SPACE

Orbiting Needles Sighted

➤ THE 400 MILLION copper needles circling the earth have been sighted at Sacramento Peak Observatory, New Mexico, part of Harvard College Observatory in Cambridge, Mass.

Faintly visible to the naked eye, they were observed flying almost overhead near midnight on Monday, May 13, Dr. William Liller of the Harvard College Observatory said. With a brightness of fifth magnitude, they looked like a small comet.

This latest experiment of throwing 50 pounds of copper hairs into orbit for communications research will have no effect on radio astronomy, Dr. Liller said.

The 400 million needles now circling the world in an orbit 2,000 miles high are three-quarters of an inch long, and about one-third finer in diameter than a human hair. They were hurled into space in a package on May 12 for the Air Force by the Lincoln Laboratory of the Massachusetts Institute of Technology.

Each of the dipole fibers is a tiny passive communications satellite. In about a month, the needles are expected to spread out along a circular orbital path, some 40,000 miles in circumference, passing almost directly over the North and South Poles. This narrow band will be used to bounce radio signals back to earth over very long distances. The pressure of sunlight is expected to push the needles out of this band in about five years.

Astronomers and scientists all over the world were given information in advance about the project. Dr. Liller said. Statements, telegrams and cablegrams were sent, even behind the Iron Curtain, he said. After the first unsuccessful Air Force attempt to diffuse needles in the sky in 1961, scientists all over the world voiced their shock and protest. Many erroneously believed that the copper dipoles would interfere with radio and astronomy observations.

This time all reasonable fears have been allayed up to this point, Dr. Liller said. Extreme precautions should be taken with this experiment, he warned, "since there is definitely a certain risk involved when tampering with space through which the astronomers point their telescopes."

• Science News Letter, 83:340 June 1, 1963

AERONAUTICS

Air-Inhaling Wing Flies

See Front Cover

➤ A NEW AERONAUTICAL milestone was established by the U.S. Air Force's Northrop X-21 by achieving laminar flow control over its air-inhaling wing surfaces with measureable reduction in drag.

The aerodynamic phenomenon was achieved over sections of the wings during a flight test of the research airplane at Edwards Air Force Base, California. This is the first time that laminar flow control has been achieved on an airplane wing that approximates the size of those of jet transports, the Air Force and Northrop Corporation, builder of the X-21, reported.

Jack Wells, chief engineering test pilot for Northrop's Norair Division, who flew the X-21, said he could actually feel a reduction in drag as a result of laminar flow. Engine power had to be reduced, he said, in order not to exceed the stabilized test speed when the flight test engineers, Roy Whites and Bob Thomas, turned on the laminar flow control system.

Laminar flow is achieved by inhaling a very thin layer of air through razor-thin slots in the wing surfaces. Suction compressors mounted in pods beneath the wings pull the air through inner-wing ducts and expel it to the rear. This prevents the build-up of high-drag turbulence and decreases the friction drag on the wing surfaces. The net result of this drag elimination will be great increases in range, payload capability and long flight endurance.

The X-21 program is being conducted under contract with the Aeronautical Systems Division of the USAF Systems Command.

The X-21 was built specifically to overcome the technical barriers standing in the way of applying laminar flow control to future aircraft.

• Science News Letter, 83:340 June 1, 1963

PHYSICS

Flow Patterns Seen Inside Drops of Water

➤ MINIATURE liquid currents have been measured inside the tiny sphere of a water drop.

As a drop of water gently moves through mineral oil, trails of a purple particle indicate the flow of liquid inside the sphere.

The potassium permanganate dye, soluble in the water drop and insoluble in the surrounding oil, is trapped at the boundary between the two liquids, Drs. R. H. Magarvey and Juris Kalejs, Acadia University, Canada, reported.

As internal circulation builds up inside the drop of water, the dye particle flows along the boundary to a position above the sphere equator where forces acting on it are in equilibrium, the physicists report in Nature, 198:377, 1963. Thin trails of the purple dye indicate the circulatory flow, and permit measurements of velocities.

Study of velocities of internal flow are vital to solving the 60-year-old meteorological question of whether large water drops falling through the atmosphere break up because of internal circulations.

• Science News Letter, 83:340 June 1, 1963

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GEOLOGY—How thick is the earth's crust under the Great Plains east of the Rocky Mountains? p. 338.

NUTRITION—What are the main constituents of Incaparina? p. 346.

PUBLIC HEALTH—How many established insect pests have developed resistance to pesticides? p. 341.

SOCIOLOGY—How many persons more than 100 years old are there in the United States? p. 339.

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SCIENCE NEWS LETTER

VOL. 83 JUNE 1, 1963 NO. 22

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage. Change of address: Three weeks notice is required. Please state exactly how magazine is addressed. Include postal zone number.

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U.S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member of Audit Bureau of Circulation.