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ABSTRACT

Aimed at a society which is forced to make decisions relative to their total environment, this pamphlet discusses a few of the problems associated with restoring and maintaining an environmental relationship conducive to the health and well-being of man. The topics covered include: air pollution, noise, solid waste, the urban environment, drinking water, radiation, and the health of workers. For each, a discussion is given of the problem, the effects on human health and welfare, control possibilities, and the federal programs related to it. One chapter is devoted to what experts say on these problems, and another contains an explanatory listing of organizations concerned with environmental problems. A partially annotated bibliography follows. (BL)

# ENVIRONMENTAL HEALTH PROBLEMS



U S DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Environmental Health Service

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# INTRODUCTION

FOR ALL OF MAN'S PROGRESS in science and philosophy, he has behaved for most of his time on earth as though he and his actions were exempt from the natural laws that govern his ecosystem. Of all living things, man alone is capable of creatively cooperating with the natural processes to insure his continued survival and progress.

Yet he has used the earth's resources as though he could heedlessly exploit, contaminate and alter the world about him without endangering the stability and harmony of the system of which he is a part. So long as his numbers were small, and his impact on the environment remained limited and localized, he did not have to pay the price for his shortsightedness; having spoiled one part of the earth, he could move on and leave to nature the long task of repairing the damage.

But recent history has changed all that. Human population has soared. Almost incredible advances in science and technology have given man a new and awesome power to alter - or even to destroy - his environment. His skill and ingenuity in manipulating the environment have produced tremendous benefits to human life, but more and more these benefits have been accompanied by frightening, and sometimes irreversible, changes in the ecological system of which he is an integral part. He has seriously depleted the world's natural resources and devastated much of the earth's surface. The waste products of his technology and of his own biological processes have grossly polluted the land, air and water. Moreover, 20th century man is beginning to discover that his basic social and psychological drives are increasingly frustrated by pressures of the artificial, urbanized world which he himself has constructed.

In our own Nation - the most technologically advanced in the world - streams and lakes are dying before their time; birds, fish and other wildlife are threatened with extinction. Human health is already

affected by the socio-psychic stress of an urbanized industrial environment and by the barrage of microbiological, chemical and physiological insults which man has injected into his environment. The very survival of future generations may be threatened by the seemingly endless buildup of pollutants.

Inhabitants of our great cities - man's creations once envisioned as the repository of all that was finest and best in civilization - are assailed by pollution, noise, crowding and other unwholesome byproducts of modern urban life. For the urban poor, these conditions, and the social and cultural deprivation which accompany them, have reached an almost intolerable stage. At the same time, the pell-mell flight from urban life has produced the acres of unplanned housing that characterize our "suburban sprawl." Misuse of our farms and forests has caused us to coin another term - "rural blight." Among even the most fortunate, there is a growing uneasiness that the benefits of man's technological progress have been attended by a subtle and incomprehensible degradation in the quality of life.

A very important fact which is too frequently overlooked is that the decisions that shaped the world of the present were not the result of any painful weighing of alternatives with all the facts at hand, nor did they, for the most part, involve consideration of what was best for society as a whole.

On the contrary, they were decisions made by individuals or groups on the basis of what, in their time and place, were clear-cut and valid--if, indeed, limited--goals. Society was not called upon to make considered judgments in favor of the mass production of automobiles, nor to cast its vote for steel production, or pest control, or the building of suburbs only geographically connected to the cities they surround, or the concentrated exploitation of natural resources in Appalachia or Wales or the Ruhr Valley. And had a

choice been presented to us, it would have seemed no choice at all. Automatic application of science and technology to meet the immediate demands of human progress offered benefits that ruled out all alternatives.

And today, society is being called upon to make decisions about similar things, and hence to make choices which raise difficult questions about conflicting public and private rights, or require careful measurement of public benefit against public risk. Moreover, despite growing awareness of past mistakes, society is called upon to make such decisions every day in the social and economic spheres--on the basis of scientific data which, at worst, is nonexistent and, at best, by the very nature of science, is subject to the charge that it is incomplete. And yet, these decisions by society cannot be avoided or deferred.

Science can tell us the "why" of these difficult decisions--it can define the choices in terms of scientific data currently available. Technology can tell us "how." But we must assure that society as a whole is able to make adequate judgment as to "what" is to be the final choice.

The Environmental Health Service of the Department of Health, Education and Welfare was created to provide direction and impetus to our Nation's efforts to restore and maintain an environmental relationship conducive to the health and well-being of man.

The Environmental Health Service has primary Federal responsibility in the following areas of environmental control: air pollution control, radiological health, occupational health, water hygiene, and solid waste management.

# IN BRIEF

## AIR POLLUTION

Toxic matter is being released into the air over the U.S. at a rate of about 200 million tons a year, or nearly a ton for every American. It comes from 90 million motor vehicles, from factories, power plants, municipal dumps and backyard incinerators.

## FOOD CONTAMINATION

Over two million Americans are stricken with illness each year from microbiological contamination of food, causing an estimated annual loss of 1.5 million work days. Salmonella contamination of food accounts for at least 50 percent of the work days lost.

## SOLID WASTE

On a nationwide basis, the total expenditures for collection of trash and other solid waste by public and private concerns are approximately $4.3 billion per year. Most systems are inefficient and contribute to land and water pollution. Collection of solid wastes by public and private organizations amount to 190 million tons per year (5.3 lbs. per person per day). By 1980, the amount collected by similar means is expected to be over 340 million tons/year (8 lbs. per person per day).

We throw away 3.5 billion tons of solid wastes per year.

360 million tons of this are household, municipal and industrial wastes.

2 billion tons are agricultural wastes.

1.1 billion tons are mineral wastes.

## DRINKING WATER

Approximately 8 million people drink water with a bacteriological content that exceeds the limits of the U. S. Public Health Service Drinking Water Standards. The presence of E. coli bacteria in water is an indicacion of pollution from sewage.

Nearly half of our 20,000 community water supply systems contain defects that are serious enough to place them in a potentially unsafe status.

In 1965, 270 billion gallons of water a day were used in the United States. By 2020, 1,370 billion gallons of water per day will be needed.

## NOISE

Over 7 million workers are exposed to noise levels that may damage their hearing over a prolonged period of time.

## INJURIES

Accidents -- many of them involving hazardous products -- take the lives of 100,000 Americans every year and injure 50 million more.

Some 3,000 deaths occur every year from accidental ingestion of poisons -- most of these among children.

## RADIATION

There are presently over 50 nuclear power reactors either built or in the planning stage. By the years 1980 and 2000 the number of power reactors is expected to increase to 140 and 720. There are now 16 nuclear power plants in the U. S.; by 1972, there will be 82 more.

At the present time, there are over 200,000 medical and dental X-ray machines in use, and over 800,000 medical radioisotope administrations are performed each year. Over half our population has one or more annual X-ray visits for medical or dental reasons.

Of 6,000 men who have been uranium miners, an estimated 600 to 1,100 will die during the next 20 years as a result of radiation exposure, principally from lung cancer.

## HEALTH HAZARDS TO WORKERS

Every year more than 500 new chemicals and chemical compounds are introduced into industry, along with countless operational innovations; thousands of workers suffer from cancer, lung disease, hearing loss, dermatitis, or other preventable diseases caused by occupational exposure.

Over 14,000 workers are killed each year in work accidents, and more than 2 million additional workers are permanently or temporarily disabled from occupational diseases and work accidents. (There are every year at least 390,000 cases of occupational disease among the 80 million employed civilians in the U.S.)

Occupational injuries and diseases cost the United States economy over $7 billion each year in insurance expenses and lost wages alone.

More than 8 percent of all underground coal miners suffer a disabling injury annually, a rate higher than in any other United States industry.

It is estimated that 10 percent of all active miners suffer from coal worker's pneumoconiosis; 20 percent of all retired miners suffer from pneumoconiosis.

Three and a half million workers are exposed to asbestos in their jobs, and run the risk of developing asbestosis or lung cancer.

Our 230,000 cotton textile workers are threatened by byssinosis, a lung disease caused by inhaling cotton dust. Limited studies have shown that in some plants, 12 to 30 percent of the workers had byssinosis.

## HOUSING

Some 34 million Americans live in 11 million dwelling units that are either overcrowded or have structural or plumbing deficiencies. Infant mortality in these areas is 3 to 5 times the national average; injuries, burns, and accidental poisonings are from 5 to 8 times the national average. More than 14,000 rat bites are recorded annually. Lead poisoning afflicts 12,000 to 16,000 children living in slum areas. Two hundred of them die.



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# AIR POLLUTION

## THE PROBLEM

As the President indicated in his environmental message, the problem of air pollution results not so much from choices made, as from choices neglected. In our efforts to achieve the most spectacular "progress" the world has ever known, we failed to notice the hazards of airborne contaminants. As we strove to achieve new goals in improvement, we failed to consider the consequences of dumping aerial filth. Air pollution has become an unwanted by-product of our successful pursuit of a higher standard of living.

Population growth combined with industrial advances are bringing increased concentrations of hazardous pollutants into the atmosphere. By the year 2000, the U.S. population will almost double what it was in 1960. These people will drive cars, manufacture goods, heat buildings, and use electrical power in much the same ways that we do now. By 2000 most major industries, including those that create pollution, will have increased production. The number of cars can be expected to have quadrupled and, if so, will burn 160 billion gallons of gasoline each year. Our need for electrical power will be about six times greater than it is today. By then about 280 million people will be concentrated in cities, bearing the brunt of the pollution problem. Tomorrow's levels of air pollution may be even higher.

## EFFECTS ON HUMAN HEALTH AND WELFARE

It took some very serious incidents to arouse concern about air pollution. In December 1930 a heavy fog blanketed an industrialized area of the Meuse River Valley in Belgium. In several days 60 people died and thousands were sickened from the poisoned air. In October 1948 a similar inversion blanketed the industrial town of Donora, Pa. In that case 40 people died and 6000 became ill. In December 1952, London experienced a five-day inversion during which more than 4000 people died. Emergency bed care increased from a normal 1000 persons weekly to more than 2,500 for two to three weeks afterward.

Air pollution disasters are alarming enough, but of greater concern to those of us who live in polluted air, and that includes most of us, are the long term effects of the air pollution that begins to assail us from the day of our birth. With every breath we take, an increasing percentage of us come a little closer to a diagnosable diseased condition. These ills are mostly diseases of the bronchial tree--from the common cold to lung cancer. But air pollution also irritates the eyes, and some pollutants in the air, like lead, may build up in the body until they reach harmful levels. Others, like carbon monoxide, are not cumulative in their effects, but in high enough concentrations can cause temporary disability, and even death.

Science is only beginning to explore the effects that pollution may have on the prenatal stage of life, or on the genetic traits we pass on to future generations.

The economic cost to the nation of the effects of air pollution is estimated to be many billions of dollars each year, including damage to buildings, equipment, fabrics, land values, farm crops, and animals.

## CONTROL

If we are to have wholesome air, despite the projected levels of pollution resulting from increased industrialization and urbanization, there must be accelerated development and application of control techniques. All levels of government--local, State, regional, Federal, and the citizen himself--must pursue the abatement of air pollution.

## THE FEDERAL PROGRAM

Stationary Sources. The 1967 amendments to the Clean Air Act provide a blueprint for a systematic effort to deal with stationary sources of air pollution on a regional basis. The legislation calls for coordinated action at all levels of government and among all segments of industry. The system that this legislation develops

hinges on the designation of regions where two or more communities--either in the same or different States--share a common air pollution problem. By September 1970, a total of 91 such areas throughout the U.S. will have been designated as air quality control regions. These areas are listed at the end of this fact sheet.

