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*A Look at the*

*Division of Occupational Health*

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

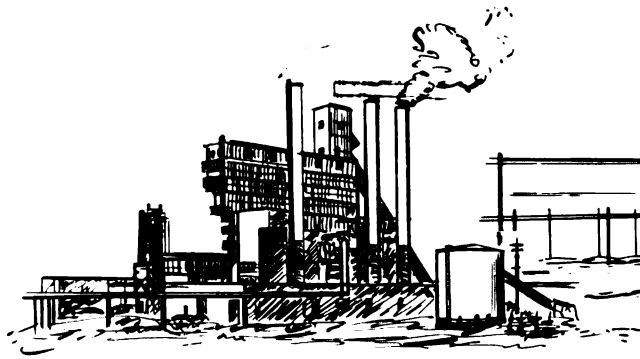
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U.S. DEPARTMENT OF  
HEALTH,  
EDUCATION,  
AND WELFARE  
Public Health Service  
Division of Occupational Health  
1964



## *Activities in Occupational Health*

OCCUPATIONAL HEALTH has been an activity of the Public Health Service since 1914.

The Division of Occupational Health is responsible for the Public Health Service's nationwide program in the health protection of workers. Emphasis is placed on protecting workers from those health hazards which are associated with their occupation.

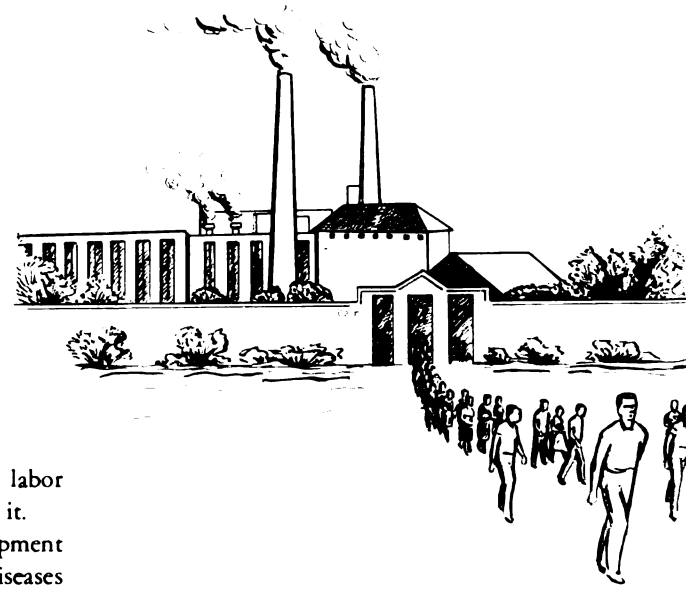
*The Division's efforts are directed toward . . .*

Ascertaining the health status of the American labor force and the impact of the working environment upon it.

Developing better techniques, materials, and equipment for use in the detection and control of occupational diseases through epidemiological and laboratory research and statistical studies.

Assisting Federal, State, and local agencies, health practitioners, labor unions, management, and individual workers in *applying* knowledge for the prevention of occupational disease, and in *developing* preventive health services.

Stimulating effective community and industrial efforts to supply occupational health services.





## *Research by the Public Health Service . . .*

in the field of occupational health was begun in 1910 when pioneering studies were made in the mining and steel industries. Another early study, which helped pave the way to the abolishment of the sweatshop, dealt with unsanitary conditions and the high rate of tuberculosis in the garment-making industry. Later followed a notable series of investigations of chest diseases in the dusty trades—the granite, pottery, cement, cotton textile and mining industries—which featured the application of the epidemiological approach to occupational disease.

### *Other significant achievements include . . .*

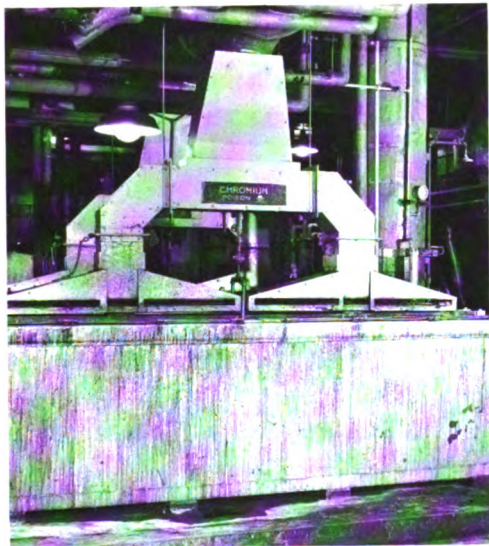
- A study of the effects of chromic acid exposure, which set the first national standard for electroplating work.

