

Cancer & the Environment

Edited by Lester A. Sobel

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Contents

'DANGEROUS TO YOUR HEALTH'	1
DANGER AT WORK, DANGER FROM INDUSTRY	9
Cancer Deaths Increase, Jobs & Industry a Cause	9
PCB Under Attack	15
Asbestos	18
Hazardous Wastes	26
Other Industrial & Chemical Problems	30
Protection of Workers from Exposure to Carcinogens	38
DANGER IN THE AIR	43
War on Air-Borne Carcinogens	43
Stress on Auto Pollution	47
Widening Regulation	50
Energy Crisis Complicates Anti-Pollution Campaign	55
Cleanup Inadequate	60
Energy, Pollution & Health	64
SST, Other Ozone Threats & Skin Cancer	71
DANGER IN FOOD & DRINK & OTHER	
EVERY-DAY ITEMS	77
The Delaney Clause: All Food Carcinogens Banned	77
Danger in Sweeteners	82
Danger from Nitrite	91
Danger from Food Colors	93
Danger from DES in Livestock	94
PBB Case	97

Danger in Drinking Water	98
Cigarette Smoking	103
Other Cancer Hazards	112
MEDICAL RESEARCH, TREATMENT,	
PREVENTION & HAZARDS	115
War on Cancer	115
Treatment & Controversies	122
Danger in Medical Practice	127
Research on Virus & Cancer	136
RADIATION & CANCER	139
Energy, the Atom & Cancer	139
Nuclear Hazards to Health	146
Action Vs. Radiation Dangers	149
Cancer Dangers Stressed	153
The Three Mile Island Accident	159
Danger from Radioactive Wastes	171
A-Weapons & Tests	174
Other Radiation Problems	180
OTHER DANGERS	183
Danger in Pesticides	183
Environmental Developments	188
Diet & Nutrition	195
INDEX	199

'Dangerous to Your Health'

THIS FAMILIAR NOTICE APPEARS on every packet of cigarettes sold in the United States: "Warning. The Surgeon General has determined that cigarette smoking is dangerous to your health."

The warning is required by law because years of research and experience have implicated cigarette smoking as a cause of lung cancer. Evidence has been produced that smoking also is involved in cases of cardiovascular disease and other ills. But the cancer connection was the weapon that won the campaign to label cigarette smoking officially as a health hazard.

With similar justification, some observers say, the government could also require notices warning that:

- The air you breathe is dangerous to your health.
- The food you eat is dangerous to your health.
- The water you drink is dangerous to your health.
- The clothes you wear are dangerous to your health.
- Your home is dangerous to your health.
- Your job is dangerous to your health.
- Your school is dangerous to your health.
- Your doctor and dentist are dangerous to your health.
- Sunbathing is dangerous to your health.
- The area you live in is dangerous to your health.
- Industrial and government activities (foreign and domestic) are dangerous to your health.

In each case, as most of us are aware, the deliberately exaggerated health hazard referred to is the danger of cancer.

Carcinogens in minute quantities are reported in food, food additives, drinks, medicines, the air, the soil, the water. Radiation from industry, American and foreign weapons testing, medical and dental X-rays and natural ("background") sources are described as potential producers of cancer. Cancer-causing substances are said to have been found in the insulation in our homes and schools, in the pollution from factories that blankets many of our communities, in flame-retardants with which some clothing has been treated and in many materials that workers handle daily on the job.

In sum, the environment—or many things in it—may give you cancer.

This conclusion was expressed in the April 1977 issue of the *Journal of the National Cancer Institute* by Ernest L. Wynder of the Division of Epidemiology, American Health Foundation, and Gio B. Gori of the Division of Cancer Cause & Prevention, National Cancer Institute, National Institutes of Health. "Most cancers today appear to be induced by elements originating in man's environment rather than as a result of purely genetic or viral factors," the two scientists wrote. They specifically defined "environmental elements . . . as those originating wholly or largely outside the host's body." The authors noted that "with the increasing number of news reports regarding hazardous components [of the environment], the average citizen considers himself immersed in an uncontrollable sea of carcinogens."