The Federal government has issued, for a number of pollutants, criteria describing harmful effects on health and damage to property, and detailed information on the cost and effectiveness of techniques for preventing and controlling these pollutants. Pollutants covered thus far are sulfur oxides, particulate matter, carbon monoxide, hydrocarbons and photochemical oxidants. Similar documents will be issued for additional pollutants in the future.

As soon as these documents have been issued for a specific pollutant and a region has been designated, whichever comes later, each State involved in the region is expected to begin developing air quality standards and plans to implement these standards in the designated region. States have 90 days to submit a letter indicating intent to set standards, 180 days to set standards, and 180 days to develop plans for implementing standards. During the 180 days to set standards, each State must hold a public hearing to give citizens an opportunity to comment on the quality of air they would like to breathe in the years to come.

If the Secretary of Health, Education, and Welfare finds that the air quality standards and plans for implementation for an air quality control region are consistent with the provisions of the Clean Air Act, those standards and plans will take effect. If a State fails to establish standards, or if the Secretary finds that the standards are not consistent with the Act, he can initiate action to insure that appropriate standards are set. States may request a hearing on any standards developed by the Secretary. The hearing board's decision will be binding. States are expected to assume primary responsibility for the application of air quality standards, but if a State's efforts prove inadequate, the Secretary is empowered to initiate abatement action.

Motor Vechicles. The 1965 amendments to the Clean Air Act empower the Secretary of Health, Education, and Welfare to regulate the discharge of any substance from new motor vehicles or engines which, in his judgment, may be a hazard to health or welfare. Under this legislation, emission standards for carbon monoxide and hydrocarbons first went into effect for 1968 model cars.

Standards for 1970 models tightened the 1968 standards and extended controls to include new trucks, buses and diesel engines. Standards for 1971 model vehicles will be even tighter. Emission controls for nitrogen oxides will begin in 1973 model vehicles and control of particulate emissions will begin in 1975.

Unfortunately, with increased numbers and use of automobiles, emissions from vehicles are expected to increase by the end of this decade. To stem this problem, Federal efforts have begun which are expected to stimulate development of an intrinsically pollution free vehicle by 1980.

## LIST OF REGIONS

The following list identifies the central cities of the metropolitan areas included in the 91 air quality control regions.

Washington, D. C.
New York
Chicago
Philadelphia
Denver

Los Angeles
St. Louis
Boston
Cincinnati
San Francisco

Cleveland
Pittsburgh
Buffalo
Kansas City
Detroit

Baltimore
Hartford
Indianapolis
Minneapolis-St. Paul
Milwaukee

Providence
Seattle-Tacoma
Louisville
Dayton
Phoenix

Houston
Dallas-Fort Worth
San Antonio
Birmingham
Toledo

Steubenville
Chattanooga
Atlanta
Memphis
Portland, Oregon

Salt Lake City
New Orleans
Miami
Oklahoma City
Omaha

Honolulu
Beaumont-Port Arthur
Charlotte, N. C.
Portland, Maine
Albuquerque

Lawrence-Lowell-Manchester
Elpaso
Las Vegas
Fargo-Moorehead
Boise

Billings
Sioux Falls
Cheyenne
Anchorage
Burlington

San Juan
Virgin Islands
Allentown-Bethlehem-Easton-Phillipsburg
Binghamton
Bristol-Johnson City-Kingsport

Columbus-Phenix City
Cumberland-Keyser
Duluth-Superior
Erie-Ashtabula
Evansville-Owensboro-Henderson

Florence
Fort Smith
Huntington-Ashland-Portsmouth-Ironton
Joplin-Miami
La Crosse-Winona

Menominee-Escanaba-Marinette
Mobile-Pensacola-Biloxi-Gulfport
Paducah-Metropolis
Parkersburg-Marietta
Rockford-Janesville-Beloit

Sequatchie River Valley
South Bend-Elkhart-Benton Harbor
Youngstown-Warren-Sharon
Augusta-Aiken
Berlin-Rumford

Davenport-Rock Island-Moline
Douglas-Lordsburg
Dubuque
Keokuk
Lewiston-Moscow-Clarkston-Pullman

Norfolk-Elizabeth City
Savannah-Beaufort
Shreveport-Texarkana
Sioux City
Spokane-Coeur d'Alene

Vicksburg-Tallulah

# NOISE

THE PROBLEM

Noise is a pollutant -- the by-product, and sometimes the end-product, of a desirable activity.

The population in general is affected by noise, with the industrial worker having the highest potential for noise-induced hearing loss. An estimated 7,000,000 industrial workers in this country are exposed to noise levels in the work place that could damage their hearing. Millions of others are threatened daily by the complex of community noises with effects ranging from mild annoyance to interference with sleep.

The 130,000,000 Americans who now live in metropolitan areas could be considered as the potential target population for noise problems in the urban environment. Communities bordering major airports experience the highest levels of outdoor noise exposure but such exposures occur intermittently. More people are probably exposed to road traffic noise which is lower in level than aircraft sounds but can be more continuous in nature. It has been forecast that by 1975, 375,000 residents surrounding Kennedy Airport at New York will be subjected to aircraft noise sufficiently great to arouse vigorous and concerted group reaction.

People living under the flight path of airports, and those who listen to amplified rock music, experience the same noise levels as do workers employed in riveting operations or around textile looms. A home power mower produces the same noise level as a farm tractor or newspaper press. Major sources of outdoor noise include roadway traffic, with trucks as the worst individual offenders, aircraft flyovers, trash collection, construction-demolition operations, children at play, signalling devices such as sirens, bells and horns. Indoor noises causing most complaints are garbage grinders, plumbing, door-slamming and such "people noises" as conversation, running, the neighbor's hi-fi or TV.

## EFFECTS ON HUMAN HEALTH AND WELFARE

Noise-induced hearing loss is the most significant physical health problem caused by excessive noise exposure. This is a major hazard in certain work environments. It is possible, however, that exposure to the aggregate of noise characterizing life in a modern, advanced technological society--from mass transportation, household appliances, power tools, hobbies, and recreational pursuits can also cause some degree of hearing loss.

In addition to losses in hearing sensitivity, noise may provoke physical and mental stress; hinder or complicate performance capability; and disrupt one's privacy, relaxation and sleep.

Social surveys registering annoyance reactions to a variety of noises in the metropolitan areas have found the percentage of people so disturbed to have increased from 23 percent in 1948 to 50 percent in 1961. And the "annoyance" trend is upward.

The potential cost of compensation for hearing loss due to industrial noise could be very large.

As to the future, the trend towards using more massive power sources to drive automated plant equipment will probably raise the noise levels in industry even though fewer workers may be exposed. Also, new and different plant processes are being developed which will emit strong sound energy in the infra- and ultra-sonic frequency ranges.

## CONTROL

Noise control technology is available to control many sources of noise in industry, the home and the community. Yet, despite increasing public awareness and concern, such knowledge, for various reasons, is not being applied.

Noise, like other pollutants, can be avoided or controlled by interrupting its transmission to exclude it from specific locations or by reducing it at the source. Control of the source requires that machinery, vehicles and other producers of sound be so designed or operated



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that the noise is limited to a safe level. This can be done through setting and enforcing standards for human exposure to noise in industry and in the community.

Noise abatement practitioners are too few in number, and training programs to develop needed competencies are limited. Only a few States and local agencies have capabilities in handling noise problems. Noise reduction and control mean increased cost which may have unfavorable implications to competition. Nevertheless, public demand for quiet is growing and finding expression as individual complaints or as civic association complaints throughout the country.

## THE FEDERAL PROGRAM

Under the authority of the Public Health Service Act, the Environmental Health Service, through its Bureau of Occupational Safety and Health:

- Conducts research on the health effects of noise in industry and in the community.
- Collects data through a National Noise Study for use in setting standards for noise under various conditions.

Other Federal organizations concerned with noise include the Department of Transportation, the Department of Defense, and the Department of Housing and Urban Development.

# SOLID WASTES

THE PROBLEM

In our affluent society, the increased generation of solid wastes is becoming a critical problem.

In 1920, on a daily per capita basis, 2.75 pounds of solid wastes were collected routinely; today, this figure has grown to 5.3 pounds, and by 1980 it is estimated that 8 pounds of solid wastes will be collected for each person daily.

The total solid waste load generated from municipal and industrial sources in the United States amounts to more than 360 million tons annually. The annual total of agricultural wastes, including animal manures and crop wastes, is estimated to be over 2 billion tons. The highly combustible, toxic or non-degradable nature of many of these wastes, in addition to the vast amounts which must be disposed of, presents a major problem in many areas. This is particularly true in urban areas, where wastes accumulate in large quantities, and there are few land disposal sites within reasonable hauling distances.

The problem of disposal is aggravated by our insistence on convenience materials which do not burn or decay, such as one-way glass bottles and plastic packaging.

The deplorable condition of most of the solid waste disposal systems in the United States was brought out in a national survey, which showed that only six per cent of landfill operations could be classified as sanitary landfills. In this type of operation, solid waste is buried in the ground and covered with a thin layer of soil at the end of each day to keep out insects and rats.

What this means is that the remaining 94 per cent of the land disposal operations consist of open burning dumps that add to air pollution, or they contaminate ground water and contribute to water pollution -- or they do both of these things.

The survey showed that about 200 of the 300 incinerators in the Nation burning municipal waste lack adequate air pollution control equipment. The figures clearly demonstrate the direct relationship of solid waste mismanagement to atmospheric pollution.

## EFFECTS ON HUMAN HEALTH AND WELFARE

Inefficient and improper methods of handling and disposing of refuse, trash and other solid wastes make vast stretches of our once beautiful land ugly, and present serious hazards to the public health.

Solid wastes have been associated with at least 22 human diseases and numerous accidental injuries. Dumps, alleyway garbage heaps, and other places of garbage accumulation are excellent breeding grounds for animals which are disease carriers.

Mismanagement of solid wastes has adverse effects on land values, creates public nuisances, and otherwise interferes with community life and development.

Solid waste management presents an economic problem of major proportions. Presently, in excess of $4.5 billion is spent annually to handle and dispose of municipal, commercial, and industrial solid wastes. Even with this impressive expenditure, the over-all quality of solid waste operations is poor or inadequate.

The vast quantities of non-renewable resources, such as ferrous metals, which are permanently lost in the solid waste stream, present an economic and raw material drain which grows along with the growing solid waste load.

## CONTROL

The control of the solid waste problem must proceed along two fronts: reduction in the generation of wastes and improvement of waste management.

Federal research efforts place emphasis on methods to conserve natural resources by reduction of the amount of waste and unsalvageable materials and by recovery

and utilization of potential resources in solid wastes, and on improved disposal methods.

You can help to solve the solid waste problem in the following ways:

- Become informed about solid waste management practices by visiting local disposal sites and attending local meetings dealing with this issue.
- Let local, State, and Federal officials know of your interest and willingness to pay for adequate solid waste management.
- Organize and participate in neighborhood clean-up campaigns.
- Ask for and use returnable beverage containers.
- Observe good waste disposal practices at home and in public areas. Don't litter. Don't burn trash or leaves.

THE FEDERAL PROGRAM

Under authority of the Solid Waste Disposal Act of 1965, the Environmental Health Service, Department of Health, Education and Welfare, through its Bureau of Solid Waste Management:

- Conducts research and demonstrations to develop new and improved methods of solid waste storage, collection and disposal.
- Develops new and improved methods of recycling and re-using solid wastes.
- Provides technical and financial assistance to State and local agencies in planning and conduct of solid waste management systems.

The Bureau's budget for the fiscal year ending June 30, 1970 is approximately $15 million.

Other Federal agencies concerned with solid waste management include The Department of Interior's Bureau of Mines, the Department of Agriculture and the Department of Housing and Urban Development.

