

## ENTOMOLOGY

**Sex Used as Weapon to Save West's Pine Forests**

► **SEX MAY BE** the ultimate weapon for foresters fighting to save the pine forests of the western United States.

The enemy is the European pine shoot-moth, a newcomer to the West, which threatens to stunt and distort pine trees from New Mexico to Washington. The war is being waged by the Northwest Forest Pest Action Council, which is doing research into the possibility of releasing millions of radiation-sterilized male shootmoths to overwhelm their fertile counterparts, causing the females to lay unfertilized eggs.

Such a solution to the problem would be an expensive one, the council reported. It could cost as much as \$15 million over the seven-to-ten-year period required to find methods for producing sterile moths and then to conduct surveys to verify the results.

However, without this biological warfare, shootmoths might overrun more than 11.6 billion square feet of pine forest land. The only other method would be to cut down the infested tree, and then burn it or cover it and gas the bugs. This would not be advisable, however, for large stands of timber, such as the pine forests.

Sterile males have been used on several occasions to control numbers of the screw-worm, a cattle pest, in the United States and other countries. The technique has been used against this insect for more than ten years, and is being studied for use against other pests.

• Science News Letter, 86:56 July 25, 1964

## TECHNOLOGY

**Miniature Library for Saving Space in Space**

► **THE BIBLE** on a postage stamp or the entire Library of Congress—270 miles of bookshelves—in a half a dozen ordinary filing cabinets?—easily, with photochromics.

Photochromics is a new technique, developed by the electronics division of the National Cash Register Company, Hawthorne, Calif., that will enable astronauts to carry 12,000 pages of instructions and reference data in a three-pound package the size of a phone book. The basic advantages of photochromics over microfilm are that no developing is required and that the time and expense of error correction are greatly reduced.

Photochromic materials, which are light sensitive organic dyes, change color upon exposure to near-ultraviolet light. The process reverses itself when the dyes are exposed to heat or certain other wavelengths of light. Developing is eliminated, and the change is instantaneous.

Since the change is reversible, material can be optically erased and rewritten as often as desired. Using conventional microfilm, errors such as dust on the negative or dirt in the film emulsion require re-photographing the entire storage card, including all the pages on it. With photo-

chromics, however, any individual image or page on the card may be selectively erased.

The astronauts in the Apollo program will each have a self-contained projector/screen unit in which 12,000 pages of 8½-by 11-inch material are stored on a two-foot strip of film, containing the image of a photochromic master copy. The pages are selected by turning a wheel, and then projected in 12-point type onto the back of a piece of ground glass in the face of the unit.

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## PSYCHOLOGY

**Sight Loss Heightens Sense of Touch**

► **TEMPORARY BLINDNESS** definitely causes increased sensitivity to touch and pain, with the sensitivity lasting even after sight is restored.

A group of 16 male university students were blindfolded with black masks and placed, in groups of two, in an ordinary room for one week. Everything else was normal; there was even a radio.

Before and after the "week of darkness," sensitivity to touch was measured by the "flicker" test, in which an intermittent jet of air of known strength is directed at the skin. The frequency of the jet is increased until the subject reports feeling a constant pressure.

To test for the smallest amount of pain that a subject could feel, slowly increasing heat was applied to the skin over a small known area until the subject reported the first sensation of pain.

At the end of the week, all 16 subjects showed uniform increased sensitivity to both touch and pain, in all measurements and in all skin areas tested. The effects lasted as long as seven days.

One subject reported, upon returning home from the experiment, that he was ticklish for the first time in his life. Several others commented that the radio was unusually loud.

The experiment, reported in *Science*, 144:1591, 1964, was conducted by Dr. John P. Zubek, J. Flye and M. Aftanas of the department of psychology at the University of Manitoba, Winnipeg, Canada.

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## MILITARY SCIENCE

**Sub-Warfare Simulated To Improve Strategy**

► **AN ELECTRONIC SYSTEM** is being developed that will enable Navy scientists to "fly" a complete antisubmarine warfare mission in an area of 250,000 square miles without leaving the laboratory.

The system, which simulates actual conditions that anti-submarine warfare aircraft face, is expected to improve the Navy's ability to cope with high speed enemy submarines. Being developed by Sylvania Electric Products Inc., the system is called a "real-world problem generator."

