IEEE

OCEANIC ENGINEERING SOCIETY

NEWSLETTER

EDITOR: HAROLD A. SABBAGH

MARCH 1983 (USPS 420-910)

EDITOR'S COMMENTS

You will notice the new name on the masthead. We are no longer a mere council; we are now a full-fledged SOCIETY, empowered to establish chapters throughout the land, and do other things to better serve our members.

This was the goal sought by the founders of the Council, and assiduously worked for during the intervening years. Special recognition should go to the likes of Art Westneat, Ed Early, Lloyd Maudlin, Don Bolle, and the many others who worked long and lovingly behind the scenes to accomplish this transformation.

And so we are no longer a council.

That's nice.

I've always wanted to be a Society Editor.

Harold A. Sabbagh, Editor
Analytics, Inc.
2634 Round Hill Lane
Bloomington, IN 47401

OCEANIC ENGINEERING SOCIETY

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March 1983

JUNIOR PAST PRESIDENT'S COMMENTS

The results of our election for President of SOE and Vice President East Coast are now available. I am pleased to report that Stan Chamberlain and Tony Eller have been elected virtually unanimously to the positions of President and Vice President East Coast, respectively. As Junior Past President I congratulate them and pledge them my full support as I am sure we all do.

At this point we are putting together a procedure for the election of the SOE Executive Committee once IEEE Headquarters has advised us of the membership announcement status. You will recall that all subscribers to the Journal will be considered members until they indicate otherwise on the announcement sent to them. Subsequently a ballot will be conducted for the election of Ad Com membership.

Donald M. Bolle

FROM THE STAFF DIRECTOR

I am delighted to announce that the IEEE Executive Committee approved the conversion of the Council on Oceanic Engineering to the Oceanic Engineering Society, effective January 1, 1983. This was done in recognition of the growing activities in the oceanic engineering areas within IEEE. The new Society plans to establish Chapters in various locations to better serve its members.

As a subscriber to the JOURNAL OF OCEANIC ENGINEERING (JOE) through one of the Council-member-Societies, you will be designated as a member of the Society through which you chose to subscribe to JOE as well as a member of the new IEEE Oceanic Engineering Society for 1983.

Your membership renewal and dues notice for 1984 will indicate membership in all Societies of record in 1983, including the Oceanic Engineering Society. As usual, you will, of course, have the option to make additions or deletions in your subscriptions and Society memberships.

Dr. Irving Engelson

A PERSONNEL MATTER

TO: Jesus, Son of Joseph
Woodcrafters Carpenter Shop
Nazareth 25922

FROM: Jordan Management
Consultants
Jerusalem 26544

Dear Sir:

Thank you for submitting the resumes of the twelve men you have picked for management positions in your new organization. All of them have now taken our battery of tests; and we have not only run the results through our computer, but also arranged personal interviews for each of them with our psychologist and vocational aptitude consultant.

The profiles of all tests are included, and you will want to study each of them carefully.

As part of our service and for your guidance, we make some general comments, much as an auditor will include some general statements. This is given as a result of staff consultation and comes without any additional fee.

It is the staff opinion that most of your nominees are lacking in background, education and vocational aptitude for the type of enterprise you are undertaking. They do not have the team concept. We would recommend that you continue your search for persons of experience in managerial ability and proven capability.

Simon Peter is emotionally unstable and given to fits of temper. Andrew has absolutely no qualities of leadership. The two brothers, James and John, the sons of Zebedde, place personal interest above company loyalty. Thomas demonstrates a questioning attitude that would tend to undermine morale. We feel that it is our duty to tell you that Matthew has been blacklisted by the Greater Jerusalem Better Business Bureau. James, the son of Alphaeus, and Thaddaeus definitely have radical learnings, and they both registered a high score on the manic-depressive scale.

One of the candidates, however, shows great potential. He is a man of ability and resourcefulness, meets people well, has a keen business mind and has contacts in high places. He is highly motivated, ambitious and responsible. We recommend Judas Iscariot as your controller and right-hand man. All of the other profiles are self-explanatory.

We wish you every success in your new venture.

Sincerely yours,

Jordan Management Consultants
(from a Church Bulletin)

(Reprinted from *ENGINEERING MANAGEMENT SOCIETY NEWSLETTER*)

FAREWELL TO OCEANS '82

(Reprinted from *SEA TECHNOLOGY* / NOVEMBER 1982)

Oceans '82 Conference & Exhibition A Success In Recession Year

Washington, D.C.—In a year of recession rumblings, Oceans '82, the conference and exhibition of the Institute of Electrical and Electronic Engineers Council on Ocean Engineering (IEEE-COE) and the Marine Technology Society (MTS) held here in September, drew more than 1,200 paid registrants, substantially more than the break-even figure of 1,000.

Sea Technology staff members who canvassed exhibitors and registrants reported generally good reactions on the state of ocean-related business. With stories of cutbacks by several companies, however, those interviewed were cautious about what the fourth quarter of the year will bring.

Ninety-five percent of the exhibition space was filled at the conference, the less than 100% figure accounted for partly by the late withdrawal of one company. Richard Shamp, of Engineering Services Associates, was the sparkplug on booth sales, continuing the work of many years.

The technical sessions were well-organized and well-attended. The technical program was put together by Clifford E. McLain and Helaine G. Elderkin of System Planning Corporation, Dr. Ned A. Ostenso and Dr. James B. Rucker of the National Oceanic and Atmospheric Administration (NOAA), and Dr. Anthony I. Eller of the Naval Research Laboratory.

Attendees came from the three coasts, Great Lakes, Hawaii and Alaska of the United States. There were also delegations from Japan and the People's Republic of China. Representatives from the U.S.S.R. were also on hand. Those from Japan were primarily from the Japan Marine Science and Technology Center (JAMSTEC), while those from China were from the National Bureau of Oceanography's National Institute of Oceanographic Instrumentation in Tianjin (Tientsin).

The above delegations and those from France, the United Kingdom, West Germany and Norway reflected the dominant theme of Oceans '82—ocean engineering—although there were many papers presented on the science realm.

There was much discussion around the conference about the plans for reorganizing the National Oceanic & Atmospheric Administration, announced last February. Most agree that the reorganization is moving very slowly. One reason is that a prominent minority member of the Senate, Sen. Ernest F. "Fritz" Hollings, (D-S.C.) has had some objections to the reorganization.

