

Conservation of Air Resources

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AIR POLLUTION has been defined as the presence in the air around us of substances put there by the activities of man in concentrations sufficient to interfere directly or indirectly with our comfort, safety, or health, or with the full use and enjoyment of our property (1). In many communities the simultaneous outpouring of many particles, fumes, dusts, vapors, gases, and ash, and the subsequent interactions of these pollutants in the atmosphere have created prolonged irritative effects on people; damaged vegetation, livestock, and structural and other materials; decreased visibility, with hazards to air and ground transportation; and impaired property values. Estimates of the probable cost to the communities of some of these effects have ranged from \$10 to \$65 annually for each person (2). But large as this figure may seem, it still does not include the cost of esthetic deterioration, the damage to the general fitness of the environment, and the desirability of the community as a place to live, to all of which it would be difficult to assign a dollar value.

The communities in the United States with long-established smoke abatement programs are relatively few. Many such programs have only recently begun, notably with the industrial and community expansion emerging during World War II. The U.S. Bureau of the Census statistics show that the growth of metropolitan areas

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in the United States has crowded over one-half of our present population of more than 175 million into some 180 metropolitan areas, less than 10 percent of the land area. The tendency to urbanization will continue, with further complications of air pollution.

No single factor can be charged with full or principal responsibility for air pollution. Many common and essential activities contribute. While automobile exhausts may be significant in one community or in one part of town, industrial fumes and vapors may be disturbing elsewhere. In many large cities, garbage and refuse incinerators in apartment houses or even backyard incinerators have been major contributors. Municipal incinerators, powerplants, steel mills, ore smelters, and petroleum refineries are serious sources when improperly operated or lacking devices to control dust, smoke, or other discharges. Certainly operations such as the burning of open garbage and refuse dumps and the uncontrolled burning of automobile bodies in metal salvaging operations are offensive practices.

Although the effects of air pollution are generally subtle and difficult to measure, they can be apparent and even disastrous (3, 4).

The growing concern with air pollution has resulted in Federal legislation authorizing the Public Health Service to conduct a program of research and technical assistance (5). Since efforts to control air pollution have been hindered by the lack of technical knowledge concerning the causes, effects, and practical control measures, major emphasis has been placed on research.

In developing air pollution research, the Public Health Service has enlisted the aid of other Federal agencies, universities, and research in-

stitutions in every part of the country. Some studies are designed to determine which air pollutants, if any, cause or intensify specific disease conditions or otherwise adversely effect the population (6). Through such studies, we may learn what pollutants must be removed from the air and what elements may be safely ignored. By observing the effects of polluted air in the laboratory and on human beings over a considerable period of time, sound conclusions can be reached. Significant leads have been uncovered. There is evidence of a relationship between air pollution levels and mortality rates from stomach and lung cancer, with allowance being made for smoking habits (7). We know that there are pollutants in urban air which can produce cancer in experimental animals.

A followup study on the population of Donora, Pa., has shown that the people who were made ill by the air pollution disaster in 1948 have had poorer health in general and higher mortality rates these past 10 years than their neighbors who were apparently unaffected. Many who died during acute air pollution episodes in London, Donora, and the Meuse Valley were elderly people with preexisting respiratory or cardiac difficulties.

Research in Great Britain has shown a direct relationship between air pollution and chronic bronchitis, a serious disease ranking third among causes of death in England and first among causes of economic loss due to illness (8). We have reason to believe that chronic bronchitis is also on the increase in this country (9).

During the past 4 years, the Public Health Service has established a national air-sampling network which for the first time permits a systematic measurement of air pollution throughout the United States. At present, the network consists of some 230 sampling stations, all manned by cooperating State and local agencies.

New methods of analyzing pollutants have been developed including the use of chemical, physical, and biological means which are proving to be more accurate and economical. Air pollution effects from specific industrial or community activities, such as oil refining, burning of municipal wastes, and operation of motor vehicles, are being evaluated. Fundamental studies are being conducted of the re-

lationship between weather conditions and the buildup of pollutants in the atmosphere. A method is being developed for forecasting weather conditions which permit the abnormal concentration of pollutants.

