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Health Center Offers Courses in Radiation Hazards and Problems

TO ASSIST health department personnel and key personnel in other governmental or private organizations in achieving a broader understanding of radiation hazards and problems, short training courses in radiological health are being offered to qualified applicants by the Public Health Service at its Environmental Health Center in Cincinnati, Ohio. This program is offered for professional people who are primarily concerned with radiological health problems in their respective fields. Candidates should have a degree in medicine, engineering, physical science, or biological science, and have had experience in work relating to public health. No tuition will be charged for these courses.

Basic courses provide a 2-week period of training in the theory of radiation and radiation detecting instruments, the use and maintenance of instruments for measuring radiation, the detrimental effects of radiation, the means of shielding and protection against radiation, and recommended permissible radiation dosage.

Intermediate courses for those having completed the equivalent of the basic curriculum provide 2 weeks' training in the operation, maintenance, and repair of radiation detection devices used in monitoring of personnel and in the monitoring of water, food, and other samples.

Basic courses are scheduled for March 10–21, 1952, and April 21–May 2, 1952.

Intermediate courses will be given February 4–15, 1952, and May 5–16, 1952.

Additional information concerning the curriculum and application procedure may be obtained by addressing Chief, Radiological Health Training Section, Environmental Health Center, USPHS, 1014 Broadway, Cincinnati 2, Ohio.

COVER PICTURE.—A miner operating an air driven rock drill in an underground copper mine at Butte, Mont. The drill delivers running water to eliminate the dust. Ordinarily the miners protect their eyes with specially designed goggles. Photograph by courtesy of the American Brass Co.

SALT LAKE CITY FIELD STATION EQUIPPED TO AID WESTERN INDUSTRIES

ACCELERATED industrialization of the 11 Western States, comprising the Federal Security Agency's regions IX and X, has given impetus to current activities carried on by the Salt Lake City field station of the Division of Occupational Health, PHS.

To satisfy the increasing demands for service, the station has quadrupled its personnel in the last 2 years. Four engineers, three chemists, a nursing consultant, two part-time medical consultants, and two secretaries comprise the staff.

The vast economic resources of the West are playing a significant role in the Nation's defense effort. The Western States provide most of the Nation's supply of nonferrous metals and a large portion of its oil and timber resources, in addition to being the only domestic source of the basic raw material for atomic energy. The development of new industry, together with the expansion of old, has given rise to many problems of occupational health. This growth is reflected in the activities of the field station, which renders two distinct types of assistance to the States and Territories—administrative and technical consultation in engineering, chemical, and medical problems. A complete chemical laboratory service is offered in this connection.

Currently, the field station is contributing to the defense effort by conducting a study of the health hazards associated with the uranium mining and milling industry in Utah, Colorado, New Mexico, and Arizona. Since the health hazards associated with this industry are relatively unknown, the study offers opportunity for research in establishing and identifying the existing hazards. The toxic substances encountered in this study are uranium, vanadium, radon, silica dust, and radioactive ores.

During the past 2 years, varied studies and investigations have been made. These include special studies on the organic phosphate insecticides, arsine, and some of the heavy metals. Studies will be undertaken to determine the toxicology of the newer metals coming into common use, such as antimony, germanium, indium, selenium, tellurium, and cobalt. This industrial expansion has focused attention on not only new occupational health problems but old ones as well, such as air pollution, toxic gases, and the pneumoconiosis-producing dusts.

The acquisition of two unusual laboratory instruments has enabled the station to undertake work formerly contracted to other agencies. There are the transmission fluorimeter for the determination of uranium in micro concentrations and the radon measuring instrument for the determination of this radioactive gas. To date, the laboratory has received from the States of this area over a thousand samples, which have included a wide range of toxic metals.

In addition to the more spectacular aspects of the work mentioned above, the Salt Lake City station renders routine assistance to these Western States in carrying out their programs of industrial hygiene. Assistance has been given in ventilation, lighting, and dust control studies, as well as mine surveys and the chemical analysis of samples collected in these studies. The staff has been called upon to participate in a number of conferences and has prepared and given technical papers in technical meetings held in the area.

The station has also aided in the training of new occupational health personnel for regions IX and X, and cooperates with the University of Utah and other institutions by providing certain teaching assistance in this field, particularly to the School of Medicine and the School of Engineering.