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**IN SCIEN**

## BIOCHEMISTRY

**Chemistry Affects Nerve Action in New Theory**

► **CHEMICAL ACTION** in the body's nerve cells stimulates nerve action, Dr. Julian M. Tobias, physiologist of the University of Chicago, advances as a new theory in *Nature*, 203:13, 1964.

Depolarization has long been the focus of research on how the nerve shifts from the resting to the "excited" state.

More research is needed to uphold the theory that a chemical molecular mechanism underlies nerve stimulation. Dr. Tobias believes enough information is at hand to indicate that more work is justified.

Depolarization is believed to initiate a "complex of molecular events," such as the increase of water in the membrane of the nerve cells.

"The combined calcium displacement and increased hydration cause, and are paralleled by, loosening and spreading apart of membrane structural components," of which phospholipid is the most important. Phospholipid is a class of greasy or waxy compounds.

Dr. Tobias concludes that the "phospholipid geometry" expresses itself as a fall in resistance, with increased transmembrane fluxes of sodium and potassium, both of which are major signs of the "excited" or stimulated state in nerve cells.

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## PSYCHOBIOLOGY

**Goldfish Sees Sideways Better Than Up and Down**

► **GOLDFISH CAN SEE** things moving from side to side better than those moving up and down.

At the University of Oxford, England, a goldfish was wired for electrical effects and clamped in a tank of water. A black cardboard disk and spots of white light were placed alternately in front of the fish.

A small electrode was surgically planted in the retina of one eye to record how various cells reacted to the movements of the images. The retina as a whole was found to be more sensitive to flat plane movement coming from the side of the head to the center of the head than it was to movement in the reverse direction.

This could explain why fish know how to keep facing upstream in a moving current. If there is any tendency to turn with the current, the image of the bank of the stream will pass before the eye toward the center of the head, thus allowing better vision for correcting its direction.

Dr. J. R. Cronly-Dillon of the Institute of Experimental Psychology, University of Oxford, reported his study in *Nature*, 203: 214, 1964.

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# CE FIELDS

## PHYSIOLOGY

### Cleft Palate Caused by Prenatal Injections

► INJECTIONS of large amounts of hormone substances in pregnant mice have produced cleft palates and cleft lips University of Michigan researchers reported.

"Environmental shock" is the term applied to such injections along with excess radiation, insufficient oxygen, a deficient diet and other experiences that can produce malformed offspring in experimental animals.

Studying the occurrence of facial and oral clefts, which strike one out of 800 American babies each year, Dr. James K. Avery with Dr. Peter Gryson, both of the School of Dentistry, and Dr. Alexander Barry, professor of anatomy at the University, found that there are critical stages during early pregnancy when the lip and palate develop. If the animal receives an "environmental shock" at this critical time, normal development is hindered.

Facial and palatal tissues, however, do not mature at precisely the same time, so clefts of the lip and palate can occur independently.

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## MEDICINE

### Birth Control Cheapest With New Plastic Coils

► CHEAP PLASTIC or nylon coils, about the size of a nickel, provide the greatest hope for birth control in underdeveloped countries, a graduating class of physicians was told.

In the next 30 years, the doctor's practice should include the "awesome responsibility" of stemming the tide of births throughout the world, Dr. Nicholson Eastman, Ford Foundation population consultant, said in Brooklyn, N. Y. If the present rate of increase is unchecked, three billion people will be added in that length of time, which will almost double the population.

Although contraceptive pills have been successful in economically developed countries such as our own, Dr. Eastman pointed out, the bulk of the world's population needs a method that will cost virtually nothing and will give protection without further attention or the sustained wish of people for birth control. The cost of the coils is about two cents each.

The intrauterine devices are shaped like a coil or the letter S or X. They are inserted into the womb by a physician and remain there without further attention in most cases. One doctor with an assistant can insert 100 a day, and removal of the devices is equally simple.

The new coils have been found suitable for use in 85% of the women studied. In about 15% they were not successful because

they either slipped out, caused bleeding or cramps, or pelvic inflammation.