The reorganization plan would: create an augmented National Ocean Service; expand the National Weather Service to include data buoys; keep the National Marine Fisheries Service; continue the National Environmental Satellite Service, Data and Information Service; and form the Office of Oceanic and Atmospheric Research. (For details, see *Sea Technology* for March, page 63.)

Plenary Session

Conference General Chairman Dr. John V. Byrne, NOAA Administrator, mixed science and technology in his presentation at the opening plenary session. He voiced a theme much on the minds of scientists and engineers—the shortage of mathematics teachers and fewer students taking math and math-related subjects such as physics. Many students, he said, take jobs immediately after earning a bachelor's degree instead of going on to higher studies in their specialty, creating the shortage of college and graduate level teachers.

Byrne discussed these varied subjects: the importance of gaining more knowledge of the southern ocean circulation to complete the earth's weather picture; Landsat D satellite images marking progress in environmental monitoring; more persons, institutions, industries and governments recognizing the importance of ocean resources; private industry adjusting itself to pick up some government programs; and reassessment of ways of doing things in NOAA, adding that changing tradition is difficult.

Senator Ted Stevens (R-Alaska), majority whip, presented an optimistic view of the oceanic political scene. He said that many in Congress share concern over the oceans, and it is shared on a bipartisan basis.

"We are on the threshold of exploiting ocean resources," he declared, "such as energy, food and minerals. Both the executive branch and Congress quite often are dealing with the symptoms of what is wrong," he said, "but not the basic problems." As for the outer continental shelf area, he stated, there is a standoff, and access is limited because "we just haven't convinced some people we should go ahead."

In fisheries Stevens noted the catches of fish by the Japanese and Koreans, saying that their catches in Alaskan waters are 1.5 million metric tons annually,, while the U.S. catch is 400,000 tons. He noted that the U.S. doesn't know how to handle such huge volumes of fish. Also, the Asians take all kinds of fish, even those considered high value by the U.S., and treat them like "trash" fish, mincing them all for convenient processing, storage and shipment.

Stevens emphasized that Congress needs the help of such groups as IEEE and MTS. He asked, "Are there regulations that stifle progress? Remember, we are trying to assure you that the government is a fair partner."

Carl H. Savit, Western Geophysical Company senior vice president, didn't go along with the idea that there is general agreement in regard to ocean resources. As a voice of industry he stated optimistically that some sources say inactive hydrothermal vents with mineral riches in them can be found by geophysical exploration. Vents and other discoveries capture the imagination, he said. The biggest stride in ocean technology, he declared, was the development by the military of the *Glomar Explorer* submarine retrieval ship.

As for deep ocean drilling success he said that credit is due to the technology developed for "the late unlamented Mohole project." (Mohole was a program of the early 1960s to penetrate the earth's crust by drilling northwest of Hawaii—Ed.)

Savit said that what is holding back deep ocean work are economic, rather than social or political, constraints. There is an "overhang" of oil, the so-called glut, which prevents some companies from developing the deep ocean. The same idea applies to nonferrous metals, he stated, citing the fact that landbased copper mines are shut down due to an oversupply and consequently low prices.

As a parting shot Savit cited the government's requirement that proprietary oil exploration data be turned over to it, adding that it wouldn't happen in the auto industry.

Dr. E. A. Trabant, president, University of Delaware, noted the troika that operates together in the oceans—industry, government and academia; the first making enterprises that create new wealth; the second in recent years restricting new wealth and reshuffling wealth; and the third creation of new knowledge.

He praised the Sea Grant Program as an excellent example of university activities. Its youth is its disadvantage, he said, compared, for instance, with the Land Grant program which dates from 1862. Sea Grant, he declared, does not have a national constituency.

Trabant mentioned a fourth partner, private capital, which, if attracted, can open new sources of activities in the ocean. He concluded by saying that oceanographic research vessels, like computers, need to become smaller, yet do the same job as bigger ships.

Ronald C. Lassiter, president of Zapata Corporation, Houston, Tex., called for the academic community to act as a catalyst in a stronger industry-government partnership, during his presentation at the September 20 Chairman's Luncheon. While stressing a belief that increased communications between the private and public sectors can lead to a smoother road for business, he cited the following example of how far regulation has gone.

In 1973, Lassiter said, Outer Continental Shelf regulations required the filling out of ¼" of paper to drill three exploration oil wells in the Gulf of Mexico. By 1976, the drilling of three wells in the U.S. mid-Atlantic area required the filing of 32" of forms. And by 1980, Lassiter added, the drilling of only two wells in the north Atlantic required a stack of reports that measured 11 feet high.

Oceans '82 Awards

IEEE-COE awards, presented by IEEE-COE president, Dr. Donald M. Bolle:

- Distinguished Technical Contribution Award—professor Ira Dyer, Massachusetts Institute of Technology.
- Distinguished Service Award—Arthur S. Westneat, University of New Hampshire.

MTS Award, presented by Dr. Arthur E. Maxwell, MTS president:

- Special Commendation & Award—The Marine Board, National Research Council, accepted by its chairman, John Flipse, Texas A&M University.

Presented by Charles H. Bussmann, president, Compass Publications, Inc.:

- Compass International Award—COMEX, S. A. of France, accepted by Yves R. Giran.
- Compass Distinguished Achievement Award—Jack W. Boller, executive director, Marine Board, National Research Council.
- Compass Industrial Award—Harbor Branch Foundation, Inc., Ft. Pierce, Fla., accepted by its president, J. Seward Johnson, Jr.

Lockheed Award for Ocean Science & Engineering:

- Presented by James G. Wenzel, vice president, Ocean Systems, Lockheed Missiles & Space Company, to Dr. John P. Craven, University of Hawaii.
- The following were made Fellows of MTS: Albert G. Berian, The Rochester Corporation; Larry L. Booda, *Sea Technology;* Dr. John V. Byrne, NOAA; Scott E. Drummond, SEACO; Ben Gerwick, Jr.; Jack Harmon; Jean Jarry, CNEXO, France; Maxwell McKnight, University of Delaware; John Norton Moore, University of Virginia; Morris A. Ransone, Shenandoah Systems, Inc.; James Rickard, EXXON Production Research Co.; Kurt Stehling, NOAA; Richard C. Swenson, Naval Ocean Research and Development Activity; James G. Wensel; Arthur S. Westneat; and James J. White.

1982 Compass Award recipients *(L to R):* Y. Giran, J. Boller, J.S. Johnson, Jr., and Dr. A. Spilhaus, 1981 Compass Distinguished Achievement Award recipient.