This Is the Area Serviced by the Salt Lake City Office. Chief Industries of These Western States Are:

METAL MINING
COAL MINING
NONFERROUS SMELTING
IRON AND STEEL
AGRICULTURE
LOGGING
FOOD PROCESSING
WOOD PRODUCTS
AIRCRAFT
SHIPBUILDING
OIL REFINING
PULP AND PAPER
FISHING

Survey of Uranium Mining Leads to Medical and Environmental Studies

URANIUM ORES have been mined on the Colorado plateau since early in 1900. Although these ores contain uranium, vanadium, and the radioactive daughters of uranium, they were originally mined and processed for the radium content. Since 1925, when high grade uranium ores were discovered in the Belgian Congo, very little radium has been extracted from American sources. The Colorado plateau ores, however, continued to be mined and processed for the vanadium, and several mills have been engaged in this work for many years. The development of atomic energy resulted in the revival of interest in carnotite ores in the Colorado plateau.

Since about 1946 a program of exploration and development of these ore bodies has been in operation. At this time there are eight mills operating in Colorado and Utah to process these ores, and there are a large number of mines. Most of the ore bodies are relatively small, and the mines are operated by only a few people. As a result, the mills are located in areas adjacent to active mining districts and draw their supplies from many mines. The transportation of ore and supplies thus becomes one of the primary problems. These difficulties are accentuated by the fact that most of the uranium ores are

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located in inaccessible areas with few recognizable roads and very scanty water supplies.

At this time Colorado probably produces the greatest amount of ore, although Utah and Arizona also contribute large amounts. There are about two to three thousand people employed by the industry and, according to the mining journals, the ore production is estimated at more than 20,000 tons per month. The final products of the mills are vanadium and uranium compounds.

In August 1949, when the industry began to assume sizable proportions in Colorado, Dr. Roy L. Cleere, executive director of the State Department of Health, appointed an advisory board to assist him and the State Division of Industrial Hygiene in outlining procedures for studying the operations involved and the potential health hazards. As a result of several meetings of this group, it was decided that there were insufficient data available to draw any conclusions concerning the extent of health hazards that might be present in the uranium mining and processing industry.

In view of the lack of data, this group requested the Division of Occupational Health, U. S. Public Health Service, to conduct a study of the uranium mines and mills. The Division of Occupational Health agreed to conduct such a study and the work began during the summer of 1950. This study has been financed in part by grants from the National Cancer Institute to the State of Colorado.

This survey has been conducted as a cooperative effort between the Colorado State Health Department and the Division of Occupational Health, PHS. Much valuable assistance has also been given by the State health departments of Utah, New Mexico, and Arizona, where operating units of the industry are located. Other Government agencies, such as the Division of Biology and Medicine and the Health and Safety Division of the Atomic Energy Commission; the U. S. Bureau of Mines; the Los Alamos Scientific Laboratory; the Naval Radiological Defense Laboratory; and the U. S. Bureau of Standards also have given assistance on special problems.

The study itself has been conducted along lines similar to other surveys done by the Division of Occupational Health. A medical investigation has been made of the workers, and an environmental investigation has been conducted of the various facilities. By following this procedure, it is hoped that information would be gained as to the present health status of the workers and that these findings could be correlated with the results of the environmental investigation.

The environmental studies are concerned primarily with the exposure to silica dust, uranium and vanadium, and the other mineral constituents of the ores, and evaluation of the exposure to other radioactive dusts and gases. While most public interest has been centered upon the possible toxic effects of uranium, it is necessary not to lose sight of the fact that the ores contain a high percentage of free silica, as compared with a low percentage of uranium; and the greatest potential hazard in this industry is probably caused by silica. Therefore, it has been necessary to devote a considerable portion of the study to exposures to these familiar materials.

Medical and environmental studies have been completed in most of the operating mills and a representative number of mines, but final conclusions cannot be drawn from the data thus far obtained. It is planned to continue this project on a reduced scale of activity for a considerable number of years in order to follow the workers to see if there are any significant changes in their physical status. Much experimental work must be done to evaluate the exposures to external and internal radiation and to develop means for measuring these quantities on a routine basis.

This survey, then, resembles those that have been conducted in other industries, with many of the same difficulties. The remoteness of the areas in which it has been conducted has accentuated the usual troubles with sampling and analytical methods, and has made it necessary to schedule trips with due regard to the weather, in addition to other factors. However, much important information has been and will be obtained, which will permit an evaluation of the health of the workers in this industry, and the institution of control measures where they are necessary.

COAL MINES IN WYOMING GET CLEAN BILL OF HEALTH

AFTER MAKING studies of general atmospheric conditions in the Wyoming coal mines, the Industrial Hygiene Section of the State Department of Health reports that, where the conventional methods are employed, the working atmosphere has been found to be safe and suitable for an 8-hour exposure. These surveys have been conducted in cooperation with the State Inspector of Coal Mines.

However, in one mine where an automatic mining machine was used, relatively high dust counts were encountered. Chemical determinations on samples indicated a free silica content ranging between 1 and 11 percent, averaging between 2 and 4 percent. More studies at these machines will be necessary before an accurate evaluation of the indicated hazard can be made.