Some concerned observers are beginning to question the accuracy of reports about the prevalence of so many claimed cancer-causing agents. "Almost daily," Rep. William C. Wampler (R, Va.) told the U.S. House of Representatives March 14, 1979, "the consuming public is being bombarded with news stories that hundreds of substances—in such items as bacon and hot dogs, saccharin, beer, asbestos, tobacco, spinach, pesticides used to control insects and weeds in food production, and cleaning fluids—that people breathe, touch, eat or drink or encounter in the workplace every day are suddenly suspected of causing cancer. These media announcements, generally unsupported by the scientific community, give the public a horrible fright. Of greater concern, however, many in the general public are beginning to wonder who and what to believe, because so many beneficial substances, long in use, are being linked to this ever-growing suspect list of substances that are alleged to cause cancer." Wampler continued:

Congress, which is a nonscientific body, has in the past been called upon to write legislation concerning carcinogens. . . . We have authorized various Federal agencies to regulate the use of chemicals that may pose a risk to cancer. We have not told them how to do it, but have entrusted them with the task of using their scientific expertise to formulate policies that would protect our population from harm while preserving the capability of our farmers and our industries to carry on their business, and the working people of this country to earn their bread and butter. Unfortunately, we were too optimistic in assuming that 'scientific validity' necessarily leads to 'workability.' We find that today no less than seven agencies operating from nine laws promulgated by several congressional committees are involved in assessing the cancer risk posed by various chemicals, and that they all have their own policies for doing so. The result—despite the recent efforts of a task force of the Interagency Regulatory Liaison Group to come up with a common Federal policy—has been haphazard application of controls on potential carcinogens that has left both the public and large segments of American agriculture and other industries in a state of confusion and uncertainty. . . .

. . . [T]his confusion is understandable, for there is no scientific consensus of opinion on risk assessment of chemical carcinogenesis. Implicit in cancer and toxic substances research is a large degree of uncertainty and a distressing scarcity of hard facts. The long-term effect of many chemicals is simply not known, nor is the validity of some of the tests currently used to measure the toxicity or carcinogenicity of a particular substance. Above all, there is little agreement on how the results of animal tests should be applied to humans. . . .

. . . [T]he universe of known chemicals is something on the order of 4.2 million, of which roughly 50,000 to 70,000 are in the inventory of Chemicals in Commerce being compiled under the Toxic Substance Control Act. In addition, there are probably between 1,000 and 2,000 new chemicals introduced every year. . . . [The Environmental Protection Agency] states that only 1,500 to 2,000 substances have undergone testing that is considered scientifically valid. Those chemicals were selected for testing on animals because they had, at one time or another, fallen under suspicion of being carcinogens. Results accumulated over recent years, according to EPA, indicate that between 700 and 1,000 substances, or roughly fifty per cent of those tested, show reasonable solid evidence of being animal carcinogens. Another measure of the approximate number of suspected carcinogens is the list maintained by the National Institute of Occupational Safety & Health (NIOSH). As of the 1977 edition, it named 2,091 compounds that were referred to as suspected carcinogens at least once in the scientific literature. . . . [T]he National Cancer Institute informs me that the U.S. Public Health Service Report No. 149 lists some 7,000 chemicals tested, including some tests which were fragmentary. Less than 1,000 of these chemicals tested show possibilities of carcinogenicity to animals. NCI states that only 600 to 800 of these animals tests were conducted using what they consider to be acceptable test methods. Finally, the National Cancer Institute cites findings in the reports of the International Agency for Research on Cancer. Volumes 1 through 16 identify only 247 of 368 chemicals that had positive animal tests, which might show some evidence of carcinogenicity to man.

Having established to some degree the extent of known chemical carcinogenesis in laboratory animals, the crucial question now becomes: How are

these data to be extrapolated to humans so that the risk of cancer in man may be assessed? Here is where we find disagreement among scientists and divergence of policy among the regulatory agencies charged with controlling chemicals.

While it is generally agreed that the best method of documenting carcinogenicity in man is through epidemiological studies, it is also recognized that such studies have severe drawbacks. . . . The limitations on human studies are such that only thirty or so chemicals have definitely been identified as carcinogenic in man. For all practical purposes, then, the detection of carcinogenic activity of chemicals is necessarily based on animal experimentation. It is the process of interpreting the resulting data for application to humans that generates scientific and regulatory controversies. . . .

