

Environment, autos and the public

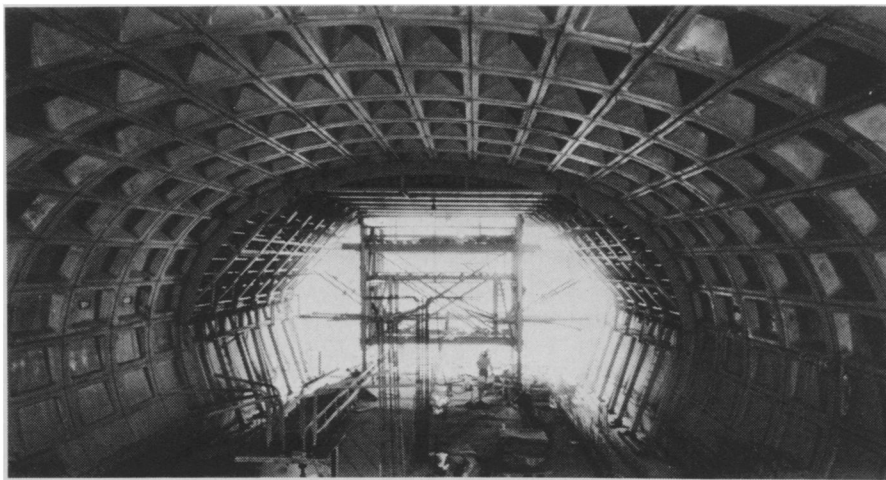
**A decade of battles
over autos in cities
seems to be in prospect**

One of the great controversies of the 1970's in the United States will be over the automobile. The battle has already been joined, as increasingly acrimonious disputes arise over the urban future of automobiles and of alternative modes of transportation such as rail rapid transit.

The most visionary of the environmentalists and humanists dream of central cities revitalized by removing the automobile. In place of today's noise, smog and congestion, these advocates would have tranquil malls and grassed-over streets where pedestrians, including the aged and the infirm, could stroll in safety. The transportation of such an idealized city of the future would be mostly underground, silent, unobtrusive and efficient. But on the other side of the dispute are the highway, petroleum and automobile company interests who insist that rapid transit can never be as efficient and convenient as the automobile and who now are demanding huge, new highway funding programs as interstate highways are completed.

There is no way now to predict the outcome of the dispute. But governmental action already under way seems to assure—unless there is a powerful backlash—that automobile use in cities sometime during the next five years will be restricted to some degree. And it would appear that some drastic changes will be required in the nature of the machine. Beyond this, predictions are impossible.

Former Interior Secretary Walter Hickel said in a recent interview in ENVIRONMENTAL QUALITY that even if pure oxygen came from automobile exhausts, cars would still be a major environmental liability. But hydrocarbons, carbon monoxide and nitrogen oxides—the NO_x and hydrocarbons combining to form smog—do come out of automobiles, and it is this liability rather than the others that is now



Metro

Washington's Metro: The trains may not run despite the President's help.

bringing the automobile in cities under great pressure. To meet ambient air standards for these pollutants by the 1975 deadline, Environmental Protection Agency administrator William D. Ruckelshaus says, "some cities will have to require drastic changes in their commuting habits." In a recent speech to state legislators, Ruckelshaus said certain cities likely will have to limit the number and kind of vehicles allowed downtown, encourage car pools, set up parking lots near outlying bus and subway stations, encourage bicycling and such expedients as staggered work hours and, most important, thoroughly upgrade urban mass transit.

One city has already taken steps in some of these directions. The Washington, D.C., Air Pollution Bureau has proposed a number of auto restrictions, the most radical one being prohibition of parking on city streets by cars from suburban Maryland and Virginia between 7 a.m. and 5 p.m. Monday through Friday. If the proposals survive hearings and administrative hurdles, "They'll really be a first in the nation" and will establish an important precedent, says a spokesman for the anti-freeway, anti-automobile Highway Action Coalition. But HAC is taking no bets the proposals will survive probable objections from suburban Congressmen. The first hearings are scheduled for this week.