# THE URBAN ENVIRONMENT

## THE PROBLEM

People who live in cities bear the burdens of land, air and water pollution, and they are also subject to the stresses of noise, crowding, estrangement from the natural systems, and the inconveniences and frustrations that characterize urban life. The urban poor bear the greatest burden from our mismanagement of the urban environment.

Some 34 million Americans live in 11 million dwelling units that are either overcrowded or have structural or plumbing deficiencies. Infant mortality in these areas is three to five times the national average; injuries, burns, and accidental poisonings are from five to eight times the national average. More than 14,000 rat bites are recorded annually; an even greater number probably go unrecorded.

## EFFECTS ON HUMAN HEALTH AND WELFARE

These urban conditions are part and parcel of the pollution problem -- they contribute to it and, in a vicious circle, they are intensified by it.

People, as Dr. Hugh H. Iltis of the University of Wisconsin has pointed out, need clean air, sunshine and unpolluted water. He has said: "If the concrete and steel city...turns man into a social, erratic and sick animal; if urbanization degrades human society through increased emotional stress, crime, delinquency, slums, and other neuroses and psychoses, it is because the genetic flexibility of the human animal...is not great enough."

### Lead Poisoning in Children - One Problem of the Slum Environment

In older, uncared-for homes, woodwork, walls and furniture are often coated with old paint containing lead.

Babies and young children often chew on furniture or paint flakings containing lead-based paints and develop lead poisoning.

If untreated, lead poisoning can cause serious brain damage, mental retardation, and death. Even in less severe cases, the child's learning ability may be impaired.

Lead poisoning does not usually manifest itself early by rapid, dramatic changes in the child's health. Instead, the child becomes lethargic, loses appetite and weight and is less attentive to the world around him. Later, he may vomit, complain of vague stomach, arm or leg pains, and become increasingly irritable. Eventually, if the poisoning is undetected, symptoms of severe poisoning and involvement of the brain and nervous system, such as convulsions, appear. By then, the permanent damage will have been done.

In the early stages, if a specific check is not made for lead poisoning, the symptoms are so subtle that the child's condition might not be attributed to lead poisoning. If the poisoning is detected in early stages, the child can be treated to rid his body of the lead. Chances are, however, that after treatment, he will go back to the same home environment where he may again ingest lead-containing substances. Lead poisoning will recur unless the home environment is changed to prevent this exposure.

Of the 12,000 to 16,000 cases of lead poisoning reported every year in the United States, about 200 children die. No one knows how many other children suffer from lead poisoning. Estimates range from 225,000 to 400,000 children.

For each severely retarded child, society invests about $200,000 for care and education. Hospital care to treat lead poisoning averages $100 daily for several days. The loss to society from impaired learning ability and disability is incalculable.

Control of lead poisoning must be based on control of the products containing lead, including the deteriorating old homes in which lead-based paint or plaster is present, and on early detection of children having lead poisoning.

Local housing codes should contain regulations dealing with the conditions of walls, ceilings, or other surfaces. Every apartment or house should be in conformance with the code and any deviations should be brought to the attention of the landlord and the local health or housing department.

There are, moreover, many local social service agencies that provide assistance in determining whether old paint is lead-based and from whom help can be sought to have the health hazard corrected.

A local public information program should stress the dangers of old lead-based paints and the need for early detection and treatment of lead poisoning.

## FEDERAL PROGRAM

Under the authority of the Public Health Service Act, the Environmental Health Service:

- Formulates and establishes criteria and recommends standards for sustaining man's health and well-being in his living environment --in housing, neighborhoods and communities.

- Conducts or participates in research and other investigations to control environmental hazards to health.

- Assists in the development of manpower and training needs for community environmental management.

- Assists communities in rat control programs.

The Department of Housing and Urban Development is also concerned with environmental problems of urban and rural communities.



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# DRINKING WATER

THE PROBLEM

Community water supplies serve some 157 million Americans.

Approximately 8 million of these people drink water with a bacteriological content that exceeds the limits of the U. S. Public Health Service Drinking Water Standards. The presence of E. coli bacteria in water is an indication of pollution from sewage.

Millions more are served by supplies that are under inadequate surveillance, contain serious defects, or are operated by poorly qualified personnel. Presently, nearly half of our 20,000 community water supply systems contain defects that are serious enough to place them in a potentially unsafe status if the defects are not corrected.

Not too many years ago, water-borne communicable diseases, such as cholera, amebic and bacillary dysentery, and typhoid, were major causes of illness and death in the United States. When the causes were recognized, processes were developed to make water safe. Gradually, this safety was taken for granted, and despite the growing pollution of rivers, lakes and underground waters, vigilance was relaxed. A current national community water supply study, in fact, shows approximately nine percent of the samples tested exceeded acceptable limits of bacteria content.

In addition to biological insults to our drinking water, the amounts and varieties of chemical contaminants entering our streams and waterways are increasing at a rapid rate, and conventional water treatment methods are not effective in the removal of these contaminants.

Some chemicals occur naturally in water but most are introduced by the waste waters from our expanding industries and municipalities. Most conventional treatment processes, originally designed to produce water that is bacteriologically safe, do not appreciably change the chemical characteristics of the water.

The use of chemical compounds for agricultural, industrial, institutional and domestic purposes has increased at an astonishing rate since World War II. In 1967, production of synthetic organics alone exceeded 104,000 million pounds, representing a 100% increase in 7 years. There are some 12,000 different toxic chemical compounds in industrial use today. Over 500 new chemicals are developed each year. Many of them enter and contaminate both surface and ground waters.

In 1965, 270 billion gallons of water per day were used in the United States. By 2020, 1,370 billion gallons of water per day will be needed. Hydrologists estimate that the total usable supply from precipitation is only 700 billion gallons of water per day. This means that, nationally, waste water from industries and municipalities will have to be immediately recycled for reuse. Due to unequal population and rainfall distribution, regional water reuse will continue to increase. In each reuse cycle the chemical concentrations increase.

## EFFECTS ON HUMAN HEALTH AND WELFARE

Evidence that water-borne communicable disease from bacteriological contamination is still a problem in the United States and is contained in these examples:

- In Riverside and Madera, California, 20,000 people were made ill in 1965 in water-borne disease outbreaks. Several deaths were charged to these episodes.

- ... In 1968 an outbreak of gastroenteritis affecting nearly 200 people, or one third of the population, occurred in a small Eastern village. Treated sewage from the village flowed into a lake which was also the source of water for the community. Although the water was routinely filtered and chlorinated, it was determined that the cause of the disease was water borne.

> As recently as 1969, the entire varsity football team and coaching staff of Holy Cross College became ill from drinking water from a municipal supply contaminated by sewage.

Although reporting of waterborne outbreaks is totally inadequate, a reliable estimate has been made that a minimum of 40,000 cases of water-borne illness occur every year. Actual figures could be much higher.

Chemical contamination has been implicated with several diseases. There are indications that certain organic chemicals are cancer producers. Nitrates, a significant inorganic waste product, have been implicated with a methemoglobinemia in infants. Chemical contaminants such as phosphorous (from fertilizers), pesticides, detergents, trace amounts of metals, acid from mine drainage, cyanide, phenols and radioactive substances, solvent and halogenated hydrocarbons are comparatively new insults to our water sources. There are several unknowns concerning the effects of chemicals on health. Means of detecting their presence and measuring their concentration at a treatment plant are limited.

## CONTROL

Technology exists to produce and maintain water that is of a safe bacteriological quality. That technology, frequently inexpensive, needs to be used. The additional cost for disinfection of a water system is about 20 cents a person a year. This would buy sufficient chlorine to treat the water one person uses. In addition, antiquated water treatment plants and distribution systems need to be modernized. Better trained personnel are often needed to operate the system. They should have that training.

Although for many chemicals, the technology to detect and measure them are well established and the methods to remove them exist, it is nevertheless vital to institute a vastly expanded research and development program to identify, measure and remove all chemicals that are found to be detrimental to health.

It is essential that the amount of pollution entering our water courses be reduced to a tolerable limit. Pollution control, however, does not remove the need for modern water treatment plants, incorporating the latest technological developments, as a final barrier in the protection of man's health. Pollution from transportation accidents, agriculture fertilizer runoff, and farm pesticide use are examples of pollution which gets into sources of drinking water which can't be treated by sewage treatment plants.

You can help in this effort in the following ways:

- Keep yourself informed of developments in your community relating to drinking water supplies.

- Learn about the water you are drinking: Where does it come from? Is it polluted by other communities or industries? What is its chemical quality? The local water company should have this information. The U.S. Public Health Service Drinking Water Standards of 1962 provide recommended limits established to date.

- Fill a glass of water from your tap; hold it up to the light; it should be colorless and free of sediment and suspended floating matter. Smell it; it should be odorless. Drink some; it should have no taste. If the drinking water does not pass all of these tests, it does not necessarily mean it is unsafe to drink. However, answers should be sought as to why it does not pass all the tests. The water department should have an explanation. The local or state health departments may also be of help.

- Let your local, State, and Federal officials know your concern for having drinking water that is chemically and biologically safe and palatable.

THE FEDERAL PROGRAM:

Under the authority of the Public Health Service Act and the Federal Water Pollution Control Act, the Environmental Health Service, Department of Health, Education, and Welfare, through its Office of Water Hygiene:

- Conducts a basic and applied research program to develop means to detect, measure and remove chemical and biological agents found in water, and to relate their agents to man's health.
- Establishes standards of water quality for the protection of the Nation's health.
- Provides consultation to the Federal Water Pollution Control Administration, Department of Interior, in the health aspects of water pollution.
- Provides technical assistance to public and non-profit institutions engaged in the operation of public water supply systems and use of water resources.
- Enforces the Interstate Quarantine Regulations for water supplies serving airplanes, buses, trains and vessels.

The Office's budget for the year ending June 30, 1970 is approximately $2 million.

The Federal Water Pollution Control Administration of the Department of the Interior has primary responsibility for the control of water pollution.

# HEALTH OF WORKERS

THE PROBLEM

There are 80 million working people in the United States. In this age of unparalleled technological change, millions of these workers are exposed to health-threatening toxic agents, to physiological stresses, and increasingly, to psychological stresses, as a direct result of their occupations. It is in the industrial environment, moreover, that man is first exposed to materials that subsequently contaminate our air and water, endangering his total environment.

The dusty trades, mining and grinding, have been practiced since the dawn of civilization, and have always been related to chest disease. Old well-known poisons, such as mercury, arsenic and lead, are still in industrial use.

In our modern industrial society, solvents, plastics, resins, lasers, masers, microwave, ultraviolet, ultrasound offer subtle, insidious threats. There are over 10,000 chemical and physical agents in use today. In 15 years this number is predicted to reach 45,000 based on an estimated introduction of 3,000 chemicals per year. New techniques and processes often involve new hazards to the workers who use them. Little is known of possible synergistic action, that is, the combined, intensified effect of several toxic agents.

The National Health Survey estimated that the average American worker has nearly 6 days of absence each year because of job-related accidents or illness and about 16 days of restricted activity. The total cost is estimated at $60 million.

There are approximately 390,000 cases of occupational illness each year. These diseases are preventable if standards fixing maximum concentration of pollutants are established and if these standards and appropriate control measures are applied at the workplace.

The provision of in-plant health services and professional surveillance of the workplace is an integral part of worker health protection. Industry spends an estimated $320 million annually for these services, but no more than 20 percent of the total work force is employed in plants where such services are provided. Four out of five of the Nation's workers are employed in small plants which usually offer no health services at all.