Dust samples were taken with the midget impinger during a complete work cycle at the face where the coal is first extracted. Determinations for carbon monoxide were taken immediately after shot firing to evaluate the exposure to the men engaged in loading. Air movement and humidity readings were registered in air courses and entries, to evaluate the effectiveness of existing ventilation practices. A mine safety lamp was used to indicate the presence of black damp and methane.

Weighted dust averages for an 8-hour exposure for the last 6 mines visited ranged from 9.7 to 36.9 million particles per cubic foot of air with an average of 21.8 mpcf. These figures are for mines employing the usual methods of coal extraction.

Carbon monoxide readings averaged about 50 parts per million after shot firing. This concentration was almost immediately dispersed in all cases and apparently constitutes no particular health hazard to the workmen.

No significant evidences of miners' black damp or methane have been encountered in any of the mines visited.

Ventilation figures in individual air courses, cross-cuts, and entries were greater than the 6,000 cubic feet per minute minimum prescribed in the 1951 Wyoming Session Laws.

Industrial Medicine in the Intermountain West

By Glen R. Leymaster, M. D., M. P. H.*

IT is timely to discuss briefly some of the industrial medical problems in the Western States in order to emphasize some of the lines of action to be taken in the future. This paper is not intended in any sense to be inclusive. Indeed, it is obvious that most of the industrial medical problems that occur anywhere are to be found in the West as well. Only some of those that may be unique or especially important in the area will be mentioned here.

Silicosis is still one of the leading occupational diseases and constitutes a considerable portion of the expense of industrial compensation. Due to combined efforts of private industry and community health agencies, the exposure to silica-bearing dusts in mines and mineral industries has undoubtedly been greatly reduced. Because of the long exposure period involved in the occurrence of silicosis, a systematic, exhaustive survey of silicosis in industry to evaluate the present importance of the disease would be highly desirable. Such a study was performed in Utah in 1940, and a comparison of incidence now with findings in 1940 would be of great use in evaluating the effectiveness of control measures.

During the last half of the nineteenth century, lead intoxication was by far the most important of all occupational diseases. Primarily because of the exhaustion of the shallow deposits of the soluble ores and the working of the far less soluble ores located at deeper levels, but also because of systematic control efforts, lead has become proportionately much less important as an industrial poison. That it is still important, and that the prevention of damage to health is not completely successful, is shown by the yearly occurrence of several cases of clinical lead intoxication. The occurrence in the manufacturing industry has now become relatively more important.

The intermountain West has, for most of its industrial history, been an area with a relatively large supply of labor in relation to demand. As a result, there has been little need or interest in the problems associated with the effective utilization of the laborer who is physically below normal. With industrialization increasing at a rapid rate, the entire field of job placement, rehabilitation and employment of the older or handicapped worker will demand much more attention than it has received in the past. A satisfactory solution will require the combined efforts of management, organized labor and industrial medical personnel, and considerable willingness on the part of all to make concessions and adjustments for the common good.

As in all other parts of the United States, the great majority of industrial plants are too small to support full-time medical departments, and as a result, most industrial medical services are taken care of by the physician outside the plant. It is inevitable that under this system attention is centered on the therapeutic services to the virtual exclusion of preventive services. While the therapeutic services are not ideal, and indeed are under serious criticism in certain small areas, their desirability is generally accepted. With certain exceptions, industry is making far too little use of the advantages of preventive medicine in promoting the health of the worker, reducing absenteeism, and thus increasing productivity.

Industrial developments, while associated with improvement in some of the health hazards that have been present for decades, have brought with them problems that have only recently become important in this area. Ores which in the past have been shipped elsewhere are more and more being processed in the West. Thus, for the first time, industrial health personnel are being forced to consider seriously the toxic effects of materials which occur in very small concentrations in ore but which may occur in concentrated form during the refining process. The possible toxicity of selenium and tellurium occurring in copper ore is a typical example of such a problem.

The development of the oil industry, including the refining of petroleum products, is relatively new in the intermountain West. Although most of the associated health problems are familiar ones, they are new to physicians and hygienists in this part of the country. The newest potential hazard, the possible carcinogenic effect of petroleum and coal products, is one that is of great interest to those concerned with industrial health everywhere.

There is no need to recount details of the development of the industry relating to the radioactive materials in order to emphasize its importance in industrial health in the area. The Colorado plateau is the center of extensive mining activities. The preliminary refining of most of this ore is done in nearby areas. The extensive industrial development involved in the final refining and utilization of these materials is public knowledge, but many of these industrial health problems are not suitable for public discussion.

