

SPACE

Man Beats Electronics At Spacecraft Spotting

► AN ASTRONAUT with sharp eyes, a good memory and a little help from the sun would be better than electronic devices at spotting another spacecraft in orbit.

This was shown in a study of the condition an astronaut may expect to experience during a rendezvous in space. Scientists at Thompson Ramo Wooldridge Inc., Redondo Beach, Calif., found that a man could spot a target equal to a fifth magnitude star, moving very slowly across the sky (.01 degree per second), is less than a minute. A fifth magnitude star is about as dim as the faint member of the double star in the Big Dipper's handle.

How quickly a man can find the target depends on the amount of light reflected from its surface. A background that is cluttered with stars also adds to the problem, although the study showed that a person who has memorized the star field or positions of the stars has no trouble spotting a "foreigner" in the field.

L. G. Summers, R. A. Shea and K. Ziedman of TRW performed the experiments by showing subjects a spot of light moving across a projected background of stars. They reported their findings at the American Institute of Aeronautics and Astronautics' third manned space flight meeting in Houston.

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PUBLIC HEALTH

Pipe and Cigar Heat Dangerous to Mouth

► PIPES AND CIGARS, considered less dangerous than cigarettes, are under suspicion because of their greater volume of smoke which concentrates heat in the mouth, said the chief dental officer of the U.S. Army.

Major General Joseph L. Bernier of Washington, D. C., speaking to the American Dental Association meeting in San Francisco, noted that the influence of heat in the oral cavity should be given more consideration.

Injury through unusual pressure to the lips seems greatest with a pipe, he said, "even though this has been reduced materially with the advent of newer materials, such as plastics, from which most pipe stems are being made."

Another danger to the mouth from smoking is a disease called leukoplakia, which develops a thickening and overgrowth on the mucous membrane, of the cheeks, gums, or tongue and sometimes leads to cancer.

In addition to smoking, said Gen. Bernier, who specializes in oral pathology, rough or over-hanging fillings, irritating denture bars or clasps and cheek biting can be cited as possible triggering mechanisms for leukoplakia.

Other factors, such as alcohol, spices and galvanism, which is an electrical current produced by chemical action, could be responsible for leukoplakia, Gen. Bernier

said, but more study should be done to clarify their role.

The most common type of malignant mouth tumor is squamous cell cancer, a scaly condition more common on the lips than inside the mouth. It represents about 90% of all oral malignancies, and is more frequent in men than in women.

This tumor occurs most frequently in persons between the ages of 50 and 60, he said, but there are indications that more people under 40 have it than formerly was believed.

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MEDICINE

Smell Governed by Electrical Process

► THE SIMPLE ACT of smelling is related to a complicated electrical process that occurs in the olfactory nerve when a whiff of odor hits the lining of the nose, two Massachusetts Institute of Technology researchers said.

They selected frogs for their experiment because of the ease with which the animals' smelling apparatus can be reached, stimulated and studied with electronic monitoring apparatus.

The frog experiments were carried out at the MIT Research Laboratory of Electronics by Drs. Robert C. Gesteland and Jerome Y. Lettvin, who reported their findings at a biomedical engineering session of the Northeast Electronics Research and Engineering meeting in Boston.

Emphasizing that their work so far has dealt only with the signal-generating mechanism and not with identifying or breaking an odor code, the investigators said their findings show that the electrical signals in a single nerve fiber depend upon two different types of receptor mechanisms. One increases the rate of firing while the other depresses the rate. Both are usually involved when any odor is given.

The researchers said their primary interest is in decoding the electrical activity of nervous systems in living organisms. They selected the first cranial nerve, or olfactory nerve, to investigate because of its comparatively simple connections.

Olfactory nerve fibers have their external endings in the surface of the nose lining where they come in contact with the molecules which, when excited, govern the nervous activity.

The fibers come together in larger and larger bundles to form the olfactory nerve leading to the brain.

The experimental frogs were given puffs of various odorants and then average electrical records, called electro-olfactograms, were taken and analyzed.

By detailed analysis of a large series of electro-olfactograms the researchers pieced together their concept of how the endings generate the electrical signals that indicate the arrival of odors in the nose.