Forty-two States, the District of Columbia, and Puerto Rico maintain occupational health units, as do 32 local jurisdictions. Staffing and activities of these programs vary widely and resources have never been commensurate with the size and needs of the work force. Personnel assigned to occupational health duties, either full or part time, in State and local governments numbered 702 in 1969. All State and local expenditures for worker health protection total about 5 cents a year for each member of the Nation's work force.

## EFFECTS ON HUMAN HEALTH AND WELFARE

Some elements of the occupational setting create obvious, immediate dangers. Others work in slow and subtle ways to undermine the health and shorten the lives of workers.

> More than 14,000 workers are killed yearly by industrial accidents.
>
> Over 2.2 million workers suffer disabling work injuries each year.
>
> Workmen's compensation claims amount to over 2 billion dollars annually.
>
> It is estimated 380,000 plants in the U.S. need the attention of an industrial hygienist immediately or within the year.

## Respiratory Diseases

Three and a half million American workers are exposed to asbestos in their jobs. They are subject to the lung scarring pneumoconiosis of their trade, asbestosis, and they are also endangered by lung cancer associated with the inhalation of asbestos fibers. Recent studies of asbestos insulators showed that one of every 5 deaths in this group were caused by lung cancer -- 7 times the expected rate. Half of the men who had worked in the trade 20 years had X-ray evidence of asbestosis. One in every 10 deaths was caused by mesothelioma, a cancer of the lung pleura, so rare that it strikes only 1 in 10,000 in the general working population.

Black lung, or coal miners' pneumoconiosis, is caused by the inhalation of soft coal dust. It is a progressive, crippling lung disease, often complicated by emphysema in the later stages. The death rate from respiratory disease in soft coal miners is 5 times that of the general working population. At a conservative estimate, "black lung" affects more than 100,000 soft coal miners in the U. S.

Approximately 2,000 deaths occur annually from the pneumoconioses alone.

In recent months, our scientists are discovering that America's 230,000 cotton textile workers are threatened by byssinosis, a lung disease caused by inhaling cotton dust. One researcher estimates that as many as 17,000 workers in the cotton textile industry suffer from byssinosis.

## Others

Talc, diatomite, sugar cane fiber, even dust from moldy silage all produce their own form of lung damage wherever dust control and work protection are inadequate.

## Skin Diseases

Hundreds of thousands of workers each year suffer skin diseases from contact with materials used in their work. The dermatoses are the most common of all occupational illnesses.



905-901 O - 70 - 5

## Noise

An estimated 7 million industrial workers are exposed to noise levels that can damage their hearing over long periods of time.

## Old Problems

Even the old, well-known industrial poisons, such as mercury, arsenic and lead, still cause trouble. In New Mexico recently, workers dismantling a missile site were hospitalized from lead intoxication after using acetylene torches to cut structural steel coated with a red lead paint.

## New Problems

The list of known potential health hazards in industrial use is long and is growing longer. The possibility of genetic damage, affecting generations yet unborn, is an immeasurable, but very real, threat whenever the living body is assaulted by a constant barrage of different chemical and physical agents.

## THE FEDERAL PROGRAM

Under the Public Health Service Act, the Environmental Health Service, Department of Health, Education and Welfare, through its Bureau of Occupational Safety and Health:

> Plans and conducts a program of technical assistance to governmental agenci[illegible] professional groups, universities, labor, [illegible]stry, and health-related organizations for improvement of the health and safety of the wo[illegible] population.
>
> Conducts studies, field investigations and demonstrations for the detection [illegible]col of occupational-related disease and ju[illegible].
>
> Develops scientific data for establishing standards that fix maximum lim[illegible] pollutants in the working environment to [illegible] disease.

The Bureau's budget for the fiscal year ending June 30, 1970, is approximately $10 million.

Other Federal agencies concerned with occupational health include the Department of Interior's Bureau of Mines and the Department of Labor.

# RADIATION

THE PROBLEM

Radiation, both ionizing and non-ionizing, is increasingly present in the environment. Man-made exposures include radiation emissions from X-ray equipment, nuclear power plants, reactor fuel reprocessing plants, and electronic products such as color television receivers, microwave ovens, lasers, etc.

Exposure of man to radiation can cause biological injury, including genetic effects and cancer. It is generally agreed that any increase in radiation exposure will be accompanied by a commensurate increase in the risk of injury. Therefore, society has a responsibility to keep man-made exposures as low as possible.

It is estimated that over 50% of the United States population has one or more annual X-ray visits for medical or dental reasons. If diagnostic exposures are kept to minimal dose levels, it is assumed the benefit of the examination generally is greater than any associated risk.

At the present time there are sixteen nuclear power plants operating in the United States; 82 additional plants are now under construction or being planned by 1976. Nuclear energy offers man an alternative energy source for use in generating electricity. The operation of these nuclear plants results in the discharge of small quantities of radioactive waste into the environment which can reach man through the air, water, or food supply. Continuous surveillance of these primary pathways to man is essential to assure that the risk from these exposures are to be kept to a minimum.

Electronic products have the potential of producing unnecessary radiation. Because these products operate in the home, they may expose large numbers of the population to radiation. Unnecessary radiation exposure must be controlled by reduction or elimination of the potential hazard.

Medical care, electric power generation, and communications are three of the growth "industries" directly benefiting from these sources of radiation. They must be concerned with the impact of radiation on man and his environment with an optimal benefit/risk ratios if they are to continue to grow and serve mankind.

## EFFECTS ON HUMAN HEALTH AND WELFARE

Long-term effects which can result from either acute or protracted exposure to radiation include certain types of cancer, reduction of fertility, acceleration of the aging process, eye damage and genetic mutations. The effects and frequency vary with dose and exposure time.

It is generally accepted that any amount of radiation, however small, can cause damage to genetic cells and hence can cause an indeterminate number of undesirable mutations. These genetic insults are believed to be cumulative. Also it is generally accepted that any increase in radiation exposure will cause increases in the frequency of certain cancers. For example, of 6,000 men who have been uranium miners, an estimated 600 to 1,100 will die during the next 20 years as a result of radiation exposure, principally from lung cancer.

## CONTROL

It is prudent to eliminate all unnecessary radiation exposure, and to reduce all excessive exposures while attempting to maximize the benefits of each unit of prescribed exposure.

Methods are available for controlling radiation exposures from medical equipment, nuclear power plants, and some electronic products. Distance, shielding, and limiting exposure time are the three basic factors of protection.

Public health programs to control X-radiation in the healing arts have focused on improving X-ray equipment, the X-ray facility, and the judgment and training of radiation users.

Citizens can urge their State governments to require that all operators who use X-rays must pass a suitable examination and be certified or registered and that all professional health practitioners receive adequate radiological training. They can press for a State requirement that all medical X-ray equipment and facilities meet accepted radiation safety standards. They can discourage mass X-ray screening of large populations, where the incidence of new cases of active disease is low and where alternative methods of disease detection are available for screening purposes.

For reasons of public safety, nuclear power plants are now constructed in areas having a relatively low population. During the initial evaluation of a reactor site, a certain exclusion distance is established and the population centers and their distances from the site are included in the evaluation. During the lifetime of the plant, however, changes in the environs may take place by population encroachments which could make the original safety evaluation invalid. Local zoning restrictions may therefore be required to prevent unacceptable population, commercial, or industrial growth in proximity to the plant. Preferred land uses for reactor plant environs would be recreational areas, wildlife refuges, military establishments, or others from which the population could be moved rapidly with a minimum of economic loss.

Citizens should:

- Attend public hearings conducted prior to construction of nuclear power facilities or relating to the construction or operation of such facilities.

- Encourage State officials to establish planning mechanisms for long-range studies of potential power reactor sites that will meet public safety and environmental criteria.

- Keep informed on all developments, including plans for monitoring radiation in the environment of such facilities and local zoning plans.

Unnecessary radiation exposure from electronic products can be controlled by establishment of, and compliance with, performance standards. Standards for television receivers, recently established, require manufacturers to limit the amount of X-radiation emitted from color television receivers effective January 15, 1970. Standards for microwave ovens are being developed.

For those millions of color television receivers manufactured prior to regulatory controls, service personnel can provide significant reduction in X-ray emission by proper adjustment of service controls. TV repairmen should adjust the high-voltage to the manufacturers' recommendations and select only replacement parts which meet design criteria for the reduction of radiation emission. Viewers themselves can provide additional precautions by maintaining a safe viewing distance (approximately 6-10 feet) from the receiver.

## THE FEDERAL PROGRAM

The Federal Radiation Council establishes Radiation Protection Guides to provide basic protection to the public from peacetime uses of radiation. It should be noted that these guides do not apply to medical radiation exposure. These guides must be followed in the design and operation of nuclear power plants.

The Atomic Energy Commission has responsibility for regulating the operation of nuclear facilities. The Commission holds hearings prior to the construction of their facilities. The Commission also conducts research on the development of nuclear applications and on the health effects of radiation.

Under the authority of the Public Health Service Act and the Radiological Control for Health and Safety Act of 1968, the Environmental Health Service, Department of Health, Education, and Welfare through its Bureau of Radiological Health:

- Establishes and enforces standards for controlling radiation exposures from electronic products.

- Plans and conducts research on the health effects of radiation exposure.

- Provides technical assistance and training to State and local radiological health programs.

- Maintains a system of surveillance on the exposure of the population to radiation.

- Conducts and supports research studies and inspections to control hazards caused by exposure to radiation emissions from nuclear facilities, nuclear explosives or nuclear power sources and other applications of nuclear energy.

The Bureau has a budget of approximately $17 million for the fiscal year ending June 30, 1970.

## WHAT THE EXPERTS SAY

Chronic pulmonary disease now constitutes the greatest single medical problem in Northern Europe, as well as the most costly. It is increasing in prevalence at an alarming rate also in North America and it will undoubtedly spread to all areas undergoing industrialization. There is good evidence, furthermore, that air pollution contributes to the incidence of various cancers -- not only pulmonary carcinoma. It also increases the number of fatalities among persons suffering from vascular disorders. The delayed effects of air pollutants thus constitute a model for the kind of medical problems likely to arise in the future from the various forms of environmental pollution.

Dr. Rene Dubos
The Rockefeller University

Either man controls his exploding population, his crowding into cities, and his industrial activities, or he faces disaster through his pollution and manipulation of our planetary environment.

Irving S. Bengelesdorf, Ph.D.
Los Angeles Times

It is known that injection into newborn mice of particulate materials separated from urban air greatly increases the frequency of various types of tumors during the adult life of these animals. If this observation can be extrapolated to human beings, the worst effects of environmental pollution are yet to come, since it is only during the past decade that large numbers of babies have been exposed to high levels of pollutants in urban areas.

Dr. Rene Dubos
The Rockefeller University

...the use of lead in gasoline has increased tremendously. Today, about two pounds of lead per capita are blown into the air of the United States each year.

The feeding of lead to mice and rats in amounts comparable to the present human intake has been found to result in significant shortening of the life span by a general reduction in vigor. Other experiments point to the red blood cells as the principal sufferers from low lead intake; the brain, the kidneys and other organs become involved only with larger doses.

Joshua Lederberg, Ph.D.
Stanford University

The increase in chronic and degenerative diseases is due in part at least, and probably in a very large part, to the environmental and behavioral changes that have resulted from industrialization and urbanization.

The modern environment is dangerous on two accounts: It contains elements that are outright noxious; it changes so rapidly that man cannot make fast enough the proper adaptive responses to it.

Dr. Rene Dubos
The Rockefeller University

About 30 million tons of sulfur are released each year in the United States in the form of oxides. In the combustion of sulfur-containing materials, most of the sulfur is converted to sulfur dioxide.

With time and oxidation, part of the gas is converted to sulfuric acid. This substance is a strong irritant to the respiratory system.

