IEEE Council on
OCEANIC ENGINEERING
NEWSLETTER

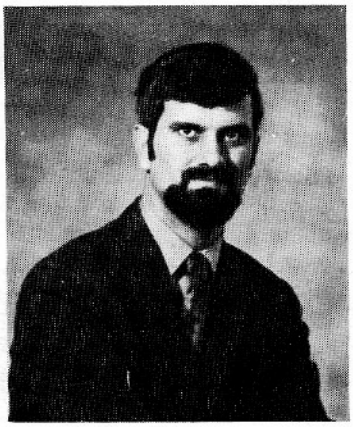
EDITOR: HAROLD A. SABBAGH SEPTEMBER 1981 (USPS 420-910)

Editor's Comments

Now that *OCEANS '81* is safely behind us, it's time to clear my correspondence file, whose contents have been accumulating since February.

Much correspondence comes in regarding some of our *It's a Puzzlement* items. The Bell Ringer problem continues to provoke comment. I'd like to publish a definitive solution, but I don't have the time. (That's always a convenient out. Anyway, the answer is still 50.) If any of you wishes, please send your solution to: Professor George V. Mueller, 2229 Indian Trail Drive, West Lafayette, IN 47906, who has consented to edit the *Puzzlement* column (I'd been stealing so many of his *Purdue Puzzlers* that he decided to quit fighting and join me). Professor Mueller taught electrical engineering for many years at Purdue, where I first knew him. It's a pleasure to renew his acquaintance.

We always enjoy hearing from you so continue to send your general comments to me and your *Puzzlement* contributions to Professor Mueller.



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

In This Issue

Members please send contributions for the December '81 newsletter to Harold A. Sabbagh, Analytics, Inc., 2634 Round Hill Lane, Bloomington, IN 47401, no later than October 1, 1981.

Send Form 3579 to IEEE, 445 Hoes Lane, Piscataway, NJ 08854

Letters

Thank you for the copy of the Dec. 1980 issue of the *IEEE Council on Oceanic Engineering Newsletter.* The article about the ASNE and the cumulative index were fine. We could not have expected more.

Sincerely yours,
E. M. MacCutcheon

Re "The Promise of OTEC" by Robert B. Krueger, as reprinted in the March 1981 issue, the article is very interesting technically but contains several misassumptions and/or misstatements.

1. It is not probable that OTEC electrical plants will be operated over 12 miles of the coasts in the near future, much less as much as 200 miles offshore of Hawaii or Puerto Rico. Cables to carry the power such distances as 200 miles are not readily available or justifiable; more importantly, they are not needed. In Hawaii, for example, a few miles from most islands provides adequate depth and thermal conditions.

2. A "legal regime" is *not* needed to "authorize" OTEC exploitation. The author says no existing domestic (I presume he means U.S.) law provides such a right. He is correct—but no such law is needed to give us the right to set up an OTEC facility. Study of the Constitution shows that it is very much a set of restrictions on government and that there is no basis for passing a law to *permit* me to do something, although it (the Constitution) does provide for regulation. Such regulation (via the FCC, ICC, CAB, etc.) has normally occurred after an actual need has been demonstrated. At present, even bringing the cable ashore is quite well regulated.

3. There is no clear justification to the U.S.(or any other coastal state) as to why a near-shore facility such as OTEC should be subject to UN CLOS—except to provide work for lawyers and the U.N. Nor is there any justification as to why a roving OTEC, obeying well established maritime laws or even current fishery zone declarations, must await international decisions; no resource is being depleted, as the author states. (He does conjure up something called "overdepletion," which is hardly a realistic scenario.)

There are real problems and promises of OTEC; they are not solved by diversion of time and money to UN CLOS activities.

Sincerely,
George D. Curtis
Senior Member, IEEE

P.S. This was an excellent issue, and I enjoy the content and style.

Safety Engineering and the Value of Life

T. W. Lockhart

It has been argued that any realistic approach to safety engineering must countenance setting a monetary value on human life. This is because most practical engineering designs involve tradeoffs between safety considerations and costs. Usually either it is impossible to produce a design that carries no risk to human life or the costs of implementing such a design would be prohibitive. The engineer often must decide what risks are acceptable.

