METEOROLOGY

World Joins Tiros Plan

➤ THIRTEEN countries and the crown colony of Hong Kong have so far shown interest in receiving weather information from the orbiting United States satellite, Tiros III. Russia is not among them.

Nor have any other Iron Curtain countries answered the U. S. invitation asking 100 countries to participate in a mutual exchange weather program.

Tiros III is taking pictures of the earth's cloud cover between 48 degrees latitude north and 48 degrees south, or as far north as Newfoundland and northern France and covering all of Africa and Australia, and South America as far as southern Chile.

Since England and The Netherlands are north of latitude 48 degrees they will be able to get only very limited information from Tiros III. However, the United Kingdom will take pictures of radarscopes showing cloud cover from several stations while Tiros passes by, as Japan will also.

The Netherlands plans to make observations from the ground, as do Ireland, France, Australia, Japan and New Zealand, the U. S. Weather Bureau told SCIENCE SERVICE. Japan and Australia will take pictures of the whole sky at one time.

Weather photos from planes at times when Tiros III passes will be made by France, Australia and New Zealand. Australia will also launch cameras in high-flying balloons and make special upper air soundings.

An expanded program of upper air soundings will be undertaken by India, Rhodesia, Chad and British East Africa. Special solar radiation studies will also be carried out by the last country and by Ireland.

Portugal, Brazil and Columbia are interested but have outlined no program yet. The British crown colony of Hong Kong has a fleet of merchant ships that will make special observations when Tiros III passes.

Meteorologists from the invited nations have also been asked to come to the U. S. for a workshop between Nov. 13 and 22. The workshop will consist of lectures discussing all the Tiros satellites, past and future (four more are expected in the series), and what they can do. Samples of information from the already launched Tiros will be distributed, and how to use this information will be studied.

• Science News Letter, 80:146 September 2, 1961

ASTRONOMY

Cometary Space Probe

➤ A SPACE PROBE traveling through the head or tail of a comet in April, 1962, could yield information on the formation and evolution of the solar system.

Dr. P. Swings of the University of Liege, Liege, Belgium, proposed that a far-flying rocket be hurled some 18,000,000 miles into space to investigate the composition of comet Tuttle-Giacobini-Kresak, which makes a "close" approach to earth next April. The probe might even share the orbit of the comet while sending back information by radio, he told the International Symposium on Space Age Astronomy.

Dr. Swings also suggested launching an artificial comet nucleus that would be in a 24-hour orbit, thus remaining visible for long periods of time. A man-made mixture of ice and frozen ammonia and carbon dioxide weighing about a ton could probably last for several days. The addition of meteoritic material to make the artificial comet a more realistic model might change this lifetime.

Such a one-ton artificial comet nucleus in orbit would probably release enough gases to give rise to an observable cometary head, Dr. Swings said. An artificial comet tail would also be formed.

Studies of the man-made comet could yield valuable clues as to the chemical composition of real comets, and thereby clues to the solar system's origin.

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SPACE

Space Telephone by 1962

➤ BY LATE 1962, telephone conversations and telegraph messages will be relayed by way of an "active" communications satellite in a 24-hour orbit 22,300 miles above the earth, if present plans are successful.

The 50-pound experimental space craft will be built by Hughes Aircraft Corporation for the National Aeronautics and Space Administration as part of Project Syncom. When placed in an orbit synchronous with the rotation of the earth, the satellite would move in an elongated "figure eight" pattern 33 degrees north and south of the equator over a given longitude near the east coast of the U. S.

The satellite will be boosted to the 22,300-mile orbit by a three-stage Delta vehicle. Then it will be injected into the desired orbit by an additional solid propellant rocket attached to the space craft.

An "active" communications satellite carries equipment to rebroadcast the messages it receives, whereas "passive" ones act as high-flying "mirrors" from which the messages are bounced back again toward earth.

Two other active satellite projects—Relay of NASA and TSX of American Telephone and Telegraph in cooperation with NASA—will test low-altitude systems at up to 3,000 miles. The Department of Defense, using Project Advent facilities, will participate in Project Syncom by furnishing ground stations and performing communications experiments.

Syncom test results will be made available to communications interests, commercial and governmental, around the world. Early Syncom satellites will not have instruments to handle TV band widths. Frequencies used will be 8,000 megacycles from ground to satellite and 2,000 megacycles from satellite to ground.

