

SPACE

OGO Strangest-Looking Object Circling Earth

➤ NONE OF the 476 man-made objects floating around in space is odder-looking than OGO, the Orbiting Geophysical Observatory.

Not something you would want to meet in a dark alley (or orbit), OGO is a veritable porcupine of modules, nodules, flaps, booms and antennas. At the center of it all is a three-foot-square box, six feet long.

When OGO was launched Sept. 4, all of the various booms and things were folded in against the box, extending out only about nine and a half inches from each side. If everything had deployed as planned, the satellite would have measured 59 feet long and 50 feet across.

Included in the porcupine's "quills" are two 22-foot booms that failed to unfold, four 4-foot booms, and one 5-foot directional antenna boom. Even the gas jets that keep the satellite pointed in the right direction are mounted at the ends of two 45-inch booms to give increased leverage.

On opposite sides of OGO are two solar panels, six by seven and one-half feet in size, keeping two banks of nickel-cadmium batteries fully charged.

Even the booms have booms. Omnidirectional transmitting antennas, one VHF and one UHF, are mounted on two of the four-foot booms, to send data from 20 experiments—of which 14 are working—back to earth.

The deployment, or unfolding, of OGO would have been quite a sight to an observer in orbit. The many appendages took less than 60 seconds to unfold, operated by small explosive charges and coiled springs.

• Science News Letter, 86:184 Sept. 19, 1964

DEMOGRAPHY

Teen-Age Increase Brings Added Social Problems

➤ THE RAPID GROWTH of America's teen-age population is bringing with it increased problems in teen-age education, marriage, employment and crime.

In 1960 about 33% of the population was 17 or under; by 1985 that number is expected to reach 40%, the Population Reference Bureau in Washington, D. C., reported. For the past four years the 17 and under group has increased 6.6% a year—four and a half times the rate of the total population growth.

Teen-agers will increase high school enrollment from the 12.7 million expected this fall to 16 million in the fall of 1974.

Along with higher enrollment will come a greater number of dropouts, although the percentage of dropouts is not expected to rise. The Population Reference Bureau estimates that during the 1960's about 7.5 million young people will leave school without graduating.

More and more teen-agers are getting married. In this year's crop of 3.7 million 17-year-olds, 258,000 are already married—12% of the girls and 2% of the boys. More than a third of all the boys and one-fifth of the girls who married at age 17 or

younger are now divorced or separated.

Juvenile delinquency will also be a bigger problem in coming years, simply because there will be more teen-agers around. The FBI reported that 15- to 19-year-olds are the most frequent offenders in burglary, larceny and auto theft cases.

"The teen-age tidal wave of the 1960's is so vast that even though the percentage of problem teen-agers is not increasing, the number in trouble can be expected to grow," said Robert C. Cook, president of the Population Reference Bureau.

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GENERAL SCIENCE

Space Age Accounting To Eliminate Bills

➤ AN "ACCOUNTS PAYABLE" system being used by one of the country's largest aerospace companies is on its way to eliminating bills.

SNAPO, for Swingin' New Accounts Payable Operation, is based on the premise that a purchase order is a contract in itself. This does away with the need for an invoice, since payment is made as soon as a shipment is delivered.

With the new system, Lockheed-California Company, Burbank, Calif., had only \$6 million in incompletely processed invoices at the end of 1963, compared with \$26 million in 1962.

• Science News Letter, 86:184 Sept. 19, 1964

PHYSICS

Lutetium Fissionable, Rate Unexpectedly High

➤ AN ELEMENT so rare most persons have never heard of it, lutetium, has been found to split up, or fission, at a rate 100 times greater than predicted.

The unexpected discovery could lead to a revision of theories about the formation of the universe, since it affects the abundance and distribution of the elements during billions of years.

The probability that lutetium would fission, as uranium does, had been considered so low as to be not worth investigating. However, Prof. J. W. Cobble of Purdue University, Lafayette, Ind., decided to test it with very sensitive techniques only recently available to detect small amounts of radioactivity.

With his co-workers, Prof. Cobble found that fission occurs only in one out of 100 million excited atoms in a sample. This rate is so low that it is swamped by cosmic ray background, radioactive substances in the air and even by spontaneous fission of heavy elements present in trace amounts in building materials.