Airborne particulate matter is important for two reasons: It may affect health directly when it is inhaled in the lungs, and when it contains toxic substances, such as the carcinogen benzopyrene.

Drinking water with nitrate-nitrogen levels above 8 to 9 parts per million causes methemoglobinemia or cyanosis in infants. For water given livestock, a nitrate concentration above 5 parts per million is unsafe. High concentrations may result in methemoglobinemia, thyroid disturbances, and reproductive difficulties and abortions. Substantial contamination of ground water with nitrate has already been reported in many states.

Another newly identified source of radiation is the family of alpha particle emitters related to uranium and widely disseminated in artificial phosphate fertilizers. When tobacco is grown with such fertilizers, some of the alpha emitters are incorporated into the leaf. Later, they appear as part of the smoke.

Phillip H. Abelson, Ph.D.
American Association for
the Advancement of Science

...interest has been shown in the possible role of water as a vehicle for the transport of carcinogenic agents. For example, skin cancer has been reported as a delayed effect of drinking water supplies heavily contaminated with arsenic.

Professor J. R. Brown
University of Toronto

The age of affluence, technological marvels, and medical miracles is paradoxically the age of chronic ailments, of anxiety, and even of despair.

Dr. Rene Dubos
The Rockefeller University

As unique as we may think we are, we are nevertheless programmed genetically to need clean air and sunshine, a green landscape and unpolluted water, and natural animal and vegetable foods...If the concrete and steel city....turns man into an asocial, erratic, and sick animal; if urbanization degrades human society through increased emotional stress, crime, delinquency, slums, and other neuroses and psychoses, it is because the genetic flexibility of the human animal...is not great enough....Our human genetic adaptations are here simply out of evolutionary context.

Dr. Hugh H. Iltis
University of Wisconsin

The new technological man carries strontium 90 in his bones, iodine-131 in his thyroid, DDT in his fat, asbestos in his lungs.

Our technology, while magnificently productive, is seriously flawed because it is consuming the natural capital of mankind -- namely, the environment and the people who live in it -- at such a rapid rate that it threatens probably within the next 50 years to destroy it irreparably.

Barry Commoner, Ph.D.
The Washington University

Pollutants have altered on a global scale the carbon dioxide content of the air and lead concentration in ocean waters and human populations. Pollutants have reduced the productivity of some of our finest agricultural soils, and have impaired the quality and safety of crops on others.

President's Science
Advisory Committee

As the world of an individual expands, the contacts increase but the quality of contact deteriorates. The increase in the number of contacts shortens a contact with a particular person. Its frequency reduces and becomes shallow. Thus the sense of alienation and isolation sharpens even in the center of the city where human contact has developed to the greatest extent.

Christopher Alexander, Architect
University of California

Constant contact with filth and ugliness can be as harmful to esthetic and moral sensibilities as the pollutants we breathe can be to our bodies.

National Commission on Urban Problems

The effects of overcrowding of humans have not been evaluated. However, from studies of animals, it seems likely that there must be adverse effects. Ecological studies have shown that animals have minimum needs for private space. To reduce crowding, animals kill each other or engage in mass suicide. Experiments with rats showed that when crowded in cages, patterns of courting, nest-building, and rearing the young were disrupted. Aggressions and fighting increased, and sexual conduct became more sadistic. Studies of many other animals show that crowding aggravates all forms of pathology within a group and causes high blood pressure, circulatory diseases, and heart disease.

Philip H. Abelson, Ph.D.
American Association for the Advancement of Science

What the inner-city child calls home is often a set of rooms shared by a shifting group of relatives and acquaintances -- furniture shabby and sparse, many children in one bed, plumbing failing, plaster falling, roaches in the corner and sometimes rats, hallways dark and dimly lighted, stairways littered, air dank and foul. Inadequate, insanitary facilities complicate keeping clean. Disrepair discourages neatness -- Rickety, shadowy stairways and bad electrical connections take their accident toll. Rat bites are not infrequent and sometimes, especially for infants, fatal...

National Crime Commission
Report, 1967

A man can live and even be happy in the environment of a garbage can... But life under these conditions is little more than survival. Most of man's ability to use his brain for emotional and aesthetic purposes must be cut off, and in some cases it is never regained. He becomes half a man.

Richard S. Latham in
<u>From Sea to Shining Sea</u>

The psychiatric distress that comes of living a cubical life in a human honeycomb is overlooked by municipal authorities... Doctors responsible for a community's mental health are not asked what they think of contemporary apartment buildings that are built without soundproofing -- much less are they given a chance to condemn them.

Edward Higbee, Ph.D.
Geographer
University of Rhode Island

An estimated total of 112,000 to 225,000 young children in the United States fell victim to lead poisoning last year. Health officials are aware of the problem, but little is being done about it.

The widespread problem, which debilitates 25,000 to 35,000 children in New York City, is called the "silent epidemic". It affects 5 to 10 percent of all children who live in America's dilapidated pre-World War II housing units.

Conference on Lead
Poisoning in Children
Rockefeller University

By 1980, we will be producing enough sewage and other waterborne wastes to consume, in dry weather, all the oxygen in all 22 river systems in the United States, while the need for fresh water will have almost doubled.

Dr. Glen Seaborg
Atomic Energy Commission

Man may be skeptical about following the flight of the dodo into extinction, but the evidence points increasingly to just such a pursuit.

The planet and mankind are in grave danger of irreversible catastrophe if the political structure that now prevails is not drastically changed during the next few decades. We live in a high risk environment, and the trends that create the present level of risk continue to increase the danger and to reduce the possibilities of creatively controlling it.

Professor Richard A. Falk
Princeton University

We are engaged in a race between catastrophe and the intelligent use of technology, and it's not at all clear we are going to win.

Dr. Jerome Wiesner
Massachusetts Institute of Technology

It is the only environment we have. There are more than 20 tons of DDT "on the hoof" in this country, "walking around" stored within the fatty tissues of 200 million Americans.

Irving S. Bengelsdorf, Ph.D.
Los Angeles Times

# GROUPS THAT CAN HELP

*The organizations listed are primarily national ones, many with State, regional or local chapters or affiliates which could be contacted directly to be of service in home communities. All of the organizations listed are nonprofit.*

*Several organizations are listed which are statewide or regional in scope. This is to serve two purposes. First, the organization illustrates a kind of organization to be found in other States and regions as well as for similar services. Second, the organizations listed—insofar as funds and staffing allow—are able to offer help to those in other States or regions wishing to establish organizations with similar functions.*

*A resource not to be overlooked in seeking help for community action are the countless kinds of national and local service organizations, social clubs, church and business groups actively concerned with environmental problems.*

*Local private industry, private utility companies, and local divisions of national corporations are possible sources of help in the community. Many already have active community improvement and incentive programs.*

*The directory below will be of further help in locating private organizations with a variety of related interests.*

*Conservation Directory*. Lists national, regional and State citizen and professional organizations and officials in natural resource and related fields. Issued annually. 122 pages. $1. National Wildlife Federation, 1412 16th Street, Washington, D.C. 20036.

CITIZEN MEMBERSHIP ORGANIZATIONS

*Air Pollution Control Association*, 4400 Fifth Ave., Pittsburgh, Pa. 15213. Membership represents industry, government, education and health organizations. Emphasizes education, cooperation and exchange of technical information on atmospheric pollution control and improved air sanitation. Publishes monthly Journal and abstracts.

*American Association for Conservation Information*, 1416 Ninth St., Sacramento, Calif. 95814. Promotes understanding of conservation principles by assisting State efforts in conservation information and education.

*American Forestry Association*, 919 17th St., N.W., Washington, D.C. 20006. Membership organization supported by private citizens and businesses to promote conservation education and conservation of forest and related resources of water, soil and wildlife. Sponsors annual conferences on resource topics, and wilderness trips. Publishes monthly magazine, American Forests.

*American Society of Planning Officials*, 1313 E. 60th St., Chicago, Ill. 60637. Membership organization of planners, public officials, and others interested in planned development of communities and regions. Provides research and consulting services, conducts meetings and workshops. Publications include a monthly newsletter and technical assistance bulletins on a broad range of environmental problems.

*Appalachian Trail Conference*, 1718 N St., N.W., Washington, D.C. 20036. Coordinates volunteer maintenance of the 2,000-mile Appalachian Trail from Maine to Georgia. Can provide publications and other guidance to other groups interested in establishing and maintaining trail systems.

*California Roadside Council*, 2626 Ocean Ave., San Francisco, Calif. 94132. Example of a statewide citizen organization which works to protect natural beauty in corridors of roads and highways, and encourage good design and wise location of highways. Interests include scenic conservation zoning, billboard and sign control, and undergrounding utilities. Instigates local action; supports local, State, and national legislation. Distributes publications and reprints at nominal cost.

*California Tomorrow*, Monadnock Building, 681 Market Street, San Francisco, Calif. 94105. Example of educational organization to bring greater public awareness of problems that must be faced in order to maintain a beautiful and productive State. Quarterly journal *Cry California* for membership.

*Citizens for Clean Air*, 40 W. 57th St., New York, N.Y. 10019. An example of a citizen group work-

ing for public education on health, esthetic and economic effects of air pollution. Pioneered an all-media educational advertising campaign which resulted in citizen support for enactment of a local air pollution control ordinance.

*Colorado Open Space Coordinating Council*, 5850 E. Jewell Ave., Denver, Colo. 80222. Example of a statewide federation of citizen organizations which provides a focal point for citizen action for the preservation, wise use and appreciation of scenic, historic, open space, wilderness and outdoor recreation resources as related to the total environment. Affiliates include 25 organizations with total memberships of some 25,000.

*Conservation Education Association*, c/o Dr. W. F. Clark, Eastern Montana College, Billings, Mont. 59101. Encourages conservation education programs in public schools and teacher-training. Sponsors annual conference. Publishes newsletter, bibliography, reports and other education materials.

*Desert Protective Council*, P.O. Box 33, Banning, Calif. 92220. Works to safeguard desert areas of scientific, scenic, historical, and recreational value, and to promote understanding of desert resources.

*Ducks, Unlimited*, P.O. Box 8923, Chicago, Ill. 60666. Membership organization to perpetuate wild waterfowl principally by preservation and rehabilitation of wetlands in U.S. and Canada. Establishes, promotes, assists, contributes to, and otherwise encourages conservation, restoration and good management of waterfowl habitat.

*Garden Club of America*, 598 Madison Ave., New York, N.Y. 10022. Organization of local member clubs which promotes knowledge and appreciation of horticulture, landscape design, and natural resource conservation. Provides information on pending legislation, maintains library, holds forums and lectures, sponsors flower shows. Supports scholarships in horticulture and conservation. Distributes packet on conservation practices to teachers and children.

*General Federation of Women's Clubs*, 1734 N St. NW., Washington, D.C. 20036. An organization of 51 State federations of local women's clubs. Supports study and action programs for community betterment. Departments include Conservation, Education, Home Life, Public Affairs, International Affairs, and Fine Arts. With Sears, Roebuck Foundation sponsors Community Improvement Program to encourage clubwomen to improve their communities, by involving many segments of the community. Publishes program materials for members.

*International Shade Tree Conference*, 1827 Neil Ave., Columbus, Ohio 43210. An organization of commercial, municipal and utility arborists, public officials, and scientists which promotes improved practices in the planting and preservation of shade and ornamental trees. Offers film and slide presentations. Publications include monthly Arborist News, proceedings of annual conference, and papers on specific problems such as "Industrial Landscaping" and "Highway Beautification."

*Izaak Walton League of America*, 1326 Waukegan Rd., Glenview, Ill. 60025. Membership organization with local chapters and State divisions. Promotes conservation of natural resources, and development, protection and enjoyment of high quality outdoor recreation and natural beauty resources, and public education in these concerns. Can furnish speakers and literature. Publishes monthly magazine. Cosponsors books and other educational materials.

