

What's done is too little

A good deal is already being done about air pollution, to be sure. Thanks to the Clean Air Act of 1963, which for the first time made matching federal grants available for state and local enforcement efforts, dozens of localities have set up control programs. While many companies have waited until local authorities forced them to clean up, some enlightened managers have designed new factories more tightly controlled than local regulations require. Exact figures are not available, but industry is probably spending about \$300 million a year on the installation and operation of special equipment, changes in materials and production processes, and on research designed to abate air pollution. Spending by government at all levels on enforcement and research now is running at \$35 million annually, about three-fifths of it federal money. The national effort may grow larger now that Congress has passed a bill by Senator Edmund S. Muskie of Maine that, among other things, enables the Secretary of Health, Education, and Welfare to order the nationwide installation on new cars of devices to limit the pollution from tail pipes.

But all the present efforts, even combined with those under serious consideration, may not permit us to hold our own. During the next forty years the population of the country's urban areas is expected to double, and industrial output and automobile ownership in these same urban zones will grow even faster. The emissions from each factory chimney, automobile tail pipe, and other sources will have to be reduced more than 50 percent on the average, just to keep the urban air from becoming any fouler than it already is. If the air is to be improved, the clampdown on emissions will obviously have to be even tighter.

In the case of "stationary" sources of air pollution like factories, incinerators, and electric power stations, the present effort is far too small to bring about any significant advances. The only pollutants of this kind that have been reduced noticeably are the nongaseous, largely nontoxic dusts and fumes that come under the general heading of "particulate matter." Chicago's "dust fall" has declined since the 1930's, and Pittsburgh and St. Louis no longer experience darkness at noon. But this improvement was helped along by the switch from coal for heating, and the switching is nearly complete. As the rainfall of dust and soot on Manhattan's East Side (eighty tons a month per square mile) testifies, particulate matter is still an abominable nuisance in many areas. In fast-industrializing cities like Denver, it is on the increase.

Meanwhile, emissions of the far more dangerous gaseous pollutants are rising dramatically. If recent trends continue, the emission of sulfur dioxide from electric power stations—the largest single source—will increase sixfold by the year 2000. The control devices recently developed for autos, even if adopted across the nation, will bring no lasting rollback in carbon monoxide and hydrocarbon emissions, since these gains will be more than canceled out by rising automobile registrations, which are doubling every twenty-five years.

In the longer-range future, the increase in the airborne wastes thrown off by man's activities may require some drastic solutions. The tremendous rise in the worldwide use of fossil fuels, some authorities say, is putting carbon dioxide into the atmosphere faster than plants and the

ocean can absorb it. This gas, which is the unavoidable result of all combustion, is not a "pollutant" in the ordinary sense of being harmful or annoying. But carbon dioxide produces a "greenhouse effect," and tends to block the radiation back to outer space of some of the heat energy that the earth absorbs from the sun. The carbon dioxide concentration in the atmosphere has increased about 8 percent since 1890, and may account for the slight warming up of the Northern Hemisphere since then. In a study two years ago, the Conservation Foundation found this carbon dioxide buildup "not yet alarming," but said it might eventually cause the polar ice caps to melt, submerging many of the world's cities. To this kind of threat, the only answer might be a large-scale switchover to nuclear power, which produces no carbon dioxide.

The dump has its limits

While the carbon dioxide buildup will bear close watching in the years ahead, the immediate task is to cleanse the air of those 133 million tons of dirt and poison that are annually pouring into it. The atmosphere's limitations as a dumping ground for this kind of junk have already become obvious. There are 90 trillion tons of air over the forty-eight contiguous states at any given time. Last year's load of pollutants, if released in an instant and evenly dispersed, would amount to only 1.5 parts per million in the air. Since the contamination actually is spread over a year and continually falls to the ground or is washed out by rains, the average concentration in the nation's total air supply is considerably less than that. But half of this pollution is emitted from less than 1 percent of the U.S. land area, where 50 percent of the population lives. When winds are slack, this far heavier outpouring can build up to thousands of times the national average.

Things can get even worse when there is also a temperature inversion, in which a warm layer of air aloft acts as a lid atop the contaminants in the cooler surface air. This phenomenon was once thought to be peculiar to Los Angeles, where the lid drops to 500 feet or less 40 percent of the time. Actually, it occurs commonly throughout most of the U.S. In New York and Philadelphia, for example, low-level inversions occur 25 percent of the time, and even more often in the fall. The only real difference is that Los Angeles' inversions tend to be lower, and are accompanied by below-average winds. But New York throws off much more non-automotive air pollution. The air above us is not a boundless ocean. Much of the time it is a shallow, stagnant pond, and we are the fish at the bottom.

In Los Angeles, compulsion brings results

The most rigid emission standards in the U.S. today are applied in the Los Angeles County Air Pollution Control District. Faced with acute smog conditions, Los Angeles authorities have forced the installation of pollution-limiting devices on California automobiles. They have also forced industry to reduce its emissions by nearly 80 percent since the late 1940's; an estimated 5,000 tons of pollutants a day from stationary sources are now being kept out of the sky. What would be the cost of a "Los Angeles treatment" for all manufacturing? We can get some indication by looking at a few of the major air polluters, such as steel and chemical plants and oil refineries.