarctica, the world's southernmost active volcano, the National Science Foundation (NSF) reported.

The volcano has been monitored for three years by a team of scientists from the United States, Japan and New Zealand headed by Dr. Philip R. Kyle of the New Mexico Institute of Mining and Technology in Socorro.

The researchers had installed four seismic stations on the volcano—three on the slopes and one at the summit—under an NSF-funded program to check on its activities. NSF funds and coordinates all U.S. activities in Antarctica.

When the scientists returned for their annual field expedition in November, 1982, they found that the stations had recorded "an astounding" 650 small earthquakes on October 8. Prior to that date an average of 20 to 80 such tremors had been recorded each day. The October 8 maximum was followed by 140 on October 9 and 120 on October 10. Dr. Kyle, who has just returned from Antarctica and made his report to the NSF, said some of the strongest earthquakes recorded during their three years of observation at Mount Erebus also occurred on October 8, although these earthquakes could not have been felt by people and registered less than 2 on the Richter scale.

A visual examination of the volcano showed there were no lava flows or other external signs of an eruption. The quakes, Dr. Kyle said, were caused by magma or molten rock that was moving within the earth just as it is believed it is doing at Mammoth Lakes in California, which recently has experienced a large number of earthquakes.

Dr. Kyle stressed that there is little, if any, chance that Mount Erebus would erupt. Unlike Mount St. Helens, he said, there is no pressure being built up in Erebus. He

described Erebus as being in a state of "hydrostatic equilibrium", an earth scientist's way of saying there is no excess pressure present within the volcano.

Icy cold on the outside and fiery hot inside, Mt. Erebus is an unusual volcano and dominates the landscape visible from McMurdo Station, the principal U.S. scientific outpost in Antarctica.

Its crater harbors an exposed lava lake of molten rock 91.4 m in diameter. The lake, one of two active lava lakes in the world, is believed to be the top of the volcano's magma chamber, a storage area for the molten rock within the mountain.

On their most recent expedition, the scientists observed the lake had dropped by about 3 m or lost about 300,000 cubic feet of lava since their previous visit a year earlier. Since the lava from the lake had to go somewhere, and there were no external signs of the molten rock, the scientists speculated that magma forced itself into a crack in the volcano and spread out like an arm from the magma chamber.

Dr. Kyle, an assistant professor of geochemistry, said the team hopes the seismic stations will provide them with enough information to determine the location and dimensions of the "arm" or dike as geoscientists call it.

Dr. Kyle explained that seismic waves are absorbed by magma but transmitted by solid rock. Therefore, the researchers can determine where molten rock is by looking at the pattern of the seismic waves. They already have used this technique to trace an artery of magma that appears to lead from the volcano's magma chamber up to the lava lake.

Now they hope it will help them determine if a dike was formed on October 8 and to pinpoint its location if it does exist.

Shipbuilders Council Says U.S. Shipping "Relegated to Extinction"

In its newsletter of early last month, the Shipbuilders Council of America noted that on March 1 one American flag flying over the U.S. Capitol was flying upside down. This is one of the international distress signals at sea.

This accidental signal could not have been more symbolic, it was stated, concerning the U.S. commercial shipbuilding situation. Council President Edwin M. Hood, testifying before a subcommittee of the House Committee on Merchant Marine and Fisheries on the Fiscal Year 1984 Maritime Administration Authorization Bill, had this to say:

"In light of events of the past two years, the absence of any request for construction-differential subsidy (CDS) funding is not surprising. By decision and indecision, by word and action, the Administration has evidenced a disposition to relegate commercial shipbuilding in the United States to extinction.

"The fact that production facilities are being idled; the fact that shipyard workers are being laid off; the fact that the shipbuilding industrial mobilization base is being critically weakened and national security thereby endangered—these demonstrable facts are taking place while the Administration and the Congress ironically propose emergency measures to put people back to work, to reduce the present high level of unemployment.

"Jobs are being exported to shipyards and shipyard workers in other countries. The statements of Department of Transportation/Maritime Administration officials in these respects have been truly unbelievable, mind-boggling, you might say: placement of contracts with foreign shipyards, in their view, will improve the com-

petitiveness of U.S. shipyards, and even more, it is inferred that there will be a beneficial fallout for U.S. shipyards.

"Here is the 'beneficial' fallout: contracts for only three merchant-type vessels of 1,000 gross tons and over were awarded U.S. shipbuilders during 1982. None of these were cargo ships. At this moment, the U.S. order-book comprises 21 merchant vessels, all of which are scheduled for delivery by the end of 1984. Thereafter, nothing!"

Admiral James L. Holloway, III. (USN-Ret.), President, Council of American-Flag Ship Operators (CASO), revived issues of foreign building rebuilding for subsidized operators and application of withdrawals from tax deferred Capital Construction Funds (CCF) for foreign ship construction, reconstruction or acquisition.

His statement included this sentence: "Representatives of United States shipyards and their allied industries have stated that, in the absence of CDS, no work will be lost to U.S. shipyards if the CCF program were extended to the 'build foreign' authority contemplated." When pressed to identify these representatives by name, he replied: "Ed Hood."

To which, Council President Hood later responded: "I can tell you that the position of our Board of Directors on the application of CCF withdrawals for foreign building, rebuilding or acquisition is unanimous. We have been and still are emphatically opposed to any such device to use tax-free U.S. dollars to subsidize the shipyards of other countries."

Oceanic Society Opposes Navy Plan to Sink Nuclear Submarines

A committee convened by the Oceanic Society, national marine conservation group, has criticized U.S. Navy plans to sink some 100 obsolete nuclear powered submarines off the U.S. coasts in the next 30 years.

The scientific panel warned that insufficient data was developed in the Navy's Draft Environmental Impact Statement (DEIS) to proceed with the sea disposal option. Instead, scientists suggest a modification of the land dis-

posal alternative considered in the DEIS to minimize release of radioactivity to the environment.

"A fundamental concern of Scientific Committee members centered on how little we know about the deep sea environment," Oceanic Society President Christopher Roosevelt said in releasing the panel's report. "Compared to other ocean ecosystems, the deep sea is at best poorly studied."

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