If a monetary value can be assigned to human life, then the task of deciding how safe the design should be is greatly simplified. Since human life has a monetary value, the preserving of a human life is an economic benefit, just as the costs of safety are economic costs. The optimum design will be that which is expected to maximize the margin by which benefits exceed costs. It is therefore of practical importance to determine what monetary value should be assigned to human life. However, views differ greatly on how one even approaches such a task.

If we agree that when a person dies something of value is lost that is not merely its utility for society, then we have reason to believe that there is an *intrinsic value of human life* that generally makes it worth preserving. According to this view, associated primarily with Immanuel Kant, human beings have a worth that is not commensurable with that of mere objects. This Incommensurability Principle is clearly incompatible with any attempt to place a monetary value on human life or to justify actions on the basis of such a valuation.

Is it possible to reconcile the Incommensurability Principle with the commonsense view that considerations of safety must be weighed against economic costs? If we accept the Incommensurability Principle, how can we ever say that further risk reductions are "too expensive"? I believe that part of the answer lies in the fact that we increase the *quality of life* by accepting certain risks—for example, the risks inherent in air transportation, in driving our cars, or in walking across the street. We would consider it "too expensive" to eliminate those risks by foregoing those activities. The intrinsic value of human life, while perhaps not expressible in dollars and cents, may be commensurable with the *quality of life.*

To say that some safety improvements may be rejected as "too expensive" of course does not explain how to distinguish them from those that should be implemented. Perhaps, however, our analysis does support the principle that we should forego available safety improvements only when they would require substantial sacrifices in the quality of our lives.

(Excerpted from IEEE *TECHNOLOGY AND SOCIETY,* March 1981. To get a free copy of the March issue, write or phone Frank Kotasek Jr., 73 Hedges Avenue, East Patchogue, NY 11772, (516) 475-1330.)

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Ethical Dilemmas in Modern Engineering

Rosemary Chalk

The editors of the trade journal *Chemical Engineering* recently conducted a reader survey on engineering ethics. They presented a set of nine hypothetical cases illustrating some ethical dilemmas that arise in the practice of engineering. The cases were accompanied by a questionnaire in which readers were asked to indicate an appropriate course of action for an "ethical" engineer to take in each case.

The response to the survey was overwhelming, with more than 4,300 readers returning the questionnaire. But perhaps the most interesting result of the survey was that the Code of Ethics of the American Institute of Chemical Engineers was almost universally *ignored* by the respondents in determining solutions to the problems. Fewer than half-dozen readers even mentioned a code of ethics at all. They tried instead to resolve each problem on a very individual and personal level, and the result was a wide diversity of opinion as to what was the "right" solution to a given problem. The editors of *Chemical Engineering* concluded that there is a real need for the engineering profession to make its code of ethics relevant to situations encountered by engineers in rel life.

The "rights" and "wrongs" of ethical dilemmas in engineering practice are not sharply divided. True dilemmas, by definition, often involve a balancing of rights and duties, weighing values that may be ambiguously understood or unevenly shared by members of the profession. The current interest in engineering ethics is prompted in part by a search for clear-cut solutions to the knotty value judgements that must be made by a pluralistic society in using science and technology to build the kind of lifestyle we want. In the 1960's and the 1970's society became increasingly aware that science and technology could be used both for good and for evil, and that technology may have unintended side effects that are detrimental to individuals who are not directly served by—or who do not participate in the decisions to use—a particular technology. The search for clear-cut solutions to value conflicts is often an elusive one, producing many more questions than answers. But in searching for the basic moral principles which lie beneath ethical dilemmas in engineering, we learn something about the kinds of goals that we strive towards as a society.

One of the most important value conflicts that I see occurring today in science and technology is balancing the needs of a society for effective communication with the rights of an individual to privacy and confidentiality. There has always been a historic tension—particularly in democratic societies—between individual rights and the common good, and it is now appearing in the development of information technology.

(Excerpted from IEEE *TECHNOLOGY AND SOCIETY*, March 1981. To get a free copy of the March issue, write or phone Frank Kotasek Jr., 73 Hedges Avenue, East Patchogue, NY 11772, (516)475-1330.)

It's very important that engineers be aware of and acknowledge the basic values that guide their technical choices. Otherwise we have a situation which I call *ethical drift,* in which a person says, "I'm designing something that is value-free; it can be used for either good or evil. There's a particular need that I'm responding to, and there really are no broader ethical issues associated with it." This is a very narrow—and dangerous—perspective for a profession to have. There's a real need for the engineer to ask: "What values are imbedded in the private demands that I'm responding to? What public goods do they address?" This not to say that engineers should become philosophers. But they need to recognize the value implications of their work.