*League of Women Voters of the United States*, 1200 17th St., N.W., Washington, D.C. 20036. Nonpartisan membership organization of local and State Leagues. Promotes political responsibility through informed and active citizen participation in government. Concerns include open space, parks and outdoor recreation facilities, with special study and effort devoted to water resource programs at all government levels. Publishes books and pamphlets.

*Men's Garden Clubs of America*, Morrisville, N.Y. 13408. Supports conservation of natural resources, parks and open spaces, abatement of water and air pollution, undergrounding of utility wires, encouragement of youth gardening. An awards program recognizes service in various environmental fields. Joins in community and industry projects such as the Institute of Scrap Iron and Steel's Green/Screen program.

*National Association of Soil and Water Conservation Districts*, 1025 Vermont Ave., N.W., Washington, D.C. 20005. Membership organization of 3,000 local districts and 50 State associations working to conserve and develop land, water and related natural resources. Its Recreation and Wildlife Committee can advise private landowners.

*National Audubon Society*, 1130 5th Ave., New York, N.Y. 10028. Membership organization with State chapters. Works for conservation of all natural resources and conservation education. Special programs for junior groups. Nature Centers Divi-

tion provides technical assistance in planning and operation of community nature centers. Offers field staff assistance on cost-share basis. The Society publishes monthly magazine, manuals, bulletins and teaching aids, publications list. Offers films and speaker services.

*National Conference on State Parks*, 1700 Pennsylvania Ave., N.W., Washington, D.C. 20006. Promotes and encourages State parks and related types of recreation resources. In cooperation with the National Park Service and the National Recreation and Park Association, provides publications on park planning, design, operation and philosophy. Publishes newsletter, proceedings, and reports of studies and surveys.

*National Council of State Garden Clubs*, 4401 Magnolia Ave., St. Louis, Mo. 63110. Organization of local clubs in every State concerned with community improvement. Sponsors, with Sears, Roebuck Foundation, a Community Beautification Program. Films, filmstrips available.

*National Parks Association*, 1300 New Hampshire Ave., N.W., Washington, D.C. 20036. Encourages public support for the protection of the national park system and of the natural environment generally. Interests include river basin planning, regional recreation planning, and wilderness and wildlife protection. Publishes monthly National Parks Magazine, conservation leaflets for use in schools, and studies on conservation issues.

*National Recreation and Park Association*, 1700 Pennsylvania Ave., N.W., Washington, D.C. 20006. Dedicated to advancement of recreation and park activities and the conservation of natural and human resources. Provides public information programs, research services, workshops and other training through nine regional offices. Publishes monthly Parks and Recreation magazine and newsletters on specialized subjects.

*National Trust for Historic Preservation*, Decatur House, 748 Jackson Pl., N.W., Washington, D.C. 20006. Membership organization made up of individuals and groups. Provides advice and technical assistance on preservation and restoration of buildings or sites significant in American history and culture. Cooperates with National Park Service and other agencies on Historic American Buildings Survey, National Register of Landmarks and similar projects. Administers endowed properties for public enjoyment. Publishes leaflets on such subjects as preservation law and restoration techniques, a quarterly journal and a monthly newspaper.

*National Wildlife Federation*, 1412 16th St., N.W., Washington D.C. 20036. Membership organization, with affiliated State organizations. Dedicated to encourage wise use and management of natural resources. Sponsors annual National Wildlife Week. Makes grants to graduate students. Publishes booklets, newsletters, bimonthly magazine of general interest, monthly nature magazine for children. Distributes television and radio materials.

*National Youth Conference on Natural Beauty and Conservation*, c/o Girl Scouts of the U.S.A., 830 Third Ave., New York, N.Y. 10022. Cooperative effort of 11 national youth organizations to work toward goals of their 1966 conference. Encourages involvement of young people not affiliated with these groups. A Youth Project Assistance Grants Program sponsored by the Coca-Cola Co., helps young people to further worthy natural beauty and conservation projects already underway. Participating youth organizations may be addressed directly:

Boy Scouts of America
New Brunswick, N.J. 08903

Boys' Club of America
771 First Ave.
New York, N.Y. 10017

Camp Fire Girls, Inc.
65 Worth St.
New York, N.Y. 10013

4-H and Youth Development
Federal Extension Service
U.S. Department of Agriculture
Washington, D.C. 20250

Future Farmers of America
U.S. Office of Education
Department of Health, Education, and Welfare
Washington, D.C. 20202

Future Homemakers of America
U.S. Office of Education
Department of Health, Education, and Welfare
Washington, D.C. 20202

Girls' Clubs of America, Inc.
101 Park Ave.
New York, N.Y. 10017

Girl Scouts of the U.S.A.
830 Third Ave.
New York, N.Y. 10022

Red Cross Youth
The American National Red Cross
17th and E Sts., N.W.
Washington, D.C. 20013

Young Men's Christian Association
291 Broadway
New York, N.Y. 10007

Young Women's Christian Association
600 Lexington Ave.
New York, N.Y. 10022

*The Nature Conservancy*, 1522 K Street, N.W., Washington, D.C. 20006. Membership organization with primary purpose of acquiring land to help preserve the country's natural heritage. A revolving loan fund permits purchase of natural areas threatened with destruction. Accepts gifts of land for conservation purposes, manages a system of reserves, provides technical and financial assistance to landowners, groups, and government agencies. Assists universities in acquisition of land for biological study. Publishes quarterly News, and pamphlets on scientific, educational and legal aspects of natural area and open space preservation.

*The Open Lands Project*, 123 W. Madison St., Chicago, Ill. 60602. Example of a metropolitan area effort to examine area conservation and recreation needs, and press for action to meet them. Affiliated with Welfare Council of Metropolitan Chicago, coordinating body of 263 Chicago area health, welfare and recreation agencies. The project is administered by staff and a committee of conservationists, businessmen and scientists.

*The Outdoor Circle*, 1319 Kalakua Avenue, Honolulu, Hawaii 96814. Example of membership organization (formed in 191 ) supported by annual dues, to preserve the natural beauty of the State. Works with public officials and businessmen on such problems as outdoor signs, public landscaping projects, proper garbage and sewage disposal, and the planting and preservation of trees.

*Regional Plan Association*, 230 W. 41st St., New York, N.Y. 10036. An example of a citizens' organization dedicated to development of an efficient, attractive and varied metropolitan region—in this case the three-State metropolitan region surrounding New York City. Membership is open to individuals, businesses and organizations. Holds an annual Regional Plan Conference. Publishes research bulletins and periodicals, including Regional Plan News.

*Roadside Councils*. In some 17 States Roadside Councils work for scenic highways, billboard control, roadside rests, and related concerns. There is no national organization but the California Roadside Council (which see) serves as a national clearinghouse for other State Councils.

*Save-the-Redwoods League*, 114 Sansome St., San Francisco, Calif. 94104. Membership organization which cooperates with California State Park Commission, the National Park Service, and other agencies in establishing and preserving redwood parks, and other parks and reservations, and in rescuing from destruction representative areas of primeval forests.

*Sierra Club*, 1050 Mills Tower, 220 Bush St., San Francisco, Calif. 94104. Membership organization devoted to exploring, enjoying, and protecting natural scenic resources. Active in conservation administration, litigation, and legislation. Sponsors wilderness outings, mountaineering, skiing, and river touring. Produces conservation films, exhibits, and manuals; sponsors conferences on wilderness and natural science; and publishes books on wilderness and other scenic resources, guide books, a monthly Bulletin, and other conservation-education materials.

*Society of American Foresters*, 1010 16th Street, N.W., Washington, D.C. 20036. Membership of professional foresters to represent, advance, and protect the interests and standards of the profession. Publishes monthly magazine.

*Sport Fishing Institute*, 719 13th Street, N.W., Washington, D.C. 20005. Works through research, education, and serves to enhance fishery resources.

*Urban America*, 1717 Massachusetts Ave., N.W., Washington, D.C. 20036. Educational organization seeking to improve total quality of life in cities. Purposes include fostering of planning for the best use of land and natural resources, conservation of natural scenery, and encouragement of good environmental design. Publications include a bimonthly, City; and brochures and other materials.

*Western Pennsylvania Conservancy*, 204 Fifth Ave., Pittsburgh, Pa. 15222. Example of active State, citizen membership organization. Work includes comprehensive planning and acquisition of land for State parks, nature centers, and other open space, and acquisition and restoration of historic landmarks. Conducts educational programs, maintains speakers bureau.

*The Wilderness Society*, 729 15th St., N.W., Washington, D.C. 20005. Membership organization dedicated to increase knowledge and appreciation of wilderness, and to see established policies and programs for its protection and use. Encourages

members to work for preservation of wilderness areas near home communities in cooperation with other groups. Publishes quarterly magazine, The Living Wilderness.

NONMEMBERSHIP ORGANIZATIONS

*American Association of Nurserymen*, 835 Southern Bldg., Washington, D.C. 20005. Promotes replanting of forests and unproductive farmlands, and park, street and highway planting. A Landscape Awards Program recognizes achievement in industrial, institutional, municipal and commercial planting. Members participate in public service programs such as *New Roots for Young America* (sponsored by Reliance Insurance Co.), to provide plantings for schoolyards. Provides films and pamphlets.

*American Conservation Association*, 30 Rockefeller Plaza, New York, N.Y., 10020. Privately supported nonmembership educational and scientific organization dedicated to the advancement of knowledge and understanding of conservation, and to the preservation and development of natural resources for public use.

*American Forest Products Industries*, 1835 K St., N.W., Washington, D.C. 20006. Encourages management of forest lands on the multiple-use principle, including regard for natural beauty. Provides free materials including booklets, charts, packets for organization programs, and films.

*Conservation Associates*, Mills Tower, 220 Bush St., San Francisco, Calif. 94104. Provides assistance in land planning and land acquisition to private and public conservation interests.

*The Conservation Foundation*, 1250 Connecticut Ave., N.W., Washington, D.C. 20036. Privately supported organization for research, education, and information to help protect and enhance the quality of the environment. Conducts an interdisciplinary program of environmental studies, conservation services, and a research grant program. Seeks to encourage recognition of ecological principles and natural resource values in planning and decisionmaking, and to increase effectiveness of social action for accomplishing conservation goals. Publications include a periodic newsletter on environmental issues, a quarterly education bulletin, and booklets.

*Conservation Law Society of America*, Mills Tower, 220 Bush St., San Francisco, Calif. 94104. Helps defend the public interest in protection and appropriate uses of parks and comparable reserved areas through application of law. Can provide counsel on a fee basis in administrative and court proceedings on selected cases of nationwide significance.

*Design for Washington*, 312 First Ave. North, Seattle, Wash. 98109. Example of a statewide organization which encourages citizens to involve themselves in community environment. Suggests how to get and use professional assistance to rally business, public and other elements of the community, how to coordinate private enterprise and public works, and what people have done elsewhere that worked. Developed from 1965 Governor's Design for Washington Conference, financed by private contributions.

*Ford Foundation*, 477 Madison Ave., New York, N.Y. 10022. Privately funded institution to serve the public welfare including support of research, training, and demonstration projects relevant to the quality of man's environment. Operates only through grants to private nonprofit agencies, State and local bodies, and educational institutions. Concerns include strengthening applied ecology, improving training of resource administrators, preserving open space, encouraging good environmental design, assisting in elimination of pollution, and promotion of sound policies of resource use.

*Industrial Gas Cleaning Institute*, Box 448, Rye, N.Y. 10580. Trade association. Disseminates information on air pollution control, the effects of industrial gas cleaning on public health, and other industry matters. Cosponsors a nationwide Clean Air Community Action Program with U.S. Jaycees.