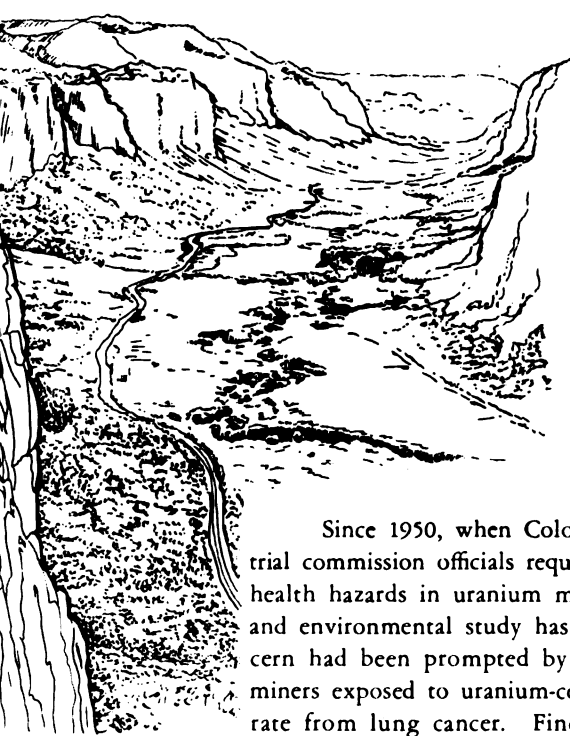
- Investigations of mercury poisoning among fur cutters and other workers in the hatting industry, which led to the outlawing of mercury as a carroting agent and the substitution of a less toxic material.

- Studies directed at the serious problem of lead poisoning in the pottery, storage battery, and other industries.

- Continuing studies of skin disease, which have reached into practically every segment of American industry.

Through the years, the Division has carried out a broad range of activities to uncover and control occupational health problems in many industries. The following projects illustrate the Division's current fields of study.





## *Health Hazards in Uranium Mines . . .*

Since 1950, when Colorado health, mining, and industrial commission officials requested the Division to investigate health hazards in uranium mining, a comprehensive medical and environmental study has been carried out. Official concern had been prompted by earlier evidence that European miners exposed to uranium-containing ores had a high death rate from lung cancer. Findings of radiation in American mines exceeding 5 to 10 times the reported European levels confirmed the need for long-range studies and control programs.

The development of definitive mortality data was not rapid because of the small number of uranium miners in the early part of the study and the long period required for the development of lung cancer from radiation exposure. In 1950,

the uranium mining population numbered 350. In 1960, there were 5,760 uranium miners.

By 1960, sufficient evidence was on hand to demonstrate a health problem in American uranium mines. Among miners with more than three years of underground experience, deaths were occurring in excessive numbers due to lung cancer and complications of silicosis. The study suggests that lung cancer is directly related to degree of exposure. The program of medical examinations, environmental controls, and training courses in radiation monitoring and control techniques has been intensified, and encouraging progress has been made in reducing radiation exposures in the mines. There is still need, however, for continued and intensified activity.





## *Silicosis in Metal Mines . . .*

Silicosis has for years been the major occupational disease problem of the American mining industry. In 1958, to obtain a more complete picture of the prevalence of silicosis in the mining industry, a comprehensive reevaluation of the problem was undertaken by the Division, in cooperation with the U.S. Bureau of Mines, at the request of the Congress.

The joint study was designed to determine (1) the extent of silicosis among currently employed miners, and (2) the relation of the disease to occupation, length of exposure, and other significant environmental factors. A total of 14,959 miners were given physical examinations, and 67 mines were included in the study.

The overall prevalence rate was 3.4 percent, considerably below rates found in earlier surveys. Older workers, however, had higher rates and there were also significant differences among the mines surveyed.

## *Industrial Noise . . .*



Noise levels in the work environment are potentially harmful to a significant portion of the working population.

Results of a long-term study initiated in 1953 at four Federal penitentiaries on the relationship of industrial noise to hearing ability were recently published in a comprehensive report. Information obtained from hearing tests given 2,000 employees of the Federal Prison Industries was correlated with noise measurement of their work environment. An advantage of studying the prison groups was that these individuals were known to have no significant noise exposure off the job, while, in other segments of the population, off-the-job noise may be an important factor.

Newer types of aircraft also present special noise problems for airport personnel. The Division has recently undertaken studies in Miami, Los Angeles, and Honolulu to determine the effect of aircraft noise on airport employees.

Major Division projects involve the determination of hearing loss produced by continuous and impulse types of industrial noise, and the psychological effects of noise, including alterations in perception and in the ability to learn and perform complicated tasks.

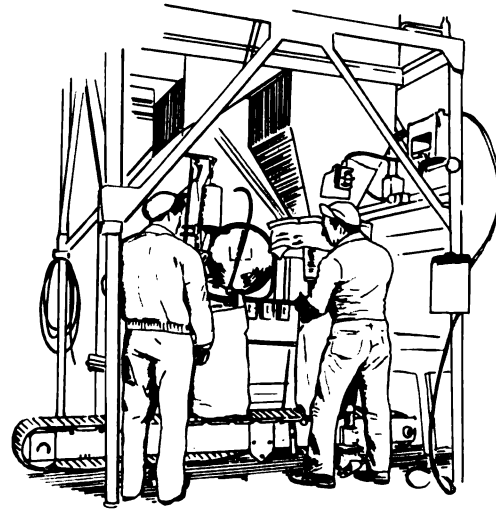
These studies are aimed at helping industry develop standards for safer and quieter worksites to protect the worker from the assault of noise.

