The problems of air pollution from the automobile may be nearly insolvable. Environmentalists suggest that although efforts to solve them should continue, a far broader approach may be necessary. The broader approach: largely do away with the automobile in urban areas (while recognizing its cross-country, small town and rural appropriateness). A truly inclusive systems analysis of the urban effects of the automobile—social and demographic, as well as ecological—would show, the environmentalists say, that it is an increasingly destructive machine.

They say it takes no elaborate behavioral study to demonstrate, for instance, that driving in modern urban traffic increases the already heavy load of human hostility. The garish commercial strips that have grown up in suburbia since World War II are an obvious product of the automobile—as is the urban sprawl which denies many human beings, especially the poor, the elderly and children, any real sense of community (SN: 3/20/71, p. 198). Freeways, cutting either through the urban ghetto or through green countryside, are another liability.

Some more subtle liabilities might be turned up by a behavioral study of automobile company advertising, which may encourage hostility with its image of aggressive manhood (and which, circularly, defines the "driveability" factor the auto executive mentioned so frequently). In an aside at the hearings, one auto executive cynically asked, in reply to such arguments, "Should we go back to the horse?" Environmentalists retorted that the technology for public transport is available and that EPA might find fruitful an alliance with the Urban Mass Transit Administration—along the lines of EPA's recent entente with the Army Corps of Engineers to solve water pollution problems.

If this should be EPA's course of action, the ambient air standards, not the emission standards, will be the lever. EPA Administrator William D. Ruckelshaus said two weeks ago that he means to enforce the ambient air standards. □

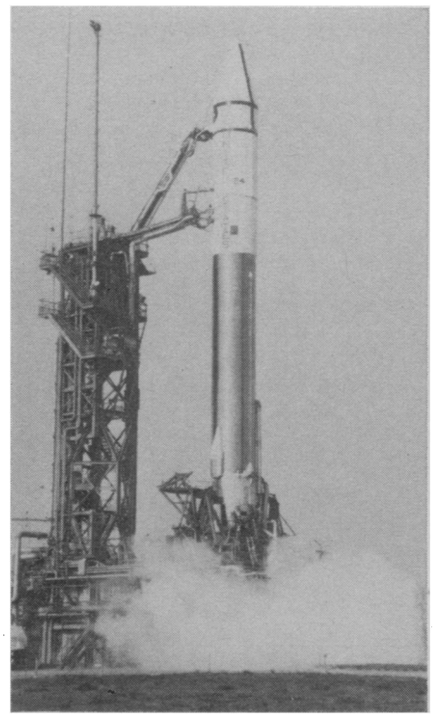
MARS ORBITER LOST

. . . then there was one

"We are GO for the planet Mars," boomed the loud speakers moments before the Atlas-Centaur rocketing the first Mars orbiter lit up the Florida night sky with a spectacular pink glow. All appeared normal up to four and a half minutes into the launch. Suddenly the signals being displayed on the flight control screens showed the vehicle deviating from the proper attitude. "It appears we have a problem with the telemetry." A few minutes later all signals stopped. Eleven minutes after the launch a hushed audience was told "the Mars mission has not succeeded."

Two hours of poring over yards of data narrowed the point of failure to the electronics in the pitch channel of the Centaur's autopilot. (The Atlas stage had already shut down.) Failure occurred in a component in the electronics between the rate gyro and the amplifier. The rate gyro senses the motions of the Centaur and relays the information to the amplifier which in turn signals the engines to fire in a certain direction to compensate for the motions. Since the signals were not being sent, the oscillations built up, Mariner H began tumbling out of control, and the Centaur engines shut down. The Mars orbiter reentered the atmosphere 900 miles down range and plunged into the ocean about 250 miles north of Puerto Rico.

The loss of the $77 million Mariner H, the first attempt to place a spacecraft in orbit around another planet, was the second failure of a high-priority unmanned science mission in six months. The destruction of the $97 million Orbiting Astronomical Observatory in November was also due to an Atlas-Centaur failure (SN: 12/5/70, p. 427).



NASA

The felled Mariner H before launch.

But the greater loss was of the knowledge that might have been gained by having two spacecraft orbiting Mars at the same time in different orbits.