Diving Sessions

The Oceans '82 emphasis on diving and undersea vehicles reflects the importance of these components of the offshore industry, and a larger number of papers than in some previous years was presented.

One paper receiving attention from the attendees was "An Analysis of U.S. Occupational Diving Fatalities 1970-1981," by John McAniff, University of Rhode Island. Of the 167 such diving fatalities, the largest number by year and category was the 11 fatalities in 1977 in the category called "Harbor and Inland Diving."

In the undersea vehicle subject area, an entire session was presented on one-person vehicles. Popular papers dealt with a status report on the *Alvin* conversion, recovery of a one-atmosphere transfer system, by Harbor Branch Foundation, Inc., and numerous others.

Among diving service companies queried, the most optimistic expectation for a reversal in the current depressed market predicted a lessening of the squeeze in six months. Others felt that a return to normalcy might be longer than a year, governed by a web of influences tied to international economies, interest rates, and oil company level of confidence in investment.

Symptomatic of the confused picture in the undersea service support business is that one company is taking delivery of additional undersea work vehicles while losing one or more contracts due to customer belt-tightening.

One international visitor volunteered the opinion that although experimental diving has proved that work can be done at 600 m (not a unanimously-held premise) there is no foreseeable need on the horizon for actually working at that depth.

Oceans '83

Oceans '83, again to be jointly sponsored by IEEE-COE and MTS, will be held August 29-September 1, 1983 at the Hilton Hotel in San Francisco, Cal. The meeting's theme is "Effective Use of the Sea—An Update."

General chairman of Oceans '83 is James G. Wenzel, vice president, Ocean Systems, Lockheed Missiles & Space Company. Program chairman is Elmer Wheaton, former Lockheed Research and Development chief. Wheaton told *ST* that next year's format will be changed with one day of formal papers and two days of speeches by prominent authorities, each one followed by discussion periods.

The call for papers has been issued. They should focus on the science and technology required for the utilization of five major ocean areas: mineral resources and energy, non-mineral resources, transportation, ocean science, and military ocean engineering. The deadline for papers is February 11, 1983. Paper summaries should be limited to 250 words and should be sent to Oceans '83 Technical Program Chairman, P.O. Box 71030, Sunnyvale, CA 94086. Manuscripts and camera-ready illustrations must be recieved no later than August 1, 1983.

FUZZIFY! BORENWORDS AND STRATEGIES FOR BUREAUCRATIC SUCCESS

by James S. Boren. EPM Publications, Inc., McLean, VA 22101. 197 pages, hardbound. $9.95. IBSN 0-914440-53-5.

After extensive experience in business, academe, politics, and the U.S. Foreign Service, Boren learned some lessons about the bureaucratic way of life that he feels impelled to share with others who may wish to survive and thrive in the world's magnificent bureaucracies. He has written *FUZZIFY!* in the spirit of a missionary—a missionary seeking to lead others to find the peace and tranquility of bureaucratic salvation.

The helpful hints of strategies and the wordational techniques are presented to help enrich the lives of work-a-day thrummifiers who need to feel they are part of something big and vital whether they are or not.

Now, what is a bureaucrat? The dictionary portion of *FUZZIFY!* defines:

> **bureaucrat** (byoo'-row-krat) n. Once defined as an employee of a governmental bureau or agency. Now defined to include anyone who is dedicated to the principles of dynamic inaction, decision postponement, vertical and linear mumbling, creative nonresponsiveness, bold irresolution, and procedural abstrations. Bureaucracy is no longer related to employment; it is a way of life. Bureaucrats are found in all organizations, but they thrive in large govenrmental agencies, corporations, unions, educational and religious institutions.

If you are trapped inside the Bureaucracy, Boren's insights can help you win the bureaucratic game. You'll learn, for example, that if you have to be a phoney, how to be sincere about it. He shows you how to write learned papers and resumes; apply for grants; profundify reports; yes, and how to have sex like a seasoned bureaucrat.

If you are not a bureaucrat yourself but must deal with those who are, you can learn how to handle a drivelator, or how to tell a floatator from a flapperator. All the bureaucratic types are mercilessly revealed. And their fuzz words are laid bare in "syllabattic" detail in a dictionary section that tops all word books for laughs and inventiveness.

This reviewer, ". . . an observer of the idiotoxic scene of Washington and authority of boobilated floatum . . ." (according to Boren), definitely recommends this book to all who meet the above qualifications. He especially recommends it to those who have not yet become one. Also of value are Boren's previous works: *Have Your Way With Bureaucrats and When in Doubt, Mumble.*

(Reprinted from *IEEE IMPACT* DECEMBER 1982)

AND HAIL TO OCEANS '83

20 December 1982

Harold A. Sabbagh
Analytics, Inc.
2634 Round Hill Lane
Bloomington, IN 47401

Dear Mr. Sabbagh:

The OCEANS '83 Conference and Exposition will be held in San Francisco August 29 - September 1, 1983. The goal of this conference, expressed in the theme "Effective Use of the Sea—An Update," will be to update the mid- and late-sixties reports that launched our present marine resource efforts. The purpose of this letter is to acquaint you with the OCEANS '83 technical program and to solicit your support and participation in the conference.

OCEANS '83 has been organized into five categories to cover marine science and technology: Mineral Resources and Energy, Non-Mineral Resources, Ocean Science, Transportation, and Military Ocean Engineering. The (tentative) program plan for OCEANS '83—enclosed—shows the relationship of the various sessions to the rest of the conference. As you can see from the plan, there will only be a limited number of sessions to span the breadth of marine science and technology. Therefore, each session is a key element within the conference format. The success of each session will materially help assure the success of the whole conference.

The conference will begin on Monday morning with an opening plenary session. At this session, the members of the Blue Ribbon Panel will be introduced. (The Blue Ribbon Panel members will attend the sessions and provide a critique of the conference, and an update of the historic PSAC, Stratton Commission, and NAE reports, at the closing plenary). After the introductions, Dr. Ferris Webster will speak about our knowledge of the ocean since these reports were written. Dr. John Knauss will follow this with a broad look at ocean affairs and industrial efforts.

In the afternoon, the conference will break into five concurrent sessions, along the lines of the five major categories identified above. Each of these resource areas will be introduced by means of an overview paper in the category. Drs. J. R. Moore and C. R. Hocott will provide the overview of Mineral Resources and Energy, respectively; Dr. W. Gaither will overview Non-Mineral Resources; Mr. F. D. Jennings will overview Ocean Sciences; Mr. John Wing will overview Transportation; and Admiral Brad Mooney will overview Military Ocean Engineering. Following these overviews, there will be a number of 30-minute papers dealing with emerging and Important Technologies in each category.