## *Animal Feed Mill Study . . .*

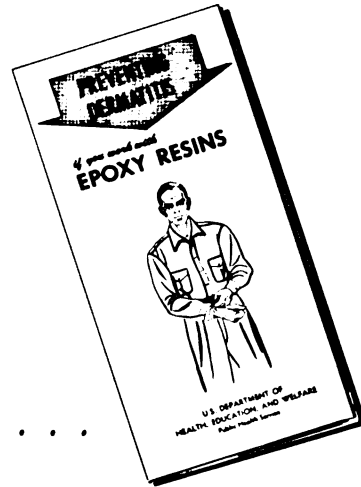
Anticipating possible hazards from the increasing use of a wide variety of additives in feeds, the Division recently undertook a pilot occupational health study to determine any effects on workers handling animal feeds. Additions include vitamins, antibiotics and material such as diethylstilbestrol, a patent estrogen.

Medical examinations were given 139 employees of three Iowa animal feed mills; approximately 200 airborne dust samples were obtained for physical, chemical, and mycologic examination. Observation of production methods and environmental samples revealed that exposure did, on occasion, occur in excess of the recommended threshold limits for compounds used as an index of overall environmental exposure. However, the average daily atmospheric concentrations for these compounds were generally within suggested limits. Findings of medical examinations of the workers were essentially negative.

Nevertheless, hazardous exposures could result from changes in mill processes and in the type and quantity of feed additives. Also, it was impossible to rule out all effects of long-time exposures to potentially hazardous materials in the mill environment.



*Dermatology . . .*



The Division has a never-ending task in keeping up with the toxic, potentially toxic, or allergenic effects of new materials invented by a dynamic technology. A major study of the epoxy resins, now widely used in molds, matrices, and adhesives, has shown the necessity for careful handling and protection of the skin from exposure to many compounds of this class. By applying the recommended control measures, numerous industries are now safely using these versatile resins. To assure the widespread application of these procedures, the Division has developed informational materials for the workers

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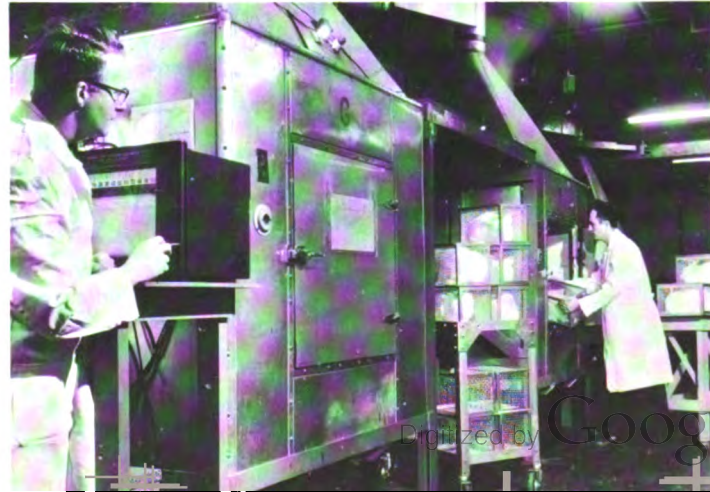
*Toxicology* →

and supervisory personnel as well as for the health professions.

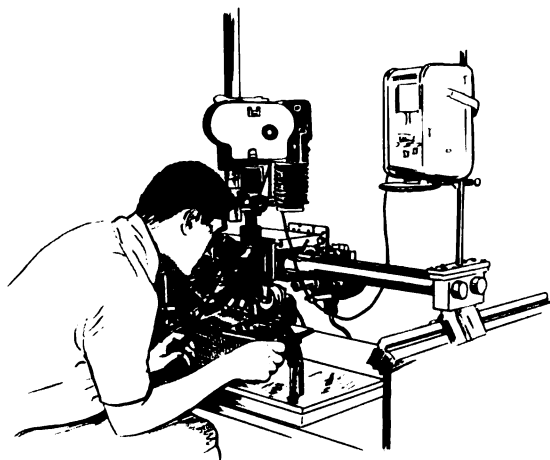
Dermatologic work receives special emphasis in clinical research activities. As part of a recent research project, 25 components of epoxy, polyester, and polyurethane resins were applied to the skin of rabbits to obtain their primary irritation indices. To confirm the findings 119 human volunteers underwent a series of patch tests totalling over 600. This study has led to the establishment of recommended procedures as well as a list of diluents for use as a diagnostic aid in distinguishing between allergic and primary irritant dermatitis.

Data from several recent toxicologic studies found practical application in guidelines for worker health protection. Laboratory study showed that toluene diisocyanate, used extensively in the plastics industry, produced an immunologic response detectable in the blood and in the skin, as well as severe effects on the respiratory tract. Due in part to this research, the American Conference of Governmental Industrial Hygienists has recommended a downward revision of the threshold limit of toluene diisocyanate to 0.02 part per million parts of air. Other toxicologic studies are being directed toward development of acceptable standards of exposure to oil mists.

Previous work by Division investigators had demonstrated that disturbances in the metabolism of zinc and copper were implicated in the early stages of carbon disulfide toxicity. Following this lead, a comparative study was made of diets fortified with a metal salt mixture, and diets not so fortified. The metal-fortified diets were found to delay the onset of neural signs of carbon disulfide poisoning in rabbits. Associated with these changes was redistribution of copper and zinc in critical tissues, particularly in the spinal cord of the rabbit. This study points to at least one specific relationship between diet and the response to a toxic agent encountered in industry.