The immediate concern in the field of public health in this industry is the possible effect of the radioactive materials on the health of miners and mill workers. This has been the object of extensive study by several state health departments and the U. S. Public Health Service for the past 2 years. Although the data are incomplete, it would appear that the major hazards are two. The old, familiar problem of silicosis may well be the most important hazard involved in uranium mining. The new problem, that of the possible chronic effects of radioactive materials, principally radon and its decay products, is one that will be under investigation and discussion for years to come.

These latter considerations can perhaps best be summed up under the term "need for education and training." Industry must be educated in the need for industrial hygiene in its broadest aspects and in the realization that hygiene in industry is an important part of increasing productivity. Labor needs to become aware of the many advantages of preventive as well as curative medicine, and of the ultimate desir-

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ability of more flexibility in their restrictions on placement of the workers in industry. The medical profession needs more awareness of the particular opportunities of the practice of medicine in industry, especially in the prevention of disease.

There are not enough, and perhaps for many years will not be enough, trained personnel—physicians, nurses, engineers, chemists, hygienists—to fill present needs. However, there is increasing awareness of these needs, and progress is being made. In the problems of personnel, as in all the other problems briefly referred to above, if the West goes forward with the same energy, intelligence, and vision that it has shown in meeting its problems in the past, the next few years will see very rapid progress indeed.

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Ewing Explains to AFL Changing Concept of Occupational Health

OSCAR EWING, Federal Security Agency Administrator, in his talk before the annual convention of the American Federation of Labor, explained that industrial health services must be an integral part of the total health program. He said, in part:

"We cannot subdivide the body of a worker. He is a human being before he is a worker, and disease is disease whether he contracts it on the job or off the job. If he is sick, and must stop working, he and his family may have serious financial difficulties. His absence from work can harm him, and the industry in which he works, and the country that depends on industrial production in a time of crisis. Everybody is hurt, and certainly nobody gains. So we must think of the worker not only as an employee, but as a whole human being. His home environment, the hygiene of his neighborhood, the happiness of his family life—all these are legitimate considerations in this broad new vision of industrial hygiene."

AVAILABLE PUBLICATIONS

Job Placement for the Cardiac Patient.—Copies of *The Work Classification Unit* are now available from the American Heart Association, 1775 Broadway, New York 19, N. Y. The brochure serves as a guide for work classification units, cardiac clinics, physicians, and others concerned with selective placement of patients with cardiovascular disease.

Health Hazards of Solvents—A new booklet, prepared by the Pennsylvania Bureau of Industrial Hygiene, may be obtained from the Bureau at 432 South Office Building, Harrisburg.

Minnesota Prepares Guides for Health Practices in Industry

ENTITLED *Opportunities Unlimited*, a guide for public health nurses has been prepared by the Minnesota Department of Health to encourage plant visits and cooperation with industrial nurses. Outlining the many activities in which public health nurses can participate in promoting good health practices, the guide provides much helpful information.

Through a pamphlet distributed to Minnesota plant managers, the consultative services of the public health nurses have been explained and managers are urged to take advantage of them.

For plant health problems, the public health nurse will advise management of the services of the Division of Industrial Health.

Since personal and family health problems directly affect efficiency on the job, attendance, and morale, the public health nurse should be called upon for help in this field. She can assist the worker in many ways.

Advice on first aid facilities, first aid classes, and community programs is available from the public health nurse. She is also prepared to give information on available publications for a plant health education program.

For the benefit of physicians a *Guide for Industrial Health Practice in Minnesota* has been prepared jointly by the Committee on Industrial Health of the Minnesota State Medical Association, the Division of Industrial Health of the Minnesota Department of Health, and Minnesota Nurses in Industry, Inc.

Dr. W. E. Park, director, Division of Industrial Health, wrote an article, entitled, "Have a Plant Catastrophe Program" which appeared in *Nursing in Industry*, and is now available in reprint form.

Also prepared for use in industries is a placard sign with the heading *In Case of EMERGENCY*, on which may be listed the names and telephone numbers of physicians, ambulance, fire department, hospital and plant officials.

Copies of these publications are available from Director, Division of Industrial Health, Minnesota Department of Health, University Campus, Minneapolis 14.

Industrial Health—A Total Public Health Responsibility

By Herbert K. Abrams, M. D.*

OCCUPATIONAL health is a phase of what we are coming to recognize as the discipline of social medicine—the science of health as it is related to the world about us. Occupational health is not merely the prevention of industrial accidents, important as this is. It is not merely the study of ventilation in the factory. It is a composite of all of the things that affect the health of working men and working women by virtue of the conditions of life that go with their particular occupations.