Yet, discussing data on cancer mortality rates in the United States, Dr. Samuel S. Epstein, professor of occupational and environmental medicine at the School of Public Health, University of Illinois Medical Center in Chicago, reported a growing consensus "in the scientific community that most human cancers are environmental. . . ." Epstein, in an article in the March 1977 issue of the *Bulletin of the Atomic Scientists*, noted a "marked geographical clustering of high cancer rates of various organs in white men and women in heavily industrialized areas." He asserted that "[s]uch data correlate cancer rates in the general community with living near certain industries." "[S]pecific exposures at specific occupations are an important cause of cancer deaths," he continued, "particularly among males." Epstein's article, which had appeared in part in the July/August 1976 issue of *Technology Review*, cited estimates indicating that five to fifteen per cent of "all current cancer deaths in males are occupational in origin."

The possibility of a direct connection between an occupation and a risk of a specific cancer has been known for more than 200 years. The English surgeon Percivall Pott reported in 1775 that most patients he examined with cancer of the scrotum were chimney sweeps. Even earlier, it had been noted that miners were fairly frequent victims of what is recognized as a lung cancer that was rare in the rest of the population. By the late nineteenth century, other occupationally linked cancers had been reported, and in recent decades, scores of carcinogens have been traced to the workplace.

Data on cancer mortality in the United States had been mapped on a county-by-county basis by researchers of the Epidemiology Branch, National Cancer Institute. Researchers Robert Hoover, Thomas J. Mason, Frank W. McKay and Joseph F. Fraumeni, Jr. reported in the September 1975 issue of *Science* that when they plotted the distribution for bladder can-

cer, "the tumor most strongly linked to occupational exposures," they found "clusters of elevated mortality [for white males] in heavily industrialized areas"; this pattern "was not duplicated in females." This obviously suggested "industrial hazards." The group cited Salem County, N.J., which "leads the nation in bladder cancer mortality among white men." The researchers attribute[d] this excess risk to occupational exposure since about 25% per cent of the employed persons in this county work in the chemical industry. . . ."

Environmental causes of cancer often involve an element of voluntary risk. This aspect of the situation was discussed by Admiral Hyman G. Rickover Aug. 1, 1979 in an address accepting the Winston Churchill Award of the International Platform Association. In his speech, entitled "The Need for Environmental Perspective," Rickover asserted that "the environmental risk having the greatest effect in the United States today is smoking. Smoking causes us about 325,000 deaths each year, . . . about one-quarter [of them] from lung cancer. Sixty years ago we had little lung cancer. Today more are dying from it than from automobile accidents."

Rickover, who headed the Navy's atomic program, suggested that the risks from radiation were misunderstood, even "widely distorted." He said:

While accepting the many daily risks of living, many seem to be getting the idea that their demands for energy should be met on essentially a risk-free basis. Since this is impossible, attention should be focused on taking reasonable steps to safeguard the public, on developing realistic assessment of the risks, and on placing them in perspective. . . . At the start of the Navy's Nuclear Propulsion Program in 1946, I realized the need for careful attention to radiation. . . . [I]f nuclear ships were to be viable, there would have to be assurance that workers and crews not be subjected to excessive radiation. To emphasize this, I designed the shielding for our naval nuclear plants to be many times more stringent than required by the standards then in effect. As a result, the shielding built into the first nuclear submarine, the *Nautilus*, was so conservative that it continues to be far more than adequate to meet the considerably lower radiation levels permitted today.

Insofar as the environment is concerned, naval plants have been so designed and operated that in each of the last eight years the total gamma radioactivity discharged to all harbors of the world has been less than two thousandths of a curie. This quantity is for the operation of over 100 ships and of all their support facilities. To give you an idea what this means, if one person were able to drink the entire amount of this radioactivity discharged into any harbor in all of 1978, he would not exceed the annual radiation exposure permitted by the Nuclear Regulatory Commission for an individual worker. . . .

