Intense fog settled on the British Isles, the air was still, and large numbers of people complained of respiratory difficulties. Before increased atmospheric ventilation removed the stagnant air, hundreds of fatalities had occurred. The cause of death may have been listed as bronchitis, asthma, or emphysema, but a significant factor that could not escape blame was the aggravation of existing respiratory ailments by severe air contamination. Similar occurrences in other areas of the world have established air pollution as a public health problem.

The history of air pollution reveals eras of misunderstanding and neglect of the problem preceding the present concern for atmospheric cleanliness. Malaria, for example, is a contraction of the Italian words mala aria, meaning bad air. The name was derived from the mistaken notion that malaria was caused by the bad air of swamps. Other diseases were similarly blamed on atmospheric contamination until the actual causes were isolated. The attitude toward the air changed rapidly from one of undue concern to complete neglect. Man’s talents were devoted to developing water, milk and food sanitation procedures that are familiar in modern public health circles. Even with isolated cases of acute air pollution effects occurring periodically, an apathetic attitude prevailed on the assumption that the air supply was unlimited, self-cleansing, and capable of absorbing any amount of pollution that should be released. Increased urbanization has exposed the fallacy of the unlimited air concept, however, and man is once again seriously concerned about the preservation of his air supply.

The reasons for concern are basic. The average person’s consumption of air far exceeds his intake of food and water combined, on a weight basis. Survival time without air is a small fraction of the time people can go without food or water. In addition, contamination in the atmosphere is not in the confined state that occurs with pollution of water or contamination of food. An air purification plant that could pipe the treated substance through a tap to each individual on a continuous basis is impractical. It is therefore essential that air pollution control be related to the sources of contamination rather than to a purification of the contaminated atmosphere.

In addition to the health aspects, air pollution has created a serious economic impact on this country. Recent estimates cite the national costs of air pollution effects at 4 to 12 billion dollars annually.

There should be no doubt that air pollution is a firmly established environmental problem worthy of the consideration of government, business, and the public. There is a great deal left to be determined on actual cause and effect relationships that are attributed to air contaminants, but action should not be delayed until all the research is done. Sufficient evidence has been compiled to establish air pollution as an existing or potential problem in many communities. To delay action until disaster strikes could only be classified as short-sighted negligence.

THE PROBLEM

Air pollution is complex, involving innumerable sources, economic and health effects that are difficult to document, and meteorological variables that complicate the establishment of specific source and effect relationships.

Sources

Contamination is released to the atmosphere during most of man’s activities. All sources, large and small, are important as each contributes to the total pollution burden.

Industry is often cited as the major or sole source of air pollutants. It is true that in most urbanized areas, industry makes a significant contribution to air pollution. They should be urged, and when necessary required, to control their effluent to minimum practical concentrations. It is equally important to realize, however, that many other sources of air pollution exist, and industry alone cannot assume responsibility for deterioration of the atmosphere.

Combustion is a major source of emissions that brings governmental agencies and the public into intimate contact with air pollution, both as contributors and recipients. Heating of homes, offices, and other buildings consumes millions of tons of fuel annually. Combustion products from an individual household seem infinitesimal when compared to the smoking stack of a large industry. However, when this small amount of pollution is multiplied by the number of homes and buildings in a community, it reaches astounding proportions. Figure 1 shows the relationship between the smoke-
haze index and degree days. The smoke-haze index is a measurement of fine particle concentration in the atmosphere. Degree days are temperature measurements recorded daily by the weather bureau. This unit indicates the number of degrees necessary to raise the daily average temperature to 65°F and can be used to calculate fuel consumption for heating purposes. A remarkable correlation exists between the smoke-haze pollution index and the degree day measurement in the winter months. This correlation serves to indicate the relationship between fine particulate pollution and combustion products from space heating.

Burning of refuse is another air pollution source that cannot be overlooked. Backyard burning barrels, open burning dumps, municipal incinerators and use of fire for land clearing purposes release significant amounts of contamination to the air. Single contributions may again be small, but the total volume of pollution created on a community-wide basis by waste disposal is significant.