Thus broadly defined, the improvement and maintenance of industrial health demands the collaboration of all community agencies concerned: the labor department, the health department, other social agencies, private industry and trade unions. Within the health department, everybody has a job to do. Let us take inventory of a few items that every modern health department should be concerned with.

General

(1) Does the health department maintain an industrial intelligence system which shows the number, types, sizes of industrial plants in the community—the number and kind of in-plant health services—the number and types of industrial medical care plans—the number and types of full and part-time health personnel?

(2) What are the causes of sickness absenteeism in the plants of the community? Can the health department assist local industries through preventive services to cut absenteeism? What does the department do to stimulate development of plant medical services so urgently needed, particularly in small and medium-sized plants?

In California a valuable source of data on industrial illness is available in the statistics of the Disability Insurance Plan. Are these data received and used in planning the public health program? There are also useful data available in some of the better plant medical programs and in the occupational disease data of the Bureau of Adult Health.

We know that the incidence of many diseases varies with occupation. For example, tuberculosis is higher among special groups of workers in the dusty trades, where pneumoconiosis occurs as a companion disease, such as in mining, foundries, and pottery making. Do we plan our chest X-ray studies systematically on the basis of such an analysis—or do we occasionally do an occupational group since it offers a convenient aggregation of people?

What about the multiphasic approach? Here is the most efficient and economical case-finding approach marvelously adapted to industrial groups. The idea started in San Jose, but the most active programs are under way in other parts of the country. In Georgia, the state and local health departments are carrying out such surveys in every county of the State.

There are several acute communicable diseases of particular significance to occupational groups. For example, Q-fever and brucellosis occur predominantly among those in contact with livestock—packing house workers and farmers. Leptospirosis, anthrax, epidemic keratoconjunctivitis, and other diseases single out occupational groups. In many of these the health department can use its facilities in case-finding and prevention.

Public health epidemiology is now shifting its focus to the long-term disseases such as cancer and cardiovascular renal diseases. Industrial exposures are a rich field awaiting exploration to elucidate the causes of cancer. Heart disease and employment is a subject of great importance. What is the effect of work on the heart? What is the effect of work on heart disease and vice versa? How can we get industry to employ cardiacs and other physically handicapped? These are all problems the health department should take a hand in solving.

Vocational Rehabilitation

Is the health department aware of this program and is it helping the program? Do the nurses refer patients to it? In some areas the health officer (not in California) acts as medical consultant to it.

Accidents

Like the weather, everybody talks about accidents, but too little is done. There are 140,000 reported disabling occupational injuries each year in California, of which 700 are fatal. Are the health departments aware of the work of the industrial safety program of the state labor department? Is there liaison between the health and safety people for exchange of information? Do you receive the accident reports of the State Division of Labor Statistics? The industrial safety inspector can report health problems to the health department and the latter can help the safety people with information to channel to industry on everything from ventilation to nutrition.

What are you doing about the epidemiology of accidents? Did you know that the peak of industrial accident incidence occurs between the hours of 10 and 11 a. m. and 3 and 4 p. m.? What about nutrition, fatigue, and speed-up?

What are the facts and fallacies of "accident proneness"? Here is a worthy field for the mental health program, the nutritionist, and the health educator.

Rural Health

Mechanization and modern chemicals have brought factory conditions to the farm but under far less satisfactory circumstances for coping with them. The occupational death rate for farmers exceeds that of factory workers. Farmers lose 9 percent of their gross income from accidents. In California in 1949, a total of 14,202 farm hands had disabling accidents, and almost 60 were killed. There were 300 officially reported cases of occupational poisoning from agricultural chemicals.

Health on the farm in general is not what many used to think it was. A recent study showed the prevalence of disabling illness among agricultural workers to be greater than among non-agricultural workers.

The interested health officer can find much to do in this field. For example, in the recent past, a new series of in-

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secticides, known as organic phosphates, caused numerous poisonings and several deaths. Private practitioners were suddenly presented with a clinical entity about which they knew nothing. The health officer was in a strategic position to supply data on diagnosis and treatment, which were available but not yet generally known.

Sanitation

Decent sanitary facilities in industry can result in prevention of communicable diseases, prevention of occupational dermatitis, better morale, and increased production. In many places where people are employed, sanitary conditions are shockingly inadequate; in some, completely absent. Here is a pioneer and rewarding job awaiting the sanitarian, the sanitary engineer and the health officer. In many, if not most cases, local health department sanitarians do not routinely inspect industries. Are they less important than schools or restaurants?

The sanitarian should not neglect the farms, where some of our worst sanitation problems exist.

There is still another way in which the sanitation people can function profitably. By making routine inspections of places of work they will often encounter problems needing the attention of the industrial hygiene service, the Division of Industrial Safety, or medical consultation. Here is an opportunity for real teamwork.