Scientists have stated for decades that radiation can cause harm. However, all of us have been subjected to radiation throughout our lives. . . . The en-

tire human race has been subjected to radiation, as has every living thing, throughout the entire evolution of our earth. The average person in the United States receives each year about one-tenth rem from natural radioactivity in the earth, in his body, and from cosmic radiation. The unit of radiation, rem, . . . is defined in terms of energy absorbed in body tissues. Receiving one rem of gamma radiation is equivalent to absorbing 100 ergs of radiation energy for each gram of body tissue. There are 454 grams in a pound. An erg is the amount of energy required to lift a mosquito weighing one thousandth of a gram about one centimeter. In terms of energy the rem is a small unit. A dose of one rem would raise body temperature only two millionths of a degree centigrade. We are not accustomed to fear background radiation; after all it is part of our natural environment. Yet in scientific terms it can be shown that its risk is not zero.

More is known about radiation than almost any substance that can affect humans. More money has been spent to learn the effects of radiation on humans than for any other hazard in our modern society. The main effect is cancer. . . . The combination of one-tenth rem per year background radiation, together with nearly the same average amount from medical diagnostic radiation, is estimated to cause almost one per cent of cancer deaths in the United States. In an average group of 10,000 people, 1,600 will die of cancer. Sixteen of these deaths will be from background and medical radiation. If the lifetime radiation exposure of 10,000 people is increased by an average of one rem per person—a total of 10,000 rem—it is estimated that one additional fatal cancer may occur.* . . .

Of all industrial and medical radiation workers in the United States, about 15,000 die each year from cancer. The total radiation exposure from their work adds an estimated 25 cancer deaths per year. Radiation from the nuclear accident at Three Mile Island may add one fatal cancer death to the public within fifty miles. Of the two million people living within this fifty-mile radius, 325,000 are expected to die of cancer from causes other than the radioactivity released from this accident.

The perspective on radiation can be improved by comparison. For example, I know an apparently healthy person who forty years ago received more radiation from medical chest X-rays than the total exposure all 15,000 radiation workers at nine shipyards received in 1978 from naval nuclear power plant work. . . . Another example: . . . rumors have persisted that radiation-induced cancer has killed the crew of the first nuclear-powered ship, the *Nautilus*. In 1978 the Navy traced each of the 96 officers and enlisted men of this first crew. . . . [A]ll the men associated with operating the nuclear propulsion plant were alive and well. . . .

The questions of risk and perspective had been taken up earlier by Richard J. Mahoney, executive vice president of the Monsanto Co. "We hear and read that a majority of human cancers—possibly as high as 70 per cent to 90 per cent—are due to

*This risk estimate was made in 1977 by the United Nations Scientific Committee on the Effects of Atomic Radiation and by the International Commission on Radiological Protection. It is within the range of estimates in the 1979 draft report of the U. S. National Academy of Sciences Committee on Biological Effects of Ionizing Radiations, and in the 1972 report of this committee.

environmental causes," Mahoney noted in a speech in St. Louis. "From this, many people leap to the conclusion that chemical food additives, pesticides and industrial chemicals are to blame. Yet, medical studies have shown repeatedly that the main human cancers do not stem from intentional or even inadvertant chemical contaminants in our environment. A . . . medical research paper noted that the overwhelming environmental causes of cancer are cigarette smoking and dietary considerations. . . . Control these two elements—cigarettes and diet—and you've controlled the cause of perhaps 95 per cent of environmentally caused cancers. . . ."

The work of Dr. John Higginson adds further complexity to the puzzle of the link between cancer and the environment. After studying South African black and U.S. cancer rates in the 1950s, as Daniel S. Greenberg notes in the *Washington Post* July 17, 1979, Higginson had theorized that perhaps two-thirds of non-skin cancers "are environmental in origin" and that men lived in a "carcinogenic soup" created by industrialization. Higginson later became founding director of the eleven-nation International Agency for Research on Cancer, established in Lyon, France in 1966. After a decade and a half of work at the Lyon agency, Greenberg reports, Higginson characterizes his early formulation as simplistic and misleading. Higginson is said to consider the environment only one of the culprits in the cancer problem. "Diet, stress, sexual and child-bearing patterns, and, especially, tobacco and alcohol consumption"—in two words, life style—appear to Higginson to be responsible for the variations in cancer rates. He hints that these may be more important factors than chemical pollution in causing cancer.

