

AIR POLLUTION

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The problem and approaches to solving it have come a long way since smoke chasing days. Recent infusions of public concern and federal money may make it a systems problem more challenging than reaching for the moon

IN BRIEF: *The idea that polluted urban air is dangerous, widespread, costly, unpleasant, and perhaps unnecessary in societies affluent enough to pollute it so extensively has gained wide currency in recent years. The U. S. Clean Air Act of 1963 is the most far-reaching embodiment of this attitude; it authorized the Department of Health, Education and Welfare to spend \$95 million through 1967 for a wide variety of research and control measures. This beginning promises to stimulate badly needed developments in many areas of meteorology, atmospheric chemistry and photochemistry, fuel chemistry, sensing and monitoring devices, and control devices for automobiles and industrial pollution sources. A pivotal need for a more systems oriented approach to air-pollution control is the definitive set of air-quality criteria which the Act charged HEW with developing. Innumerable technical and social difficulties stand in the way of establishing these, and of translating them into effective community control measures. It seems clear that a much larger commitment to safe, clean air will be needed to really do the job.—S. T.*

■ Researchers at General Motors are studying smog. They produce it artificially, in a chamber, by diluting automobile exhausts with air and irradiating the mixture with simulated solar ultraviolet. And they use a 5-stage filtering system to purify outside air to the levels required by their experiments. Nobody appreciates the irony of this more than those who are professionally concerned with the larger problems posed by polluted air.

Polluted air—to which auto exhausts are one contributor—is bad, they say. It's bad for people, plants, and materials. It's bad for aesthetic reasons and economic ones. It consumes ingenuity in sophisticated activities such as smog-chamber experiments, clean-room technology, and corrosion control. It poses unsolved risks whenever your plane is delayed or makes a blind landing made necessary by fog, which is up to twice as prevalent in polluted urban atmospheres as it is in clean air. Pollutants have changed the weather over urban areas in other ways also, mostly unpleasant and perhaps unhealthy. And some say the accumulation in the atmosphere of even

such a non-pollutant as ordinary carbon dioxide, contributed by man's burning of fossil fuels, may turn out to have unwelcome effects on the climate, geology, and ecologic balance of the entire planet before the century ends.

Most immediate concern centers however on the health hazards of polluted air, and here the statistical and epidemiological portents are suitably harrowing. Over the long run, breathing polluted air may make us more susceptible to lung cancer, emphysema, bronchitis, and asthma—not to mention acute non-specific upper respiratory diseases as well as good old-fashioned pneumonia. Over the short run, when pollutant concentrations become high enough, those with cardio-respiratory insufficiency who also happen to be very old, or even very young, are likely to stop breathing. The list of horrors could be extended in rather more exotic directions, if men were mice and responded to certain pollutants in the way that laboratory creatures do.

Documenting these health hazards—especially the ones which result from chronic long-term exposure to the characteristically exceedingly minute concentrations of pollutants—is a complex, tedious task. It's the subject of most current research in the air-pollution field. In spite of difficulties documentation is growing rapidly, but not as rapidly as the growth of pollution itself. This imbalance promises to be redressed, however, as rising public concern makes itself felt in many urbanized parts of the world. This concern crystallized in the U.S. two years ago when Congress passed a far-reaching Clean Air Act which authorized the Department of Health, Education, and Welfare to spend \$95 million over the next few years on a broad spectrum of training, R&D, and control activities. The Act specifically focused technical attention on three major interrelated problems—motor vehicle exhausts, sulfur-containing fuels, and the development of air quality criteria.

Pollution sources and the research door

Motor vehicle exhausts are the chief contributor to the air pollution syndrome that once used to be known to the rest of the world, mostly through comedians' jokes, as Los Angeles smog. It involves a variety of unpleasant pollution effects which center around the photochemistry of dilute mixtures of hydro-