On Tuesday, the conference will break into additional concurrent sessions, preserving the five-category organization throughout. There will be four groups of ten concurrent sessions on Tuesday. Each session will have time for five 20-minute papers (including Q&A). It is hoped that, after each session, the audience will have the complete picture about that session subject.

On Wednesday morning, the conference will return to five concurrent sessions which will deal with major programs in each of the five categories. These sessions will offer a number of 30-minute (or, possibly, 60-minute) papers dealing with "big science," and/or major programs within a category that cuts across a number of disciplines.

A closing plenary will be offered on Wednesday afternoon. This session will feature an update on "The Effective Use of the Sea" by the Blue Ribbon Panel. This update will be based on the papers offered at OCEANS '83. (Since it is unrealistic to expect the Blue Ribbon Panel to make a credible update in "real time," we will provide the Panel members with an executive summary of each paper approximately two-three months before the conference, and an opportunity to review the full papers two to three weeks before the conference.)

In addition to a program plan, the Technical Program Committee has developed a plan for the selection of papers for OCEANS '83. This plan is enclosed. Basically, the plan sets up three review committees: Preliminary Review, Abstract Review, and Final Review. The Preliminary Review Committee will screen out the obviously "commercial" and crank papers (abstracts, actually) and sort the successful abstracts into categories and sessions. The abstracts will then be sent to the appropriate Abstract Review Committee.

The Abstract Review Committee forms the heart of the review process. This committee will be specific for each session, and will be comprised of the Session Chairman, a cochairman, the Overview speaker, and one or more members of the Blue Ribbon Panel. The Session Chairman will chair the Abstract Review Committee, and he will be asked to establish the specific criteria for "grading" the abstracts ("A" to "F"), and to communicate this to the rest of his committee and the Technical Program Committee. The Session Chairman will be responsible for seeing that the abstracts get fairly and objectively graded, and that the results are communicated to the Technical Program Committee on schedule.

The Final Review Committee will order the abstracts by grade, review them for consistency with conference theme and goals, and make a final selection based upon timing constraints. The Technical Program Committee will make the final determination of the papers that are accepted for presentation at OCEANS '83.

The Technical Program Committee needs your support and cooperation. We need you to help get the word out about OCEANS '83 and encourage your professional colleagues to submit abstracts. Although some disciplines are not explicitly represented in OCEANS '83, good papers are welcomed and will be considered in an interdisciplinary sense. For *all* papers, we will look most favorably towards papers which provide an assessment of the current status of marine science and technology. You could also think about and encourage abstracts geared towards important technologies and focal programs in your area—papers that are suitable for the Monday and Wednesday programs.

(*Continued on page 10*)

AWARDS TO OCEANIC ENGINEERING SOCIETY MEMBERS

Arthur S. Westneat Selected as Recipient of the IEEE Oceanic Engineering Society Distinguished Service Award for 1982. Mr. Westneat, a Consultant in Electronic Systems Development and associated with the University of New Hampshire as a Senior Research Fellow, was selected in recognition of his outstanding and dedicated service to the aims of the Society, his prominence in the field and his energetic and effective leadership since the early days of the IEEE Oceanography Coordinating Committee. It is recognized that the present strength and vigor of the Society is in no small measure due to his constant support.

Arthur S. Westneat was born in 1921 in New Jersey. He received the BSEE degree from Purdue University, West Lafayette, IN, in 1943 and the MSEE from Purdue in 1946. He joined the Underwater Sound Lab, New London, CT in 1943, doing work in circuit development. In 1944 he worked at the MIT Radiation Lab developing radar-communication systems and in an advanced analytical group. In 1949 he joined the Applied Science Corp., Princeton, NJ, as assistant chief engineer and also served as manager of R&D, leaving in 1959 to join Gulton Industries as a division manager and director of advanced electronics. In 1965 he served with Raytheon Submarine Signal Division, Portsmouth, RI, in the capacity of principal engineer in advanced R&D and also managed a group working in advanced acoustic signal processing techniques. Upon his early retirement age of 55, he was established as a consultant in electronic systems development. Currently he holds the title of Senior Research Fellow at the University of New Hampshire, Durham, NH.

He has been active in IEEE work for many years. In 1966 he organized the first IEEE group devoted to Ocean Electronics. This group helped to organize the first OCEANS Conference, which was held in Newport, RI. Later he served as Chairman of the Oceanography Coordinating Committee for two years. At the end of his term of office, the Committee became the Council on Oceanic Engineering. His current COE duties include serving as a delegate from the S-AES and as Chairman of the Education Committee and the Conference Committee.

He is also active in the Marine Technology Society. He is a Past Vice-President and was elected as MTS Fellow at the OCEANS '82 Conference.

Professor Ira Dyer Selected as Recipient of the IEEE Oceanic Engineering Society Distinguished Technical Contribution Award for 1982. Professor Dyer, of MIT's Department of Ocean Engineering, was selected in recognition of his contributions to ocean acoustics and his leadership in education for ocean engineering.

Professor Dyer's accomplishments span the field of acoustics. As a graduate student and eventually Vice-President of Bolt, Beranek and Newman, he pioneered research in the analysis of jet engine noise. More recently he extended this to ocean acoustics in the analysis of plate responses to convective turbulent noise. He was one of the first to recognize the role of statistical fluctuations of multipath in long range acoustic propagation.

In 1982 Professor Dyer became Head of the Department of Ocean Engineering and soon after that Director of Sea Grant. Under his leadership, both the Department of Ocean Engineering and the Sea Grant program have prospered. In addition, to his administrative responsibilities, he continued to publish work in fluctuation theory with his graduate students. He also inaugurated his very popular course in Fundamentals and Applications of Underwater Sound. More recently, he has led several acoustic experiments in the Arctic Ocean which have revealed fundamental aspects of long range, low frequency acoustic reverberation in ocean basins. In the course of these experiments, he and his colleagues at MIT and Woods Hole have significantly advanced the technology for acoustic and geophysical research in the Arctic. His contribution will continue to be felt as the U.S. and other countries extend their activities in this hostile part of the globe.

His technical work has been recognized by numerous awards. He is a fellow of the Acoustic Society of America, the Institute of Electronic and Electrical Engineers, and the American Association for the Advancement of Science. He is a member of the National Academy of Engineering and has chaired the Coast Guard Research Advisory Committee.

