

## OCEANOGRAPHY

**Bathyscaph Gets Set For Ocean Probes**

A DEEP ocean diving bathyscaph, the Trieste, from the Navy Electronics Laboratory, San Diego, Calif., is in operation following four months of reconditioning which equips the craft for ocean probings as deep as 20,000 feet.

The Trieste, piloted by Jacques Piccard, who with his Swiss father Auguste Piccard designed and built the craft, made two dives in the Atlantic to 10,500 feet before the craft was brought to the Laboratory last December, test dived, and dry-docked for repairs.

Dr. Andreas B. Rechnitzer, NEL scientist in charge of the bathyscaph, described the miniature blimp-like craft as the "Model T" of future submarines.

Dr. Rechnitzer and Mr. Piccard are beginning a series of 3,600-foot shakedown and testing dives seven to 12 miles off the San Diego coast. After these shakedown exercises are over the research submersible will probe the San Diego trough which is 40 miles off shore.

After exploring the San Diego trough which is about 6,500 feet deep, the Trieste will be in for newer and bigger things. It will search ocean depths down to 20,000 feet, exploring the sea floor, ocean characteristics at various sea levels, thermodynamics, and the ocean's deep scattering layer—a layer that sometimes causes refraction of acoustics under water, believed caused by marine life.

Acoustical studies may help achieve a breakthrough in extremely long-range detection of enemy submarines, which is one of the Navy's serious defense problems.

After being reconditioned, the 70-ton bathyscaph was weighed prior to its "re-launching" to determine its new displacement. Then it was loaded by hand with nine tons of iron buckshot ballast. Its hull holds 28,000 gallons of aviation gasoline.

This gasoline, which is 30% lighter than water, provides positive buoyancy, like gases do in balloons. The iron ballast can be jettisoned like a balloon's sand bags.

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## METEOROLOGY

**Look to Ozone for Better Weather Forecasts**

WEATHERMEN at the U.S. Weather Bureau hope to find a way to improve weather forecasts through measurements of ozone in the air.

Ozone is a form of oxygen especially noticeable by its "clean, fresh" smell right after a thunderstorm. In heavy concentration, however, it is poisonous to man and may be a potential threat to our high-flying military airplanes as well as their crews. Ozone attacks rubber and can convert oil ultimately into a gummy mass.

It is already known that variations in ozone in the air correlate with weather. For instance, a drop in ozone concentration appears often before a storm. Weathermen hope to find close and reliable correlations

of ozone and weather that might be used, some day, to improve 24-hour forecasts.

Supported also by the U. S. Air Force, Navy and Atomic Energy Commission, the project has as its immediate goal the expansion of a network of seven stations to measure ozone routinely.

(The Atomic Energy Commission is interested because it sees the possibility that ozone movements might yield data on the speed of radioactive fallout following bomb tests.)

Tests have been completed in Denver, Colo., on several ground and balloon-borne instruments that might be used to gather data about this faintly bluish gas. An ozone layer high in the atmosphere protects us from the sun's skin-burning ultraviolet rays.

Ozone is found at ground level, but reaches its heaviest concentration at an altitude of 60,000 to 110,000 feet. At present there are few ozone stations throughout the world. The U. S. has only five: Caribou, Me., Green Bay, Wis., Bismarck, N. D., Washington, D. C., and Mauna Loa Observatory, Hawaii. Two new U. S. stations are to be at Nashville, Tenn., and Fort Worth, Texas. A temporary station, at the South Pole, might become a permanent eighth station.

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## ENGINEERING

**Device Uses Satellites To Rescue Lost Craft**

A DEVICE using space satellites to hunt down and rescue lost vehicles has been proposed.

Known as SARUS, Search and Rescue Using Satellites, the device is designed to search out and find almost any type vehicle within one mile of its location. Among rescued vehicles might be missile nose cones, space capsules or conventional aircraft and ships.

The system would provide such vehicles with a subminiature radio transmitter to send out signals in time of trouble. Only a few milliwatts of power on an international distress frequency in the Ultra High Frequency range would be required.

Satellites circling in a polar orbit a thousand miles above the earth would receive the distress signals and record them for later transmission to ground stations.

The satellites would also be able to measure the relative frequencies of the signals. The rate of change of the frequencies would provide the information necessary to find the location of the sought vehicle in relation to the satellite.

