

## GEOPHYSICS

# No Danger From Needles

A second launching of tiny metallic needles in space is scheduled, but to avoid misunderstandings, advance notices and discussions should be permitted—By Barbara Tufty

► THE NEXT LAUNCHING of several million tiny metallic needles into the atmosphere will create no significant interference to optical or radio astronomy.

But it could blow up another human storm on earth, stated Dr. S. Fred Singer of the National Weather Satellite Center, U.S. Weather Bureau.

Referring to the tempest of protests that arose from astronomers all over the world and from the International Astronomical Union after the first launching of the Project West Ford needles from California in 1961, Dr. Singer said that the human dissension could be alleviated this time if advance notices and discussions were permitted.

Bitter objections raised by scientists were partly provoked by a very real feeling of frustration at being left out of semi-scientific, semi-military experiments, Dr. Singer told a news conference at the 44th annual American Geophysical Union meeting in Washington, D. C. He believes more opportunities should be given for international scientific discussions on this and other proposed experiments.

The needles are copper dipoles in the shape of fibers about seven-tenths of an inch

long and one-third the thickness of a human hair. Each one weighs about 0.0001 gram, or about 10,000 needles in a gram. In the first launching, by the Massachusetts Institute of Technology's Lincoln Laboratory, Lexington, Mass., for the Air Force Systems Command, about 75 pounds of these dipoles in a "package," about 350 million dipoles, were hurled aloft.

Sent into orbit for the purpose of studying new methods of long-range radio communications, the needles were supposed to disperse from the "package" and scatter out into a narrow band around the earth at a height of about 2,000 miles. Because of a mechanical technicality, the needles never dispersed.

The second "package" of needles, due to be launched in the "near future," will be studied, not for communication, but for purely scientific experimentation "to see what will happen," Dr. Singer said.

If several billion needles would be thrown up, he noted, there could be a danger that the dipole reflectors might interfere with research on such astronomical phenomena as light signals from the stars and radio signals from other celestial objects.

But the proposed number is 350,000 dipoles, the same as last time, and this is not enough to interfere.

If the needles are thrown up into a special orbit at an altitude of 2,000 miles, they would come down in seven years. This zone is a special resonance belt about a hundred miles wide, where two rotations are exactly the same: that of the earth around the sun, and that of the orbit of the belt around the earth.

At this balance of rotations, Dr. Singer said, the reflection of the sun on the needles will push them out of place. It's like pushing a swing, he explained. Push it at the right time, and the swing gains momentum, and goes higher and higher until it could go over.

If the needles do not orbit at this particular height, then they could stay up for a period of time ranging from a few months to 10,000 years. The length of time they remain in orbit would depend on the amount of voltage or electrical charge of the needles.

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Westinghouse

**WEIGHT OF SMOKE**—A measuring instrument so sensitive it can detect the weight difference of two words added to a 30-volume encyclopedia has been developed by Westinghouse Electric Corporation. Here, engineer R. A. Mebner measures the weight of tars and other residue from cigarette smoke.

## Radiation Belt Decreases

► THE ARTIFICIAL RADIATION belt created last summer by a U. S. high altitude nuclear bomb is being "eaten away."

Within six months after the explosion, the number of electrons in the man-made belt decreased to about 15% of the original level, stated Dr. James A. Van Allen of the State University of Iowa, Iowa City.

Electrons are scattering down into the

atmosphere from the bottom, sides and to a lesser extent from the top of the belt, he reported to the 44th annual American Geophysical Union meeting at Washington, D. C.

This radiation belt formerly extended about 2,000 miles into space, with its bottom edge about 200 miles high at a point over South America.

The loss of electrons occurred rapidly during the first two weeks after the explosion, but then slowed down considerably. Particles from the blast, which was called Starfish, may remain in detectable numbers for as long as ten years, Dr. Van Allen said.

Vital data on the electron intensities were gathered by satellites Injun I and Injun III, built at the State University of Iowa for the Office of Naval Research.

"For the first time we have a definite life history of electrons in the inner belt," the physicist stated. This supplies valuable data on how the inner belt is replenished as the electrons "leak out," and what mechanism accelerates the trapped particles to high energies.

Search for naturally occurring electrons with energies of more than one million electron volts must be slowed down, however, so long as the Starfish electrons remain.

Effects of three Soviet high altitude bomb tests in October and November of last year had substantially disappeared within one month, Dr. Van Allen said. The Soviet blasts threw up particles into the earth's magnetic field at much greater altitudes than did the U. S. explosion in July.

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## Clouds Around Venus

► A BLANKET of clouds around the planet Venus keeps surface temperatures there as high as 800 degrees Fahrenheit.

A new answer as to why Venus is so hot comes from Dr. George Ohring of Geophysics Corporation of America, Bedford, Mass.

The extensive cloud cover prevents the planet's long-wave infrared rays from escaping out to space, while permitting sunlight to pass relatively freely down to the surface. Other scientists attribute the high temperatures to atmospheric gases that give a "greenhouse" effect to the planet.

Approximately 73% of the sun's rays falling on Venus are reflected back into space, Dr. Ohring told the 44th annual American Geophysical Union meeting at Washington, D. C. This means that about 27% of the rays remain to heat up the planet's surface and atmosphere. A balance seems to exist between this incoming 27% of solar radiation and the outgoing infrared radiation that escapes into space.

Dr. Ohring said his new mathematical formula calculates the nature and extent of the clouds to give the "greenhouse" effect.

Other calculations show that the planet Venus has a grey atmosphere that constantly absorbs infrared radiation, and that the temperature in this atmosphere decreases with height at a rate of about five degrees Fahrenheit for every thousand feet.

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