The reason for the proposed restrictions is clear enough. Even if automobile companies could meet stringent 1975 and 1976 emission standards for new automobiles, says Ruckelshaus, ambient air would still not be clean enough till at least the 1980's—because of the large number of older cars that would still be around. And the likelihood grows that cars as they are now, will *not* meet the emission standards. John T. Middleton, Ruckelshaus' assistant for air pro-

grams, told the American Society of Mechanical Engineers this week, in effect, that he agreed with auto companies that meeting 1976 NO_x standards is "beyond the present state of the art." The now-documented failure of current emission control devices in about half the cars tested by the California Air Resources Board (SN: 11/27/71, p. 356) bodes ill for the much more stringent 1975 and 1976 standards, which can be reached only through devices far more delicate and costly than those that failed on the 1971 models tested by the California authorities.

Another speaker at the ASME meeting, Lewis D. Conta, dean of the University of Rhode Island College of Engineering, summarized existing information as a basis for some predictions and recommendations for the future. First, said Conta, alternatives to the internal-combustion engine are not feasible for the foreseeable future. Electric cars pose serious safety problems because of the high operating temperatures of lithium-chlorine and sodium-sulfur batteries—the only ones that promise to be low-cost, lightweight and long-lasting enough. And because of the inefficiencies in generating and transmitting electricity, power plants producing energy for electric cars might generate as much pollution as the cars replaced by the electric ones.

Liabilities of gas turbines small enough for automobiles make them an unlikely alternative, he said. This leaves steam engines—which Conta also rejects, on grounds of low efficiency, high weight and other engineering drawbacks. The only feasible action, according to Conta, is a radical turnaround in automotive engineering. "The time has come," he says, "when performance must be sacrificed in order to optimize more relevant parameters, such as fuel economy and a

clean exhaust." He recommends lower-compression engines, much reduced in size and power, plus engineering innovations such as stratified charge engines. But he says Detroit's insistence on continuing to produce large, powerful machines means that the engineering turnaround may have to be forced on the manufacturers.

Such a turnaround, as well as the restrictions on autos in cities and the building of mass transit systems, will require massive public support, which to date has not been forthcoming. Although some cities, such as San Francisco, and, more recently, Atlanta, have approved large public transit systems, many more such projects have been defeated. Such a defeat appeared this week possibly to be the fate of the Washington, D.C., Metro system, already under construction. The House Appropriations Committee voted 31-13 to deny more funds to the big subway project.

Although Metro's defeat may have been based more on traditional deference to a subcommittee chairman who opposes the project than upon any feelings about subways, still the com-

parative levels of funding by Congress for highways and urban mass transit reflect Congressional apathy toward transit systems. The Highway Trust Fund receives some \$5.6 billion a year in Federal funds; the Urban Mass Transit Administration gets about \$400 million.

But there are signs a change may be coming. President Nixon personally intervened in the Metro dispute, asking for appropriation of the funds. And a recent survey by the Highway Users Federation for Safety and Mobility—a pro-highway group—shows that 57 percent of a broad spectrum of Americans favored limiting cars in urban areas. The figure rose to 66 percent when only urban respondents were considered. But most surprising was the willingness of 60 percent of urban dwellers to limit their own use of autos in cities. (These figures were not issued by the Highway Users Federation, which released the portions of the poll most favorable to its position, but rather by Ben Kelley of HAC, who obtained a copy of the complete poll.) Other signs of changing attitudes are reflected in increasing Congressional

restiveness displayed in proposals to convert the now sacrosanct Highway Trust Fund to a Total Transportation Fund, giving local governments the right to decide whether grants should be used for highways or urban mass transit.