Despite some doubts raised by a minority of investigators as to exactly where to lay the blame for the scourge of cancer, most authorities seem to have no doubt that environmental causes bear an overwhelming share of the guilt.

There certainly is no doubt as to the fear cancer spreads or the damage it does. According to health officials, cancer is the second leading cause of death in the United States. (Heart disease is the first.) A million people in the country are under treatment for cancer, and it is expected that about 900,000 new cases of cancer will be diagnosed in the United States within a year after this book is published. Authorities predict that one out of every four Americans will ultimately develop cancer in some form and that

more than half of us who do so will die of it. The dollar cost of cancer has been estimated at \$30 billion a year—some \$2 billion alone for hospitalization, additional billions for non-hospital treatment and about \$12 billion lost to the economy and wage earners in time away from work.

This book is intended to serve as a record of the facts about cancer and the environment as they emerged during the 1970s. It is based largely on the accounts compiled by FACTS ON FILE in its weekly reports on current history. As in all FACTS ON FILE works, there was a sincere effort to keep this volume free of bias and to make it an accurate and useful reference tool.

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*New York, N.Y.
September, 1979*

Danger at Work, Danger from Industry

Cancer Deaths Increase, Jobs & Industry a Cause

The incidence of cancer in the U.S. has increased to the point where it is authoritatively described as "a killing and disabling disease of epidemic proportions" (Dr. Samuel S. Epstein in Bulletin of the Atomic Scientists, March 1977). A major cause of the increase is said to be industry. The victims are reported to be workers in high-hazard industries, people who live near industrial plants that allegedly use cancer-causing materials, and consumers of carcinogenic products.

Cancer & the workplace. Sen. William Proxmire (D, Wis.) summarized in the Congressional Record Oct. 2, 1978 "the devastating effect [of job-related carcinogens] on workers in certain industries and how greatly the incidence of cancer exceeds that of the general population." Listing some of "the appalling statistics," he said:

A shoe worker is eight times more likely than the average American to develop cancer of the nasal cavity and sinuses and twice as likely to get leukemia.

A tire builder is twice as likely to get cancer of the brain or bladder.

A metal miner is three times as likely to develop lung cancer.

Printing pressmen on newspapers are more than twice as likely to get cancer of the mouth and pharynx.

Textile workers are nearly twice as likely to also develop cancer of the mouth and pharynx.

Coal miners get stomach cancer at a rate 40 percent more than normal.

Furniture workers have an incidence of nasal cavity and sinus cancer 300 to 400 percent higher than normal.

Coke byproduct workers have a 181-percent excess incidence of cancer of the large intestine and a 312-percent excess incidence of cancer of the pancreas.

In short, a worker's occupation will determine his or her odds of contracting cancer and also the kind of cancer.

The data on estimates of cancer by occupation were prepared by the National Cancer Institute, the National Institute of Environmental Health Sciences, and the National Institute for Occupational Safety and Health.

The study became available a week after Health, Education, and Welfare Secretary Joseph Califano told the AFL-CIO's national conference on job health and safety that Government scientists estimated that 21 to 38 percent of all cancers are work-related. This buried the conventional wisdom propagated so long by industry that only 1 to 5 percent of cancers were job-related and, therefore, workers should just go ahead and

whistle while they work.

Proxmire noted that these facts had appeared in the "Washington Window" column of the Sept. 30, 1978 issue of the AFL-CIO News. Among other statements in the column:

While scientists can pinpoint the excess incidence of cancer in certain occupational groups, they cannot always identify the specific cause.

The scientists say the excess incidence of cancer in these occupational groups is in addition to the risks involving exposure to known cancer agents.

These known agents include asbestos, arsenic, benzene, chromium, nickel, and petroleum products. There are an estimated 13,900 excess cancer deaths per year associated with exposure to asbestos. Exposure to other substances cause an additional 33,000 excess cancer deaths.

Some 1.5 million workers are exposed to arsenic and they run a threefold to eightfold risk of respiratory tract cancer.

Some 2 million workers are potentially exposed to benzene, with a fivefold risk of excess cancer deaths from leukemia.