Transportation media are another example of a multitude of minor individual sources creating a major problem. The amount of pollution placed into the atmosphere by the various modes of transportation is difficult to conceive. The automobile has been cited as the major source of pollution in some areas, and will be fitted with exhaust control devices in California by 1967.

The relative impact of various sources is different for each community. Studies must be conducted to place all sources in proper perspective before an effective control program can be initiated.

The Effects.

Problems created by air pollution are diversified. The insidious nature of many effects complicate the establishment of specific causal relationships. The economic impact of air pollution has been estimated to be as high as 65 dollars per capita per year in this country. This compares with a few cents per capita per year being spent on control. Establishment of precise cost is impractical, due to the varied manifestations of the problem.

Vegetation damage by air pollutants is an established fact in many areas. The effect varies from obvious damage to unapparent changes in the plants resulting in reduced yield or mediocre crops.

Soiling of fabrics and surfaces and deterioration of materials exposed to the atmosphere are two other common air pollution effects.

Reduction in visibility is a difficult effect to evaluate monetarily, but it is known that people place value on scenic views that are too often obstructed by excessive air pollution. Figures 2 and 3, courtesy of the Seattle Post Intelligencer, show the visibility reducing effects of air pollution in Seattle.

Air purification systems for sensitive processes, and reduction in property values are other costs that can be attributed to air pollution. An economic balance must be attained between effect and control,
Figure 3. Seattle, Washington — visibility reduced by air pollution.

and at the present time, the cost of neglect far exceeds control expenditures.

Economics is an important facet in overcoming any environmental problem. However, cost should not be allowed to dominate decisions affecting public health. It is a well-documented fact that severe air pollution episodes aggravate existing respiratory conditions. Chronic effects from long-term exposure to low concentrations of air pollutants are not as well substantiated. Research is establishing a circumstantial and statistical link between air contamination and disease, however, and a positive relationship is becoming apparent. To wait until indisputable evidence is compiled may unnecessarily cause widespread sickness. Environmental hazards are more effectively controlled by preventative than corrective measures. It is still not too late in some areas to apply this premise to air pollution.

Complicating Variables.

Pollutants that have left their source through release to the atmosphere are out of the control of man. The specific relationship between the sources and the receptors of the pollutants is complicated by meteorological factors. Wind determines the direction of pollution and the ventilation rate. Vertical stability, often referred to as an inversion, is another significant variable in establishing the total volume of air available for dilution purposes. Low-level inversions in conjunction with light winds seriously restrict atmospheric mixing and cause high pollutant concentrations to occur. Solar radiation, rainfall, and temperature also influence the type and extent of air pollution. An evaluation of potential atmospheric problems in a community must include a comprehensive study of meteorological conditions.

The Solution

A community air pollution problem, existing or potential, cannot be solved hurriedly. It is necessary to gain an understanding of the cause of the pollution, its movement throughout the area and synergistic effects resulting from atmospheric reactions.

Technical Control.

Pollution from most sources can be substantially reduced by the installation of available control equipment, and the establishment of proper operating and maintenance procedures. Control equipment for industry is expensive. In some cases, a valuable by-product can be obtained from the material recovered. Unfortunately many control installations must be installed for the sole purpose of abating air pollution. Sizeable amounts of money are often needed for pollution abatement, but the capital-and operating costs of equipment should be considered an integral part of business expenses.

More research is needed to improve existing techniques of control and to develop highly efficient collection systems for pollutants that are undesirable in minute concentrations.

The Legislative Approach

Many air pollution ordinances have been written and rewritten. Their effectiveness is generally directly proportional to the knowledge of the local situation obtained prior to the adoption of the regulations. Air pollution control laws can be written at city, county, or state levels, and under the recently adopted Clean Air Act can, under certain conditions, be adopted and enforced by the federal government. Although it appears at times to be infeasible, the most efficient enforcement is obtained at a local level. Air pollution has no regard for political boundaries, so cooperation or formal agreement is required between cities and counties to attack the problem on a practical basis. Primarily a local problem exhibiting large variations between areas, air pollution is deserving of control by local government.