But perhaps most significant are new attitudes being displayed by corporations. Some oil companies, such as Gulf and Mobil, are now speaking favorably of urban mass transit—perhaps because of threats to their Mid-eastern oil supplies. And General Motors Chairman James L. Roche told a dealers meeting recently that Americans are increasingly fed up with problems of servicing their cars. "The fact is that a dangerous and ugly climate of dissatisfaction and distrust shadows the prospects of our industry," said Roche. This climate, if it does not force the automobile entirely out of cities, may, at least, produce some reforms. A major problem with emission control devices, for instance, is getting them serviced. If the dealers heed Roche's recommendation for better service, this could be a major gain for clean air. □

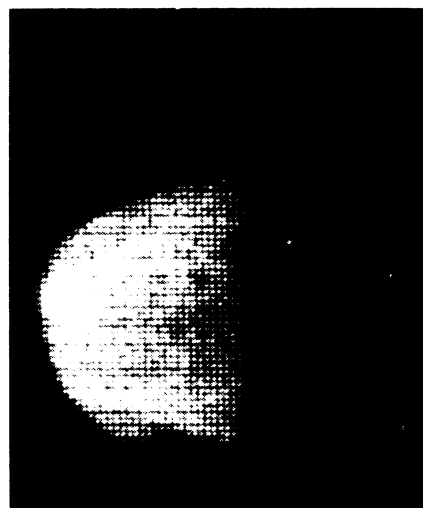
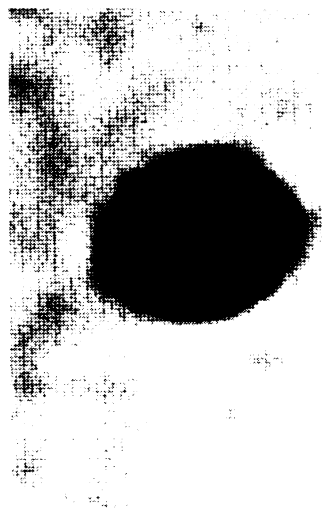
The lumpy miniworlds of Phobos and Deimos

It has been less than a century since the American astronomer Asaph Hall discovered the two moons of Mars—Phobos and Deimos—in 1877. Last week scientists viewing photos transmitted by Mariner 9 were getting their first close-up look at the tiny satellites. "This is a remarkable testimony to mankind—the first time man has seen up close the satellites of another planet," says Carl Sagan of Cornell University, "It's cosmogonical!"

Through the years, various theories have been developed for the origins of the tiny Martian moons: that they are chunks out of the parent planet; that they were formed at the same time as the parent planet and in the same general vicinity and captured by the parent; or that they were formed in other places of the solar system and then later captured. (The tantalizing idea that they might be a Martian civilization's artificial satellites was long ago discarded.)

Phobos and Deimos resemble the earth's moon on only two accounts so far. They have a low albedo and are cratered. That ends the similarity.

Both are shaped like a potato. Phobos, the closer to Mars and larger of the two, is about 16 kilometers pole to pole and 23 kilometers wide (SN: 5/23/70, p. 508). It revolves around Mars every 7 hours and 39 minutes—less than a third of the length of the Martian day and the shortest revolution period for any known satellite.



JPL

Mariner 9's views of Mars' elongated satellites, Phobos (left) and Deimos.

Deimos is almost 9 kilometers through the poles and 11 kilometers across. Its revolution period is 30 hours and 18 minutes. The first unenhanced picture of Deimos reveals a dark area in the southern region that could be a cleft about one kilometer deep.

The nonspherical, lumpy shapes may hold the key to the origin of the moons. Planets have enough total mass and surface gravity that hydrostatic pressure evens them out into spheroidal shapes.

The Martian moons, on the other hand, must have enough rigidity to maintain their shapes. "For their size," says Hal Masursky of the U.S. Geological Survey, "the moons are stronger than the earth."

What could the moons be made of? Their low albedos—similar to that of the dark basaltic areas of the moon—suggest they could be composed of basalt. That would mean that they originated from a larger body that had been melted. But the material also is similar in appearance to the carbonaceous chondrite meteorites. This would fit nicely with the theory that the moons are captured asteroids. If so, Mariner 9 will have been "a free mission to an asteroid," quips Sagan.

But it is much too early to tell. Scientists will, however, be able to begin charting the rotational velocity of the moons, calculating their masses and densities and mapping their surfaces. □