And Elected to Fellow Status on January 1, 1983 were:

Mr. Eric Herz
14 Magnolia Drive
Rye Town, New York 10573
For contributions to the development and management of information systems for testing aerospace vehicles and for valuable services to the Institute.

Dr. Calvin T. Swift
55 Cherry Lane
Amherst, MA 01002
For contributions to the area of microwave remote sensing of the oceans.

OUR CONGRATULATIONS TO ALL OF THESE OES MEMBERS.

'TIS A PUZZLEMENT

NEW PUZZLES

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

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. A voltage of 240 v a-c is applied between a and the outside terminal of the current coil. The wattmeter reading is 20 w. Compute the transformer core loss. Neglect current-coil loss.

If the voltage coil connection that was on c were transferred to the outside terminal of the current coil, what would be the wattmeter reading?

INTEGER SQUARE AND CUBE ROOTS

Between 1 and 1,000,000, inclusive, there are ten numbers whose square and cube roots are integers. Determine the only one of these that is between 500,000 and 999,000.

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_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. Then determine the area between the curve and the x-axis in terms of C_0, C_1, C_2, x_0 and x_2 with the base from x_0 to x_2.

(Why not write a computer program to solve the above computations? These relations will be used in future puzzles.)

PAST PUZZLES

Solution: Wattmeter Connections

When two wattmeters are properly connected in a 3-phase 3-wire circuit it may be that one meter has a downscale deflection. If this occurs the connections on the current coil should be reversed to bring the deflection upscale. The reading should be recorded as negative. The current coil and the voltage coil act as the plates of a capacitor. When there is potential between them an electric pull is exerted on the coils that can cause a deflection of the wattmeter pointer. If the pointer deflection has been brought upscale by reversing the voltage coil connections, the potential between the two coils is nearly line-to-line voltage. The electric pull may be great enough to produce an appreciable error in the wattmeter reading. The error is greater in a low-power factor meter (*i.e.* one that produces full scale deflection at 0.2 power factor with rated current and voltage) than in one built for a higher power factor.

When current transformers are used to supply current to the current coils, voltage transformers should be used to supply the voltage coils so that all of the coils will be at nearly the same potential.

Solution: The Monkey and the Coconuts

Five men were shipwrecked on an island. They took stock of the food supply and found a monkey and lots of coconuts. After spending a day gathering the coconuts, they decided to wait until the next day to divide them and went to bed. One man feared that the others might cheat him, so he got up, divided the coconuts and had one left over that he gave to the monkey. He then hid one fifth, repiled the remaining coconuts and went back to bed. Then a second man awoke and had the same thoughts that the first man did. He arose, divided the pile into five equal piles, had one coconut to give to the monkey, hid his one fifth, repiled the remaining coconuts, and went back to bed. Each remaining man in turn did the same thing, so all told the monkey got five coconuts. The next morning the remaining coconuts divided evenly among the five. What was the minimum number of coconuts originally?

Let n be the original number of coconuts. The first man leaves $0.8(n - 1) = 0.8n - 0.8$ coconuts. The second man leaves $0.8(0.8n - 0.8 - 1) = 0.64n - 1.44$ coconuts. The third man leaves $0.8(0.64n - 1.44 - 1) = 0.512n - 1.952$ coconuts. The fourth man leaves $0.8(0.512n - 1.952 - 1) = 0.4096n - 2.3616$ coconuts. The fifth man leaves $0.8(0.4096n - 2.3616 - 1) = 0.32768n - 2.68928$ coconuts. This number is a multiple of 5. Hence

$$0.32768n - 2.68928 = 5k$$

where k is an integer such that n is also an integer. By trial it is determined that for $k = 204$, $n = 3{,}121$.

The puzzle can also be solved by the equation

$$n = km^{m+1} + m^m - (m - 1)$$

when m is an odd number. Here n is the number of coconuts, m is the number of men and $k = 0, 1, 2, - - -$. For $m = 5$ and $k = 0$,

$$n = 0 + 5^5 - 4 = 3{,}121.$$

When m is an even number greater than 2 the equation is

$$n = km^{m+1} - m^m - (m - 1)$$

where $k = 1, 2, 3 - - -$.

CORRECTION

Carl A. Hagstrom of Stockholm, Sweden, points out that his spider, an *Epeira diadema*, is smart enough to reach the fly on the opposite end wall by traveling only $\sqrt{464}$ ft. This result is obtained by folding back the $10' \times 6'$ end walls into the plane of the $14' \times 10'$ side wall. Then a line from the spider to the fly has one component of $20'$ and another of $8'$. The resultant distance is $\sqrt{20^2 + 8^2} = \sqrt{464}$ ft.

December 22, 1982

Dr. Harold A. Sabbagh
2634 Round Hill Lane
Bloomington, IN 47401

Dear Harold:

I was disappointed to see in the September issue of the Newsletter that the printer made an error of sign in the second term in the numerator of the expression for V_c in the problem on the Phase Sequence Indicator.

I was doubly disappointed to see in the December issue that the same error was made in the expression for V_c at the left center and that for V_c^2 at the left bottom of page 8.

Also, on the lower right of page 8 in the expression for c the radical sign should extend over both a^2 and b^2.

A Merry Christmas to you and yours.

Sincerely,

George

(*Continued from page 7*)

The goal of OCEANS '83 is to update reports that have had national significance, so you can see how important this conference will be, and how important your support will be to it.

If you have any questions, please feel free to contact us:

Dennis G. Douglas (415) 859-4638
John Vesecky (415) 497-2669

We look forward to working with you during the next several months, and we look forward to seeing you at OCEANS '83.

