POLAR CAP ON MARS—This photograph shows clearly the southern polar cap on Mars. The white is believed to be a very thin layer of frost, which melts as "summer" there progresses and forms again during colder weather.

Even the scientists who do not agree with Dr. Salisbury's deductions concerning the evidence for life on Mars agree that discovery of life on another planet, or anywhere else in the universe, would be one of the most momentous events of human history.

It would clearly prove that earth is not alone in the cosmos. It would also culminate a long history in which the earth has been moved from the center of the universe to the third planet of the sun; the sun has been moved from the center of the universe to one star among many, and then earth's nearest star has been moved to one corner of a galaxy populated with millions upon millions of stars; and that galaxy is now believed to be only one of untold millions of galaxies in a universe seemingly without end.

Requirements for Life

Dr. Salisbury believes there are five requirements that any potential inhabitants of Mars must satisfy:

1. They must be visible or form visible colonies that cover the ground rather extensively.
2. They must account for the color and the observed color changes, which should take place in response to increases in temperature and atmospheric moisture.
3. They must account for the observed changes in size and shape of the Martian areas—that is, they must migrate or grow with some rapidity, and they should be able to re-emerge from a covering of yellow dust.
4. They must exhibit these various responses within the Martian environment, which is characterized by low temperature and great daily fluctuations in temperature; an extremely thin atmosphere, containing a considerable amount of carbon dioxide but only traces of oxygen or water, and occasionally penetrated by ultraviolet light.
5. They must conform to certain fundamental principles of ecology, such as the cycling of elements.

Dr. Salisbury notes that it is easier to modify higher plants mentally so that they will meet the criteria than it is to make the often discussed lichens meet these criteria. He suggests that a thin organ, such as a leaf, would offer the needed broad, flat surface to sunlight during the day.

At night, the leaf might roll into a small cylinder. A change of color, toward white, at night would also help cut down loss of heat by radiation during nighttime.

Fast warming during the day would be accelerated by pigment systems that tended to make the organism an efficient blackbody absorber.

Dr. Salisbury concludes that the basic shape of the leaf of a higher plant seems suited to conditions on Mars, but that earth dwellers "should be prepared to encounter some interesting surprises in biochemistry."

He urges that, in view of the evidence, "we should at least try to keep our minds open so that we could survive the initial shock of encountering" any life forms Mars might possibly possess.

• Science News Letter, 81:378 June 16, 1962

ASTROPHYSICS

Network Planned to Help Spot Fallen Meteorites

➤ A NETWORK in seven Midwestern states to locate meteorites quickly after they fall is being established by the Smithsonian Astrophysical Observatory.

Freshly fallen meteorites are invaluable to scientists, since they are the only solid material reaching earth from interplanetary space. They are especially valuable for determining their ages from their radioactivity and as a possible clue to life beyond earth.

Museum specimens are usually contaminated from having been on the earth's surface for some time.

The Smithsonian Astrophysical Observatory in Cambridge, Mass., is therefore setting up a network of 16 observing stations, which will scan a total possible recovery area of about two and a half billion acres. Each of 16 locations will have a four-windowed shelter to house four cameras aimed north, south, east and west.

Each camera will operate automatically from sunset to sunrise, taking pictures of the sky on Tri-X Pan film.

Stars as faint as magnitude eight will register, but fast-moving meteors must be of zero magnitude or brighter (considerably more brilliant than any of the stars in the Big Dipper) to be recorded. All film will be studied in Cambridge.

Those meteors brighter than the planet Venus will be analyzed for the possibility that they may have fallen to earth and be recoverable.

Most of the spotting stations are in flat areas, relatively stone-free, and far from brightly lighted cities. Combined population of the 16 towns is 19,000. Each station will be checked daily by a local assistant. About twice a month, workers from field headquarters in Lincoln, Nebr., will visit the sites to pick up film for processing, scanning and transmitting to Cambridge.

Quick recovery search trips will be made whenever a fall is indicated. Dr. Richard McCrosky is director of the project, it is reported in Sky and Telescope, 23:303, 1962.

The 16 sites are at Havana, Ill.; Milan and Vienna, Mo.; Vinton and Maple River, Iowa; Liberty, Alma, Neligh and Mullen, Nebr.; Farlinville, Goessel and Kalvesta, Kans.; Ward and Lower Brule, S. D.; and Cederdale and Hominy, Okla.

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ASTRONOMY

Computer Calculates B.C. Positions of Planets

➤ THE POSITIONS of the planets, the moon and the sun from 601 B.C. to 1 A.D. have been calculated using an electronic "brain," or computer.

The astronomical tables are expected to provide scholars with new insight in the study of ancient civilizations. Dr. Bryant Tuckerman, a mathematician with the International Business Machines Corporation, began the work while at the Institute for Advanced Study, Princeton, N. J., and continued it under IBM.

Dr. O. Neugebauer of Brown University, Providence, R. I., has worked with astronomical predictions from the pre-Christian era. Even before publication, the tables were used in dating and piecing together fragments of Babylonian clay tablets containing ancient astronomical records.

The analysis and computer programs for constructing the planetary, lunar and solar positions were based on modern mathematical theories describing the motions of the planets, together with improvements based on ancient observations. The theories are the mathematically derived results of applying Newton's laws of motion to the interactions of the bodies in the solar system. Past comparisons have shown good agreement with previously available ancient observations.

The tables of positions at five-day and ten-day intervals are available from the American Philosophical Society in Philadelphia.

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ASTRONOMY

Moon, Mars, Venus Aim of Balloon Flights

➤ THREE U.S. AIR FORCE balloon flights before the end of the year will tell more about the moon, Mars and Venus. Flight Star Gazer will have a human observer with a telescope.

Flight Sky Top will carry instruments to measure the moon's temperature in the infrared, while Balast is scheduled to analyze instrumentally the atmosphere of Venus. The balloon will rise 85,000 to 120,000 feet.

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