robots (SN: 7/25, p. 64). The scientists expressed interest in seeing the development of this capability, which would also have carry-over possibilities for use on other planets. □

EMISSIONS CONTROL

Restricting autos

So far, all efforts to curb the air pollution from automobiles have aimed directly at this goal. Either emission controls for the internal combustion engine, or new nonpolluting kinds of engines, have been the goals. Except for a few small-scale experiments, there has been little action to restrict the automobile itself.

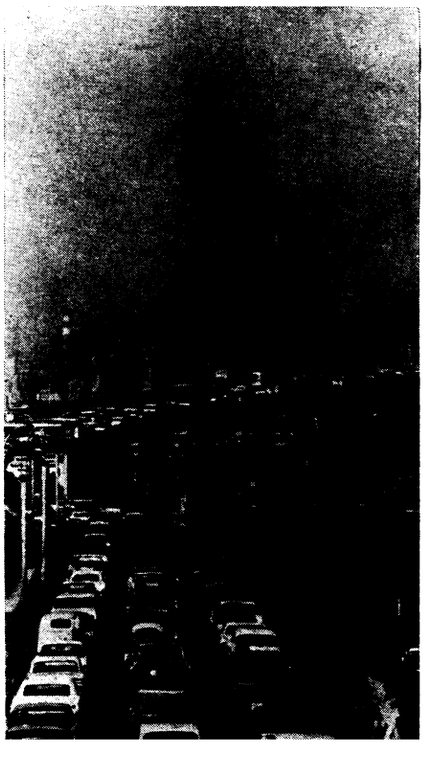
Last week, Sen. Edmund Muskie's (D-Me.) air and water pollution subcommittee reported out a bill which might effectively ban automobiles from urban areas, or, at least, significantly reduce their numbers.

The bill takes a traditional approach of attacking the air pollution from automobiles rather than the automobile itself. It would establish national ambient air standards which various regional, state and local jurisdictions would have to meet with implementation plans.

But the standards are such that new car emission levels by 1975 would have to be 90 percent lower than now. Because it would take about 10 years for all automobiles to have emission controls with this degree of effectiveness, it would be necessary for the local jurisdictions to take other steps. A probable one would be to reduce the number of automobiles within urban areas, perhaps down to cities of 50,000 population. □

Autos and smog: Restriction ahead?

NAPCA



INTERFERON

Inducing the virus-fighter

In fighting off invading viruses the body is often in a race for time. If it can quickly muster enough antiviral interferon to protect cells from attacking viruses, infection will be thwarted. But if the interferon response is sluggish, viruses will gain an overwhelming advantage.

During the last decade, interferon, a native protein that forms the first line of defense against viruses of all types, has been the object of continually expanding research. Many investigators believe that eventually interferon will be to viral diseases what antibiotics are to bacteria infections. Their challenge is to find an effective and relatively simple way of artificially inducing interferon either to protect individuals against viral infections or to insure that those that do take hold are rapidly knocked out.

Recent work on a new inducer, the first to act orally, has excited interferon researchers. Says Dr. Thomas C. Merigan of Stanford University, "Experiments with this new compound, tilorone hydrochloride, provide an important opening, showing for the first time that a small, orally active molecule can induce interferon." Dr. Merigan, with his associate Dr. Erik DeClercq, has been testing the agent, which was developed by Drs. Russell Krueger, Gerald Mayer and their colleagues at the Wm. S. Merrell Co. in Cincinnati.

Tilorone hydrochloride, a fluorenone compound derived from coal tar, represents a new class of pharmacologic agents, and scientists predict that even if this initial chemical proves unsuitable for clinical use, similar agents produced by molecular tinkering may be valuable. From experiments with animals, the Merrell investigators first reported that tilorone hydrochloride appeared to be an interferon inducer. Studies by Drs. Merigan, DeClercq and others confirmed that finding, although its effect in man has yet to be demonstrated. According to Dr. Krueger, human trials of the new drug are under way but results are not yet available. Investigators are still working to determine doses needed to induce interferon in man, if, indeed, this drug is active in human beings.

Discussing tilorone hydrochloride, whose mechanism of interferon-induction is unknown, Dr Krueger points out that it is molecularly unlike previously identified inducers. By and large, these are polynucleotides, molecules that structurally mimic the nucleic acid core of viruses. Among them, poly I:C (polyriboinosinic-polyribocytidylic acid) is perhaps the most thoroughly studied. First developed in 1967 by Dr. Maurice R. Hilleman of the Merck Institute for Therapeutic Research in West Point, Pa. (SN: 8/19/67, p. 173), poly I:C has been shown to cure a potentially blinding eye infection (herpes simplex keratoconjunctivitis) in rabbits (SN: 1/18/69, p. 60). This year, Drs. Paul Fenje of the University of Toronto and Bosko Postic of the University of Pittsburgh used poly I:C successfully to induce protective and therapeutic levels of interferon in rabbits exposed to lethal doses of rabies virus. In limited cases, it is currently being tested in man.

But at least for the moment, poly I:C's uses are somewhat circumscribed. A large molecule with a molecular weight of upwards of 100,000, it has some toxicity and is active only when given by injection. Dr. Hilleman and others are exploring modifications of its structure which may enhance its effectiveness. Dr. Merigan observes that poly I:C may one day be useful for local therapy of virus infections by administering it specifically to the eye or respiratory tract, for example, and thereby avoiding systemic side effects.

To achieve high interferon levels throughout the system, however, tilorone hydrochloride or one of its descendants holds greater promise. In contrast to poly I:C, tilorone is a relatively small molecule with a molecular weight of 400. It is this feature that allows its absorption from the gastrointestinal tract. According to Dr. Merigan, whose work has shown it to be active in mice but not in chickens, tilorone is actually safer and more therapeutically active when given orally.

His experiments with mice demonstrate a 15-fold difference between the doses at which it is therapeutically effective as an interferon inducer and those at which it is highly toxic. Theoretically, at least, this provides a sufficiently wide margin of safety. Extrapolation of the mouse data to man, however, is risky. "We can't predict what will happen in man," Dr. Merigan declares. "We may find that therapeutic and toxic doses are very close or we may find an even greater margin than in the mouse."

Should tilorone become clinically available within the next few years, it could be put to work in a variety of circumstances. A pregnant woman exposed to rubella, for example, could be protected from infection. And, in situations in which large numbers of persons were in danger of being exposed to a virus during an epidemic, the pill could be downed as a prophylactic. □