Sincerely,
Dennis G. Douglas, Cochairman
John Vesecky, Cochairman
Technical Program Committee

CALL FOR PAPERS

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

ANNOUNCEMENTS

FORTHCOMING JOURNAL OF OCEANIC ENGINEERING SPECIAL ISSUES

Topic	1983 Issue Month	Submission Deadline	Guest Editor(s)
Tracking & Localization	July	past	James F. Bartram Raytheon Company Submarine Signal Division P.O. Box 360 Portsmouth, RI 02871
Atlantic Remote Sensing Land Ocean Experiment (ARSLOE)	October	past	Ledolph Baer NOAA C2X8 National Ocean Survey Rockville, MD 20852 and C. Linwood Vincent Coastal Engineering Research Center Kingman Building Fort Belvoir, VA 22060

IEEE CENTENNIAL YEAR

Topic	1984 Issue Month	Submission Deadline	Guest Editor(s)
Oceanic Seismic Exploration	January	April 15, 1983 (if March issue of Newsletter)	Rui J. P. de Figueiredo Department of Electrical Engineering Rice University P.O. Box 1892 Houston, TX 77251 and Gerald H. F. Gardner Seismic Acoustics Laboratory AE Building University of Houston Central Campus Houston, TX 77004
Simulation Modelling	April	July 15, 1983	Stanley G. Chamberlain Raytheon Company Submarine Signal Division P.O. Box 360 Portsmouth, RI 02871
Extremely Low Frequency (ELF) Communications	July	October 15, 1983	Michael L. Burrows Massachusetts Institute of Technology Lincoln Laboratory Lexington, MA 02173
Acoustic Telemetry	October	January 15, 1984	Arthur B. Baggeroer Ocean Engineering Department Massachusetts Institute of Technology Cambridge, MA 02139

Topic	1985 Issue Month	Submission Deadline	Guest Editor(s)
Instrumentation Development for High Level Nuclear Waste Disposal Beneath the Deep Ocean Floor	January	April 15, 1984	Kenneth R. Hinga Graduate School of Oceanography University of Rhode Island Narragansett, RI 02882 and Armand Silva Ocean Engineering Department Narragansett Bay Campus Narragansett, RI 02882

INTEL 8085—MICROPROCESSOR WORKSHOP, UNITED ENGINEERING CENTER, NEW YORK, NY, APRIL 27-29, 1983

"Intel 8085—Microprocessor Workshop" is designed for the practicing engineer who is interested in learning the fundamentals of microcomputer hardware, software and interfacing with special emphasis upon the Intel 8085 microprocessor. Each participant will receive a fully assembled and tested Intel SDK-85 microcomputer, lecture notes and an 8085 Microcomputer Systems User's Manual.

For further information please contact the Continuing Education Department, 445 Hoes Lane, Piscataway, NJ 08854, telephone: (201) 981-0060, extensions 328 or 331.

WINTER/SPRING 1983 SCHEDULED CONTINUING EDUCATION SHORT COURSES

Power System Planning & Operating, Emphasizing Interconnections Ames, IA	Feb. 14-15
Spread-Spectrum Techniques & Vulnerability United Engrg. Center New York, NY	Mar. 14-18
Concepts and Applications of Program Management Hotel Beverly, New York, NY	Mar. 21-25
Intel 8085 Programming Workshop United Engrg. Center New York, NY	Apr. 27-29
Basic Project Management Offshore Tech. Conf. Houston, TX	May 6-7

SATELLITE TELECONFERENCE TO BE ANNOUNCED FOR: JUNE, SEPTEMBER, AND DECEMBER 1983

To register for courses, to schedule a course, or for additional information please contact:

IEEE Service Center
Continuing Education
445 Hoes Lane
Piscataway, NJ 08854

For most recent bookings call: (201) 981-0060, extensions 327, 328, or 329.

RADAR TECHNOLOGY COURSE

The Boston IEEE/AESS is putting on their well-received one-day Radar Technology course in San Jose, CA. This up-to-date course is framed around the new 432-page, 8½″ × 11″ book Radar Technology edited by Dr. Eli Brookner, who is the lecturer. This book ($45 list price) and supplementary notes (updated to 1983 technology) are given out free to attendees. This lecture course is geared to those unfamiliar with as well as those experienced with radar design. The time, place and course content are briefly outlined below.

DATE: Monday, April 18, 1983
TIME: 8:00 a.m. to 9:30 p.m.
PLACE: Hyatt-San Jose (just off Route 101 and close to San Jose Airport), San Jose, CA.

Course Content: Fundamentals of Radar: Phased Arrays, Cobra Dane, Pave Paws, Foreign Radars, Very Low Sidelobe Antennas, METTRA; Signal Processing: SAW, Acoustoelectronic and Monolithic SAW convolvers, CTD, CCD, BBD, FFT, and pulse compression explained in simple terms; impact of VHSIC/VLSI on radar signal processors of the future (1985 and beyond); survey of 28 existing and developmental signal processors (represented are Raytheon, Hughes, Westinghouse, GE, TI, RCA, NEC, IBM, TRW, Lockheed and Lincoln Laboratory); Microcomputers (μC), Memories, Josephson-Junction, Logic; Solid State: Bipolar and Monolithic modules and radars; Tubes: Differences, Life, Cathodes (CPC, TFFEC), Efficiency, MM; Synthetic Aperture Radar: strip and spotlight; Tracking, Prediction and Smoothing: $\alpha-\beta$, Kalman and Weiner filters in very simple terms, with emphasis on physical understanding; Detection: Simple cookbook procedure presented.

Cost: $125 (IEEE Members), $140 (Nonmembers); Add $15 for late fee after April 8, 1983; Fee includes course text, Radar Technology ($45 list price), supplemental notes (containing copies of over 700 vugraphs) as well as reprints of 3 papers having list price of $30, lunch, dinner and 3 coffee breaks.

Dr. Eli Brookner is a Consulting Scientist with the Raytheon Company Equipment Division. He conceived and helped design the Wake Measurement Radar, the first TWT radar put into space. He has consulted on the Cobra Dane, NATO Seasparrow, MILIRAD, AEGIS, MSR, Cobra Judy, WAAS, and Pave Paws radars. Dr. Brookner is an IEEE Fellow and has received the first Franklin Institute Premium Award.

Mail registration to Boston IEEE/AESS, 282 Marrett Road, Lexington, MA 02173. Give name, organization, title, business address and business and home telephone numbers. For further details on course, contact Dr. Eli Brookner (Boston IEEE/AESS Chairman), Phone (617) 358-2721, ext. 2366 (Raytheon Company, Boston Post Road, Wayland, MA 01778).

UNIVERSITY OF NEW HAMPSHIRE PUBLISHES GUIDE TO MARINE CAREERS

In the past, adventuresome teenagers yearned to run away to sea. When it comes to careers, today's youth still feel the lure of the ocean, and many still have the same romanticized idea of what they will find there.

Ocean Opportunities: a guide to what the oceans have to offer is designed to present high school students with a realistic assessment of what marine career fields are available and some of the specific duties related to each. Liberally illustrated with color photos, the 32-page book is divided into six chapters devoted to lively descriptions of job opportunities in biological oceanography, ocean

(Continued on page 14)

NIKOLA TESLA: THE GREATEST INVENTOR OF ALL TIME?