Announcements

IEEE INTERNATIONAL SYMPOSIUM ON INFORMATION THEORY

Les Arcs, France, June 21 - 25, 1982

Co-Chairmen
B. Picinbono
C. Helstrom

Vice Chairmen
N. Cot
R. Gray

International Advisory Committee
A. Viterbi (chairman)

Program Committee
J.-M. Goethals (chairman)
R. Ahlswede
P. Bremaud
P. Camion
P. Devijver
P. Flajolet
G. Longo
O. Macchi
J. Massey
M. Metivier
E. van der Meulen
J. Schalkwijk

Finance
L. Milstein (treasurer)
S. Rimoldi

Registration
S. Rimoldi

Publicity
J. Dunham
D. Neuhoff

Publications
S. Harari

Local Arrangements
N. Cot (chairman)
O. Macchi
B. Bouchon
P. Bremaud
P. Camion
G. Cohen
S. Harari

FIRST CALL FOR PAPERS

The 1982 IEEE International Symposium on Information Theory will be held in Les Arcs, an Alpine resort near Bourg St.-Maurice, Département de Savoie, France. Les Arcs, which has excellent facilities for both conferences and recreation, can be reached from the airports at Geneva (150 km) or Lyon-Satolas (200 km) or by train to Bourg St.-Maurice. The cost for full participation (five nights' lodging and all meals) is expected to be of the order of 1200 French francs for a single room, FFr. 1000 per person in a double room, and FFr. 875 per person in a triple room, plus registration fee (including banquet) of about FFr. 500. Detailed information about rates, facilities, social program, and travel arrangements will be provided in subsequent mailings.

Papers presenting new results in information theory and related fields are solicited. Areas to be covered include:

- Classical and quantum communication systems
- Complexity
- Cryptography
- Data compression
- Data networks
- Detection and estimation
- Error-control coding
- Multi-user information theory
- Pattern recognition
- Shannon theory
- Stochastic processes
- Applications of information theory to various fields, such as speech and image processing, statistical mechanics, and VLSI.

As at previous Symposia, both long papers and short papers will make up the program. Long papers will be judged on the basis of a complete manuscript; the deadline for these is *November 1, 1981.* Short papers will be judged on the basis of a 500-word summary; the deadline for these is *December 1, 1981.* Both complete manuscripts and summaries should be submitted in triplicate together with a brief abstract suitable for inclusion in the Symposium Program. A manuscript that is submitted for consideration as a long paper, but cannot be accommodated in that category, will also be considered in the category of short papers unless the author directs otherwise. Authors should indicate the area of their papers for ease in processing. All manuscripts, summaries, and abstracts should be sent in triplicate to the Program Chairman:

Dr. J.-M. Goethals
Phillips Research Laboratory
Avenue van Becelaere, 2
Box 8
B-1170 Brussels
BELGIUM

Acceptances will be made by March 1, 1982.

General inquiries about the Symposium may be directed to either co-chairman:

Professor Bernard Picinbono
Labo. des Signaux & Systèmes
École Superieure d'Électricité
Plateau de Moulon
F91190 Gif-sur-Yvette
FRANCE
Tel. no. 941.80.40

Professor Carl W. Helstrom
Dept. of Electrical Engineering
& Computer Sciences, C-014
University of California, San Diego
La Jolla, CA 92093
U.S.A.
Tel. no. (714) 452-3816

EASCON '81

"The EASCON '81 exhibition program reflects a broad range of technology exemplary of industry and representative of the technological progress it will contribute to our country in the 1980's and beyond," said EASCON '81 Exhibits Chairman, Albert F. Arant, Assistant Manager of Communications, Hughes Aircraft Company.

The 1981 Electronics and Aerospace Systems Conference (EASCON) has arranged for a major exhibition to be displayed at its annual Conference, November 16–19, at the Washington Hilton Hotel. The theme of the exhibition, paralleling that of the conference, will be "Government-Industry Interchange." The exhibition, which will include displays from many of the electronics and aerospace industries, is being arranged by Horizon House-Microwave, Inc., of Dedham, Massachusetts.