A basic key to the process, they reported, is that odorant molecules apparently temporarily alter the permeability of nerve membranes at the receptor sites.

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IN SCIENCE

SPACE

Space Monkey to Ride Solo in 'Biosatellite'

► THE SPACE MONKEYS are back again, and one of them will be the sole crew member of the first U.S. satellite to keep a living passenger in orbit for a month.

The pigtailed macaque monkey will ride the third or fourth in a series of six NASA "biosatellites," and is due for his trip in late 1965 or early 1966. The monkey is being prepared by the Space Biology Laboratory of the University of California at Los Angeles and will be monitored with the help of University of Southern California. The monkey will provide scientists with information on brain function, eye movements, heart, blood pressure and muscle action.

Prolonged weightlessness may have an effect on sleep-wakefulness cycles and depth of sleep, as well as length of attention span, said Dr. Ross W. Adey, chief "monkey monitor" for the flight at UCLA. Data from the monkey will be telemetered to the ground on each orbit.

Other satellites in the biosatellite program will carry flies, wasps, frog eggs, bread mold and other organisms into space, to measure not only the effects of weightlessness, but of radiation and the lack of earth's rotation.

Some of these organisms will be launched along with sealed capsules of strontium 85, a relative of strontium 90 present in atomic fallout. The others will serve as control groups subjected only to the radiation in outer space.

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TECHNOLOGY

Overspecialization Will Catch Up With Russians

► THE SOVIET UNION'S system of teaching highly specialized skills to its science and engineering students will lead to a marked decrease in new Russian technology, a top U.S. engineer predicted.

The Russian concept of exploiting known technology to the fullest is an adequate one, but as new ideas are introduced, widespread reschooling will be needed to keep up with the times said M. R. Lohman, dean of engineering, Oklahoma State University.

While the Russians take time out to retrain their specialists, development of new technology will dwindle, he said.

The United States has faced the same problem and has been undertaking a vast retraining program as new ideas have made old jobs obsolete.

The Russians are now using an educational system similar to the U.S. system of 25 years ago, Mr. Lohman said.

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CE FIELDS

DENTISTRY

Hay Fever Sneezes Bring Muscle Trouble

► THE CONTINUAL SNEEZING of the hay fever victim can bring trouble to his jaw and facial muscles, the American Dental Association meeting in San Francisco was told.

Abnormal neuromuscular function can result from allergies, hay fever, chronic sinusitis and postnasal drip, Dr. Robert J. Nelsen, dentist of Rockville, Md., said. The trouble comes from abnormal swallowing patterns.

Dr. Nelsen explained that the normal pattern of swallowing is also altered by excessive smoking, which irritates the soft tissues of the mouth and throat.

Treatment of neuromuscular dysfunction, if it is severe, may involve use of a dental appliance to guide and relax the jaw muscles.

The modern dentist is no longer confined to tooth care alone, Dr. Nelsen pointed out, but uses a more comprehensive approach to total oral health. After diagnosis of a disorder, appropriate referral to a physician is sometimes needed.

Soreness of the gums in some dental patients may be caused by liver and gastrointestinal conditions, Dr. George S. Sharp, physician of Pasadena, Calif., reported. In a ten-year study of oral mucous membranes in 3,000 patients who complained about alimentary tract disorders, problem denture cases were found in 122 of them.

In a toothless person, Dr. Sharp explained, abnormal mucous membrane changes frequently are a cause of a low tolerance to dentures. There may be a pattern of general mucous membrane change throughout the entire alimentary tract.

The false teeth of the 122 problem cases, he said, were not the primary cause of gum trouble, but were only triggering mechanisms that produced an exaggeration of local symptoms.

When the patients were treated with a combination of a liver fraction tablet, a slow-release gastric hydrochloric acid supplementation tablet and a high protein diet, the false teeth problems of 70% of them were greatly improved.

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AGRICULTURE

Pesticides Necessary To Ensure Food Supply

► MAN MUST CONTINUE to use pesticides in order to supply food to a hungry world, Parke C. Brinkley, president of the National Agricultural Chemical Association claims.

With half the world population hungry today, the loss of foods because of such pests as weeds, insects, fungi and rodents should

be reduced by using accurate doses of appropriate chemicals, Mr. Brinkley stated in BioScience, Nov. 1964.

