SPACE

Mars Less Hazardous

➤ LIVING ON MARS will be less hazardous for men than on the moon, one of the Air Force's chief scientists predicted.

Landing on Mars, which has an atmosphere, will be easier than landing on the airless moon. The Martian landing can be aerodynamically controlled, Dr. Hubertus Strughold, chief scientist of the aerospace medical division of the U. S. Air Force School of Aerospace Medicine at Brooks Air Force Base, said.

An occupant of a Martian space station will not have to worry about meteorites or micrometeorites, which Dr. Strughold calls "bullets from outer space." Because of the atmosphere, there is little danger from these on Mars. The Martian atmosphere also provides adequate protection from most harmful radiation, including cosmic rays.

Although the Martian atmosphere offers these protections, an earth visitor will fast conclude that there is really no place like home. Breathing the Martian atmosphere—93.8% nitrogen, 4% argon and 2.2% carbon dioxide, with only traces of oxygen and water vapor—man could sustain useful consciousness only 15 seconds. He will, therefore, have to take his earthly environment with him in a sealed space station.

When leaving the station to explore the Martian surface, he will have to wear a full pressure suit at all times.

Mars has one-third the gravity of the earth. Man will find movement easier than on earth and he may be less tired and require less sleep on Mars than on earth. Martian climate is more extreme than earth's but balmy compared to lunar climate.

The average temperature on the Martian surface is about 70 degrees Fahrenheit below that on earth. In the equatorial regions, summer temperatures may reach 70 degrees but drop to minus 50 degrees Fahrenheit and even lower. So a summer night on Mars is actually more like an Antarctic winter night.

On the moon, temperatures vary from more than 200 degrees Fahrenheit to 240 degrees below zero Fahrenheit.

One danger to which man on Mars will not be exposed is fire. Its nitrogen-laden atmosphere acts as a fire extinguisher. Because of its barometric pressure, "cookouts" on Mars, outside the space station, would be impossible.

In Martian air, water would boil at about 100 degrees Fahrenheit. Under these conditions, Dr. Strughold said, it would be impossible to boil an egg because the temperature required to coagulate protein is around 130 degrees Fahrenheit.

To determine the hazards Martian microorganisms might represent, explorers probably will be preceded by "bio-telescanners" that will scan surface material and telemeter the findings to earth stations.

One of these scanners, the Bio-Courier, has been developed for experimental use under the direction of Dr. William G. Glenn, chief of the immunobiology unit, U. S. Air Force School of Aerospace Medicine. Dr. Glenn has demonstrated that the Bio-Courier can be utilized for epidemiological studies on earth as well as for extraterrestrial analyses.

The Bio-Courier can scan and report a reaction in less than half a second. It will be used in aviation and space flight to take clinical measurements of pilots during actual flight performance, to evaluate the health of the traveler.

Dr. Strughold and Dr. Glenn reported their research to the scientists from all over the world attending the fourth annual lectures on aerospace medicine.

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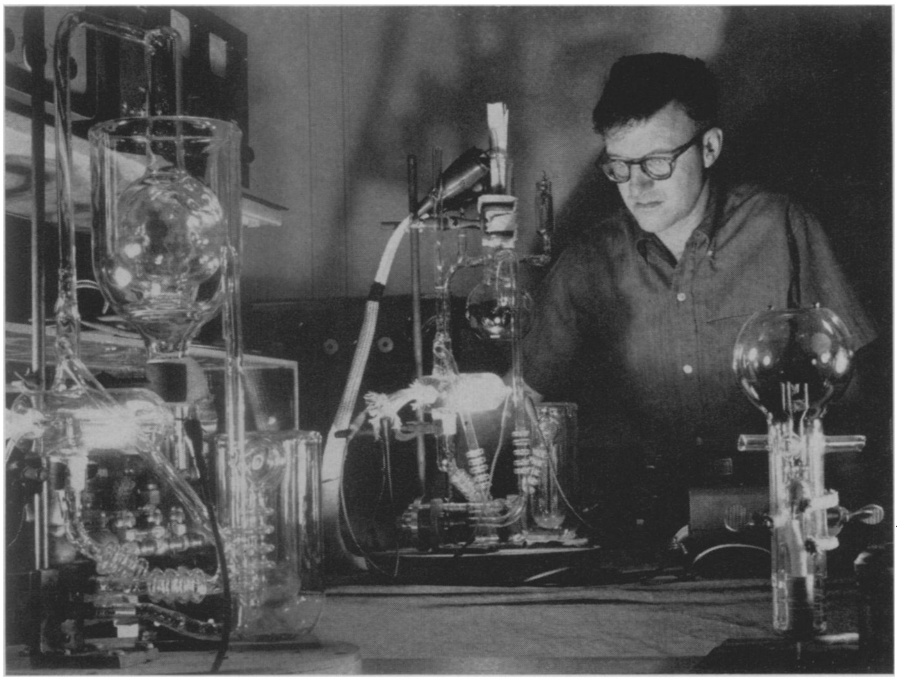

General Electric

VACUUM RESEARCH—Dr. Leon E. St. Pierre of General Electric Company is shown with ultra-high-vacuum research equipment, used in the successful search for new aluminum lubricants, in which chemical reactions which occur in a billionth of a second in ordinary atmosphere can be observed in "slow motion" over a period of many hours.

Space Shield of Water

➤ FOOD, air and water, necessary to sustain man on earth and on space, may be used also to shield him from radiation hazards expected in long-range flight.

Air Force Col. Paul A. Campbell, former commander of the School of Aerospace Medicine at Brooks Air Force Base, Texas, advanced this theory at the fourth annual lectures on aerospace medicine. Col. Campbell said that the atmosphere surrounding earth and protecting it from the radiant energies of space consists mostly of water, the equivalent of a 32-foot column, he estimates. However, half that amount would offer good shielding, Col. Campbell believes.

If an astronaut were traveling through space, a shield of four inches of water "would probably be quite helpful," Col. Campbell said. The same amount of water, if distributed properly, could be used as part of a meteoric bumper shield.

Water, besides providing radiation protection, also could be used, by changing its position, to alter the spacecraft's center of gravity, as well as to reconstitute dehydrated foods and for cleaning. Col. Campbell emphasized, however, that this multiple use of water would have to be reinforced with other materials.

Oxygen in tanks could be placed in position around the spacecraft to offer additional radiation protection. If properly stored, food could also be used for protection against electromagnetic radiation and might also function, like water, as part of the meteoric bumper shield.

If the food were properly placed, it would serve not only as a shelter from radiation storms in space but also the food could be preserved by the radiation.

The billions of dollars spent on earth for space exploration contrasts sharply with the economies in space urged by Col. Campbell. He suggests, for example, that food packaging be designed to give the greatest mass in the least volume. The packaging should either be edible or made from material that could provide radiation shielding or be used for shelter construction on a planet or space station.

Col. Campbell also urges the multiple use of crew members in space. Crewmen should be selected from the various disciplines essential to space exploration. To keep in good physical condition, crew members should get their exercise by doing things that serve a useful purpose. Pumping a hand-driven pump, for instance, could provide electricity as well as exercise.

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