

Magnetometers Locate Loaded Liberty Ship

Trying to find anything on the deep ocean floor is an immensely difficult task, complicated by man's abysmal ignorance of the ocean depths.

Nonetheless, on Sept. 14, the Navy pulled off its third such effort when it located an explosive-filled Liberty ship that had been scuttled, then lost, more than a month earlier (SN: 9/23).

In addition to the difficulties that had beset searchers for the submarine Thresher lost with all hands in 1963 and the H-bomb that fell near Palomares, Spain, 20 months ago, Navy experts this time also had to worry about the ship's delicately fused cargo—2,000 tons of obsolete bombs, mines and torpedo warheads.

The entire cargo had been set to go off when it reached a depth of 4,000 feet. The resulting blast—a tenth that of the Hiroshima A-bomb—was to help Defense Department scientists evaluate their worldwide nuclear test detection network. Records of the blast were to have been compared with those from a previous natural earthquake at the same site, just south of Amchitka Island in the Aleutians.

But the ship, the Robert Louis Stevenson, didn't sink as planned; she drifted off into a fog bank and eventually settled, but nowhere near deep enough to set off the fuses.

Long-range attempts to locate the hulk precisely with sonar proved of little value, as did attempts to pick up magnetic anomalies, caused by Stevenson's steel hull, from antisubmarine aircraft.

Precise location of the hulk defied all efforts until, partly in desperation, partly due to increasing confidence that Stevenson's cargo was not as delicately poised as had been thought, an oceanographic survey ship was sent into the area on Sept. 7.

Within a few days, the Silas Bent, the Navy's most modern ocean survey vessel, had pinpointed the hull on the bottom using a deep-towed magnetometer. Its crew then lowered a camera and came up with photographs of Stevenson's bow and the hatch beneath which the bombs were set.

The ship was sitting upright on the bottom in 2,800 feet of water exactly beneath the point at which she sank on Aug. 10. The site is 17 miles southwest of Amchitka and 11 miles from the originally intended detonation site.

The next step is up to Rear Admiral Donald M. White, commander of the Alaskan Sea Frontier, who has been in charge of the search operation. Navy planes last week made an attempt to bomb Stevenson with 24 2,000-pound,



U.S. Navy

Bow railing, deck and anchor chain identify Stevenson, 2,800 feet down.

Mark 84 bombs fused with Sofar charges. They exploded without creating sufficient extra pressure to set off its cargo.

A possible alternative would be to

lower explosives to Stevenson's deck, then set them off by remote control from a safe distance. If all fails, the Navy says, Stevenson will be abandoned to rust in peace. ♦

THE SMALE CASE

No NSF Cote for the Vietnam Dove

In the summer of 1966, Berkeley mathematician Stephen Smale stood on the steps of Moscow University and denounced United States policy in Vietnam. Soon after, Representative Richard Roudebush (R-Ind.)—a member both of the House Science and Un-American Activities committees—warned the National Science Foundation not to renew Dr. Smale's research grant when it expires in March 1968. NSF had helped finance Dr. Smale's trip to Moscow for the International Congress of Mathematics.

Now, a year later, NSF has rejected the University of California's request for a quarter of a million dollar grant to be administered by Dr. Smale, "in light of Prof. Smale's performance in the administration of the present grant." In an unprecedented move, NSF asks that the request be split into two grants, one for Dr. Smale and one for the other researchers involved. That way, NSF says, any decision on Dr. Smale's grant proposal will not adversely affect the other grantees whose administrative ability is not in question. NSF refuses to specify its objections to

Dr. Smale as an administrator, and insists that it has no quarrel with the scientific merit of his research.

Dr. Smale, who refuses to withdraw his name from the present grant request, is charging NSF with threatening to punish him for his outspoken anti-war views. He contends that if he applies separately for research funds he will be turned down. The Foundation answers that his proposal would be reviewed for its scientific value—keeping in mind of course the administrative problems, and that no one can fairly predict the outcome.

The American Mathematical Society, which sees the confrontation between Dr. Smale and the NSF as a potential threat to the freedom of speech of all researchers working under Government support, is prepared to go to bat for Dr. Smale. Although the Society will take no official position until its statement for its members is complete, director Gordon Walker claims mathematicians are so concerned that "there probably isn't a single bit of math going on in this country now."

Dr. Smale, while in Moscow where

all his troubles began, received the International Congress's Fields Medal for "distinguished achievements in mathematics," awarded every four years. By using Smale's theorem, topologists map spheres in all dimensions. ♦

MAVERICK

The Metric Missile

A year after the end of the Civil War, Congress passed a bill which authorized, but did not require, the use of the metric system in the United States and expressed the hope that increasing use of the system would ultimately do away with the cumbersome pounds and inches that were predominant at the time. Similar efforts throughout the succeeding century were to no avail. In every year since 1960, proposals for study of the problem have come and gone, or simply been ignored to death, despite the fact that the U.S. and the members of the British Commonwealth are almost the only holdouts in a virtually metric world.