Maternal and Child Health

About 30 percent of the labor force in the United States is female. Women workers have special problems of pregnancy, dysmenorrhea, and the problems arising from the stress of work added to domestic responsibilities. The maternal and child health program might with profit look into those industries in which there are large numbers of women workers. In one city, the health department holds well-child conferences in the premises of a union hall. In some areas, particularly farming regions, the health officer might well examine the health aspects of child labor.

Public Health Nursing

Is there liaison between the public health nurses and the local industrial nurses for the exchange of information and promotion of the public health program in industry? The industrial nurse is functionally in large measure a public health nurse. Through her close contact with the workers, she can be a valuable ally to the health department in reaching the industrial population. Since workers spend one-third of their lives in the factory, the industrial nurse's position is not unlike that of the school nurse.

Conversely, the public health nurse can help the plant nurse as a family and community contact in the many industrial problems, such as absenteeism, illness, and emotional situations in which home or community factors play a part.

However, few generalized public health nurses have exploited to the full the possibilities of a cooperative working relationship with the industrial nurses in their community.

First Industrial Nurse in Kentucky Still on Job at 79

MISS WILLIE OFFUTT was the first industrial nurse in Kentucky, according to State Board of Health records. Entering the field of industrial nursing in 1913, she still is on the job, though she was 79 in January.

Each morning at seven, Miss Willie goes on duty at the hospital of the Louisville Works, American Radiator and Standard Sanitary Corp., where she has worked for 38 years. Between that time and 4:30 p. m., she takes care of an average of 50 to 60 persons who come into the hospital.—*Louisville Courier-Journal.*

WHEN IS A MAN OLD?

By N. W. Shock*

IF THIS QUESTION is to have any significance, we must always say, "Old—with respect to what performance?" Since many performances are highly specific, it may well be necessary to resort to an over-all evaluation, subjective though it may be, to answer this question for a particular individual. This conclusion also has important implications for determining appropriate ages for retirement. It is obvious that dependence upon strict chronological age can have no real meaning. All that can recommend chronological age is the administrative convenience in its application.

With increasing numbers of elderly people, and the need for maximum productivity to maintain our economy, it is highly questionable whether we can afford the waste involved in discarding effective employees simply because they have attained a given chronological age. Our most important problem is to devise ways and means of maintaining the effectiveness of older people so that they can be retained in their positions.

Research productivity in itself has never been closely correlated with physiological states. We can, however, regard the maintenance of physiological vigor and health as an aid to full productivity and mental alertness. This is primarily a problem of personal hygiene, with perhaps the added advantage of periodic health examinations to detect disease and pathological conditions in their early stages when they can be more easily remedied.

The most productive research workers are notorious in disregarding fundamentals of hygiene. Long hours and work under pressure may or may not result in the development of gastric ulcer, coronary artery disease, and other affections. Nevertheless, certain broad principles of hygiene are undoubtedly of value in maintaining health and vigor. Research workers should be given opportunity and encour-

*Dr. Shock is chief of the Gerontology Section, National Heart Institute, USPHS. The above paragraphs are excerpted from an article entitled, "The Age Problem in Research Workers," which appeared in *The Scientific Monthly*, June 1951.

aged to follow these principles as we now know them.

A problem of identifying and describing age changes in human beings is one that should receive the attention of industrial research in the future. From its early beginnings, where industrial research was concerned primarily with specific practical problems, there has been a gradual shift to emphasis on fundamental research. Experience has shown that the building up of a backlog of fundamental research is of great value to industry in developing new and better products.

There is need now for industrial research to turn its attention to the producer as well as to the product. Many important problems relating to the productivity of older workers can be solved only within the framework of industry. Important questions about the changes of attitudes toward work with advancing age, as well as the effect of programs designed to train people for retirement, should also be considered. Nor should the physiological aspects of aging be neglected.

With increasing stability of workers within plants and industries, serial examinations on the same individual as he ages should be made by industry itself or in collaboration with university scientists. The questions of middle age and later maturity can be answered only with the active assistance of industry where large groups of people are actively working and producing, just as our knowledge about growth and development of children resulted from cooperative studies with schools and universities. As our population ages, there will be greater need for this fundamental information. It offers a real challenge to research.

Laboratory Courses Announced by CDC

A schedule of laboratory refresher training courses to be given in 1952 by the Communicable Disease Center, Atlanta, Ga., has been announced. Information and application forms should be requested from the Chief, Laboratory Training Services, Communicable Disease Center, USPHS, P. O. Box 185, Chamblee, Ga.