Also, EASCON '81 General Chairman, Dr. Delbert D. Smith, Sr. Vice President, Corporate Affairs, COMSAT Corporation, is pleased to announce that the Honorable Harrison H. Schmitt, United States Senator from New Mexico and former astronaut, will serve as Honorary Chairman; Lt. General Hillman Dickinson, Director for Command Control and Joint Chiefs of Staff, will serve as the Military Liaison Chairman; and Dr. Anthony J. Calio, Associate Administrator for Space Terrestrial Applications, will serve as Government Liaison Chairman.

International STD Conference and Workshop

The International STD Conference and Workshop, sponsored jointly by the San Diego Section, MTS, and the Oceanographic Instrumentation Committee, MTS, is being held February 8–11, 1982 in San Diego, CA. The conference will bring together those involved with STD operations, calibrations, data analyses, and processing, and new concepts in STD design. For information write: STD Conference, San Diego Section, MTS, P.O. Box 82253, San Diego, CA 92138.

Atlanta To Host IEEE Cybernetics Conference

Atlanta, GA—More than 200 professional papers will be presented at the 1981 International Conference on Cybernetics and Society, October 25 to 28 at the Sheraton-Atlanta Hotel in Atlanta, Georgia.

The conference is sponsored annually by the IEEE Systems, Man and Cybernetics Society. Participants represent a wide range of disciplines, including engineering, computer science, and psychology. The technical program consists of paper sessions and panel discussions on the following topics: Pattern Recognition, Artificial Intelligence, Man-Machine Systems, Biomedical Systems and Biocybernetics, System Design Methodology, Transportation Systems, Large-Scale Renewable Energy Systems, Microprocessor as Social Change, System Effectiveness, Modeling and Simulation, Health Care Systems, Energy Systems, Computer-Aided Design/Computer-Aided Manufacture, Decision Analysis, Education in Systems Science and Engineering, and Robotics. There will also be a variety of displays and exhibits. Further information on the technical program is available from Dr. Joanne Green, Georgia Tech Engineering Experiment Station, Systems Engineering Laboratory, Atlanta, GA 30332 (404/894-3491).

For IEEE members, registration for the full conference is $80 ($90 after September 25). The fee for one day of attendance is $60. Student registration for the entire program is $10. Copies of the Conference Proceedings can be ordered for $20. For nonmembers of IEEE, the registration and Proceedings charges are $5 greater in each category.

To register for the conference, make checks payable to "1981 ICCS" and send them with the attached conference registration form to: Harry L. Vann, Georgia Tech Engineering Experiment Station, Electronics Research Building, Atlanta, GA 30332. Hotel accommodations may be arranged by writing the Sheraton-Atlanta Hotel, 590 West Peachtree St., NW, Atlanta, GA 30308.

It's a Puzzlement

New Puzzles

Who Makes More?

Two engineers started working for different companies at the same salary. Last year Smith had a raise in pay of 10% but James was cut 10%. This year Smith was cut 10% and James got a 10% raise. Who makes more now?

Reprinted from *The Reporter,* Journal of the Central Indiana Section, IEEE, February 1981.

Band the Earth

Assume that the earth is a sphere 25,000 mi in circumference. A circular steel band is to be placed about it at the equator such that contact is made at all points. Then, if six yards were added to the band length, what would be the clearance between the earth and the band, assuming the distance to be equal at all points?

Travel from Here to Here

If one starts at the North pole and travels 100 mi south, then 100 mi east and then 100 mi north, he is back where he started. From what other point on the earth can one start, go 100 mi south, then 100 mi east and then 100 mi north and be back where he started? Consider the earth as a sphere 8,000 mi in diameter?

Girder Moving

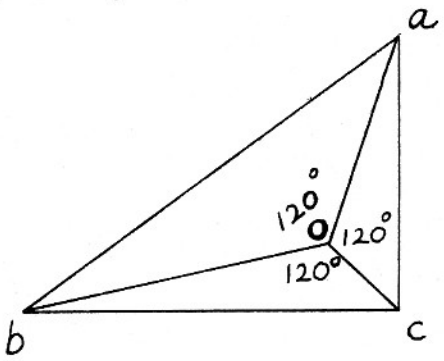
A girder 25 ft long is moved on rollers along a passageway 12.8 ft wide and into a corridor at right angles to the passageway. Neglect the width of the girder and compute the minimum width of the corridor.