Now, in an independent effort to flesh out supposition with firm data, the Air Force has finally taken what could be the first step in putting the metric system across to industry, whose resistance to the costly changeover is the biggest barrier in the way of the gram and meter.

For more than a year the Air Force has considered development of a television-guided air-to-surface weapon called Maverick. Now it has asked each of the two companies competing for the possible business to see if it would be possible to make the entire missile, from the ground up, under the metric system.

The plan goes much further than merely multiplying all the inch measurements by 2.54 to read in centimeters. Every nut, bolt, tool, die and production machine would be made or calibrated in metric units, extending all the way down to the smallest subcontractor. Though one missile does not by a long shot become a national policy, it could greatly ease the way for subsequent projects.

Except for the initial cost of conversion, many military officials favor the adoption of the metric system; it would ease joint development of weapons by the U.S. and its allies, and give the U.S. a much wider source of logistic support, including spare parts and fastenings.

The Air Force first considered doing the Maverick metrically at the request of the Department of Defense, and the stamp of Secretary Robert S. McNamara is evident on the program. At least one USAF-approved statement

from North American Aviation, which is studying Maverick along with Hughes Aircraft, stresses the need for "widening the scope of commonality in Free-World armament design," a pet notion of McNamara's.

The Maverick missile would be the first major U.S. weapon to be completely designed in the metric system. A U.S.-West German project to develop a new Main Battle Tank for the 1970s is being carried out in half-and-half fashion, with U.S. contributions measured in inches and German ones in centimeters (SN: 7/30/66).

Almost \$11 million in contracts have been awarded on Maverick; but except for the metric aspect, the Air Force wishes it could stay out of the news altogether. It is, after all, a secret. ♦

VENUS

Life in the Clouds

Although the surface conditions of Venus—high temperature and absence of moisture—make the chances of life there implausible, the clouds of earth's nearest neighbor planet present an entirely different picture. According to Dr. Carl Sagan of Harvard College Observatory and the Smithsonian Astrophysical Observatory in Cambridge, Mass., the essentials for photosynthesis—water, carbon dioxide and sunlight—are plentiful in the clouds.

Drs. Sagan and Harold Morowitz of the department of molecular biophysics at Yale University, New Haven, Conn., therefore speculate that organisms the size of ping-pong balls could be floating in the atmosphere of Venus, at a level just underneath the base of the clouds, which consist of water droplets at the bottom and ice crystals at the top.

Dr. Sagan believes that the main point is not that such life forms actually exist—there is no evidence for them—but that the possibility of some kind of living organisms should not be excluded. Because the "atmosphere is primarily carbon dioxide and nitrogen, a float bladder filled with hydrogen would be very effective," the scientists suggest. The bladder would be self-regulated to stay at a relatively fixed altitude.

An organism living just below or in the clouds of Venus, they speculate, would collect water either as rain or by contact with water droplets. Minerals blown up from the surface would be captured by the sticky underside of the thin-walled gasbag, then ingested by fluid uptake. Mineral requirements would be modest.

A model for such a life form can be worked out using biochemical mechanisms known on earth, Drs. Sagan and

Morowitz say in the Sept. 16 NATURE. They report that the conditions in the lower clouds of Venus resemble those on earth more than any other extra-terrestrial environment known.

It is even possible, they suggest, that life arose "under more moderate conditions on the surface of Venus in its early history . . . then emigrated to the clouds." Neither the U.S. nor the Soviet Venus probes scheduled to arrive near Venus in October carry instruments for detecting biological forms. ♦

FROM GENEVA

Lockjaw: A Killer

Tetanus has killed a million people in 10 years; more than 50,000 deaths are formally counted each year.

Dr. Boris Bytchenko, a Russian member of the World Health Organization's Bacteriology Unit, has conducted a worldwide survey of all available data and found surprising totals.

"Tetanus kills more people than smallpox, rabies, plague, anthrax and polio," he says, "yet it receives less attention by public health authorities and medical science than any of these."

Paradoxically, he notes, it is easy to prevent by vaccination. But once a victim gets it, chances are he's done for. The fatality rate in the United States is surprisingly high. Up to 78 percent of the patients die, according to published figures, despite good antibiotics, muscle relaxants and tranquilizers.

Japan and the Philippines also have high death rates. Europe, Asia and Africa reportedly enjoy a bit of extra immunity; only half the cases are fatal.

"In all parts of the world," Bytchenko explained recently, "men appear more vulnerable to the toxin than women, and tetanus strikes hard at newborn children and people over 50."

In some tropical areas, as many as 80 newborns per 1,000 get tetanus and die. (Most of the world's babies are still delivered by midwives or without help; a survey sponsored by the International Federation of Obstetricians and Gynecologists finds it about 75 per cent. These people use bamboo shoots, glass and even cow dung in their ritualized procedures.)

The overwhelming majority of cases is due to trivial cuts or punctures, especially of the feet and legs, Dr. Bytchenko finds. The bacillus lives in the soil, especially in rich loam. "It's a part of our world," he says. "but no one knows its habits and exactly how it kills so large an organism as man." In many countries, including Russia, scientists are meticulously studying soils. ♦