

the reputation of being the greatest Simple Simons of all time."

Dr. Abelson advocated experiments on earth to further simulate the Martian atmosphere and environment. Such tests, he said, might eliminate the need for sending a landing device all the way to the planet. The wide temperature range, for example, said Dr. Abelson, is unfavorable to life as we know it. During one day the temperature can go from a comfortable 80 degrees Fahrenheit down to 60 degrees below zero.

Bacteria Survive Freezing

Some kinds of earthly bacteria, however, have survived and even multiplied during several months of being frozen for 23½ hours every day. One way Martian organisms could adapt to a radical freeze-thaw cycle would be to evolve some kind of internal antifreeze system.

Dr. Abelson argues that there appears to be no more than 0.1% oxygen in the Martian atmosphere. Other scientists, however, note that many earthly bacteria survive without any oxygen at all and that some even find it poisonous.

The first step in the let's-find-out-about-Mars program has already been taken, as indicated by this week's front cover. The photo on the cover shows the enhanced form of the first picture taken by Mariner 4 causing the features to come out more strikingly. It is approximately 12 miles across.

The fantastic Mariner 4 spacecraft crossed 325 million miles of space and sent back a whole series of photographs of the planet, taken from as close as 5,700 miles. It withstood cosmic rays, solar winds, micrometeoroids, and space dust, and collected data about most of them throughout the trip.

However, Mariner could do little to help answer the Big Question. Able to see objects no smaller than about two miles across, Mariner could not even positively identify the famous "canals" that have often been observed to criss-cross the Martian surface.

Mars Atmosphere Thin

One important fact learned by Mariner, however, and one which could have a lot to do with the presence or lack of life, is that the atmosphere of Mars is as thin as that 20 miles above the earth. In addition to reducing the possibility of highly developed life, the rarified atmosphere poses major problems to designers of Mars-landing spacecraft, which are almost certainly limited to the use of retrorockets for soft landings. If the atmosphere were more dense, winged gliders might have provided a lighter, less failure-prone solution.

Is there life on the Red Planet? No one knows. Although many scientists believe otherwise, there is still a possibility. Nothing we have learned about Mars specifically rules out the chance. If there is life, meaning that man is not alone, the consequences will be felt at every level of civilization, from science to philosophy, from family life to religion.

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CHEMISTRY

Cyclobutadiene Made

► AN ORGANIC COMPOUND which other chemists all over the world have been trying to make for at least 60 years has been produced for the first time by Dr. Rowland Pettit, a University of Texas professor of chemistry.

His work represents a solution to one of the classical problems of organic chemistry, according to Dr. William Shive, chairman of the university's chemistry department.

Existence of the compound, cyclobutadiene, has been considered theoretically possible since before the turn of the century and efforts to produce it have been in progress for the last 15 years in leading laboratories, especially in Germany, Britain and the United States.

Repeated failures, however, had led some outstanding chemists to believe production of cyclobutadiene was impossible.

Dr. Pettit's results were published in the *Journal of the American Chemical Society*, July 20, 1965.

Dr. Michael J. S. Dewar, Welch professor of chemistry at the university, said he was especially gratified by Dr. Pettit's results because they lend support to some of Dewar's own theoretical calculations. "It is important as a check on chemical theory. It gives us a better knowledge of how organic compounds behave," he said.

Cyclobutadiene belongs to a large class of compounds which chemists label aromatic, but unlike other aromatic compounds it is

very unstable. Dr. Pettit started work on the problem about a year ago, using iron compounds.

Associated in the work with Dr. Pettit were George Emerson, a post-doctoral student from Austin; Lewis Watts, a graduate student from Oil City, La., and Jimmie Fitzpatrick, a graduate student from Jonesboro, La.

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PUBLIC SAFETY

Yellow Reflecting Tape Marks Construction Area

► YELLOW REFLECTING TAPE is being applied on Michigan highways for temporary markings in construction areas. When applied to a clean, dry pavement, with an adhesive primer, the tape has such lasting qualities that even snow plows have failed to dislodge it.

The adhesive bond can be broken and the tape removed, leaving no confusing marks to distract the motorist, Harold H. Cooper, Michigan State Highway Department traffic division director said in Lansing, Mich.

In the past, paint was used, although it was difficult to remove when the need for temporary marking in no-passing zones ended.

• Science News Letter, 88:75 July 31, 1965



Molybdenum Corporation of America

RARE EARTH PLANT—This roaster complex at the California Rare Earths Plant of Molybdenum Corporation of America is used to roast bastnasite ore from the corporation's huge Mountains Pass Calif., mine, a step in the process for extracting the various rare earth oxides.