The girder is moved around the corner formed by the passageway and the corridor with its left-hand end kept in contact with the left-hand wall of the passageway and its

right-hand side kept in contact with the corner. Determine the equation of the path traced by the right-hand end of the girder.

Unbalanced Line Currents Produced by Unbalanced Phase Currents

The phasor diagram shown represents line currents ab = 100 amp, bc = 80 amp and ca = 60 amp. The delta currents oa, ob and oc are 120° apart in phase position. Determine their magnitudes.



Past Puzzles

Crossed Ladders

I do enjoy your puzzle section (as well as the entire Newsletter). Since I am one of those who sent in the "age 26" solution to the bell-ringer problem, and was certain that I had the best answer, I sure would like to know what was wrong with it. Unfortunately I have lost the problem and my solution!

As for the crossed ladders, it's a dandy and I agree with the answer, although my method was slightly different. I solved it by putting values in your equation (1) instead of in the X^8---- version. I also wrote a BASIC program which will solve it, and am enclosing it herewith for you and/or your readers. Obviously line 250 could be changed to read END, all the rest being just a frill.

Sincerely yours,
Laurence B. Stemp

P.S. When I entered the program into a machine, I prefixed it with about 20 lines which drew a picture of the crossed ladders and buildings, but that's too lengthy to include here. Anyone can have it on request!

Larry

Program in BASIC

```
100 PRINT "CROSSED LADDERS PROBLEM"
110 PRINT "ENTER LENGTHS OF LONG LAD-
    DER A, SHORT LADDER B, AND"
120 PRINT "HEIGHT OF INTERSECTION, IN
    ORDER, SEPARATED BY COMMAS"
130 INPUT A, B, H
140 IF A>=B AND B>=H THEN 180.
150 PRINT "IMPOSSIBLE DATA. B CANNOT BE
    GREATER THAN A"
160 PRINT "OR LESS THAN H. TRY AGAIN!"
170 GO TO 130
180 LET X = 0
190 LET Y = (H*X)/SQR(A12 - X12)
200 LET Z = X-H*X/SQR(B12 - X12)
210 IF Y>Z THEN 240
220 X = X + .05
230 GO TO 190
240 PRINT "THE STREET IS";X;"UNITS WIDE."
250 PRINT "DO YOU WANT TO TRY OTHER
    VALUES? TYPE YES OR NO."
260 INPUT N$
270 IF N$ = "YES" THEN 110
280 PRINT "YOU ARE ALL DONE"
999 END
```

Note: As written above, the answer is given within .05, and is always slightly larger than the true answer. For greater accuracy, the increment .05 in line 220 can be changed to a smaller number, but the calculation will take longer.

Calculation time can be saved by requiring a minimum value for H. For example, line 120 could say (H not less than 2) and then line 180 could be changed to read LET X = 2.

The Priest and the Bell Ringer

Regarding the puzzle "The Priest and the Bell Ringer," I fail to see why 50 is the unique solution. On the attached sheet I tabulated some of the combinations which satisfy the primary criterion. The bottom line shows the minimum age of the Priest.

Columns #1, 4, 9 and 10 are not unique because here only the lower limit of the Priest's age is known. On the other hand, if the age of the Priest is 36,50 or 51, the solution is once again not unique because in each case two different sets of solutions for the Brothers' ages can be chosen. (Besides, 51 is also an open ended solution.)

Please indicate in what respect 50 is a "unique" solution. Thank you.

Sincerely,
O. Schwelb
Assistant Professor
Concordia University

#	1	2	3	4	5	6	7	8	9	10
1st	7	5	7	2	2	5	1	7	5	5
2nd	14	14	10	35	25	10	49	7	7	5
3rd	25	35	35	35	49	49	50	50	70	98
B.R.	23	27	26	36	38	32	50	32	41	54
Priest	26	36	36	37	50	50	51	51	71	99

The priest's age is fifty.

My colleague, Mr. P. Hastall, and I expressed the supplied information in the following form:

$$a \cdot b \cdot c = 2450$$
$$a + b + c = 2d$$

The priest knows the value of (d) but still cannot solve the problem, so (d) must have at least two solutions.

By substitution and bounding the numbers from 1-100, it is determined that (d) is thirty-two in two cases-where $a = 7$, $b = 7$, and $c = 50$ and where $a = 5$, $b = 10$, and $c = 49$.