The early future should see development of the "ideal" contraceptive, Dr. Eastman said. The new devices are a great improvement over the Grafenberg "ring" used in the 1930's, which had such bad effects that all intrauterine methods for contraception were condemned for a time. The old ring caused many kinds of pelvic inflammatory diseases, several of which were fatal.

More than 20,000 women all over the world are now wearing the new coils, which are being studied carefully for their efficiency as well as any hazards or side effects.

Dr. Eastman spoke to graduates of the State University of New York Downstate Medical Center in Brooklyn.

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## MILITARY SCIENCE

### U. S. Cotton Spray Goes to Vietnam

► THE SAME CHEMICAL sprays used by farmers in this country to keep cotton foliage from fouling crop-handling machinery are uncovering enemy snipers in Vietnam.

This is the first time that defoliation by spraying has been used by the United States for military purposes, although burning napalm, a sort of jellied gasoline, was used for this purpose on Pacific Islands on several occasions during World War II.

In addition to defoliant sprays, which merely cause the leaves to drop off the trees, the Army is using soil-sterilizing sprays, or "herbicides," as Army information men put it, that kill all plants in their path.

Sterilants are commonly used in this country to clear paths for railroad tracks or rural power lines. Both sterilants and defoliants require from three days to a week to do their work, however. Even the "best" of them do not cause leaves to fall instantly.

As far as defoliation by low-yield nuclear weapons is concerned, despite a recent statement by Sen. Barry Goldwater (R-Ariz.) that it "could well be done," the Army says that nuclear weapons would not do the job. Too many would be needed, the Army contends, to produce enough flame for complete defoliation.

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## TECHNOLOGY

### Weather Computer Free For Non-Profit Use

► WEATHERMEN who have a research problem they would like to solve on a computer now have one available, either without fee or at cost.

The National Center for Atmospheric Research, Boulder, Colo., is freeing some time on its computer, a CDC 3600, for use by scientists at non-profit research institutions. Problems in such diverse fields as turbulence, cloud formation, evolution of stars and the transfer of heat by radiation can be handled by the computer.

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## PUBLIC HEALTH

### Measles Vaccine Too New Health Officials Say

► THE BIGGEST EPIDEMIC of measles in recent years occurred in the United States during the spring months of 1964, although measles vaccines had been licensed for use by physicians.

Public health officials told SCIENCE SERVICE that the vaccine had not yet "caught on," because it is too new. Doctors and the public should get more "excited," they say, in view of the potential complications.

There was also an epidemic of German measles, or rubella, which is not "reportable" except on an optional basis in this country. There is not yet a vaccine available for it.

During the first 26 weeks of 1964 there were 413,777 cases of ordinary measles reported. A comparable figure for this period during 1959-1963 was 359,673.

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## GENERAL SCIENCE

### Science Service Writer Honored for Writings

► SCIENCE SERVICE WRITER Mrs. Barbara Tufty has won an honorable mention in the Fifth Annual Catherine L. O'Brien journalism awards just announced. This puts her in the top one percent of the thousand women's page writers who entered the nationwide competition.

Outranked by only the first three prize winners, Mrs. Tufty was among the seven honors winners in this contest held by Stanley Home Products, Westfield, Mass. Top winners were Muriel Fischer of the New York World-Telegram and Sun, Margaret Moore of the Indianapolis News and Ann Zurosky of the Pittsburgh Press.

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## AERONAUTICS

### Plane Flies 35 MPH, Takes Off in 75 Feet

► A NEW "channel-wing" airplane can take off in 75 feet and fly at speeds as low as 35 miles per hour.

The plane, designed by the Custer Channel Wing Corporation, Hagerstown, Md., has no conventional wing flaps or slots to provide lift. Instead, the two engines are suspended in "channels" in the wing, with the propellers at the trailing edge.

By drawing air through the channels at high velocity, air pressure over the wing is lowered much more than in conventional kinds of aircraft.

The channel-wing provides three times as much lift as a straight wing, said Willard R. Custer, designer and builder of the plane. This means that a standard plane of the same weight would need three times as much horsepower to get the same lift.

Currently being tested for certification by the Federal Aviation Agency, the Custer Channel-Wing is powered by two fuel-injected 260-horsepower Continental engines.

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