Prof. Cobble believes that the nuclei of lutetium are always distorted, maintaining a football shape instead of the spherical one of most atomic cores. This permanent football shape accounts for the unexpectedly high fission rate, in Prof. Cobble's opinion.

Lutetium, discovered in 1907, occurs in very small amounts in nearly all minerals containing yttrium. It is a rare earth element of little practical use.

• Science News Letter, 86:184 Sept. 19, 1964

IN SCIEN

GEOPHYSICS

Polar Dust Particles Appear to Be From Space

➤ VOLCANIC EXPLOSIONS can now be ruled out as a cause of the dust particles recovered from the polar ice caps.

The dust particles probably come from space, since they are strikingly unlike dust found around five Pacific volcanoes. Dr. Frances W. Wright of the Smithsonian Astrophysical Observatory, Cambridge, Mass., and Dr. Paul W. Hodge of the University of California, Berkeley, examined both kinds of dust particles.

The greatest chemical difference, they found, is the presence of aluminum in 90% of all volcanic samples, and its absence in 90% of all ice flow samples.

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TECHNOLOGY

Sulfur Foam Application Protects Against Shocks

➤ BUBBLY FOAMS of sulfur are being used to protect objects from shocks and bumps.

Sulfur foam has an advantage over the more commonly used plastic foams in that it needs no curing, allowing it to be applied in the field. The foam, developed by Southwest Research Institute, San Antonio, Texas, is effective in temperatures as high as 230 degrees Fahrenheit.

• Science News Letter, 86:184 Sept. 19, 1964

SPACE TECHNOLOGY

Gemini Delay Should Not Slow Men-on-Moon Shot

➤ ALTHOUGH U. S. HOPES of shooting two men into orbit this year are dead, the Gemini flight delay will not hold up the men-on-the-moon project, a National Aeronautics and Space Administration official said in Washington.

Target dates for various launchings in the program to put Americans on the moon by 1970 are made with the thought in mind that problems are bound to occur, he said.

The two-man Gemini flight, an important step in the Apollo moon project, was delayed until February 1965, after lightning struck a launching complex at Cape Kennedy, Fla.

A critical test flight of an unmanned Gemini capsule, which was to be launched on Oct. 6, has been delayed at least three weeks by the lightning damage to systems in the launch vehicle and ground checkout equipment. This in turn has postponed the three-orbit flight planned in December for astronauts Virgil (Gus) Grissom and John W. Young.

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CE FIELDS

PHARMACOLOGY

Large Penicillin G Dose Fights Infections

► SUCCESS in treating infections resistant to the older penicillins and other antibiotics is now reported with penicillin G.

Virtually complete lack of side effects makes this penicillin advisable as a possible substitute for other commonly used medicines, including streptomycin, a team of physicians from Tufts University School of Medicine, Boston, found.

Quantities ranging from 20 million to 80 million units a day for two to six weeks in the veins of 17 patients resulted in complete control of infection in 13, whose ages were from 12 to 79.

Seven were more than 60 year of age. Several had had surgical operations or had failed to respond to treatment by other antibiotics.

In one dramatic case, all signs of disease disappeared after six weeks of penicillin G treatment.

Penicillin G cannot be considered a panacea, the researchers point out, but it is effective in many types of infection caused by so-called gram-negative bacteria, which usually are resistant to other drugs, they said.

Gram-negative organisms, *Escherichia coli*, *Aerobacter aerogenes*, *Alcaligenes faecalis*, salmonella, shigella and indole-negative *Proteus mirabilis*, were inhibited by penicillin G.

The only adverse effects noted were related to brain irritation and consisted of generalized seizures, appearing in persons with kidney failure or with underlying central nervous system diseases. Reduced dosage appeared to stop the side effects.

Drs. Louis Weinstein, Phillip I. Lerner and William H. Chew, now of the University of Georgia College of Medicine, Augusta, all on the Tufts staff when the research was done, reported their findings in the *New England Journal of Medicine*, 271:525, 1964.

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METALLURGY

Making Metal Tubes Takes New Turn

► A DEVICE that was once used in an attempt to control sun-like reactions is now being used to make metal tubes capable of withstanding temperatures of about 6,000 degrees Fahrenheit.

The device is called "Columbus," and produces the tubes from metals, such as tungsten and molybdenum, that are difficult to form by conventional methods. It makes tungsten tubes cheaper and faster and with greater uniformity, than any other method known.