Private Contributions to Control.

The Air Pollution Foundation of Los Angeles was brought into being by industry for the purpose of investigating the causes of air pollution in the Los Angeles Basin. The Foundation made a significant contribution to the knowledge of atmospheric contamination, but this action was taken only after extensive regulations had been adopted.

Very recently, a non-profit corporation was formed in Seattle, Washington for the purpose of evaluating air pollution in the Puget Sound Basin. Known as the Puget Sound Air Resources Council, this privately financed corporation will work toward a better
understanding of existing and potential atmospheric conditions in the region, and establish factual information on which to base an effective area-wide control program. Air pollution has been aptly described as a problem of the people, and it seems proper that the public and the business community share in the responsibility for air pollution control.

One of the greatest needs at the present time is to educate the public to the fact that the atmosphere is not unlimited and that air quality is rapidly deteriorating. Leadership is necessary to bring the problem into the open where it can be effectively handled. The sanitarians may view air pollution as an additional duty that can only interfere with their existing programs. Realistically, however, air pollution is an environmental problem — the type sanitarians can effectively handle, and one that is within their jurisdiction as a potential menace to public health. The air surveillance program of the Washington State Department of Health has been made possible by the interest and cooperation of sanitarians in local health departments throughout the state. Air pollution can be handled on a local basis, and it is a challenge to sanitarians to accept their part in coping with this problem before an outraged public demands cleanliness in the air they breathe.

ENVIRONMENTAL SANITATION IN NATIONAL PARK SERVICE AREAS

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Your National Park Service of the United States Department of the Interior brings you greetings, and hopes that while in this area you will have an opportunity to visit some of your National Parks and Monuments including Coulee Dam National Recreation Area, Mount Rainer and Olympic National Parks, Whitman Mission and Fort Vancouver National Historic Sites in Washington, and Fort Clatsop National Memorial, Crater Lake National Park, and Oregon Caves National Monument in Oregon.

Before proceeding with the discussion of environmental sanitation, it would appear advisable to present some basic information regarding the Park Service. The Federal Government has two major conservation organizations that some people confuse, the U. S. Forest Service and the National Park Service. Each has an important part to play in the conservation program for these United States. However, the Forest Service's function is to provide for utilization of resources without abuse, including grazing, lumbering, and mining as well as recreation, whereas the basic law for the Park Service provides that the natural areas under its jurisdiction are to be kept as closely as possible in the condition God made them. The Park Service is also responsible for keeping other areas in such a manner as to provide full appreciation for the historic and prehistoric events the area commemorates, and for administering recreation areas of national significance.

A word too, is in order about the place of the concessioner in park operation. Aside from camping and picnicking facilities, provisions for lodging and feeding the visitors are provided by private enterprise. Many of the people who visit the Parks make their primary contacts with the concessioner at his hotel, lodge, or in the dining room, and believe he represents the Service. Actually, after careful study by Service representatives of a proposed concessioner's background, ability to perform, finances, and the like, he is granted a contract to provide necessary services. All factors are subject to careful examination and review by Park Service officials at all times to insure that they are adequate, responsible, and conform to comparable services and prices for areas in the vicinity of the Park. If the visitor does not think the service is adequate or if the prices seem to be out of line, the Superintendent should be informed so that he can take steps to rectify any irregularities that may exist.

ORIGINS OF THE NATIONAL PARK SERVICE

Historically, the beginning of the first National Park was at a campsite in the present Yellowstone National Park, September 19, 1870 where a party had explored the area and was overwhelmed with the wonders they had seen. They agreed that these wonders were too great for any person or group of persons to control, but that they should belong to the people of these United States. A year later, in December 1871, a bill was introduced in Congress to establish Yellowstone National Park as a "public