The Hughes contract, now under negotiation, calls for at least three flight units at approximately $4,000,000. The program will be managed by NASA's Space Flight Center at Greenbelt, Md.

• Science News Letter, 80:146 September 2, 1961

SPACE

Ranger Satellite Whirls In Unplanned Earth Orbit

➤ THE RANGER I satellite is now whirling through space transmitting information of "questionable" value from an unplanned near-earth orbit far short of its original goal. (See SNL, 80:85, 1961)

The complex satellite, instrumented to probe the mysteries of the cosmic rays and radiation 685,000 miles in space, swung into an orbit from 105 to 312 statute miles above the earth.

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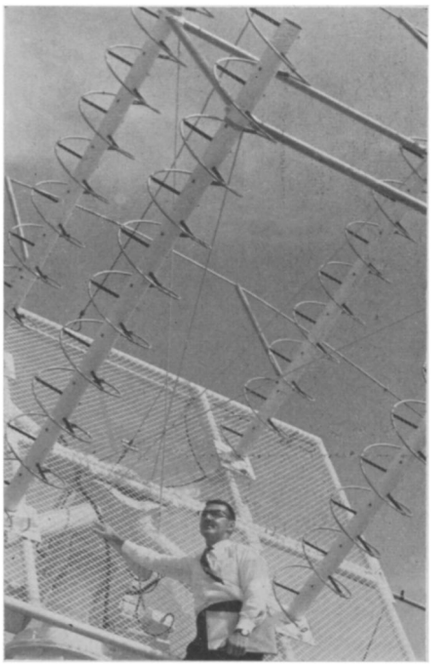

ASTRONAUT TRACKER—Antenna array, built by the Bendix Corporation, New York, is used to find and track the manned Mercury spacecraft, receive telemetered information on 90 channels and maintain two-way voice communication.

GEOPHYSICS

Dates by Magnetism

The magnetism of cooking hearths of past ages gives the dates of ancient events. Changes in the earth's magnetic field are used as a measuring stick.

➤ THE EARTH'S magnetism in the baked earth of cooking hearths of past ages dates human events of prehistory and gives archaeologists a time index, the Tenth Pacific Science Congress in Honolulu was told by Dr. Naotune Watanabe, anthropologist of the University of Tokyo.

Burned clays are permanently magnetized in the direction of the earth's magnetic field in which they were cooled from a high temperature. This can be measured like the deviation of a compass needle. Because the earth's magnetism changes in direction with the years, this effect can be used in dating. Lava flows from ancient volcanoes are affected similarly and the flows can be used to give a calendar of magnetic variations that can be applied to the ancient camp fires of past peoples.

Dr. Watanabe applied to archaeological sites the magnetic method used by geophysicists on lava flows and other igneous rocks. From baked clay samples of various ages in Japan during the past 6,000 years, he determined that the earth's magnetic field seems to have undergone a secular variation within the range of 40 to 60 degrees in inclination and 20 degrees east and 30 degrees west declination for at least that time in that country.

He built standard scale of secular variations for the past 1,700 years, which is based on dated lava flows, and can be used to date archaeological finds.

Studies are now being made to connect the magnetic dating with radiocarbon and other methods of dating the past.

• Science News Letter, 80:147 September 2, 1961

Heat in Antarctica

➤ THE AMOUNT of heat flowing into the Antarctic each year by wind is seven to ten times greater than the amount carried in by water vapor.

The heat transport per year amounts to 2,000 times the electrical energy produced in the United States in 1957, Morton J. Rubin, chief of the U. S. Weather Bureau's polar meteorology research project, told the Pacific Science Congress in Honolulu. His calculations are based on meteorological and glaciological data gathered during and after the International Geophysical Year.

Since water vapor and wind are the only means by which any appreciable amounts of heat are carried into the Antarctic, the sum of the latent heat and the measurable heat gives a good estimate of the heat lost by radiation through the top of the atmosphere. Mr. Rubin's calculation of radiation loss is 15% lower than previous estimates. This energy loss will be measured directly by the Nimbus weather satellite to be launched sometime in 1962.

Mr. Rubin said that, as part of the survey, the first map of the average annual precipitation in Antarctica was drawn, showing it to be about six inches per year.