*Institute of Scrap Iron and Steel*, 1729 H St., N.W., Washington, D.C. 20006. Encourages scrap processors to screen yards through Project Green/Screen.

*Keep America Beautiful*, 99 Park Ave., New York, N.Y. 10016. Industry-financed clearinghouse and coordinating agency for antilitter activities. Provides for public education services, largely through national publicity and advertising campaigns. Carries out research, provides litter prevention advice and materials, holds workshops and meetings with leaders of interested organizations. Publishes booklets, brochures, sponsors films.

*Mined-Land Conservation Conference*, 1130 17th St., N.W., Washington, D.C. 20036. Membership from mining and allied industries who recognize need for reclamation and conservation planning in mined-land areas, and greater public awareness of such efforts. Publishes monthly newsletter.

*National Association of Home Builders*, 1625 L Street, N.W., Washington, D.C. 20036. Encourages better housing and community planning and design. Through its Institute of Environmental Design, Land Use and Development Department, and member committees, studies political, legal, conservation, esthetic and social aspects of land use and housing; holds conferences of builders and leaders in other disciplines including planning, sociology, education. Publishes monthly Journal.

*National Auto and Truck Wreckers Association*, 18 Second Ave., San Mateo, Calif. 94401. Trade association. Makes available information on techniques of screening wrecking yards.

*National Clean Up-Paint Up-Fix Up Bureau*, 1500 Rhode Island Ave., N.W., Washington, D.C. 20005. Industry supported foundation helps towns develop "clean-up, paint-up, fix-up" campaigns of short duration, year-round civic action programs involving city governments and volunteer organizations. Provides action kits, publishes newsletter, both free. Provides posters, films and other materials at cost.

*National Sand and Gravel Association*, 900 Spring St., Silver Spring, Md. 20910. Trade membership organization. Prepares publications, including Site Utilization and Rehabilitation Practices for Land and Gravel Operations, Case Histories, Rehabilitation, Land Use Planning and other materials and guidelines capable of more general application.

*Resources for the Future*, 1755 Massachusetts Ave., N.W., Washington, D.C. 20036. Conducts programs of research and education in development, conservation and use of natural resources, through its own staff and through grants to other institutions.

*Sears, Roebuck Foundation*, 925 So. Homan Ave., Chicago, Ill. 60607. Supports community betterment programs in conjunction with nonprofit organizations such as the General Federation of Women's Clubs (Community Improvement Program) and the National Council of State Garden Clubs (Community Beautification Program). Financial aid, booklets, filmstrips available to participating clubs.

*Urban Land Institute*, 1200 18th St., N.W., Washington, D.C. 20036. Independent research organization supported by membership, publication sales, and sponsored research. Works to promote better urban planning and development through study and analysis and reporting of trends in development and use of land. Publishes monthly newsletter, technical bulletins, and special reports from research projects and from Panel Studies.

*Wildlife Management Institute*, 709 Wire Building, Washington, D.C. 20005. Supported by individuals, groups and industries to promote restoration and improved management of wildlife and related natural resources. Field representatives provide technical services to landowners and work with State and Federal agencies. Publishes books, newsletter.

PROFESSIONAL ORGANIZATIONS

*American Association for the Advancement of Science*, 1515 Massachusetts Ave., N.W., Washington, D.C. 20005. Members are scientists and scientific societies representing all fields of science. Purposes include increasing public understanding of science. Fosters broad interdisciplinary programs on environmental subjects. Publishes weekly magazine Science, quarterly review, science books, and symposium volumes including such titles as Air Conservation, and Estuaries.

*American Institute of Architects*, 1735 New York Avenue, N.W., Washington, D.C. 20006. Professional membership organization to promote excellence in architecture and urban design, and public action for improvement of environment. Local chapters implement programs developed by national committees. These include the *War on Community Ugliness* program to stimulate public interest and action to improve urban environment; urban design assistance teams, and citations for excellence in community architecture. AIA supports legislation and works with public agencies to improve urban design, transportation, and preservation of historic architecture. Publishes monthly magazine; produces books and visual aids.

*American Institute of Planners*, 917 Fifteenth St., N.W., Washington, D.C. 20005. Professional membership of individuals on State, metropolitan and local professional planning staffs and consultants concerned with comprehensive planning. Issues background papers and policy statements; undertakes studies. Sponsors conferences and interdisciplinary programs. Publishes bimonthly Journal, monthly newsletter, and annual conference proceedings.

*American Society of Agronomy*, 677 Segoe Rd., Madison, Wis. 53711. Professional membership organization of soil, crop, turf-grass and land management scientists. Publishes a journal, scientific magazines, monographs and newsletters.

*American Society of Landscape Architects*, 2000 K Street, N.W., Washington, D.C. 20006. Professional membership organization to promote education and skill in landscape architecture. Publishes policies on public-interest aspects of landscape conservation, and supports their implementation at all levels of government. Local chapters are available for consultation. Makes awards to organizations contributing to landscape improvement, and cooperates with other design professions in enhancement of man's environment. Publishes a magazine, Landscape Architecture, and special reports.

*National Education Association*, 1201 Sixteenth St., N.W., Washington, D.C. 20036. Professional organization of educators which, with regard to education in conservation and natural beauty, assists schools in teaching future citizens to appreciate their natural heritage, recognize forces which endanger it, and be prepared to help maintain a desirable environment. Affiliated departments include the American Association of School Administrators, American Association for Health, Physical Education and Recreation, and Department of Rural Education. Publications include a journal and a list of references on conservation education.

*National Recreation and Park Society*, 1700 Pennsylvania Ave., N.W., Washington, D.C. 20006. Professional branch of National Recreation and Park Association.

*Society of American Foresters*, 1010 16th Street, N.W., Washington, D.C. 20036. Professional organization of foresters to promote the science, practice and standards of forestry. Local chapters are available for consultation. Publishes Journal of Forestry.

*Soil Conservation Society of America*, 7515 N.E. Ankeny Rd., Ankeny, Iowa. 50021. A professional membership organization comprised of soil conservationists, scientists, educators and administrators. Local chapters available for consultation. Publishes a journal.

*The Wildlife Society*, 3900 Wisconsin Ave., N.W., Washington, D.C. 20016. Professional membership organization of wildlife biologists, educators and administrators. Local chapters can provide technical assistance in planning to include consideration of overall ecological relationhsips affecting natural beauty programs. Publishes Journal of Wildlife Management.

# GOOD READING

## I. MAN AND THE ENVIRONMENT

Bates, Marston. Man in Nature. Prentice-Hall Foundations of Modern Biology Series. 1964.

The author explores the area of contact and overlap between the biological and social sciences, and looks at some aspects of biology that provide useful background for the exploration of social studies.

Carson, Rachel. Silent Spring. Houghton Mifflin, 1962.

A classic.

Carson, Rachel. The Sea Around Us. Oxford.

$5.75. Paper: Signet-Nal.

Carson, Rachel. The Edge of the Sea. Houghton Mifflin.

$5.50. Paper: Signet Nal

Commoner, Barry. Science and Survival. Viking Compass Paperback.

The author warns of the danger of self-extinction caused by the forces which science has unleashed without knowledge of what the long-range effects on the environment will be. By moral judgment and proper political choice mankind can safeguard its future.

Dasmann, Raymond F. A Different Kind of Country. Macmillan, 1968.

States the need to preserve diversity in human cultures and ways of life: the preserving of natural diversity is our greatest hope for keeping the door open for future change, to enable man to correct his mistakes and alter his directions in dealing with the human environment.

Dubos, Rene. So Human An Animal. Charles Scribner's Sons, 1969. Pulitzer Prize for 1969.

Explores the idea that, because we are products of our environment, we must develop a science of human life so that the current trend toward dehumanization can be reversed.

Dubos, Rene. Man Adapting. 1966 Phi Beta Kappa Science Book Award.

This book breaks new ground in a field still in its infancy--Human Ecology. The theme states that: "the states of health or disease are the expressions of the success or failure experienced by the organism in its efforts to respond adaptively to environmental challenges."

Dubos, Rene. The Torch of Life. 1962.

An eloquent statement by a scientist who believes that science has failed to recognize the uniqueness of man.

Jaeger, E. C. The North American Deserts. Standford Press.

$5.95.

Odom, Eugene P. Ecology. Holt.

$2.95. Paper

Hamilton, Terrell H. Process and Pattern in Evolution.

$1.95 Paper.

The Subversive Science, Essays toward an Ecology of Man, edited by Paul Shepard and Daniel McKinley, Houghton Mifflin Company, 1969.

$5.95. Available in paper (454 pages.)

This book is a collection of searching and provocative essays pointing toward an ecology of man. We must, says Shepard in his Introduction, come to "a wider perception of the landscape as a creative, harmonious being where relationships of things are as real as the thing." He goes on to point out the dangers to this web of relationships of the many injuries man thoughtlessly does to it--the pollution we pour into the air, the pesticides, weedkillers and other noxious substances we scatter over the land or drain off into the rivers and seas, and so on. The theme of the spoiling of the natural environment is hardly a new one, although it is acquiring a greater urgency than ever today, in new ways which many of the essays collected here describe.

Fuller, R. Buckminster. Operating Manual for Spaceship Earth, 143 pages. Carbondale: Southern Illinois University Press. $4.25.

Mr. Fuller's central premise, shared with the Transcendentalists, is that man's intelligence is part of Nature, and its activities part of the evolution process.

McHale, John. The Future of the Future. Illustrated, New York: George Braziller, 1969.

$7.95. 336 pages.

This book is an inventory of options, or a prolegomenon to such an inventory. We will get the future we learn to expect, and "the future of the future is what we determine it to be, both individually and collectively."

## II. THE CITY

Ekistics: An Introduction to the Science of Human Settlements by Constantinos A. Doxiadis.

Ekistics denotes planning for the total human environment and attempts to plan human settlements not only in terms of architecture, but equally in terms of engineering, sociology, economy, geography, political science, mathematics and other arts and sciences.

MATRIX OF MAN: An Illustrated History of Urban Environment by Sibyl Moholy-Nagy.

Through trenchent criticism, illuminating anecdotes, and biographical details, Mrs. Moholy-Nagy analyzes the urban environment that man has shaped and that shapes him.

DESIGN WITH NATURE by Ian McHarg, Natural History Press.

"For those who are appalled by our ransacked continent and its necklace of squalid cities--here is a scientific and humane solution."

A PLACE TO LIVE: The Crisis of the Cities by Wolf Von Eckardt.

Mr. Von Eckardt blends architectural observation, social psychology, politics and planning into the large context of today's civilization demonstrating to the average citizen why he must involve himself in his own community affairs if he wishes to lead a better and more profitable life.

### Theory and Historic Background.

The City in History. Lewis Mumford. Harcourt Brach & World.

The City, Max Weber. Free Press of Glencoe, Illinois.

The Making of Urban America. John Reps. Princeton University Press Cities: Scientific American. Alfred Knopf (Paperback).

Current Commentary.

The Death and Life of Great American Cities, Jane Jacobs, Random House.

Dilemmas of Urban America. Robert C. Weaver. Atheneum Paperback.

Goals for Urban America. Brian J. Berry & Jack Meltzer (editors). Spectrum Paperback.

Cities in A Race with Time. Jeanne R. Lowe. Random House.

The Secular City. Harvey Cox. Maxmillan Paperback.

The Human City:

Report of the National Advisory Commission on Civil Disorders. Bantam Books Paperback.

An American Dilemma. Gunnar Myrdal. Harper & Brothers.

The Moynihan Report and the Politics of Controversy. Lee Rainwater, William Yancey. MIT Paperback.

