

ROCKETS AND MISSILES

Pioneer V Orbits Sun

AMERICA's new planetoid, now hurtling headlong into its around-the-sun orbit, is a triumph for the U. S. space effort. Here is why:

1. The first and third stages burned to within one second of normal; the second stage burned to within one-tenth of a second of normal. The planetoid thus left the earth's orbit at a speed of 36,480 feet per second, only 120 feet per second slower than the speeds scientists were "shooting at."

2. Guidance was built into both of the first and second stages of the three-stage Thor-Able launcher. The second stage guidance was to be used for tricky corrections in the planetoid's complex sun-going path. But the initial guidance was so accurate that the second stage guidance system was not used.

3. The 94-pound planetoid was successfully balanced to have its center of gravity at the right spot to prevent wobbling in space. To locate this center of gravity at just the right spot, all the instruments had to be carefully arranged inside the beach-ball-sized casing. Even the lengths of wire used in its intricate electric system played a significant role in controlling the planetoid's stability.

4. The planetoid will be talking back, upon command from earth, with what is believed the strongest space-going radio ever launched. The 150-watt transmitter is to operate five minutes out of the hour, resting 55 minutes to recharge its batteries with solar cells.

To broadcast on 378 megacycles, the radio

telemetered signals should be received on earth until the planetoid is about 50 million miles away. Scientists at the National Aeronautics and Space Administration say radio contact should be maintained for about 151 days. Radio contact then can cease until the planetoid next comes into broadcasting range of the earth.

The purpose of the new planetoid is to gather new information on the solar corona in an area that has not been "gouged out" by the earth and its magnetic field. Because the planetoid will be circling the sun on a pristine orbit, it should be traveling through a representative sample of "undisturbed" solar corona.

A second purpose of the planetoid is to gather data on high-energy particles in space. By receiving such information from both the new planetoid and earth-circling satellites, scientists can learn more about the movements of such particles as they romp through space.

Pioneer V vital statistics: Launched at Cape Canaveral, Fla., March 11 at sunup so that the rotation of the earth would tend to sling it off into an orbit falling inside that of the earth. Estimated "year" for the planetoid is 311 days. Temperature of its skin may vary hundreds of degrees above and below zero, but instruments inside will be kept at 55 to 80 degrees Fahrenheit due to the way that the skin was painted with black and white paint. Length of its calculated path around the sun is 506 million miles.

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PHYSICS

Krypton Line Makes Meter

A NON-DESTRUCTIBLE standard for the international meter has been proposed and is expected to be accepted by the International Conference on Weights and Measures when it meets in Paris in October.

The new standard will define the meter in terms of the orange-red spectral line of light emitted from excited atoms of krypton 86 (isotope with atomic weight 86). The meter will be 1,650,763.73 times the wavelength of this line.

The suggestion that the meter be based on a wavelength of light is more than 100 years old. Problems delaying its adoption have included finding the most suitable isotope of a usable element and separating a large enough quantity of this isotope for practical use.

At the last meeting of the International Conference on Weights and Measures, in 1954, color lines from four elements were proposed for consideration as a basis for the meter standard: cadmium, krypton 84, xenon 136 and mercury 198. Final judgment was deferred until this year so that physicists from each country could study the pros and cons of the different lines proposed.

Alvin G. McNish of the National Bureau

of Standards said that the general consensus now favors krypton 86 because it can be used at a low, stable temperature easily obtained, and the orange-red line is narrow enough that it can be measured accurately.

The present international meter standard is the distance between two scratches marked on a bar made of platinum and iridium, housed at the International Bureau of Weights and Measures in Sevres, France. It is carefully maintained in an air-conditioned vault.

If the bar should be damaged, lost or destroyed, there would be no primary standard. This is one of the reasons that a non-destructible standard is preferred.

With the new wavelength standard, any laboratory that has the proper equipment can reproduce the primary standard. And the length of the meter can be measured more precisely.

However, the meter bar does not become a useless piece of metal. Mr. McNish said that the unit of the meter will not be changed and "we will still have to have meter bars, rulers and metal surveying tapes.

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ASTRONOMY

U. S. Builds Radio-Telescope in Scotland

SECRETS of the aurora borealis, or Northern Lights, are expected to be probed by a radio-telescope built at Hillhead, about four miles west of Fraserburgh, Scotland, and about 40 miles north of Aberdeen.

The equipment is the second largest steerable radio-telescope to be built in Europe—its saucer is 142 feet in diameter, against Jodrell Bank's 240 feet. It cost \$225,000 to erect, provided by the U. S., through the Stanford Research Institute of California, under a grant from the U. S. Air Force.

The new telescope was built to perform one specific job, and that is expected to be completed in about 12 months. It is "to bounce radio waves off the aurora borealis," to increase our understanding of the Northern Lights and contribute to our knowledge of the ionosphere.

Scientists from Stanford will be operating this telescope, and they will be assisted by a small team from the Royal Radar establishment of the Ministry of Aviation. The Ministry is also providing various other forms of technical assistance and facilities.

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ZOOLOGY

Robins Risk Death Flying Into DDT Areas

WHEN ROBINS nest in the spring they will be menaced where DDT sprays are used to check Dutch elm disease.

Prof. Joseph J. Hickey of the University of Wisconsin department of forestry and wildlife management, and L. Barrie Hunt, a graduate student, have found that a DDT sprayed community is "a trap for birds that migrate into it to nest each year."

Last April through June 69% to 98% fewer nesting robins were found in areas sprayed with DDT for control of Dutch elm disease than in unsprayed areas checked for comparison.

The report states that mist blowing as well as hydraulic spraying resulted in bird mortality, and that while spraying during the trees' dormant season might spare May migrants, it "nevertheless takes a heavy toll of other bird life."

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TECHNOLOGY

USSR Develops Glass of Exceptional Strength

RUSSIAN workers at the experimental department of the factory Avtosteklo (Auto-glass) have developed a strong new material, glassporcelain. It is made from glass by a special heat treatment. This material is intended for manufacturing insulators, window sills, stair steps, and tiles for floors and pipes.

The glassporcelain has very high bending strength, and is resistant to temperatures up to 572 degrees Fahrenheit.

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