## *Analytic Research and Instrumentation . . .*



Recent developments in environmental evaluation techniques include comprehensive experimentation with direct reading devices for toxic gases and vapors, the design and construction of a miniature multi-purpose recording air analyzer, and testing of devices which count and size airborne dust. The ion exchange procedure developed for the isolation and concentration of trace quantities of toxic substances has found various applications.

Tools recently acquired to probe more deeply into the effects of the working environment on man's health include a new mass spectrometer and a vital microscope.

The time-of-flight mass spectrometer can scan up to 10,000 spectra per second. It will be used to solve complex analytical problems. An immediate use to which it will be put is the identification of the transitory, intermediate, and final products resulting from the thermal decomposition of plastics whose toxicity is being evaluated.

The vital microscope, which permits examination of living tissue, is being used to study how the lung reacts to toxic dusts. The frog lung, which is closely related in function to the air sac of human lungs, is exposed to various types of dusts and particulates. Early changes in lung function are recorded on motion picture film, as well as by still photography.

Diagnostic category	Number of cases		Diagnostic category	Number of cases	
	Observed	Expected		Observed	Expected
Infective and parasitic diseases (001-021, 027-074, 080, 082- 096, 100-130, 132-139)	44	33	Diseases of the digestive system - Continued		
Neoplasms			Hernia (560-561)		
Malignant (140-203)	9	10	Gastroenteritis (571)		
Benign and unspecified (210- 239)	30	32	Ulcerative colitis and other colitis (572)		
Allergic, metabolic, endocrine, and nutritional			Gastritis, other stomach (573)		
Respiratory (241)	13	19			
Diabetes (240, 242-245)	82				
Obesity (287)					

## *Morbidity and Mortality Studies . . .*

To permit the early development of precautionary and preventive measures, trends in modern industry and agriculture are being closely observed through studies of occupational morbidity and mortality. This surveillance is directed at (1) determining the incidence of suspected occupational diseases; and (2) detecting unidentified hazards in the working environment.

Currently, mortality records of workers in the asbestos products industry throughout the country are being examined. This epidemiologic technique, using records of the Federal Bureau of Old-Age and Survivors Insurance, will be extended to other industries.

Data from State and national vital statistics programs, Statewide temporary disability plans, and the Bureau of Labor Statistics are also being studied to determine relations between occupation and health.

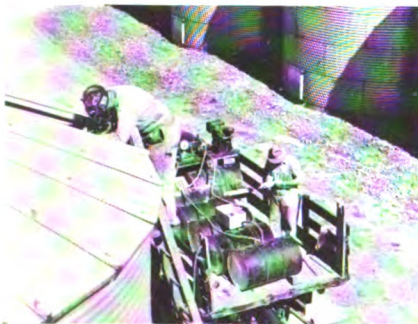


## *Consultative and Technical Services . . .*

Various types of consultative and other technical assistance are made available to Federal, State, and local agencies, industries, labor organizations, universities, and research groups. In addition, technical assistance is provided indirectly through work on committees of national organizations.

Last year, field consultation and technical services were provided on over 200 different occasions in 40 States. More than one-third of these services were in response to requests for assistance in investigating occupational diseases and suspected health hazards in industry, and the others dealt with administrative and informational aspects of occupational health programs.

In cooperation with the New Hampshire State Department of Health, a management-requested environmental study was made of potential hazards associated with the use of the plasma torch at a manufacturing plant. Capable of generating temperatures in the range of 40,000 to 60,000° F., these



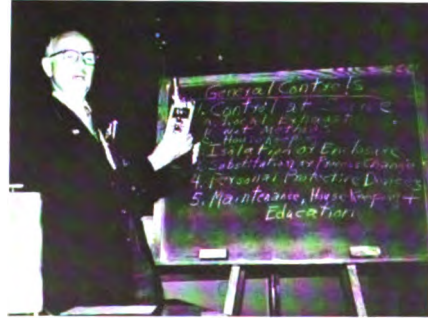
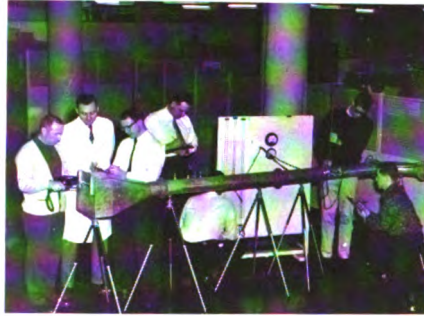


electrically-energized torches show promise of widespread use in metal cutting, surface coating, and similar operations. It was found that some plasma torches generate high noise levels and intense ultraviolet radiation. The production of toxic materials such as metal fume, ozone, and oxides of nitrogen varies with operation and control.

Consultative service was also provided to Puerto Rico, following the occurrence of 70 cases of bagassosis, a lung disease, in one paper mill within a year. This disease had been rare in Puerto Rico, despite the common use of bagasse (sugar cane residue) in such products as animal feeds and fuel. The use of bagasse that had been stored in bales was found to be associated with the high incidence of bagassosis. Rigorous dust control during bale-breaking resulted in dramatic reduction in the number of cases. A new process of selected fermentation is being developed which will make it unnecessary to bale bagasse, but still prevent it from rotting.



## Training . . .



In a recent year, 15 separate training courses were presented with a combined attendance of 435 persons. These included basic and advanced training courses in industrial hygiene, courses for sanitarians in Florida and California, and courses in New Mexico on the health hazards of uranium mining and milling.