Some 1.4 million workers exposed to nickel run a fivefold to tenfold risk of cancer of the respiratory tract.

Some 1.5 million workers exposed to chromium compounds run a ninefold excess risk of respiratory cancer. The 3.9 million workers exposed to petroleum products run a twofold to 33-fold excess risk based on studies of coke oven and gas workers.

Because cancer usually takes several decades to develop, and new substances are continually introduced, it is to be expected that the incidence of work-related cancer deaths will rise in the years ahead. Indeed, scientists say, job-related cancers now comprise a substantial and increasing fraction of cancer incidence.

Industrial chemical standards. The Labor Department announced Jan. 29, 1974 that it had approved permanent standards against 14 cancer-causing chemicals used mostly in the manufacturing of plastics, dyes and fire-resistant fabrics.

The new rules prescribed work practices, individual tolerance levels, plant contamination control plans, medical surveillance procedures, employee training programs and employer reporting standards.

Occupational cancer hazards reported.

A conference on occupational carcinogenesis, held in New York March 24-27, 1975, included presentation of a study by David L. Bayliss, a researcher with the

National Institute for Occupational Safety and Health (Niosh), which found that workers exposed to ultra-fine fiber particles might be in greater danger of getting respiratory cancer than those exposed to only large fibers. The major fiberglass companies were reported manufacturing ultra-fine fibers.

Richard A. Lemen, also of Niosh, reported to the conference that a recent study showed that two chemicals commonly used in industry, hydrochloric acid and formaldehyde, combined spontaneously to produce bischloromethyl ether (BCME), one of the most powerful cancer-causing agents known. The study found that workers exposed to BCME ran a 2½ to three times greater risk of lung cancer than a control group not exposed. The findings could affect thousands of workers in such industries as textiles, particle board manufacture and biological laboratories.

Another study, presented by Dr. H. A. Anderson of the Mt. Sinai Medical School in New York, showed that asbestos workers carrying fibers home on their persons spread cases of fatal lung cancers to their wives and children.

Other studies disclosed by Niosh:

- The discovery of a Soviet report linking chloroprene, a chemical used in the manufacture of the synthetic rubber Neoprene, to cancer had prompted E. I. du Pont de Nemours & Co., which made the rubber, to start a health study of the several thousands of its employees who had ever worked with the substance.

- A study by a federal health agency in one U.S. gold mine disclosed an abnormally high rate of lung cancer among miners exposed to asbestos-bearing ore similar to that mined by the Reserve Mining Company in Silver Bay, Minn.

- A study showed that people living near orchards sprayed with arsenic insecticide had 20% more cases of lung cancer than normal.

Worst industries for cancer?—A study performed by Research Triangle Institute for Niosh concluded in 1977 that the three most hazardous industries in terms of exposure of workers to presumed carcinogens were, in order of greatest hazard: (1) the manufacture of scientific and indus-

trial instruments, (2) the fabrication of metal products and (3) the manufacture of electrical equipment and supplies.

In 12th place was the chemical industry, considered by many observers as the most likely to top the list.

Industry-cancer link suggested by new figures. A five-member federal research team from the National Cancer Institute said that a study of cancer death rates showed strong links between some types of cancer and certain types of industrial pollution. The report, first announced April 23, 1975, ended a four-year study of U.S. death certificates during 1950-69 covering 34 different types of cancer.

Results showed indications of high bladder cancer levels near heavy auto production, according to the researchers, as well as heavy bladder, lung and liver cancer levels around clusters of chemical industries. In New Jersey, which had heavy concentrations of chemical plants, it was pointed out that every county scored in the top 10% of the country for bladder cancer. High lung cancer rates were also reported near copper and lead smelters long associated with the disease.

The group said, however, that not all cancers could be related to industrial pollution. Many cancers were apparently linked to ancestry and eating habits, while melanoma, a skin cancer, was most prevalent in the southern states where sunlight, believed a cause of it, was strongest.

The cancer mortality rate (per 100,000) in the U.S. between 1950-69 was 174 for white males and 184 for nonwhite males. The highest mortality rates of the nation's 10 largest cities, for whites and nonwhites in the same period were: Baltimore, 233 and 257, Philadelphia, 221 and 244, New York City, 216 and 234, Cleveland, 212 and 229, and Detroit, 209 and 217.