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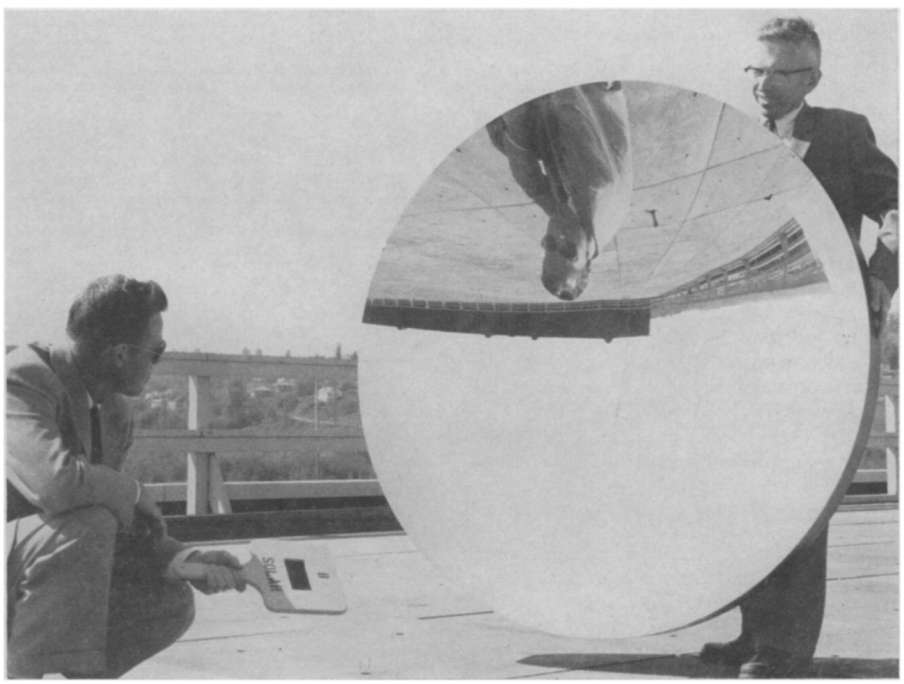

SPACE MIRROR—A prototype solar concentrator, developed by the Boeing Aero-Space Division, Seattle, Wash., may be used to convert the sun's heat to an electric power source for long space flights.

Passage Under Ice Cap

➤ A DEEP PASSAGE buried beneath tons of ice cuts across the Antarctic continent linking the Ross Ice Shelf with the Amundsen Sea.

Lying as much as 7,500 feet below sea level and under 12,000 feet of ice, the passage disappears just short of the Bellingshausen Sea, nearly 1,000 miles away from the Ross Ice Shelf. The passageway was discovered by University of Wisconsin scientists during a traverse across the frozen continent.

Part of the embayment actually veers off and continues toward still unexplored regions of the Antarctic, Dr. Charles R. Bentley, University of Wisconsin geophysicist, told the Pacific Science Congress meeting in Honolulu.

Recent traverses have also pinpointed the exact location of many West Antarctic mountains, the scientist noted.

"New mountains have been discovered and many previously shown on maps have been moved or removed entirely," he said.

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Fish Odor Isolated

➤ CANADIAN SCIENTISTS have isolated a substance that helps give fish their odor.

Dr. Herman Kleerekoper and co-workers at McMaster University separated an amine, an active substance, from the scent of trout. The substance was added to water containing a sea lamprey, causing a sudden burst of activity as the lamprey searched for its prey.

Scent substances given off by fish occur in such small quantities that thousands of gallons of water have to be processed in order to isolate and identify them. This amine, the most active substance, was prepared in crystalline form, Dr. Kleerekoper told the Pacific Science Congress in Honolulu.

The action of the amine on sea lamprey was studied with an automatic recorder in McMaster University laboratories, Hamilton, Ontario, Canada. The Canadian scientist hopes the identification of scent substances will shed light on the relationship between predator and prey, and the role of smell in fish migration and fish schools.

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Effective Shark Repellent

➤ THE MOST effective repellent for sharks is a nigrosine dye that makes the water around a swimmer black and opaque, Dr. Perry W. Gilbert, Cornell University, Ithaca, N. Y., reported.

This method of preventing shark attacks, he told the Tenth Pacific Science Congress