Special training was provided to individuals from the Philippines, Chile, Peru, and Venezuela. Visitors from Puerto Rico, Australia, Canada, and Venezuela attended training courses presented by the Division.

A new impetus has been given to orientation courses for local health officers. These courses are designed to provide local health officers with a background for understanding the opportunities which occupational health offers for better community health. The first of this series of courses was presented in cooperation with the California Department of Public Health.

A seminar on administrative practices in occupational health was also presented by the Division to focus attention on program needs in the coming decade. Sixty practitioners, representing directors of State and local occupational health programs in 38 States, formed study committees to consider occupational health goals for the future, legislation, manpower and training, and medical aspects of occupational health.



<u>Title of Project</u>	<u>Fiscal Year 1963 Support</u>
Pulmonary Deposition and Clearance of Dust in Man	\$ 32,904
Intrapulmonary Distribution of Gases and Aerosols	47,018
toxicity of Silicones in Dust- Producing Industries	

## *Research and Training Grants . . .*

To complement the research activities of the Division, grants and awards are made to colleges and universities, hospitals, research institutes, State and local health departments, and other public and private nonprofit institutions and to individuals. In fiscal year 1962, there were 78 active research projects of this type and a budget of \$1,853,700.

Grants are made to support basic and applied laboratory, clinical, and field research into the many factors and relationships of the work environment and its impact on health. Occupational health topics currently under study include pneumoconiosis; dermatoses; toxic chemicals, dusts, and mists; physical factors (heat, cold, noise, and vibration); infectious

agents; behavioral science factors (social, psychological, economic); environmental and individual exposure measurements (chemical, physical, biological and behavioral); occupational health statistics and epidemiology; occupation and chronic disease; and absenteeism.

Training grants are available to individuals and institutions for advanced degree training in the health sciences (including occupational health) and for graduate research training in occupational health.

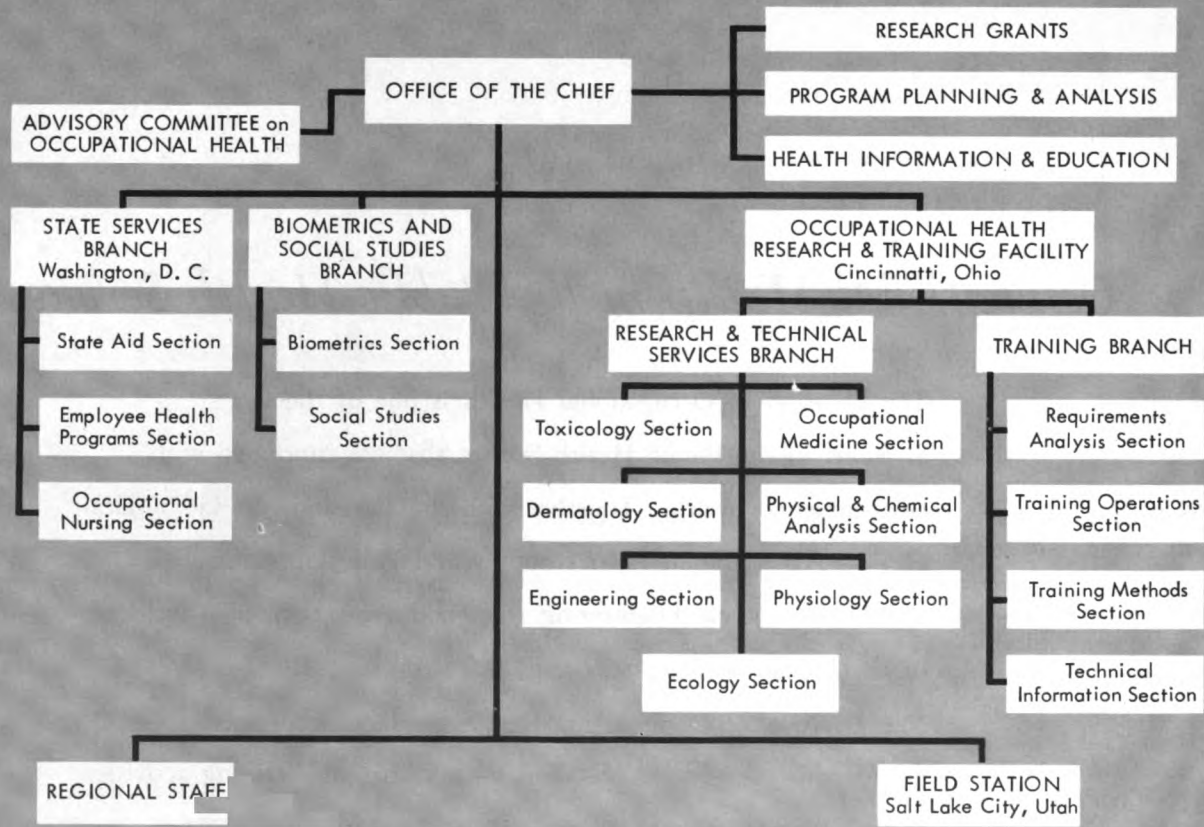
For details of programs and procedures, address Research and Training Grants Administrator, Division of Occupational Health, Public Health Service, U.S. Department of Health, Education, and Welfare, Washington, D.C., 20201.