The danger increases. Dr. Samuel S. Epstein reported in the March 1977 issue of the *Bulletin of the Atomic Scientists* that while fatalities from most other ailments are declining, the rate of increase in deaths from cancer (the U.S.' second greatest cause of death) "is more rapid than the rate of increases in population."

Epstein also found "general agreement" that the population and workforce is "continuously exposed to . . . chemical carcino-

gens in their air, water and food." New chemical agents that may pose cancer risks are also being "introduced into commerce and the workplace," he said.

Rep. George Miller (D, Calif.) called attention to questions that these new dangers raise. He said in a statement in the Congressional Record Oct. 4, 1977:

The dangers in the workplace in this generation are unlike those of the past. Safe working conditions have long been among the primary reasons for which workers agitated and organized, and similarly were among those first of workers' rights recognized by Government. In the past, those dangers, such as exposed machinery, crowded tenement conditions, fire perils, and the like, threatened workers' safety daily. One major accident could, and periodically did, result in the deaths of dozens of workers.

The dangers which affect workers today go far beyond those of the last, and early parts of this century. The dangers of the workplace to which contemporary workers are subjected are carried home to their families, and passed on to future generations. The hazards in some workplaces endanger not only the employees at that site, but can even jeopardize the well-being of an entire community.

There is an obvious question here, that being, should workers be subjected to these kinds of risks in order to earn an income and provide for their families? But there is another extremely important issue, and that is, who decides that workers are to be subjected to occupational hazards? . . . I find it extremely disturbing that someone is making decisions that there is an "acceptable level of risk" in some job, which in many cases really means that a decision has been made that some worker must risk his health and safety, and that of his family, in order that a particular business or industry operate under current design.

Who decides that a coal miner should work in a 30-inch seam? Who decides that an asbestos worker should be exposed to cancer-causing dust? And these questions can be asked repeatedly about many, many industries.

I really fear that a decision has been made that there must be some unhealthy industries in this country, and that this decision presumes that there will be

Industry & Cancer

Among the human cancers that have been shown to be due to industrial exposure are the following: bladder cancer in aniline dye workers who handle **beta-naphthylamine**; bone cancer due to swallowing radium; lung cancer caused by inhalation of chromium compounds, radioactive ores, asbestos, arsenic, and iron; cancer of the nasal sinuses and the lung in nickel mine workers, skin cancer due to handling some products of coal, oil shale, lignite, and petroleum.

Hazards to which industrial groups are exposed also have some implications for the general population. For example, air pollution from industrial wastes represents a potentially important source of carcinogens. When the air contains impurities, our lungs ordinarily are rid of them by coughing, or by more complicated processes within the lining of the bronchial tubes or lung tissue. But excessive or continuous exposure to inhaled impurities brings about changes in the bronchial linings and the lungs which may eventually result in disability and illness. If the impurities contain cancer-producing substances, prolonged exposure can lead to cancer.

—From *The Cancer Story* (U.S. Department of Health Education & Welfare)

workers subjected to the health hazards associated with these jobs. I have no doubt whatever that the people who make those decisions are not the ones who subsequently ruin their health by working at the job.

One hundred years ago, as the labor movement was first beginning to command the attention it now enjoys, decisions were made that we were not going to permit young children to climb among the whirring machines in the silk mills, and that we were not going to permit tailors to be crammed into tiny spaces despite safety hazards. Then, too, some complained that sacrifice was the price of industrial advancement. The problem which I am addressing today is only the modern variant of that dilemma between the maximization of profits and production versus the cost of human life.

Industrial cover-ups charged—Rep. Miller charged July 27, 1979 that there have been widespread cover-ups by corporate officials of cancer and other health hazards caused by industry. According to Miller:

Today, we must face a fact which is both chilling and depressing: A number of products and industrial processes pose enormous health hazards to millions of people who work with them, purchase them, live near the sites where they are manufactured or disposed of.

In recent months, we have become aware that corporate officials, in numerous cases, have known about these hazards, sometimes for decades, and yet have remained silent. As a result, hundreds of thousands, even millions, of people have been exposed to hazardous ma-