Beyond the Melting Pot. Nathan Glazer and Daniel Moynihan , MIT Press.

Renewing the Inner City:

Renewing Our Cities, Miles Clean. 20th Century Fund.

Urban Renewal: The Record and the Controversy. James Wilson (editor). MIT Press.

Urban Renewal: People, Politics and Planning. Jewell Bellush and Murray Hansknecht. Doubleday Anchor Paperback.

The City, The Suburbs, The Metropolis:

Slums and Suburbs. James B. Conant. McGraw-Hill.

The Metropolitan Enigma. James Wilson (editor). Chamber of Commerce of the United States.

The Metropolis. John C. Bollens and Henry Schmandt. Harper and Row.

Guiding Metropolitan Growth. Commission for Economic Development Report GPO.

Environment for Man: The Next Fifty Years. William R. Ewald (editor). American Institute of Planners 50th Anniversary Publication.

III. RECENT GENERAL BOOKS (Popular) ON ENVIRONMENT

Not so Rich as you Think by George R. Steward with drawings by Robert Osborn. Houghton Mifflin, Boston, 1967.

Very good popular presentation of environmental problems.

America the Raped - The Engineering Mentality and the Devastation of a Continent by Gene Marine. Simon and Schuster, 1969.

The April 1967 issue of Ramparts magazine carried an article by Gene Marine entitled "America the Raped." People who read his book may not always agree with the author but most will lay it down thinking something is sadly out of whack somewhere.

Where there is Life by Paul B. Sears. A Laurel Science Original, Dell Paperback, 50 cents.

An introduction to ecology, a science which interprets the relationships of the environment and its inhabitants.

Man in the Web of Life by John H. Storer. Signet Science Library, 95 cents.

Presents facts from all the sciences, as it draws a portrait of today's man in today's world - his body, mind, his place in economics, society, politics, and civilization. This is the "everything" book. Unifying all the sciences, John H. Storer tells how man can and must create a better world for man. 1968.

Poisons in your Food by Ruth Winter with an introduction by Senator Walter F. Mondale. Crown Publishers, 1969.

An investigation disclosing the most alarming facts regarding the dissemination of dangerous foodstuffs and drugs, pointing out the callous disregard of processors, distributors, and retailers for the safety of human guinea pigs.

The Sress of Life. Hans Selye, M.D. McGraw-Hill paperback.

"This book is dedicated to those who are not afraid to enjoy the stress of a full life, nor too naive to think that they can do so without intellectual effort."

The Fitness of Man's Environment. Papers delivered at a symposium, Washington, D.C., 1967. Smithsonian Institution Press 1968 distributed by Random House (250 pages) $5.95.

The Last Landscape. William Holly Whyte, Doubleday, 1968. $6.95.

Fortune magazine article: "We can Afford A Better America," by Edmund K. Faltermayer, March, 1969.

Time magazine article: "Ecology: Menace in the Skies," January 27, 1967.

Ecology. Peter Farb and the Life Editors, Time, Inc., 1963.

U.S. News and World Report: "Can Man Survive Life in the Big Cities," May 1, 1967 by Dr. Rene Dubos.

Poisons in the Air. Edward Edelson and Fred Warshofsky, Pocket Books, Inc., 1966.

Man Above Nature--An Essential Inquiry, The Twentieth Century Fund, August Heckscher, 1966.

## IV. AIR POLLUTION

Air Conservation, the report of the Air Conservation Commission of the American Association for the Advancement of Science. Publication No. 80 of the AAAS, Washington, D. C. 1965.

Contains three parts. Part 1 being Air Conservation and Public Policy; Part 2, Summary of the Facts; and Part 3 background reports on seven topics: meteorology, pollutants and their effects, metropolitan organization for air conservation, air conservation and the law, air pollution control, socio-economic factors, and air pollution and urban development.

Economic Costs of Air Pollution. Studies in Measurement by Ronald G. Ridker, Praeger Special Studies in U. S. Economic and Social Development, 1967.

The Economics of Air Pollution. A Symposium, edited by Harold Wolozi, W.W. Norton and Company, 1966 with a preface by Gardner Ackley, then chairman, Council of Economic Advisers.

This book contains an excellent bibliography of books, journal articles, monographs, and related papers concerned with air pollution and economics.

The Unclean Sky by Louis J. Battan. A meteorologist looks at air pollution. Doubleday Anchor paperback - $1.25, 1966.

Causes and effects of air pollution explained meteorologically. Nature of the atmosphere, atmospheric conditions that contribute to the problem of pollution, damage done in nature by air pollution. Lists suggested paths to improvement.

The Battle for Clean Air by Edward Edelson. Public Affairs Pamphlet No. 403, May 1967, 28 pages 25 cents.

Identifies and explains sources of pollution. Describes damage to human health, to plant life, and to property caused by polluted air. Explains what government and industry are doing and what citizen groups can do both for immediate and for long-range solutions to the problem.

Trial, Volume 2, No. 6, published by the Am. Trial Lawyers Association, 6 Beacon Street, Boston, Massachusetts 02108, Oct./Nov. 1966, pages 9-12.

Four articles dealing with pollution, especially air pollution. Includes articles on governmental measures, the possibility of lawsuits against polluters, the role of public opinion in creating stronger laws.

Weather and Health by Helmut E. Landsberg. An Introduction to Bio-meteorology. Science Study Series, Garden City, New York Anchor Doubleday paperback, 1969, 148 pages, $1.25.

Deals with the relationship between atmospheric and life processes. Each change in the weather require an adaptation of the human body; some of these adaptations are simple while others are subtle and at present only beginning to be understood.

## V. SOLID WASTE

Committee on Pollution, National Academy of Sciences - National Research Council. Waste Management and Control, A Report to the Federal Council for Science and Technology. Washington, D.C.: National Academy of Sciences - National Research Council, 1966. 257 pages paperback $4.00.

Findings and recommendations of the committee, presented as summary report and appendixes which offer more detailed analysis and recommendations for solving the pollution problem.

McKinney, Ross E. "The Environmental Challenge of Solid Wastes." Technology Review, Volume 70, No. 7, May 1968, Pages 35-39.

The author maintains that our society has created the problem of solid waste disposal, and we now must use our technological resources to create solutions.

Solid Waste Handling in Metropolitan Areas. U. S. Department of Health, Education, and Welfare, Cincinnati: PHS No. 15554, January 1968, 41 pages.

Discussion of problems and approaches to solving problems of solid waste disposal. See especially Policy Questions, page 37.

Wilson, David G. "Technology and the Solid Waste Problem." Technology Review, Volume 71, No. 4, February 1969, pages 29-33.

A summary of findings of a study group examining the management of solid wastes. Makes recommendations for greater efficiency and economy in waste handling and disposal.

Proceedings, The Surgeon General's Conference on Solid Waste Management for Metropolitan Washington, July 19-20, 1967. U.S. Department of Health, Education, and Welfare, PHS edited by Leo Weaver.

Waste Management: Generation and Disposal of Solid, Liquid and Gaseous Wastes in the New York Region. Authors Blair T. Bower with Gordon P. Larson, Abraham Michaels, and Walter M. Phillips. Published in March 1968.

The report of the Regional Plan Association on the second regional plan for the New York region contributing to the growing body of knowledge about wastes management.

Automobile Disposal: A National Problem. Department of the Interior, 1967. 569 pages, $4.50.

Case studies in selected areas of factors influencing accumulation of junked autos, Bureau of Mines, Department of the Interior.

Municipal Refuse Disposal. American Public Works Association, Public Administration Service, Chicago, Illinois, 1966. 528 pages. $10.00.

## VI. POPULATION

Cook, Robert C. and Lecht, Jane. People: An Introduction to the Study of Population. 1968. Paperback 63 pages $1.50.

Ehrlich, Paul R. The Population Bomb. Ballantic paperback 1968. 95 cents.

Clearly describes the dimensions of the crisis in all its aspects - air, food, water, birth control, death control, our total environment - and provides a realistic evaluation of the remaining options.

Freedman, Ronald, editor. Population: The Vital Revolution. 1965. Paperback $1.45.

Series of essays describing current world population trends, including not only the rapid population growth but other factors such as birth and death rates, age distribution, and population mobility. Specific, area-by-area, summary of world population trends and forecasts.

Greep, Roy O., editor. Human Fertility and Population Problems. Cambridge, Massachusetts: Schenkman Publishing Company, Inc., Harvard Square 02138, 1963. Paperback, 278 pages, $2.65.

Proceedings of seminar on Human Fertility and Population Problems. Focusing on what can be done about population problem and how, with material primarily from bio-medical, socio-economic and cultural fronts.

Hardin, Garrett. "The Tragedy of the Commons." Science, Volume 162, No. 3859, 13 December 1968. Pages 1243-1248.

The author believes that the population problem has no technical solution, but only a moral one: to abandon the freedom to breed.

McElroy, William D. "Biomedical Aspects of Population Control." BioScience, Volume 19, No. 1, January 1969. Pages 19-23.

Makes numerous recommendations for achieving population control, arguing that the ultimate goal must be a population growth rate of zero.

Ng, Larry K. Y., editor, and Stuart Mudd, co-editor. The Population Crisis, Implications and Plans for Action. Bloomington: Indiana University Press, 1965. Paperback, 364 pages, $2.95.

A collection of papers dealing with the population crisis, implications of the population explosion, and action programs, by leading scientists, humanists, and statesmen.

Rainwater, Lee. And the Poor Get Children. Chicago: Quandrangle Books, Inc., 1967. Paperback, 202 pages $1.95.

Deals with the background of social and psychological factors which influence the ways in which working class people think about family planning and contraception.

## VII. MISCELLANEOUS

Aylesworth, Thomas G. This Vital Air, This Vital Water: Man's Environmental Crisis. Chicago, Illinois 60680: Rand McNally and Company, P. O. Box 7600, 1968. 192 pages, $4.95.

After presenting the facts on air, water and noise pollution, the author tells of the more significant current research in pollution control and of the new thrusts that are being made by the technician in the laboratory but also by lawmakers and the public toward the reduction and control of pollution.

Fanning, Odom. Opportunities in Oceanographic Careers. Vocational Guidance Manuals, New York, 1967.

Health is a Community Affair, Report of the National Commission on Community Health Services. Cambridge, Massachusetts: Harvard University Press, 1966. Paperback, 252 pages, $2.25.

Stressing the fact that health is inescapable a community affair, the report's recommendations are intended to be acted on by communities and is addressed to all those who work either professionally or as volunteers for more effective health services.

Noise Pollution - Sound Wi[illegible]t Value - Report of the President's Office o[illegible]ence and Technology (President Johnson's Scie[illegible] Advisory Report.)

Contains a bibliography on noise articles, etc. Article on Noise - The Fourth Pollution attached to this bibliography.

## ENVIRONMENTAL HEALTH SERVICE REGIONAL OFFICES

Regional Assistant Administrators for the Environmental Health Service are located in Regional Offices of the Department of Health, Education, and Welfare. The offices serving the states indicated, are as follows:

Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island (DHEW Region I.)
John F. Kennedy Federal Building, Government Center, Boston, Massachusetts 02203
(Telephone: 617-223-6884)

Delaware, New Jersey, New York, Pennsylvania (DHEW Region II.)
Room 847, 26 Federal Plaza, New York, New York 10007
(Telephone: 212-264-2525)

District of Columbia, Kentucky, Maryland, North Carolina, Virginia, West Virginia, Puerto Rico, Virgin Islands (DHEW Region III )
220 - 7th Street, NE, Charlottesville, Virginia 22901
(Telephone: 703-296-1256)

Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee (DHEW Region IV )
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(Telephone: 404-526-6214)

Illinois, Indiana, Michigan, Ohio, Wisconsin (DHEW Region V.)
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