The priest still needs the fact that he is older than any of the brothers. Therefore, he could be 50, 51, 52, etc., but the only unique answer is 50.

While this solves the problem mathematically, we wish to extend our sincere sympathy to the parents of this unique family.

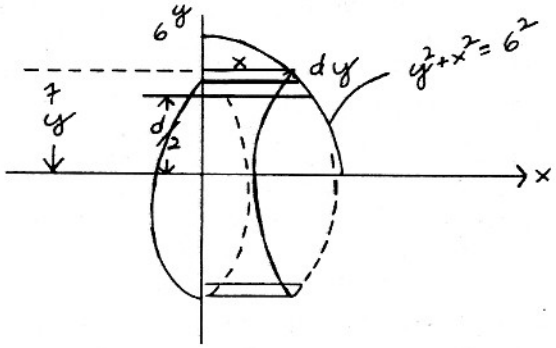
H. H. Hemming
ZT Dexamenis
Politia, Athens
Greece

Hole in a Sphere

I disagree with the solution. The hole is not a cylinder as described. The following is my solution to the problem.

Given: 12 inch diameter sphere with a hole drilled thru the center. Volume remaining is 36π in^3.

Required: Find diameter of hole.



Volume of revolution:

$$V = 2 \times 2\pi \int_{\frac{d}{2}}^{6} y \times dy, \left(x = \sqrt{6^2 - y^2}\right).$$

$$V = 36\pi = 4\pi \int_{\frac{d}{2}}^{6} y\sqrt{6^2 - y^2}\, dy$$

$$\text{but } \int z\sqrt{a^2 - 2^2}\, dz = -\frac{1}{3}(a^2 - 2^2)^{3/2}$$

$$9 = \Big|_{\frac{d}{2}}^{6} -\frac{1}{3}(6^2 - y^2)^{3/2}$$

$$-27 = (6^2 - 6^2)^{3/2} - \left(6^2 - \left(\tfrac{d}{2}\right)^2\right)^{3/2}$$

$$+27 = +\left(6^2 - \left(\tfrac{d}{2}\right)^2\right)^{3/2}$$

$$(27)^{2/3} = 6^2 - \left(\tfrac{d}{2}\right)^2$$

$$9 = 36 - \left(\tfrac{d}{2}\right)^2$$

$$+25 = +\left(\tfrac{d}{2}\right)^2$$

$$5 = \tfrac{d}{2}$$

$$10 = d$$

$$\boxed{d = 10 \text{ inches}}$$

W. R. Peavy
9205 SE Royalwood Pl.
Port Orchard, WA 98366

Of Oceanic Interest

Thirst for Adventure...or, a Rum Go

The *OSE Newsletter,* which is published by Ocean Science and Engineering Inc., Rockville, Md., recently contained the following "famous Navy story."

"On the 23rd of August, 1779, the USS Constitution, "Old Ironsides," carrying its regular cargo, set sail from Boston with 475 officers and men, 48,600 gallons of fresh water, 7,400 cannon shot, 11,600 pounds of black powder, and 79,000 gallons of rum. Her mission was to destroy and harass English shipping.

"Making Jamaica on the 6th of October, she took on 826 pounds of flour and 68,300 gallons of rum. Then she headed for the Azores. Arriving there on the 12th of November, she provisioned with 550 pounds of beef and 64,300 gallons of Portuguese wine.

"On the 18th of November, she set sail for England. In the ensuing days she defeated five British men-of-war, captured and scuttled 12 English merchantmen, salvaging only the rum.

"On the 27th of January, her powder and shot were exhausted. Unarmed, she made a night raid up the Firth of Tay. Her landing party captured a whiskey distillery and transferred 40,000 gallons aboard. Then she headed home.

"The USS Constitution arrived at Boston on the 20th of February, 1780, with no cannon, no shot, no food, no powder, no rum, no whiskey, and 48,600 gallons of stagnant water."

The *OSE Newsletter* says that this story "makes one sigh for a lost robustness." Perhaps it's lost—but who hasn't observed at least one modern sailor seeking to find it! ■

Stop Continental Drift, He Says; Others Support His Stand

You readers surely have heard of the Flat Earth Society and its notable effort to put to rest the false impression that the earth is round.

Well, now there is a companion group trying to stave off a popular movement in geological sciences. It is the International Stop Continental Drift Society (ISCDS). Its founder and president is John C. Holden.