## *Occupational Health in the Public Health Service*

The Division of Occupational Health is one of the five divisions in the Public Health Service that are concerned with environmental health. Together with the Divisions of Radiological Health, Air Pollution, Water Supply and Pollution Control, and Environmental Engineering and Food Protection, it is included in the Bureau of State Services.

The Division of Occupational Health conducts laboratory research, field studies, demonstrations, and consultative and training activities. It also sponsors extramural research in occupational health.





*Most of the work of the Division  
is carried on in three locations . . .*

The central office in Washington, D.C., provides overall direction. It is also the headquarters for activities relating to employee health programs, occupational health nursing, consultative services to the States, statistical and sociological studies, and the administration of research and training grants.

The Occupational Health Research and Training Facility in Cincinnati, Ohio, conducts research and provides consultative and training services.

The Occupational Health Field Station in Salt Lake City, Utah, provides services to the Western States.



*In Washington . . .*

#### THE OFFICE OF THE CHIEF

directs the Division's programs, policy, and administration and maintains liaison with other governmental and non-governmental agencies. Health education and information activities, program planning and evaluation, and administration of the research and training grants program are also centered in the Office of the Chief.

## *Biometrics and Social Studies Branch*

The Biometrics and Social Studies Branch was established to bring statistical and sociological skills to the study of increasingly complex and subtle occupational health problems.

By means of statistical and epidemiological studies, the *Biometrics Section* ascertains levels of disease in working populations, correlations between occupation and disease, and trends and variations in the health of the working population. Biometric services, consultation, and technical assistance are provided to State and local health departments, and to public and private organizations.

Field research and studies are conducted by the *Social Studies Section* to identify sociological, cultural, and psychological factors which may affect workers' health and health practices, utilization of employee health services, safe work practices, and attitudes toward occupational health programs. Studies are conducted in communities with diverse occupational groups to determine how long-term pursuit of an occupation affects the health and health behavior of workers and their families. The Section provides technical consultation on sociological and psychological aspects of research projects and on occupational health programs.

## *State Services Branch*

The State Services Branch of the Division assists in the development and strengthening of occupational health programs in State and local governments which have responsibilities for assisting industry in the control of occupational disease.

Our dynamic technology is placing greater demands on State and local occupational health agencies. Yet it is not practicable for each of these agencies to provide the range of specialized disciplines and expensive equipment needed to cope with the variety of problems of the occupational environment. When complex problems are encountered, the agencies often call upon the resources of the Division. The State Services Branch serves as liaison in the provision of technical assistance and consultation to the States, as well as in Division studies.

In addition, the Branch provides requested assistance to employers and labor groups in solving occupational health problems, promotes the development of preventive health services in places of employment, and maintains current information on the status and trends of health services for workers.

These responsibilities are carried out by three sections: State Aid, Employee Health Programs, and Occupational Health Nursing.



## THE STATE AID SECTION

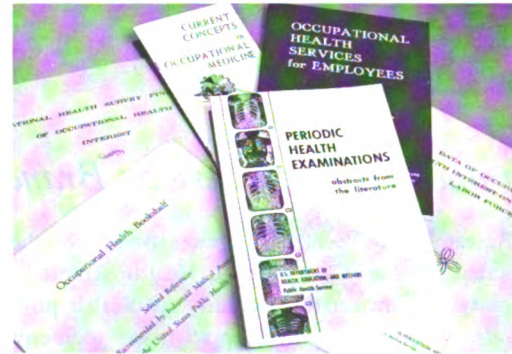
provides professional consultation on the development, operation, and evaluation of State and local occupational health programs; serves as a clearing house for special cooperative studies and the assignment of Division personnel to State and regional offices; and performs various other functions, including the analysis of legislation and regulations pertinent to occupational health.

## THE EMPLOYEE HEALTH PROGRAM SECTION

in cooperation with professional organizations, develops and recommends industrial medical policies, standards, and procedures; conducts special studies for the provision of medical services in small industrial establishments; and promotes the inclusion of occupational medicine in the curricula of medical schools.

## THE OCCUPATIONAL HEALTH NURSING SECTION

develops and promotes occupational health nursing programs; carries on educational programs for nurses; cooperates with universities and professional organizations in assessing and meeting personnel and nursing service needs; and provides consultation to States and, through them, to those at the local level with occupational health nursing interest and concern.



## *In Cincinnati . . .*

### *Research and Technical Services Branch*

The Research and Technical Services Branch of the Division is located at the Occupational Health Research and Training Facility in Cincinnati. Because the health problems of industry are so varied and involve so many man-environment relationships—physical, chemical, biological, and social—research studies, facilities, and means for undertaking field studies and operations must be broadly based. The worker is, and reacts as, a whole man, not as an isolated system responding to a single stimulus. Therefore, an integrated view of the worker must be stressed to gauge the far-reaching effects of multiple coincident factors.

In addition to seeking answers to immediate problems, the Branch undertakes long-term studies to understand the intricacies of how environmental factors affect human tissues and behavior. The multi-disciplinary staff, currently numbering 70 professional personnel, carries out the work of the several sections covering toxicology, dermatology, occupational medicine, engineering, physical and chemical analysis, and physiology. Each section provides expert consultation in its field and cooperates with other Division units in the joint investigation of problems and in training operations involving the section's particular area.