Editor's Note: Nikola Tesla and Charles Steinmetz are my two all-time greatest heros in electrical engineering, ranking right up there with "Tinkers to Evers to Chance" of the 1906 Chicago Cubs. The short essay below is reprinted from the Dec. 1982 *Instrumentation and Measurement Society Newsletter*. We welcome any similar biographies or historical notes from our readers.

United States Patent #514,170 describes an incandescent light bulb, one which produces light in exactly the manner employed by the sun. This simple mechanism, inexpensive to produce, will generate 20% more light than a common household bulb using the same amount of voltage.

Where can you buy this lovely little energy saver? As hard as it is to believe, here in the age of the energy crunch, you can't buy it anywhere. Even more incredible is the date of the patent: February 6, 1894!

The bulb's creator, **Nikola Tesla,** is likely the greatest inventor of all time. His trail-blazing work from 1860-1930 changed the world dramatically. It was Tesla, not Edison, who discovered every principle and invented every device for the alternating current we use today. Tesla, not Marconi, invented the radio and every one of its components. He pioneered work in florescent lighting, bladeless turbines, the point electron microscrope, the cyclotron, guided missiles, robots, computers and broadcasting. (In later years scientists shamelessly accepted credit for these devices that was due only to Nikola Tesla). He created lightning and earthquakes and employed the earth in his experiments as if it were nothing more than another piece of laboratory equipment. It is impossible to understand why he is not duly honored as one of the greatest scientists of all time.

Tesla possessed a special gift of visualization that helped him to stampede through the new territories he was discovering almost daily. Even as a child, if someone spoke, for example, of an apple, he would actually see that apple. He could only tell it was not real by passing his hand through it. At that time, he felt the gift was a curse. Later, when he began to take advantage of his talent by astounding his math teachers, he began to realize he could utilize his vision as a scientist and inventor.

Tesla decided to study the fresh and exciting new field of electronics. It was while in college in Belgrade, studying electronic engineering, that his gift came to fruition. During a lecture on the DC motor, Tesla stood to tell his professor that an AC motor would be more efficient for several reasons. The prof, somewhat irked, told Tesla testily, "You are correct. However, it is well known that it is quite impossible to make an AC motor."

At that moment, Tesla had one of his moments of vision. Somewhere in his mind, he solved the enigma that had eluded the best scientific minds of the time. He saw clearly the AC motor running smoothly before his eyes. He blurted out, "No sir! It is possible!"

The next day the wise professor thoroughly embarrassed Tesla by proving beyond a shadow of a doubt that AC motors would never be made. Fired by this challenge, Tesla worked relentlessly 15 hours a day (as was his habit throughout his career) toprove what he already knew was true. A few years later, he had made the first AC motor.

Tesla felt that his momentous discovery would bring him instant wealth and fame. Such was not the case. Frustrated in his attempts to find European support for his device, he came to America with a letter of introduction to Thomas Edison, already recognized as the father of practical electrical energy. One would think that this meeting between monumental minds would be a great occasion. It wasn't even close.

Edison had invested heavily in DC current; AC current would instantly outmode his developments, as it was more efficient and could be transmitted at far greater distances and in larger quantities than DC. The last thing he wanted to hear was that someone had made AC power practicable. Edison dismissed the talk of AC inventions summarily. He gave Tesla a lowly job as a technician. Tesla soon quit after being cheated out of $50,000 by Edison.

Three years later, Tesla sold his fundamental patents for every device needed for AC production and transmission to the Westinghouse Electric Company. The price, one million dollars, turned out to be one of the great bargains of all time. By 1896 the first Niagara Falls power plant was built with equipment designed by Tesla. Soon AC had lit America and set it in motion. So advanced was Tesla's design that it remains the standard for electrical power production to this date. His work was so thorough and meticulous that it has never been improved upon.

From this point on, Tesla's work became so advanced that, if he were born today, he still would have been ahead of his time. His discoveries were always of the first magnitude. No mere inventor, he unearthed the principles of electricity, found the potentials of nature, and incorporated them into his inventions. Though he had no fewer than 200 inventions, each one of which could have made him a multimillionaire, he refused to be bothered with the necessary transactions to convert his ideas to dollars. He delighted in impractical and expensive experiments that represented science for the sake of science to the highest degree. His work came to rely on the generosity of philanthropists rather than the investments of industrialists.

Tesla, tall, handsome and personable, perfect in manners and dress, became one of New York's most flamboyant and well-liked figures. The elite of society came to his laboratory at an instant's notice to see the wonders he created there. Lighting was supplied by glowing tubes that were connected to no wires. One merely placed the tubes wherever light was needed. With the snap of his fingers, Tesla would create instantaneously a ball of leaping red flame and hold it calmly in his hands. He let the flame run over his clothing and hair, then dropped it into a dumbfounded guest's lap.

Mark Twain was a close friend of Tesla who used to delight in a vibrating platform in the laboratory. The platform set in vibration by an oscillating device small enough to fit into a pocket, imparted a feeling of great vigor to anyone standing on it. One day Tesla had the idea to bolt the oscillating device onto one of the structural beams of the building housing his lab. As he watched the gadget build up speed, he did not know that he was creating the

biggest earthquake in the history of New York. The tiny motor broke windows and pipes, knocked down walls and moved heavy motors off their mountings. The police, long used to the strange sounds, lights and vibrations emanating from Tesla Laboratories, sped to its doors on quivering streets. They burst into the lab just in time to see Tesla smash the oscillator with a sledge hammer. It seems his own building had started to shake last.

Periodically, Tesla would take time from his ever-intensive research to present lectures and public demonstrations. His lectures, given before the leading scientific institutions, were as carefully crafted and magnificent as his inventions. He never repeated a lecture and for each occasion he demonstrated a new bevy of inventions, the likes of which the world has never seen before or since. The incredibly advanced state of his work, the breathtaking discoveries that he casually revealed left even the best scientists dumbfounded.

Tesla showed a flair for drama in his public demonstrations. Once, to disprove Edison's claim that AC was too dangerous, he passed one million volts of AC through his body and melted an iron bar he held in one hand. At a Madison Square Garden demonstration, he revealed the first robot: a model boat that Tesla put through a whole series of maneuvers using a remote control device. At the time, the wireless transmission of energy was thought to be impossible.