Stations at fixed points on the ground could pick up any information the satellites had recorded as the satellites came within radio range. By knowing the exact location of the satellite, as provided by recorded time signals, analysis of frequency data could locate the sought vehicle within a mile.

SARUS was described to the Institute of Radio Engineers meeting in Albuquerque, N. M., by Frank W. Lehan of Space Electronics Corporation, Glendale, Calif.

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**IN SCIENCE**

## PUBLIC HEALTH

**New Textile Finish Makes Fabric Antibacterial**

A HANDKERCHIEF that can fight off bacteria—even the antibiotic-resistant staphylococcus—will soon be on the market.

The handkerchief, which was introduced at the fall show in New York of the National Association of Men's Sportswear Buyers, contains a permanent antibacterial finish called Eversan. In this finish an organic zinc ingredient is said to be fixed to the textile fibers, making the fiber molecules permanently antibacterial.

In a seven-year testing and development program, Eversan was found to inhibit the growth of many bacteria, including those that cause odor. Eversan was developed by Ions Exchange & Chemical Corp., and its distribution in the United States is to be handled by Yardney Chemix Corp., New York. It is claimed that the finish is odorless and does not affect fabric color, nor does it impart a color of its own. Tests indicate it is non-toxic and non-irritating in normal use.

Eversan is said to remain effective "beyond the life of any garment fabric" and to withstand repeated near-boiling water washes with detergents and bleaches, including chlorine.

It is planned to use Eversan in hospital sheets, pillow cases and towels. It will also be available for individual buyers. Eversan has been tested successfully on underwear, knitted goods, work clothes and sweaters, as well as on "wash and wear" garments.

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## GEOLOGY

**Tangue Found "Non-Conforming"**

TANGUE, a very fine powder with a high concentration of calcium carbonate found close to the coast near Mont Saint Michel, France, is a "non-conforming" sediment, two French geologists report.

Tangue has been used for many generations as a fertilizer along considerable parts of the French Atlantic coast, especially in Brittany. It is "non-conforming" because the size distribution of grains is contrary to the distribution observed normally in other sediments. Instead of becoming smaller as measurements are made farther from shore, sizes of the grains increase toward shore.

The calcium carbonate in tangue comes from offshore oyster banks, Prof. Jacques Bourcart and Roger H. Charlier of the University of Paris report in the *Bulletin of the Geological Society of America* (May). One remarkable property of tangue is its silvery-pearly gray color.

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# E FIELDS

## CONSERVATION

### USDA Research Improves Water Problem In West

SEVENTEEN MINUTES is all it takes to turn a dry streambed into a torrent, with 20,000 cubic feet of water tearing by each second.

This is one of the problems—flash floods—being studied by its scientists, the U. S. Department of Agriculture has reported. Research conducted at Tucson, Ariz., by USDA experts points to several possible ways of recovering water normally lost in flash floods. Suggestions include: 1. small storage reservoirs, 2. storage of water underground, and 3. improved vegetation.

Small storage reservoirs located on the tributaries of larger streams could mean a "relatively high degree of water recovery," Robert V. Keppel and Joel E. Fletcher said. This is due to the prevalence of small local showers with large losses of runoff in normally dry streambeds. Thunderstorms near Tucson were usually less than one mile and one-half in diameter, they said, with most of the water falling from a cloud area about half this size.

Underground storage of water, where evaporation losses are the least, is being given increased study in long-range water planning for the West.

Runoff can be further reduced by changes in vegetation, the USDA scientists explained. Plants decrease surface "puddling" and can thus increase the rate of water infiltration into the soil, recharging underground water storage areas.

USDA studies indicate less than five percent of the rain running off southwestern rangelands ever reaches a point downstream where it can be put to use. With populations continuing to rise, the short water supply situation is becoming more acute.

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## PHYSIOLOGY

### Unborn Babies Create Own Sea Level Conditions

UNBORN BABIES that are carried by women that live in high altitudes create "sea level" conditions for themselves, a team of six doctors has discovered.

At high altitudes, oxygen, vitally needed by the unborn baby, is not as abundant in the air as it is closer to the lower levels of the earth. Therefore, the baby, to survive until time of delivery, creates a larger supply of oxygen for itself by enlarging its mother's placenta. This is the organ within the uterus that establishes a connection between the mother and baby by means of the umbilical cord which carries nourishment and oxygen between them.

An expedition, headed by Dr. Donald H. Barron of the Yale School of Medicine, went to Peru to study the problem of pregnant

mammals who have difficulty supplying oxygen to the unborn fetus.