## THE TOXICOLOGY SECTION

With the multiplicity of new products, procedures, and chemicals coming on the market today, and the time lag before toxicity may become evident, investigations must be made before materials find widespread industrial application. As part of its research, the Toxicology Section attempts to keep abreast of developing technologic changes. Studies include determination of acute and chronic toxicity of new materials, or of old materials finding new usages. Major emphasis is on the development of early indicators of harmful exposure, tests of individual hyper-susceptibility, and modes of action of toxic chemicals.



## THE OCCUPATIONAL MEDICINE SECTION

The Occupational Medicine Section correlates and draws on the findings of all sections of the Branch. Specifically, it carries out research and investigations on medical and epidemiologic phases of occupational problems, such as pneumoconioses, poisonings, and physical stresses; provides expert clinical consultation in occupational medicine; cooperates with other elements of the Division in the joint investigation of problems; and conducts pathologic investigations in conjunction with clinical, toxicologic, and other research studies.

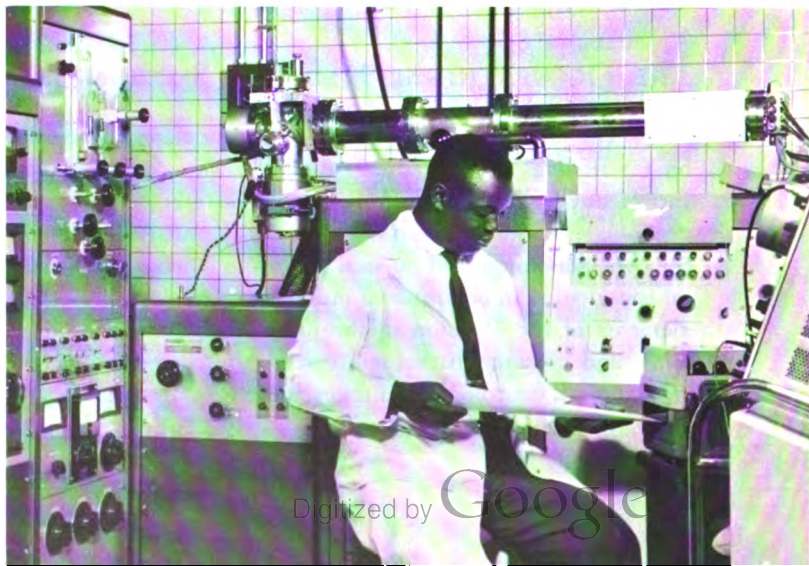


## THE DERMATOLOGY SECTION

Occupational dermatoses, or skin disorders, affect about 600,000 American workers on any given day. The introduction of new materials and new processes, coupled with the rapid growth of small plants, consistently increases the sources of dermatoses and presents a constant challenge to the Dermatology Section. Specialists in this section are engaged in the continuous appraisal and study of occupational hazards which may or do produce dermatoses. Outbreaks of occupational skin diseases are studied to establish cause-and-effect relationships, current diagnostic procedures are evaluated, new field and laboratory techniques developed, and methods of prevention established.

## THE PHYSICAL AND CHEMICAL ANALYSIS SECTION

Scientific procedures and tools require constant improvement and revision. The Physical and Chemical Analysis Section develops, evaluates, and improves methods and instruments for the detection and determination of toxic materials and their products. Its scientists analyze certain significant substances commonly found in the work atmosphere, in the physical environment of the worker, and in industrial and biological materials.



## THE ENGINEERING SECTION

The Engineering Section is concerned with environmental measurement and control in occupational surroundings. Its activities include laboratory and field investigations of chemical and physical hazards; development of instruments and methods for better characterization of the environment; and the development, improvement, and evaluation of control methods.



## THE PHYSIOLOGY SECTION

The Physiology Section conducts laboratory and field research on the physiological and psychological effects of occupational environments and stresses on the tissues, the organ systems, and the whole body. It provides expert consultation on the physiological and psychological significance of thermal, acoustic, and other stresses in occupational situations. In cooperation with the Engineering Section, it conducts studies in "human engineering," by which the work situation is adapted to the characteristics and capabilities of the worker.





## *The Training Branch*

The Training Branch, also located in Cincinnati, analyzes national manpower and training needs in occupational health. Through its own courses, it helps meet the immediate need for trained personnel to carry out employee health service and environmental control programs, and it cooperates with other groups in seeking solutions to long-range problems.

Drawing on the accumulated knowledge of all sections of the Division, the Branch presents specifically designed courses to bring practitioners of occupational health up-to-date information both in basic and highly specialized subjects. Tailored to meet the nation's diversified occupational health requirements, these courses are attended by persons with various professional backgrounds. Courses are offered both at the

facility and in the field. The content of field courses is geared to the needs of the area.

The Branch extends its assistance to governmental agencies, industry, institutions of higher learning, and other interested groups in designing occupational health curricula and in organizing courses. Instructors are drawn from the Division itself, other governmental organizations, and industrial and academic institutions.

The maintenance of a technical information service on occupational health hazards, occupational disease prevention, instrumentation, and control measures, is an important function of the Branch. The storage and retrieval system is being semi-automated through the use of index-searching equipment.