Tesla's greatest invention may have been his device for wirelessly transmitting energy around the world. Free from the energy-robbing friction of carrier wires, the system made use of the earth's own electrical potential to transmit electrical power safely and vastly more efficiently than even his own alternating current system. With this device, Tesla knew that he could supply the world with electricity using only three transmitting stations placed around the globe. To obtain electricity, one would only have to drive an iron rod into the ground and attach a simple device to it to convert the energy into a usable current. The plan, though proven workable, was never employed. Tesla could not supply potential investors with an answer to the question, "How could compensation be collected for the services rendered?"

Tesla loved these projects of global scale. He stated, and it is very likely true, that he had perfected a plan to light the night skies of the entire world with a single device. Though the machine was never made, such is the respect for Tesla in scientific circles that it is generally agreed that he could easily have performed this miracle. Any task presented by his marvelous vision could be done.

Another of Tesla's many great accomplishments was the generation of 100,000,000 volts of electricity. No scientist since that time has produced one tenth that amount. Incidentally, one of the devices employed in this generation was to become standard equipment on the sets of horror movies. It was the Tesla coil that made the giant bolts of lightning that arced through Dr. Frankenstein's laboratory.

For a number of reasons, most of Tesla's great discoveries were lost to the world. Blessed with total recall, he never bothered to write things down. Not only was it unnecessary for him, but it provided maximum security against invention-stealing. Tesla fully expected to live 125 years.He had decided to devote his first 100 years to research and then write his autobiography and chronicle his most secret discoveries. Unfortunately, Tesla was stricken with senility before the age of eighty. To the great loss of mankind, he never finished his writing project.

At his death, in 1943, what papers he did have were confiscated by the FBI. These papers remain sealed from the general public to this date. Their contents are totally unknown, nor has it been revealed whether the U.S. Government has made use of them.

Tesla was, by choice, celibate his entire life. He thought of himself as a superman whose energies were not to be wasted on useless emotion. He lived totally alone, confiding in no one. He left no heir to those unique genes that made him a giant among men.

Even though only a fraction of his total knowledge survives, he was able to make incredible contributions to the world. And to this day, scientists are rediscovering the principles that Tesla knew a century ago. Tesla showed what was possible, so it only remains for science to find out how he did it.

REPRINT: BEYOND OCTOBER 1982 by Bob Slone

(Reprinted from *Instrumentation and Measurement Society Newsletter* December 1982)

(*Continued from page 12*)

engineering, chemical oceanography, physical oceanography, and the social sciences. There is also an extensive listing of colleges, universities, and other institutions offering undergraduate programs in ocean and marine studies.

Published by the University of New Hampshire Marine Program, the book was commissioned by the Marine Technology Society and by the Institute of Electrical and Electronics Engineers. The IEEE's Council on Ocean Engineering provided the funding.

Copies of *Ocean Opportunities* are available for $2 each and may be ordered from the University of New Hampshire Marine Program, Marine Program Building, Durham, NH 03824 or from the Marine Technology Society, Suite 412, 1730 M Street, N.W., Washington, D.C. 20036.

OCEANIC ENGINEERING SOCIETY(continued)

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OF OCEANIC INTEREST

GULF STREAM GYRES STUDIED

A study of circling masses of warm water in cold surrounding waters and cold water in warm surroundings in the northwest Atlantic, sponsored by the National Science Foundation, was to begin April 14 to last three weeks. Four research vessels and 60 scientists participated. The "rings" of water, more often called "gyres", are between 100 and 200 miles in diameter. Their existence has been known for years, spotted after the Gulf Stream passes northeastward from off Cape Hatteras and begins to meander. The ships, the *Oceanus* and *Knorr* of the Woods Hole Oceanographic Institution, the *Endeavor* of the University of Rhode Island and the *Albatross* of the National Ocean Survey of the National Oceanic and Atmospheric Administration (NOAA), were joined by a NOAA aircraft and NOAA's polar orbiting satellites. Gyres to the northwest of the Gulf Stream form from eddies and circulate clockwise, carrying tropical fishes from the Sargasso Sea to waters off New England where puzzled fishermen sometimes snare them in their nets. They also bring nutrient-rich waters to the coastal area. Gyres to the southeast of the stream carry cold waters from the continental slope and rotate counterclockwise. The scientists studied the physical, chemical and biological processes of the gyres. A second cruise is scheduled for June, a third in August and a fourth late in September.

COUSTEAU EMBARKS FOR ONE-YEAR STUDY OF THE AMAZON

After extensive refurbishment, the research vessel *Calypso* of the Cousteau Society is on her way to perform studies of the Amazon River and its tributaries for one year. Capt. Jacques-Yves Cousteau and his crew were in Martinique late last month for final touches on the ship. For the previous 14 months she was in Norfolk, Va., home of the Society, being repaired and painted. Part of the renovation included replacement of the former World War II minesweeper's main power generation engines with two Detroit Diesel 6-71s. They replace similar Detroit Diesel models, one in use since the ship was built 40 years ago, the other for 25 years. The older engine is estimated to have provided 100,000 hours of service. On reaching the Amazon the *Calypso* crew will concentrate on filming for television and studying the environment in conjunction with the brazilian government. Use will be made of the ship's Cessna aircraft, the Hughes 300C two-place helicopter and an inflatable raft. This cruise begins five years away from the Norfolk home port for the *Calypso*.

(Reprinted from *SEA TECHNOLOGY* / MAY 1982)

IDOE REPORT, U.S. DIRECTORY OF MARINE SCIENTISTS PUBLISHED

A report on the highlights of the International Decade of Ocean Exploration (IDOE) has been published. In 41 pages it encapsulates the work of hundreds of oceanographers from laboratories from the United States and from 52 other nations that participated in IDOE research starting in 1970. IDOE concentrated on four areas of research: seabed assessment, environmental forecasting, environmental quality and living resources. To obtain copies costing $4.75 each, write for: "Report of the Decade: The International Decade of Ocean Exploration; Stock number 038-000-00509-0; Superintendent of Documents, Government Printing Office, Washington, DC 20402, USA. . . .The 1982 edition of the U.S. Directory of Marine Scientists has been published. It was prepared under the auspices of the Ocean Sciences Board of the National Research Council. Board Executive Secretary Richard Vetter supervised the updating compilation of the 1975 edition. Each scientist is identified by name, affiliation, mailing address, telephone number and fields of expertise. Copies cost $12.25. Write for U.S. Directory of Marine Scientists, National Academy Press, JH 700, 2101 Constitution Avenue, N.W., Washington, DC 20418.

(Reprinted from *SEA TECHNOLOGY* / SEPTEMBER 1982)