

SPACE

Mars Next Space Target

► THE PRIME TARGET for U.S. space exploration during the next 20 years, after man has landed on the moon, should be the planet Mars.

Tied for second to be investigated, following the unmanned Martian probes, are details of the lunar surface and a check-up on Venus.

These were among the major recommendations reported in Washington, D.C., by the Space Science Board of the National Academy of Sciences. They confirmed recommendations made previously by the National Aeronautics and Space Administration's Space Science Board.

The Academy report further listed as priority objects for space exploration the other major planets, comets and asteroids, Mercury, Pluto and interplanetary dust. Mars was ranked first, however, because knowledge about this planet will shed light on three vital questions.

These are "the origin and evolution of the earth, sun and planets; the origin and evolution of life, and the dynamic processes that shape man's terrestrial environment."

The report emphasized that these questions are closely related to the origin of the

universe itself. The report was the first of a series concerning directions for future U.S. space research. It was prepared by a working group of scientists and engineers under the chairmanship of Dr. Gordon J. F. MacDonald of the University of California's Institute of Geophysics and Planetary Physics, Los Angeles.

In making its recommendations, the Academy group searched for the most appropriate and timely scientific questions to be answered, whether or not the problems involved man in space.

In addition to the Mars, Venus and further lunar probes, the Academy team recommended:

1. Launching of an orbiting planetary observatory.

2. Delivery of a simple drop sonde, possibly with an existing rocket, to check on the reportedly high surface temperature of Venus.

3. Immediate development of extremely accurate pointing control for rockets making interplanetary trips.

4. Expansion of deep-space communications sending and receiving capabilities.

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ASTRONOMY

Need More Telescopes

► THE MYSTERY OF how the universe was born could be solved within 15 to 20 years if the United States would spend the \$100 million that one Gemini manned flight costs to build five new 200-inch telescopes instead.

The three or four equals of the famed 200-inch Mt. Palomar instrument that could be built at the \$60 million to \$80 million price tag of one Orbiting Astronomical Observatory would give more information than the satellite on the birth and death of the universe for the same amount of money.

These recommendations were made in New York by Dr. Philip Morrison, physics professor at Massachusetts Institute of Technology. He said such new telescopes would be able to show in less than 20 years whether the universe began with a big bang or is in a steady state, one which has always been and always will be unchanging.

He said an International Cosmological Year would not give the same new information about the universe as scientists had learned about the earth during the International Geophysical Year. Instead, new and daring ideas are needed, and they must be backed up by observations that can be made only with the very largest telescopes.

Dr. Morrison charged that the study now being made to determine the largest telescope it would be feasible to build is merely a delaying tactic. Time available for observations on the 200-inch is obviously

inadequate, and building the new 200-inch telescopes should be started now to alleviate the situation.

He recommended that the new telescopes be operated by a group of universities, as are the large radio telescopes at Green Bank, W. Va., or the giant atom smasher at Brookhaven National Laboratory, Upton, N. Y. Two of the telescopes should be placed in the Southern Hemisphere, he said.

Dr. Morrison was one of the five scientists participating in a day-long session on cosmology held in New York under the sponsorship of the American Institute of Physics and the National Association of Science Writers, Inc., with support from the National Science Foundation.

Dr. Geoffrey Burbidge, physics professor at the University of California at San Diego, La Jolla, Calif., told the same meeting that astronomers at three observatories were now making an active search for "blue-shifted" quasars.

If they are detected, it would mean that quasars are not the brightest and most distant heavenly objects known, but are relatively close to earth and the rest of the solar system, astronomically speaking.

Dr. Burbidge also reported observations indicating that quasars undergo changes in their light output in periods possibly as short as a day and more certainly as short as a week. He called quasars "the most glamorous objects in the sky."

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Questions

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EDUCATION—Why were land-grant colleges founded? p. 121.

ENTOMOLOGY—Why has the Federal Government given its protection to the Bald Eagle? p. 119.

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MEDICINE—What are some of the sources of irritating chemicals which are airborne in our modern cities? p. 120.

SPACE—In what region of the moon did the Soviet's spacecraft land? p. 115.

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