We Need the Older Worker—Let's Keep Him on the Job

By Winifred Devlin*

AS PEOPLE GROW older and work beyond the 65 year mark, the responsibilities of the health professions will increase, especially those of the industrial nurse, who is often the only full-time representative in industry.

Basic to nursing practice is a sound understanding of human beings. The competent nurse has been trained to study the personality as well as the physical structure of a person and should understand the factors and forces which make up behavior patterns.

This fundamental knowledge and sympathetic interest in people develop in her an awareness of the psychological and emotional needs of all workers and especially the older worker. With her knowledge of the symptomatology of disease and the measures which promote, maintain and restore health, she is a front-line soldier in the battle of health preservation.

Older workers often have many aches and pains, are unhappy, worried, tired, and apprehensive. Because of their years, they are subject to many chronic ailments which may result in temporary or permanent disability unless treated early.

Experience has also taught older workers a great deal about life. Many have raised families, made important decisions, and solved serious problems. As a result, they are cautious, they do not wish to change their habits readily, and, above all, they do not want to be told what to do. Many live alone, are introspective, and fear the future. Their heredity, pattern of living, and illness experience contribute to their present state of health. The way in which the older worker feels that life has treated him plays an enormously important role in his present philosophy toward society and toward his work.

This, in general, is the picture of the older worker as the nurse sees him. The competent nurse is kind and thoughtful. She is friendly, warm, and has a genuine interest in people. She also has a sense of humor which helps her to be patient, tactful, and flexible when the occasion demands it.

These are the qualities of which good teachers are made, and the nurse is often the older worker's best teacher and friend. The competent nurse is also constantly alert to any symptoms or signs of illness. Suffering from a number of ills, the older worker often presents an extremely complex diagnostic problem in contrast to the younger worker who may have an acute illness but otherwise a very well functioning body.

When the older worker comes to the medical department for consultation, treatment, or health examination, he should be afforded privacy and treated with dignity and consideration. Some workers will possess poise and assume a high degree of responsibility for their own health, while others will be so emotionally immature that they behave like children. The nurse understands that maturity is not necessarily a matter of years. She accepts each worker as an individual personality. She never calls a worker *grandma* or *grandpa* because she does not lose sight of his personality. She knows older people never consider themselves old and neither should anyone associated with them.

(Next month Miss Devlin will consider the health needs of the older worker.)

***Miss Devlin is an industrial nursing consultant with the Division of Occupational Health, USPHS, Washington 25, D. C.**

University of Michigan Offers Course on Industrial Noise

A course called *The Acoustical Spectrum, Sound—Wanted and Unwanted*, is scheduled by the University of Michigan's School of Public Health for February 5–8, 1952.

The interest and concern of industry in the problem of noise and the increasing pressure of public demand for municipal officials to "do something" about noise prompted the University to plan this course.

A staff of persons, readily recognized as top authorities on their respective topics, makes possible condensing the significant information from the total field of knowledge on this subject to focus on current problems in understandable terms.

Further information may be obtained from Dr. Henry F. Vaughan, Dean, School of Public Health, 109 South Observatory Street, Ann Arbor, Mich.

Some Pointers on the Use of U-Tube Manometer

By James P. Sheehy*

AT the present time, there exists a large mass of literature on various types of manometers. However, very little has been published on the proper use of the most common form of this type of instrument, namely, the U-tube manometer.

The U-tube is by far the most widely used of the fluid manometers because of its numerous applications, simplicity and cheapness of construction. As can be seen in the diagram, pressure is applied to either or both legs of the manometer; the pressure or difference in pressure, as the case may be, can then be read directly in inches of manometric fluid. One should be able to read such a manometer to one-tenth of an inch without any difficulty.

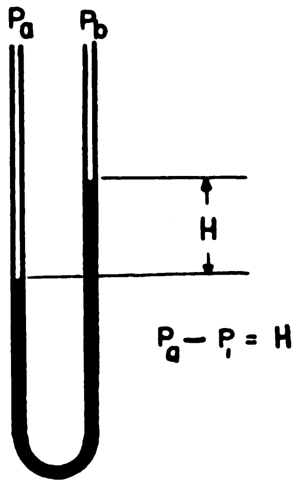
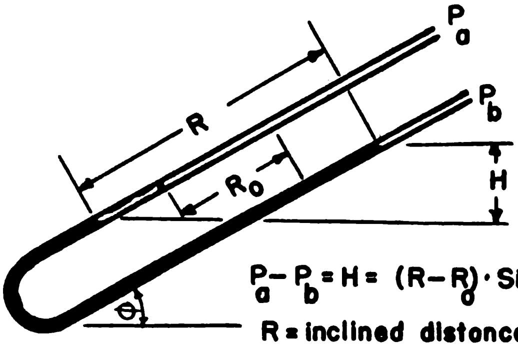


Diagram 1



$P_a - P_b = H = (R - R_o) \cdot \sin \theta$

R = inclined distance between rest levels in legs of the manometer

Diagram 2

When dealing with pressures of less than 1 inch of water, a greater range of readability can be obtained by including the U-tube, as shown in diagram two. The magnification resulting from inclining the manometer is inversely proportional to the sine of the angle of inclination. And yet, even though these two variations of the U-tube are so basic, certain factors affecting their proper operation are often neglected. The discussion following will deal with some important operational procedures, and in certain cases, with the magnitude of errors resulting from improper construction and technique.

