

A puzzling terrain

Regardless of the space pace picked by President Nixon to get a man to Mars, the red planet has lately shown itself as a strong center of interest.

Scientists analyzing data from the Mariner 6 and 7 probes, which flew by Mars in July, are just beginning to understand the implications of their data, including evidence of terrain unlike anything on either earth or the moon.

And a meeting of scientists last week to begin planning experiments for the unmanned Viking Mars landing capsule in 1973 drew such a crowd—300 instead of the expected 100 or 150—that Dr. John E. Naugle, in charge of space science for NASA, commented, "I was afraid we might have our own Woodstock."

The Mariner scientists were particularly elated. Mariner 4 in 1965 had indicated that the planet was covered with vast fields of craters, surprisingly, in fact, like earth's own moon. This year's two probes, however, have shown some more puzzling types of terrain.

One is a sort of huge, apparently featureless plain, with no visible craters, mountain ridges or anything else. A Mariner 7 photo showed one such area, covering an expanse of more than 1,200 miles, with nothing at all visible on the surface down to the camera's resolution of 1,000 feet.

Since it is almost inconceivable that such a broad area would remain free from even large meteor impacts, says Dr. Robert P. Sharp of California Institute of Technology, a possible explanation might be that some unknown process is erasing them. Perhaps, he suggests, the featureless plains are covered with a fine material—"some sort of micro-popcorn," he says—that is easily redistributed over large areas.

Even more unusual is a vast expanse of jumbled, chaotic terrain rich in short mountain ranges, little valleys, crags, escarpments and other features. No such areas have ever been seen on the moon, and the closest ones on earth—the slump areas found around landslides and volcanoes—are but tiny specks by comparison.

Most intriguing in the past to Mars researchers has been the possibility that the planet, far more hospitable than hot, high-pressure Venus, might harbor some form of life. The twin Mariners measured daytime temperatures from 62 degrees F. down to minus 63 degrees F. and nighttime readings down to a still conceivably life-supporting minus 153 degrees F. But the planet's thin atmosphere is less inviting.

In the first analysis of the data following the dual flyby, Dr. George C.

Pimentel thought he saw, in the readings from the vehicles' infrared spectrometers, traces of ammonia and methane gas (SN: 8/16, p. 129). These gases, produced on earth in part as by-products of organic decay by bacteria, could mean that Mars might be a fit place for some sorts of microorganisms to live. Dr. Pimentel later found, however, when trying to reproduce the spectra with gas mixtures made in his laboratory, that the supposedly momentous spectra were actually previously unknown spectra of solid carbon dioxide, possibly, he surmises, from a fine CO₂ hoarfrost newly formed on the ground.

The all-important component thus conspicuously amiss from the Martian atmosphere was still nitrogen—Dr. Pimentel's erroneous observation of ammonia, NH₃, would have supplied it.

"At this point," says Dr. Charles A. Barth of the University of Colorado, who looked long and hard at ultraviolet spectra but found only CO₂ and its photodissociation products, "I think we can say that there are no other major constituents." He concedes, however, that Mars could have as much as a few percent of nitrogen without its showing up in the ultraviolet spectra. "Earth would be like that if it had no oceans," he says.

In general, says Dr. Norman Horowitz of California Institute of Technology, the results certainly don't encourage life on Mars, although they don't exclude it. Dr. Carl Sagan of Cornell points out, in fact, that there could actually be a Martian civilization, complete with recognizable structures, and it could go undetected by the 1,000-foot resolution of the Mariner TV cameras. "You couldn't detect life on earth with that resolution," he says. ◇

DRUG ABUSE

A search for definitions

The functions of the Bureau of Narcotics of the Treasury Department and the Bureau of Drug Abuse Control of the Department of Health, Education and Welfare were consolidated in April 1968. The new agency—the Bureau of Narcotics and Dangerous Drugs—was assigned to the Justice Department.

Last week the first conference under the new department met to decide on methods for determining just how dangerous various drugs are. But although separate workshops were held on narcotics and analgesics, sedatives and hypnotics, stimulants and hallucinogens, the conference members, representing industry and Government as well as the

academic world, couldn't get past the problem of defining what makes a drug potentially an abuse problem.

A working definition of drug abuse, the main topic of the three-day conference, was never established. Drug abuse potential, said Dr. William Martin, director of the Federal Addiction Research Center at Lexington, Ky., "is defined by social attitudes. Personality characteristics of the abusers, values and dependence of the individuals using the drug are involved in the definition." And Dr. Jerome Jaffee of the University of Chicago Medical School felt that the term drug abuse is not and cannot be part of the scientific vocabulary. Finally, Dr. David Tedeschi of Geigy Pharmaceuticals suggested that another conference be held with more representation from psychologists and sociologists to discuss and define the question.

The scientists among the conferees, however, were uniformly disturbed over pending drug abuse legislation, introduced by the Nixon Administration as if the still-hanging questions had been answered.

"The problem of legislation," said Dr. Theresa Harwood, coordinating chairman of the conference, "kept rearing its ugly head."

Dr. Carl Pfeiffer of the New Jersey Neuropsychiatric Institute tried unsuccessfully to get the group on record against the proposed bill, which imposes even stricter penalties than at present for possession of drugs.

Others had specific complaints, including the way the bill categorizes drugs with corresponding penalties. "Some scientists," said Dr. Walter A. Pieper of Emory University, "are concerned about the severe penalties for possession of drugs that aren't all that harmful."

For example, marijuana, whose physiological effects are still largely unknown, is lumped together with drugs like heroin, and possession of them would be punishable by a minimum of five years in prison or a fine of \$25,000, with no suspension and no probation. It was felt that another category should be created to include compounds such as marijuana and peyote.

Dr. Jaffee also expressed his concern over the fact that Governmental regulatory procedures seize upon one drug. Very often the drugs under discussion have not been sufficiently investigated as to their medical uses, and the classification of the drugs by the Government is premature, he says.

The conferees also unanimously objected to the new and more complicated procedures required by the bill—including approval by the Secretary of Health, Education and Welfare and the Attorney General—before a new compound could be used in animal experiments. ◇