Nearly 20% of all foodstuffs are lost between sowing and harvesting because of weeds, fungi and insects, he pointed out. Nearly 10% of all food harvested is lost during transportation and in storage because of attack from rodents, insects and fungi.

Pesticides have been used to keep losses at these levels, Mr. Brinkley said, and can be used to reduce them even further.

Practically every authority who has studied the use of pesticides believes they are essential for production of food and protection of public health, he said. Yet, many people still think of pesticides only in terms of chemicals that contaminate food, soil, water and air, and poison humans and animals.

It is important to realize that the use of every chemical substance by man, whether for food, drug, cosmetic, pesticide or other purposes, is a potential hazard, Mr. Brinkley said. However, every chemical substance, including pesticides, has a nontoxic dose for man as well as a toxic dose.

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SURGERY

Warm Blood Transfusions Help Surgery Patients

► A SIMPLE METHOD of warming blood for transfusions is one of the most important contributions in the past 10 years to the safety of patients in the operating room, the 1962-64 report of the Memorial Sloan-Kettering Cancer Center stated.

Rapid administration of refrigerated blood can cool patients at times to levels where serious effects on heart rhythm have been observed, reported Dr. Henry T. Randall, medical director of Memorial Hospital.

If the blood is warmed by running it through a coil of plastic tubing in water held just above body temperature, serious side effects are almost completely eliminated, he said.

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TECHNOLOGY

Lab Test Processing Speeded by Computers

► COMPUTERS can take over the heavy load of clerical work in hospitals now needed to process patients' laboratory tests.

William J. Constandse, an International Business Machines Corporation engineer, said medical technologists are spending about 30% of their time on routine clerical work. The IBM system, demonstrated at a meeting in Bal Harbour, Fla., eliminates many clerical tasks and also reduces the possibility of errors in reporting.

In most laboratories up to seven hand transcriptions of information are made on numerous forms and sheets before test results are finally entered in the patient's chart, Mr. Constandse told the annual meeting of the College of American Pathologists and the American Society of Clinical Pathologists.

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MEDICINE

Home Medical Remedies Big Help to Physicians

► SELF-MEDICATION, often condemned by the medical profession, actually helps physicians by freeing them from treating minor complaints, a New York Academy of Sciences meeting was told in New York.

It would be physically impossible for the nations doctors to treat the estimated 760 million colds that Americans have each year, much less all the minor burns, bruises and other relatively insignificant ailments, said Dr. Morris Fishbein, editor of Medical World News, who for many years was editor of the Journal of the American Medical Association.

The declining cost of home remedies compared to total medical costs was pointed out by another speaker, Dr. Jules Backman, economics professor at New York University.

Non-prescription medicines, called proprietaries, were responsible for only 4½% of the \$19.4 billion increase in the total cost of medical care between 1939 and 1962, Dr. Backman said.

"In 1929," he stated, "consumers spent for proprietaries an average of 56 cents out of every \$100 of after-tax income; in 1939, 45 cents; and in 1962 only 31 cents."

For a family of four, he said, consumers spent about 50 cents a week in 1962 for home remedies, which was less than the cost of two packages of cigarettes or two gallons of gasoline.

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TECHNOLOGY

Heat Scanner Promising For Volcano Detection

► A SCANNER that detects and measures heat given off from the surface of the earth may indicate when future volcanoes will burst forth with lava and fire.

Using such a scanner, called an infrared radiometer, a team of scientists has already been able to detect heat changes in Hawaii that have correlated with later volcanic eruptions.

The infrared technique is able to pick out details of the earth not evident from surface observation.

Aerial surveys of Hawaiian volcanoes, including Kilauea and Mauna Loa, showed that the scanner picked out irregularities around the volcano sites, difficult to detect by conventional methods.

To aid the scanner in picking up radiation given off by the earth's surface, both infrared and conventional photographic systems were used in the Hawaiian study. These systems were used to determine among other things, the amount of energy absorbed from the sun's rays.

W. A. Fischer and R. M. Moxham of the U.S. Geological Survey in Washington, D.C., F. Polcyn of the University of Michigan, Ann Arbor, and G. H. Landis, Aero Service Corp., Philadelphia, reported the study in Science, 146:733, 1964.

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