## THE REQUIREMENTS ANALYSIS SECTION

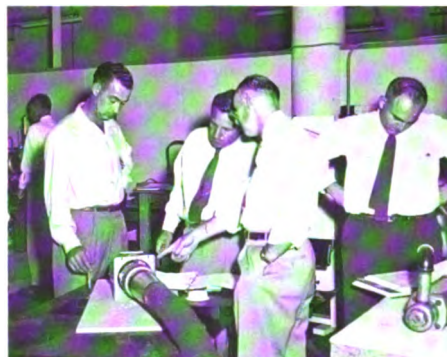
From the Requirements Analysis Section is drawn information about personnel and resource requirements for training capable professional personnel to function in occupational health programs. This section is also alert to industrial trends in a changing technology and to the characteristics of a growing labor force.

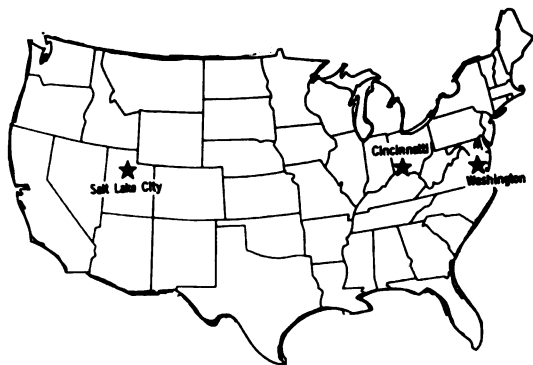
## THE TRAINING OPERATIONS SECTION

In cooperation with other parts of the Division, the Training Operations Section formulates, schedules, and conducts special training courses designed to complement the total occupational health training effort to meet the nation's needs.

## THE TECHNICAL INFORMATION SECTION

Specific and general technical information for professional and public distribution is issued from this section. The section also cooperates with the International Labor Office as an official United States liaison in the international exchange of technical information and in abstracting technical literature.





## *The Challenge In Occupational Health*

### *In Salt Lake City . . .*

The Occupational Health Field Station is located in Salt Lake City, Utah. Established to provide faster and more direct consultative and technical services to the Western States, it draws upon the skills of all four branches of the Division of Occupational Health. Currently, the field station's central interest is the long-term study of radiation hazards in the uranium mining industry.

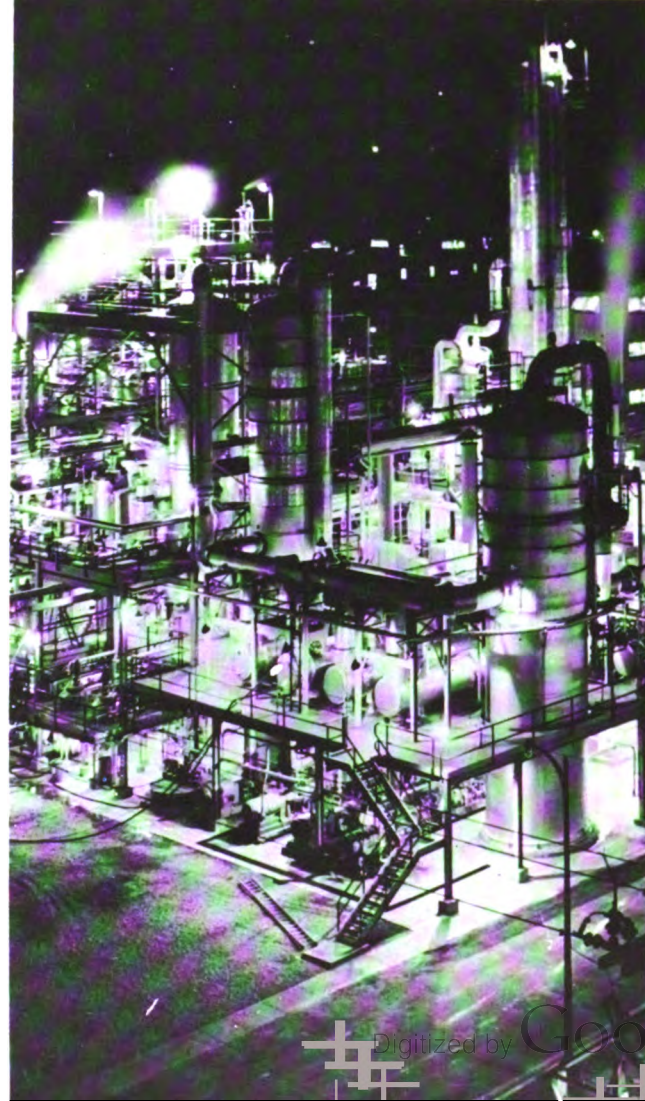


Since the nebulous beginnings of occupational health in the Public Health Service in 1914, the range of activities has broadened from early studies in the mining, steel and garment-making industries to a variety of responsibilities affecting all occupations and all workers.

With new developments in the working environment, such as automation, nuclear energy and the growing use of chemicals in industry and agriculture, constant effort and vigilance are necessary to recognize and control occupational health problems introduced by a dynamic technology.

The Division of Occupational Health continues the search to develop better techniques, materials, and equipment for detecting and controlling occupational hazards and diseases. In training, consultative, and health education services, knowledge gained through research is passed on to other agencies and organizations with responsibilities for worker health, to those in the health professions, and to the workers themselves.

Conserving and protecting the health of people who work is a challenge of vital concern to the Public Health Service and to all Americans.





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