One of the big problems in working

with these metals is that they are usually powders and cannot be easily poured into a mold after being melted like iron or lead. Instead they have to be squeezed or drawn into shape by a great pinch of some kind.

The Columbus produces this pinch at a pressure of 25 tons or more per square inch by forming an extremely strong magnetic field around the powdered metal, which is housed between a copper jacket and a steel spindle. The magnetic field, created by pushing a million amperes of electricity at 20,000 volts through the copper jacket, lasts for only a few millionths of a second.

After the metal powder is squeezed into shape, the steel spindle is removed from the new metal tube, and the tube is hardened.

Tubes made from such materials are valuable because of their application to rocket research and as fuel elements in nuclear reactors.

The tubes are being produced by Donald J. Sandstrom, metallurgist, and Charles L. Terrell, technician, both with the Los Alamos Scientific Laboratories, N. Mex.

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VITAL STATISTICS

Upsurge Predicted in Continuing Baby Boom

► ALTHOUGH THE U.S. BIRTHRATE has declined since 1957, the baby boom appears to be far from over.

The postwar boom babies will soon be having babies of their own, the Population Reference Bureau in Washington, D. C., reported. The number of children born each year is expected to rise from four million in 1964 to six million by 1975 and 6.5 million by 1980.

If the current trends continue, it is estimated that the U.S. population, now more than 190 million, will total 362 million by the year 2000.

• Science News Letter, 86:185 Sept. 19, 1964

PHYSICS

Ultrahigh Sound Waves Created From Crystals

► SOUNDS almost one million times higher than the human ear can hear have been created in laboratory experiments using man-made crystals only 10- to 100-millionths of an inch thick.

Sound waves with frequencies as high as 9,000 million vibrations a second have been produced by scientists at Westinghouse Research Laboratories in Pittsburgh, Pa. They used cadmium sulfide crystals built up atom by atom from deposits of hot vapor.

The crystals are being used to study the basic structure of such laser rod materials as ruby and sapphire.

Conventional crystals must be formed, and then cemented to the surface of the material being studied. With the new technique, the hot vapor deposits can crystallize directly on the material itself.

Knowledge of crystal structure is important to research not only in crystal lasers, but in microwave and radar systems as well.

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ROENTGENOLOGY

Moving X-Ray Pictures Study Neck Injuries

► X-RAY motion pictures may be used to prevent fakery in claims of neck injury due to "whiplash," or the sudden jerking of the head and neck in an auto collision. Standard X-rays do not always reveal if injury is present.

Cinefluorography is now being used at the University of Pennsylvania's School of Medicine, Philadelphia, to study how a normal neck functions, so that more can be learned about an injured neck, its treatment and what it looks like under X-ray examination.

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MEDICINE

New AMA President Firm On Kerr-Mills Adequacy

► THE NEW PRESIDENT of the American Medical Association, Dr. Donovan F. Ward, is a Dubuque, Iowa, plastic surgeon who stands firm on the adequacy of the Kerr-Mills law rather than any Social Security plan for hospital and medical care of the aged.

His views on this issue are similar to those held by the AMA House of Delegates and by his predecessor, Dr. Norman A. Welch, who died Sept. 3. As president-elect, Dr. Ward automatically took over.

"In Iowa," Dr. Ward told SCIENCE SERVICE, "an aging person may continue to own his own home if he gets financial help under the Kerr-Mills law. The law is well implemented in this state, with no means or pauper test any more than is consistent with requests for loans."

The Kerr-Mills law provides Federal grants matching those of states in medically helping the needy aged. Backers of Medicare, which has now passed the Senate, contend that Medicare is not a rival of the Kerr-Mills law.

They say needy persons, whose income averages \$1,500, the most common figure for eligibility for Kerr-Mills aid to a single man living alone, will continue to require help even if Social Security measures are passed.

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AGRICULTURE

Scientists Receive Award For Root-Rot Study

► TWO PLANT pathologists, Dr. Milton N. Schroth of the University of California, Berkeley, and Dr. Floyd C. Hendrix of the U.S. Department of Agriculture, have been awarded \$1,500 by the American Institute of Biological Sciences for a discovery concerning root-rot in the bean plant.

Drs. Schroth and Hendrix found that both roots and seeds release a liquid containing amino acids and sugars into the soil, and that this stimulates the spores of the fungus causing root-rot. Previously it was believed that the fungus grew through the soil searching for the bean root.

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