

Martians, Mars itself, he says, may be in a pre-biotic state, perhaps with molecules as complex as DNA surviving on the surface. The idea, Oyama admits, takes him "way out on a limb," but if future studies prove him correct, the discovery could overturn accepted theories of the origins of life on earth.

Conventional wisdom, Oyama says, has it that life on earth began in the oceans, with a pre-biotic soup of nucleotides and amino acids combining to form DNA and proteins. Oyama, however, believes that DNA formed during an earlier dry period—"the cosmologists are willing to give me 100,000 years," he says—before the primordial oceans even appeared.

The hypothesis begins with carbon suboxide (C_3O_2), which plays a major role in Oyama's explanation of the Viking biology results. Past studies cited in the chemical literature, according to Oyama, suggest that carbon suboxide can combine with ammonia and carbon dioxide to form ring-shaped molecules similar to precursors of DNA components known as pyrimidines and purines. All of the pyrimidines and purines, he maintains, can be formed from these reactants—which he believes are or have been available on Mars—under Martian temperatures and the Martian solar-wind environment. Another important DNA component, sugar, comes, Oyama says, from the polymeric form of the carbon suboxide, hydroxylated by performate (which is formed in the atmosphere from CO , CO_2 and water under the sun's ultraviolet radiation).

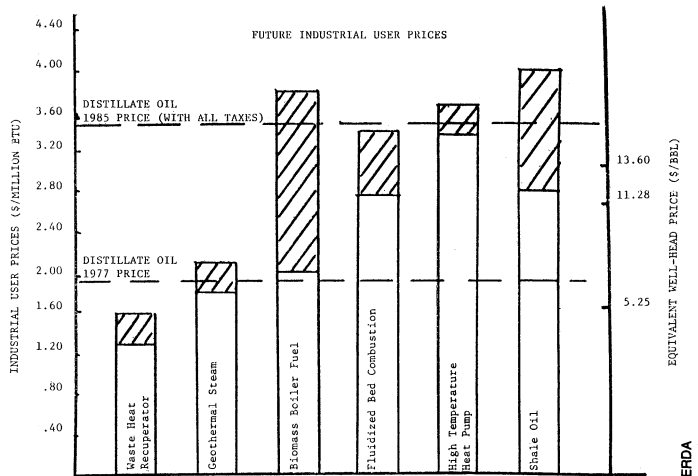
Oyama proposes that the ammonia was released into the Martian atmosphere from the breakup, during entry, of carbonaceous chondrite meteorites. The same source, he says, could have provided necessary phosphorus in a form that could combine with the precursors to link the DNA "subunits" together.

It is not possible to tell at present just where Mars stands in this complex process. The Viking lander instruments, Oyama points out, could not distinguish DNA molecules—only their components—and could miss even those if the amounts are small or irregularly distributed. Furthermore, the planet may be prevented by a variety of factors from advancing further toward the development of life. Future missions could seek DNA, however, and the idea that it could have formed "dry" would be revolutionary.

This is admittedly rather sensational stuff to have developed from such a young hypothesis, particularly one with so many unknowns. Its potential import is not too far out of scale, however, with possibilities envisioned by various researchers before the Vikings ever got to Mars. In a way, says Oyama, more stands to be learned about life's origins from the lack of Martians than from their presence. "Life," he says, "would gobble up its ancestral beginnings." □

Carter on energy: The R&D impact

New energy technologies would become economically feasible under Carter program.



President Carter's recently announced energy program would not only change the kinds of fuel Americans use and the way they use them but also shift substantially the emphasis of research and development aimed at providing energy for the future. If Congress approves, Carter's program would raise the price of oil enough to make several new technologies economically competitive (see chart) and would provide new R&D funds to speed these technologies on their way to market.

Robert Fri, the acting administrator of the Energy Research and Development Administration, announced the following changes in energy R&D funding that would be brought about by the President's energy strategy. The figures represent proposed changes in outlays between the fiscal 1978 budget announced in February (SN: 3/5/77, p. 150) and those resulting from the energy message:

- Conservation, \$4.5 million (1.8 percent) increase. ERDA would work with private industry to accelerate introduction of gas-fired heat pumps into the market and save the waste heat from ERDA facilities for commercial and residential use.

- Breeder reactor, \$62 million (9.5 percent) decrease. Construction of the Clinch River prototype breeder would be deferred indefinitely, but the experimental Fast Flux Test Facility would be completed.

- Solar, \$10 million (4 percent) increase. The increase would go to expanding engineering design efforts in photovoltaic systems and for acceleration of solar energy as power for space cooling.

- Thorium fuel cycle, \$12.5 million (625 percent) increase. Breeder reactors that convert thorium to uranium are considered less of a threat to nuclear proliferation than those that convert uranium to plutonium, which can be used in bombs.

- Uranium enrichment facilities, \$91 million (6.5 percent) decrease. The decrease reflects cancellation of a proposed gaseous diffusion plant in favor of a new gas centrifuge enrichment plant, which

should cost less and use less power.

- Fossil energy, \$12 million (2.3 percent) increase. The extra funds would provide for the design of a solvent-refined coal demonstration plant and early development of eastern gas shales, which may be competitive by 1985 if prices rise.

Fri said that other major shifts of emphasis may follow in fiscal 1979, when the results are known from a current study on the effects of carbon dioxide on climate. Some scientists fear that CO_2 buildup would increase the "greenhouse effect" of the atmosphere, heating the earth and even perhaps melting the polar ice caps. Since increased coal burning would result in more generation of CO_2 , this study may bring about a decision to limit the expansion of coal-fired plants. Fri says this "could be to fossil fuel what proliferation was to the breeder." □

Sexes equal in alcohol, drug use

In a scene from the new Norman Lear sitcom, "All That Glitters," the harried female executive tries to relax with a scotch and water while her male secretary gazes lovingly at her, hoping she'll ask for a date. Role transformations may not have reached that stage in real life, but it appears as though at least the alcohol aspect is close to reality.

The results of a survey of nearly 2,000 high school students in central New Jersey indicate that females may have finally caught up to males in alcohol and drug use. But according to the survey, few of the youngsters consume excessively. Researchers at Rutgers University's Center of Alcohol Studies, who conducted the study, attribute much of the "catch up" phenomenon to the movement toward equalizing male-female roles. And the trend among adults appears to be mirrored in high school youths, says Rutgers's Robert Pandina, the study's principal investigator. "There are less constraints on