An automobile exhaust test facility developed by this program is becoming recognized as one of the best in the country. It permits simultaneous study of divers factors concerned with fuel and engine variables as they relate to the effects of irradiated auto exhaust on plants and animals.

For work on air pollution, short-term training courses are being given for personnel in health agencies. In addition, grants-in-aid have been made to 10 universities for the development and support of graduate level courses. Technical assistance on specific air pollution problems has been provided to State and local government agencies and other organizations.

Congress, in passing Federal legislation on air pollution, reserved to the States and local communities the responsibility for controlling air pollution within their jurisdictions. With the growing interest in conserving the Nation's air resources, States and communities have been surveying their air pollution position. Within the last 10 years, more than 20 States have adopted or modified legislation in this field. An increasing amount of legislative activity has also been observed in municipalities.

No modern city can hope to be completely free of air pollution. Industrial activities necessarily produce vapors, dusts, or gases which slip by the most effective control and retention devices now known. To require industry to establish absolute restraint of such byproducts can easily impose an intolerable economic burden.

There is a need for health agencies to determine the maximum concentrations of pollutants permissible and to apply these standards. This degree of control undoubtedly will prove costly, but it is no longer a question of whether we can afford to conserve the air. We cannot afford not to. It is the breath of life.

It is for this reason that continued research into the effects of air pollution is so vital. New knowledge may show that the application of controls which on the surface appear expen-

sive may actually save as yet unmeasured costs of damage to life and property caused by air pollution.

REFERENCES

- (1) U.S. Public Health Service, Ad Hoc Committee: Federal role in community air pollution. Apr. 8, 1955. (Mimeographed.)
- (2) Gustafson, R. G.: What are the costs to society? *In* Proceedings, National Conference on Air Pollution. PHS Pub. No. 654. Washington, D.C., U.S. Government Printing Office, 1959, p. 41.
- (3) U.S. Public Health Service: Air pollution in Donora, Pennsylvania. Public Health Bull. No. 306. Washington, D.C., U.S. Government Printing Office, 1949.
- (4) Clean air yearbook, 1957. London, National Smoke Abatement Society.
- (5) Public Law 159, 84th Cong., July 14, 1955, 69 Stat. 322. (Superseded by Public Law 86-365, Sept. 22, 1959, 73 Stat. 646.)
- (6) Heimann, H., Emik, L. O., Prindle, R. A., and Fisher, W. M.: Progress in medical research on air pollution. Pub. Health Rep. 73: 1055-1069, December 1958.
- (7) Manos, N. E.: Comparative mortality among metropolitan areas of United States, 1949-51. PHS Pub. No. 562. Washington, D.C., U.S. Government Printing Office, 1957, 143 pages.
- (8) Oswald, N. C.: Recent trends in chronic bronchitis. London, Lloyd-Luke Medical Books, Ltd., 1958.
- (9) Roberts, A.: Air pollution and bronchitis. (Part 1.) Am. Rev. Respiratory Dis. 80: 582-584, October 1959.

First Aid Reminder

Mouth-To-Nose

and

Mouth-to-Mouth

Rescue Breathing

VICTIM ON HIS BACK IMMEDIATELY

CLEAR THROAT	of water, mucus, toys, coins, or food.
TILT HEAD BACK	as far as possible.
PULL CHIN	to keep his tongue out of air passage.
BLOW	air through nose or mouth (or both) until his chest rises.
LISTEN	for snoring and gurgling - signs of throat obstruction.
REPEAT	10 - 20 times per minute.

Continue Rescue Breathing Until He Breathes For Himself.

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MOUTH TO NOSE MOUTH TO MOUTH MOUTH TO BOTH (Baby)
 HE-8 (9.59) ECHO

Rescue breathing instructions, printed on handy wallet-sized cards, have been distributed by the Erie County (N.Y.) Health Department. Both sides of the card are reproduced, actual size, in the illustration above.