

SPACE

Earth Could Infect Mars

► ONE OF THE SHORTCOMINGS of the Mariner spacecraft which passed by Mars on July 14 was that it got no closer than about 5,700 miles. If the vehicle were actually to land on the planet, however, it could be the cause of irreparable damage.

Bacteria picked up from earth or its atmosphere could conceivably survive the 325 million-mile trip through space and then reproduce and spread on Mars, making it impossible for biologists ever to learn what the planet was like before it was contaminated.

A worse danger is the possible effect of earthly organisms on any native Martian life forms that may exist.

Space scientists have been concerned with the need for sterilization of spacecraft landing on other planets ever since pre-satellite days. In 1960, two years before the first Mercury manned orbital flight, Dr. Charles R. Phillips, a biologist with the Army's Chemical Corps, warned that "sterilization must be maintained at every step of each manufacturing process if we are to prevent forms of earth life from getting to other planets on space vehicles.

Today, one of the chief worriers about these problems is Dr. Lawrence B. Hall, a National Aeronautics and Space Administration biologist with the title of Special Assistant for Planetary Quarantine. Dr. Hall has determined that conditions of deep space do not kill many forms of bacteria.

Before a Voyager Mars fly-by spacecraft ejects a capsule to land on the Martian surface in about 1969, every part will have

spent at least a day sealed in a tank at higher-than-boiling temperatures.

The first estimate of the treatment needed for adequate sterilization by heat was a 24-hour stint at 275 degrees Fahrenheit. Later this was increased to three 36-hour doses at 293 degrees. Heat is not the only technique under consideration. Exposure to ethylene oxide gas is another likely candidate but it is likely that several kinds of treatment will be selected and used together.

Almost every aerospace company today has its contamination officer, and none of those officers will ever be completely satisfied that a given spacecraft is completely free from bacteria and other microorganisms.

"Ordeal by heat" has created new problems for space hardware manufacturers, particularly the makers of electronic equipment such as guidance and communications gear. High temperatures can damage the performance of many kinds of electronic parts, so the engineers have been sent back to the drawing boards to create a whole new heat-proof generation of components.

Even rocket fuel must be sterilized for a planetary landing, and propellants have heat problems of their own. After a few trips to the "torture chamber," or sterilization tank, many solid fuels either come apart or refuse to burn at all.

There are exceptions, however. Aerojet-General Corporation, for example, found that the same propellant that had been used for 15 years in JATO (Jet Assisted

Take Off) rockets for missiles and aircraft, a substance called "Aeroplex," was completely unchanged by heat treating.

A decontamination technique, which has been suggested by some space scientists, is to seal not only the spacecraft but its booster rocket as well in the same cannister. The cannister would be placed in orbit or on a trajectory toward the spacecraft's destination, and opened automatically in space. The vehicle would be launched from within the cannister, having no contact whatever with either earth or its atmosphere from the time it was first sterilized.

• Science News Letter, 88:50 July 24, 1965

SPACE

Sky Elevator Proposed To Link Space to Earth

► AN ELEVATOR to the sky that would link a satellite 22,300 miles in space with earth's surface by a thin wire is the most recent space proposal.

Such a plan, named Project Skyhook, may seem just as "far out" as launching rockets was deemed when the late Dr. Robert H. Goddard experimented with them in the 1920's.

However, studies of the feasibility of Project Skyhook indicate the technology necessary for such an achievement should be possible in the future. The scientists who are proposing the sky-piercing plan calculate that a wire with the necessary properties is only a factor of ten away from reality.

The Skyhook would be built in much the same way that engineers now build suspension bridges, but on a far grander scale. The thin line would be hurled up to 22,300 miles in a satellite, then unreeled to drop down to earth's surface.

After this was accomplished, it could be strengthened with more wire or other material as needed, forming a ladder to the sky. Any number of experiments could be conducted along the Skyhook satellite-earth line, at whatever altitude desired up to 22,300 miles.

At that height, a satellite in orbit stays fixed over the same position on earth's surface, as the Syncom communications satellites do.

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TECHNOLOGY

Test Chamber Simulates Outer Space Conditions

► AN ENVIRONMENTAL test chamber, designed to simulate conditions in outer space has been built to study the British Research Satellite UK3 before it actually goes into orbit sometime in 1966-67.

Two diffusion pumps will produce the test vacuum and a 13,500-gallon storage tank will supply liquid to the system. The sun's radiation will be duplicated by means of six Genarco Solar Radiation simulators.

The UK3 will be used to conduct a series of five experiments at an altitude of 400 miles. The test chamber was built by Robinson Technical Products, Inc., in Hingham, Mass.

• Science News Letter, 88:50 July 24, 1965



Boeing

SIMULATED METEOROID—A pellet traveling as fast as a meteoroid tore through the lineup of aluminum sheets during tests by Boeing Company engineers. Despite damage to the aluminum results favor this material over tougher space age metals.