They presumed that the problem would be automatically magnified at higher altitudes where oxygen becomes scarce.

At sea level, the greatest single cause of death among infants at or about the time of birth is fetal anoxia, an insufficient supply of oxygen.

The investigators learned through detailed laboratory experiments with pregnant sheep and llamas that a fetus in an atmosphere of rare oxygen is capable of enlarging the placenta to receive oxygen from his mother.

The researchers emphasized that their study was limited to the unborn fetus only and did not extend to a further study of the baby during the actual process of birth or after.

The scientists conducted their study at the Institute of Andean Biology in Morococha, 15,000 feet above sea level. In addition to Dr. Barron, Drs. James Metcalf of the Harvard Medical School, William Huckabee of Boston University Medical School, Andre Hellegers of Johns Hopkins Medical School, Harry Prystowsky of the University of Florida Medical School and Giacomo Meschia of Yale participated. Dr. Alberto Hurtado, director of the Institute and dean of the Medical School of the National University of San Marcos, Peru, assisted.

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## ASTRONOMY

### Supernova's Light Due To Radioactive Iron

THE LIGHT of a supernova, a star that suddenly blazes forth at more than a million times its previous level, may be due to iron, not the artificial element, californium-254.

Dr. Edward Anders of the University of Chicago's chemistry department and Enrico Fermi Institute for Nuclear Studies proposes the iron-group theory to account for the observed falling-off rate of a supernova's light. His theory disagrees with one proposed about three years ago by five astronomers.

They suggested that californium-254, made when supernovae explode, is responsible for the supernova's dwindling light. Californium-254 is heavier than uranium and, like uranium, spontaneously breaks up, half of any given amount disappearing in about 55 days. This same period of 55 days is observed in the decreasing light curves of supernovae.

Dr. Anders suggests the declining light is due to the breakup of iron-59, which takes 45 days for half of any amount to disappear. This picture, he says, can account for the build-up of both the light and heavy elements in about the same proportions as found in the solar system, unlike the theory of the five astronomers.

The synthesis of elements of the iron group in a supernova is a theory proposed by Dr. Fred Hoyle, now at Harvard College Observatory. Dr. Anders' theory is outlined in detail in the *Astrophysical Journal* (March).

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## BIOLOGY

### Extinct Sea Life Hunted by Scientists

TRILOBITES, crab-like creatures that inhabited the oceans 500,000,000 years ago and considered extinct in today's textbooks, are objects of an intense search that is getting under way by scientists of the Scripps Institution of Oceanography.

The scientists who will make the living fossil hunt are Robert H. Parker, a Scripps ecologist, and Dr. Henning Lemche, a zoologist from Denmark. They do not believe the trilobite is extinct and are planning to go out and look for the organism. They hope to bring living specimens back and breed little trilobites in a laboratory.

If they can find this living fossil, they may be able to push back the knowledge of how life got started on this earth by millions of years.

The Scripps scientists are optimistic about finding trilobites, based on the fact that ocean creatures called "neopilina," once believed extinct, were dredged up out of the Gulf of California. They believe if neopilina can be found, so can trilobites.

The wrong places may have been searched for living fossils in the past. Although some old, dead fossils have been shallow-water residents (found in ancient sediments that have turned to sandstone), neopilina and other fossils once thought extinct were found from 1,200 to 12,000 feet down on the continental slopes or underwater mountain sides. It is believed that they were crowded out of shallow water by other animals and found less competition on the deeper slopes.

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## PHYSIOLOGY

### Chemical Helps Preserve Frozen Living Tissues

A NEW METHOD for preserving frozen red blood cells, both human and cow, has been reported.

The chemical dimethyl sulphoxide promises more effective protection against the damaging freezing-thawing process than several other compounds, say J. E. Lovelock and M. W. H. Bishop of the National Institute for Medical Research, Mill Hill, London. Previously it had been found that glycerol and "other neutral solutes" prevented freezing damage to living cells.

The researchers found that dimethyl sulphoxide penetrates the red blood cell more quickly and less is needed for complete protection against freezing. For example, they pointed out, two hours with glycerol before freezing gave poor protection to both cow and human red blood cells. However, only 30 seconds with dimethyl sulphoxide gave complete protection.

The compound should be useful for preserving living tissues that are not now protected by glycerol treatment, the researchers conclude in *Nature* (May 16).

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