Holden is no stranger to the oceans. He is noted as having been the illustrator of a book called "The Id of the Squid" by Arch E. Benthic. It is a small volume of humorous doggerel published by Compass Publications, Inc., publisher of this magazine.

The motto under the organization's logotype says, "Eschew Sea-Floor Spreading." The bumper sticker, of which we are a proud owner, declaims, "Stop Continental Drift."

The ISCDS is not your ordinary stuffy organization. Its newsletter justifies every line to the right hand margin, not as usually done, but by simply stopping a word there and continuing it on the next line without a hyphen.

In one issue there are pictures of the unveiling of the "Leiden Screw," a device designed to arrest the movement of the Eurasian Plate. The scene was in front of a Leiden University (The Netherlands) building. Its sponsor, Prof. H. Swart, was enthusiastically supported by students who are members of another affiliated society called the LGWBG (acronym unexplained, but then maybe it shouldn't be explained).

If your appetite for Id of the Squid has been whetted, it can be obtained from Compass Publications, Inc. Suite 1000, 1117 N. 19th St., Arlington, VA 22209 for $4.95 plus $1 for handling and postage. If you want to join ISCDS, send $5 to Holden at Star Route 38, Winthrop, WA 98862.

Other news in the newsletter includes the LGWBG's campaign to Re-Unite Godwanaland. Funds gathered for it have been forwarded to UNDOING (United Nations Development Organization in Godwanaland).

Another issue published a limerick submitted by Jack Smiley:

There was a young lady named Ocean
Whose Bottom was ever in motion.
Sat on a Hot Spot—
A flushed bottom was got!
What an outcry it brought, what commotion. ■

Reprinted from *Sea Technology*, January, 1981.

Mt. St. Helens Has Little Effect on Weather

According to scientists from the National Oceanic and Atmospheric Administration (NOAA), ash from the eruption of Washington States' Mt. St. Helens had no effect upon precipitation and had a lower nitrate content than particles in air samples uneffected by the fallout. In fact, in some ways the volcano produced less pollution than a coal fired power plant.

A team led by Dr. Rudolf Pueschel of NOAA's Air Resources Laboratories measured airborne particles and cloud droplets upwind and downwind of the volcano in April 1980. Downwind, the mass of particles in the air was a thousand times greater than upwind, but the ash appeared to have no effect on the amount of water in clouds or the size of water droplets.

NOAA scientists are not calling the eruption of Mt. St. Helens insignificant, but as far as local weather is concerned, the scientists believe the volcano is relatively benign. ■

Reprinted from *Sea Technology*, April, 1981.

Hawaii Wind Farm to be Developed

An alternative energy development company and a high technology company have reached agreement in principle to build what is claimed will be the world's largest wind turbine farm. It will supply electrical power to the island of Oahu Hawaii, power grid. Windfarm Ltd., San Francisco, and United Technologies' Hamilton Standard Division, Windsor Locks, Conn., have joined to develop an 80 megawatt farm. Current plans call for it to include 20 wind turbines of four MWe each. When completed the complex will furnish about 9% of Oahu's electrical needs in 1985. The project, according to Windfarms, is valued at $350 million. Hawaiian Electric Company (HECO) has agreed to purchase all the power generated by the project. HECO currently generates 97% of its power with oil, an expensive fuel. Wind power will reduce the percentage, saving 600,000 barrels of fuel oil a year. The site, at Kahuku Point at the northern tip of Oahu,is viewed as ideal, because for ten months of the year the northeast trade winds blow steadily. Each of the 20 systems will consist of a fiberglass blade 80 meters in diameter and mounted on a nacelle assembly on top of a tower 80 meters above the ground. ■

Reprinted from *Sea Technology*, July, 1981.

Charleston Harbor Civil War Ship Search Resumed

What began last year as a search for the Confederate Navy submarine Hunley that sank the warship USS Housatonic in Charleston, S. C. harbor during the U.S. Civil War was resumed and concluded last month. The expedition of the National Underwater and Marine Agency (NUMA), under the leadership of sponsor, author Clive Cussler, did locate the Housatonic and dove on it. Also located were three blockade runners, the CSS Raccoon, which sank in July 1863, the CSS Rattlesnake, which sank Jan. 18, 1865, and the CSS Norseman, which was found buried in sand. The USS Patapsco, lost Jan. 15, 1865 off Fort Sumter, also was located. ■

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