

ASTRONAUTICS

Moon's Air Blown Away

Solar winds have reduced the moon's possible atmosphere by a factor of a billion. The earth's magnetic field protects it from the solar wind.

► THE SOLAR winds that blow energetic particles into the outer Van Allen radiation belt also blow most of the moon's atmosphere into space.

Dr. Robert Jastrow of the National Aeronautics and Space Administration told a symposium on problems in space exploration that the solar wind reduces the moon's possible atmosphere by a factor of a billion. The symposium was sponsored by the National Academy of Sciences-National Research Council, the American Physical Society and NASA.

Dr. Jastrow said that any atmosphere the moon might have would consist of argon produced by the decay of radioactive potassium-40, and small amounts of water, sulfur dioxide and carbon dioxide produced by volcanic activity, if any. The earth's magnetic field protects it from the solar wind, trapping the particles in the outer radiation zone.

Instruments for the lunar probes to measure the moon's magnetic field and any particles that may be trapped by it were described by Dr. J. W. Townsend, also of NASA. He said the space vehicle, a follow-up of the Pioneer launchings that succeeded in putting a tiny man-made satellite into a sun-circling orbit, would weigh about 75 pounds.

Even if this lunar probe does not come very close to the moon, it will carry instruments so sensitive they can map the hydro-magnetic waves in space, giving a chart of

their intensity between the earth and the moon and beyond.

Dr. Townsend also reported on the instruments being planned for the next family of satellites and space probes to be launched within the next two years or so. They include vehicles to measure primarily: the structure of the earth's atmosphere; cosmic rays and energetic particles in space beyond the earth's immediate neighborhood; and the temperature, layers and electrical charges of the ionosphere. An astronomical vehicle with a stabilized observing platform also is planned.

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PUBLIC SAFETY

Three-Fourths of Fallout Caused by Soviet Tests

► SOVIET NUCLEAR bomb tests have been blamed for three-fourths of the strontium-90 fallout that everyone is talking about.

The increases in fallout that have occurred each spring for several years are largely due to Russian tests. These intermediate and high-yield weapons have injected debris into lower and intermediate levels of the stratosphere, Dr. E. A. Martell reports in *Science* (May 1).

Data on the fallout rates over various cities in the north temperate latitudes from 1952 through 1955 plus soil samples in several states have been studied. The striking spring peaks in fallout rate must be

attributed largely to stratospheric debris from Soviet bombs exploded previous winters, Dr. Martell of the Air Force Cambridge Research Center says.

Most fallout reaches the earth through rainfall. Some small amount of dry particles descends with the aid of the pull of gravity, the scientists say, but this amount is negligible.

Therefore, the seasonal distribution of rainfall also limits the strontium-90 distribution. High-yield atomic tests inject debris into the stratosphere where it proceeds to undergo diffusion throughout a broad region of the equatorial stratosphere and subsequently mixes poleward where roughly equal amounts "rain" down on both the Northern and Southern Hemispheres.

Commenting upon other weapon sources of fallout, Dr. Martell points out that middle-latitude detonations create clouds of debris that apparently reach lower stratospheric levels after only limited diffusion. These weapons release all of their contamination into a zone of restricted latitude during the first six months or so.

Detonations that do not exceed 100 to 200 kilotons inject contamination into the troposphere, about the first 40,000 feet of atmosphere. This strontium-90 is widely dispersed and accounts for only a few percent of total fallout to date, Dr. Martell says.

Dr. Willard F. Libby, Atomic Energy Commissioner, has stated that a "tremendous rise" in fallout rate occurred in October, 1958. It was found to be due to the Russian test series in the polar regions.

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GEOPHYSICS

Earth's Core Reported Not to Be Pure Iron

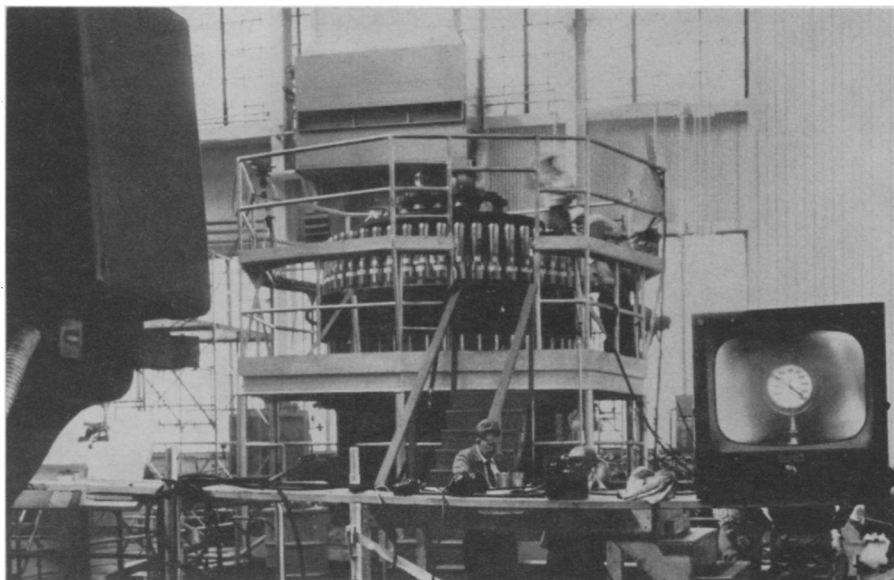
► EARTH'S CORE is not made of pure iron, as many scientists believe, but contains "significant amounts" of lighter weight elements.

Drs. Leon Knopoff and Gordon J. F. MacDonald of the University of California, Los Angeles, said the new make-up for the earth's center is based on Russian measurements of the compressibility of iron and eight other metals at extremely high pressures. They reported to the American Geophysical Union meeting in Washington that the density of iron at the pressure believed to exist at the boundary between the core and the mantle is 11.8. However, the density of the material at the core boundary is estimated to be between 9 and 10.

This difference can only be resolved by assuming that the core is not pure iron, they said, but contains alloying elements of lower atomic number than iron. The rate at which earthquake waves travel through pure iron at the pressure of the earth's core is also significantly different from that observed, indicating the presence of light materials.

A material with a mean atomic number of 23 in the core is consistent with earthquake wave observations and density measurements, Drs. Knopoff and MacDonald concluded.

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GIANT FURNACE—The 105-ton steel vessel that will become the "atomic furnace" for the N.S. Savannah, the world's first nuclear powered merchant ship, is shown at The Babcock & Wilcox Company's works where it successfully completed a hydrostatic pressure test of 3,000 pounds per square inch.