Originally the Mariner Mars '71 program envisioned two craft, both with the same mission. The second craft would be a back-up in case of failure. Through the years, however, "we tended to get caught up in the program," says Robert S. Kraemer, director of planetary programs at the National Aeronautics and Space Administration headquarters. The two identical missions evolved into separate ones as a way to get the most science from two craft (SN: 9/12/70, p. 227). Mariner H was to orbit Mars every 12 hours mapping 70 percent of the planet. Its orbit of 750 by 10,000 miles would have had an inclination of 80 degrees to the Martian equator. Meanwhile, an identical spacecraft with an identical science package, Mariner I, would be orbiting the planet at 530 by 20,500 miles every 20 and a half hours. This would have allowed the two television cameras and three sensing experiments to record repeatedly selected areas of Mars in order to observe seasonal changes such as the "wave of darkening," dust storms and other surface and atmospheric variations.

"To say we are a bit disappointed is an understatement," said Kraemer after the Mariner H failure.

But all is not lost. If the problem is not inherent to the Centaur's autopilot, Mariner I will be launched to Mars no earlier than May 20, although a launch is still possible until June 3. The spacecraft, then to be called Mariner 8, will travel 287 million miles to a target spot of only 435 square miles, where it will go into orbit around Mars. Scientists and engineers have until November to decide the best orbit and inclination. Some optimistic engineers predict that 70 percent of both A and B mission objectives can be accomplished.

The two top priorities for Mariner 8, however, will be to map the planet and find at least two "nice, low, warm, damp spots," for the Viking Mars craft to land in 1976. Such spots would be the most likely to have life forms if any life does exist on Mars. "The probability of finding life as we define it on earth, however, is small," emphasizes Earl W. Glahn, program manager at NASA headquarters.

This week as the second spacecraft was being mated to another Atlas-Centaur, the Mars '71 program was in high gear. At the Lewis Research Center in Cleveland where the Atlas-Centaur is managed, Director Bruce T. Lundin appointed two investigative teams—one to examine and simulate the failure of H and the second to determine a remedy, if needed, for Mariner I. And at the Jet Propulsion Laboratory in Pasadena, the managers of the Mariner missions were looking at the alternatives for the remaining orbiter.

While NASA was looking at ways to

compensate for the loss, more basic questions involving the nature and future of the unmanned missions were being raised.

Only one spacecraft, not two, is being built for the Mariner Mercury-Venus flybys in 1973. This is largely due to financial limitations, although recommendations to NASA have been made that duplicate missions not be pursued unless the two craft perform different functions.

The other alternative to insuring success of a given mission would be to build the unmanned spacecraft as delicately as manned spacecraft are built —with redundant systems in case of failure. In space jargon this is called "man-rating" a vehicle. In addition to larger boosters needed for the weight of duplicate systems, however, such a procedure requires much more time and money. "Whether this is a wise thing to do," says Dr. James C. Fletcher, the new Administrator for NASA, "involves making a trade-off between that and the money that you lose from a failure." Mariners 1 and 3 failed as did two of the seven Surveyors. All five lunar orbiters, however, were successful. □

When the manned space shuttle is built, it would carry craft such as the Mars orbiter to earth orbit where the craft would then propel itself on to the planets. Unmanned launch failures might then be a thing of the past.

NSF BUDGET

RANN gets rundown

The National Science Foundation's proposed budget for fiscal 1972 not only provided more total funds for the agency but also called for a certain shift in priorities (SN: 2/6/71, p. 94). Apparently in response to a growing body of opinion that scientific research should be directed toward solution of current social, environmental and health problems, NSF proposed a substantial increase in its support of applied research projects. The increase came at the expense of direct student and postdoctoral support and institutional science programs.

The total budgeted for national and special research programs, $166.6 million, was double the 1971 amount. Of this, $81 million came under the heading of Research Applied to National Needs (RANN), the Foundation's new program for the funding of applied research in such fields as earthquake engineering, enzyme technology, energy resources and weather modification. At the same time, institutional support for science was cut from $34.5 million to $12 million and science education support, including student fellowships and traineeships, was cut from $100.6 million to $77.3 million.

The House Committee on Science and Astronautics, the first of the four Congressional committees that must screen the NSF budget, has now rearranged the priorities, shifting some budgetary support back to educational and institutional grants. The over-all budget total of $622 million remains unchanged, but the committee has cut RANN to the tune of $30.6 million and shaved off $11.7 million worth of scientific research project support. The money was redistributed, with an additional $22 million for science education support, $16.8 million for institutional support for science and $3.5 million for specialized research facilities and equipment.

There were two basic reasons for the shuffle in funds. On the one hand, the committee apparently felt that, for an experimental program, RANN was expanding too rapidly. Dr. Philip Handler, president of the National Academy of Sciences and a member of the National Science Board, told the committee during hearings that he viewed RANN as "a large experiment," and contended that its predecessor, Interdisciplinary Research Relevant to Problems of Society (IRRPOS) had been none too successful. "Today, one cannot make any great claims that it has really solved a major problem which is pressing on our society."

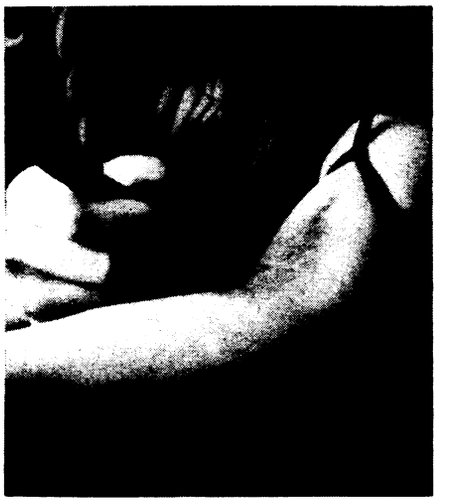
On the other hand, there was a great deal of dissatisfaction with the cuts in educational support. Congressmen had received numerous complaints from the educational community and the general public. In fact, one committee spokesman said practically everyone was unhappy with the NSF budget. "The only one satisfied with it was the NSF."

In making its budget proposal NSF emphasized the importance of increasing the understanding of society's problems and played down the educational and institutional cuts. The reallocation in funds, the agency argued, would not really result in an actual reduction in expenditures for science education and institutional programs. The increase in research projects would, according to NSF head Dr. William D. McElroy, "provide for the training of many science and engineering graduate students through employment on research projects." In addition, he said, NSF research programs would be conducted primarily through colleges and universities.

From the committee's point of view, there was also a question of labeling and of maintaining Congressional control over expenditures. Though the NSF plan would probably provide some support for students, there was no real assurance of how much. "It's hard for Congress to control how money is spent unless it's labeled properly," explained a committee spokesman. □

HEROIN ADDICTION

Finding partial solutions



Dept. of Justice

Complete withdrawal won't be easy.

The horrors of heroin addiction are becoming increasingly evident as the problem takes on epidemic proportions in its rapid spread throughout the United States. Formerly clean cities in the Southeast and Midwest and affluent suburbs everywhere are feeling the effects. Dr. Bertram S. Brown, director of the National Institute of Mental Health, told a Senate subcommittee on narcotics last week that there are not 125,000 but 250,000 heroin addicts in the country. Some experts even double this figure.

The physical and psychological effects of addiction and the cost of supporting the habit make the heroin problem even more severe than other forms of drug abuse. The user becomes hooked. He develops a tolerance to the junk and needs increasing amounts until the drug becomes the center of his life. Apathy and reduction of hunger physically deplete him, and pneumonia, tuberculosis and venereal disease are easily contracted. Bad drugs or unsterile needles cause hepatitis and other blood infections. In 1969 in New York City 900 people died of overdoses of heroin. Of these, 200 were teenagers.

Psychologically the junkie is worthless to himself and to society. He can't stay in school or hold down a job. Preoccupation with obtaining drugs keeps him in constant trouble with his family and the law. New York City addicts had to steal $10 billion last year to support their habits.

This personal and sociological decay lend urgency to the problem and have forced authorities into half-way solutions. Of these, methadone treatment is the most successful (SN: 4/12/69, p. 364). Methadone, an inexpensive synthetic material similar to heroin, is used to help addicts detoxify.