One widely known fact that is often overlooked is the necessity of keeping the inner surfaces of the manometer clean. In a number of cases it was observed that the inability of the manometer to zero itself was a direct result of the accumulation of dirt inside the manometer. Under field conditions, the reading of a manometer is difficult enough, without obscuring the liquid levels with a thin layer of foreign matter. A standard laboratory dichromate cleaning solution followed by several rinsings with distilled water will leave the inner surfaces of the manometer in a good operative state. Periodic cleaning of manometers used in any study is absolutely necessary.

Another point which should be checked before any measurements are made with a manometer is whether or not the two legs of the U-tube are in the same plane. In an inclined manometer this is especially true, as will be shown later (see Table 1).

In reading the various articles and text books on measuring instruments, one often comes across the statement in regard to the vertical U-tube that after calibration the rising leg of the manometer should be read. It is true that, where the facilities are available, calibration of manometers should be encouraged. However, any calibration is true only if the conditions under which the instrument was calibrated remain the same.

In the case of the U-tube, occasionally the manometer fluid evaporates, thereby creating a new zero level in the two legs. Unless the level of the manometer fluid is raised to its calibration level, any readings taken with the manometer will actually be with a manometer that has not been calibrated.

A good procedure to follow when using any U-tube, whether calibrated or not, is to measure the total distance between the two levels in the U-tube. This can be made even easier by inserting a sliding scale on the manometer and placing the zero mark on

TABLE 1

(1) Ratio of actual head to manometer reading	(2) Angle included between manometer and horizontal**	(3) Percent error due to different variations in inclination			
		1′	10′	30′	1°
1:1*	90°			0.002	0.015
1:2	30°	0.05	0.51	1.5	3.0
1:5	11°32′	.14	1.4	4.3	8.5
1:10	5°44′	.29	2.9	8.7	17.4
1:20	2°52′	.58	5.8	17.5	34.9

*Verticle U-tube.
**All angles shown have been rounded off to the nearest minute, after the computation of error was completed.

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the lower level of the manometer fluid at each reading. By using this method, any variations in the bore or liquid level of the manometer are corrected automatically, thereby removing the necessity for calibration.

Table 1 shows the magnitude of the errors that will result from an improper setting of the angle of inclination of a manometer. As can be seen, the smaller the angle of inclination (column 2), the greater the error due to any deviation from that angle (column 3). For instance, it is not too far fetched to imagine a manometer set at a magnification of 1 to 10, which would be 30 minutes off; (that is, instead of 5°44', we had an angle of inclination of 5°14') an error of almost 9 percent would result. It is therefore of great importance when using an inclined manometer that the instrument be leveled and set at its proper angle of inclination.

The importance of correcting for parallax cannot be overstressed. By parallax is meant the error that will result from not observing the meniscus in each leg from a position at a level with the bottom of the meniscus and at right angles to the leg of the manometer. Suppose we have zeroed our vertical U-tube manometer and have just applied a pressure that would raise one level four inches above the other.

Let us also suppose that our eye remains at the same level that it was when we zeroed the manometer, and is approximately 10 inches away from the manometer. We shift our movable scale so that the zero mark corresponds with what we see as the bottom of the meniscus of the lower level of manometric fluid. Instead of reading a pressure of 4 inches of manometric fluid, we will read very probably 4.1 inches—an error of 2.5 percent in our initial reading. The necessity of properly reading a manometer is evident.

One error that can cause a considerable degree of inaccuracy is the use of one manometric fluid and the recording of the results as inches of another fluid. As one can readily see, it would not be too difficult to read a manometer containing alcohol as inches of water. This type of error can be avoided if a small tag identifying the manometric liquid and the date that the manometer was filled is attached directly to the manometer.

To summarize, the following points should be checked:

(1) Cleanliness of the inside of the manometer.

(2) Alignment of the legs of the manometer.

(3) Measuring of the total head.

(4) Proper angle of inclination.

(5) Proper reading technique to avoid parallax.

(6) Identification of the manometric liquid.

Wisconsin Plant Controls Toxic Vapors Given Off in Degreaser Drainage

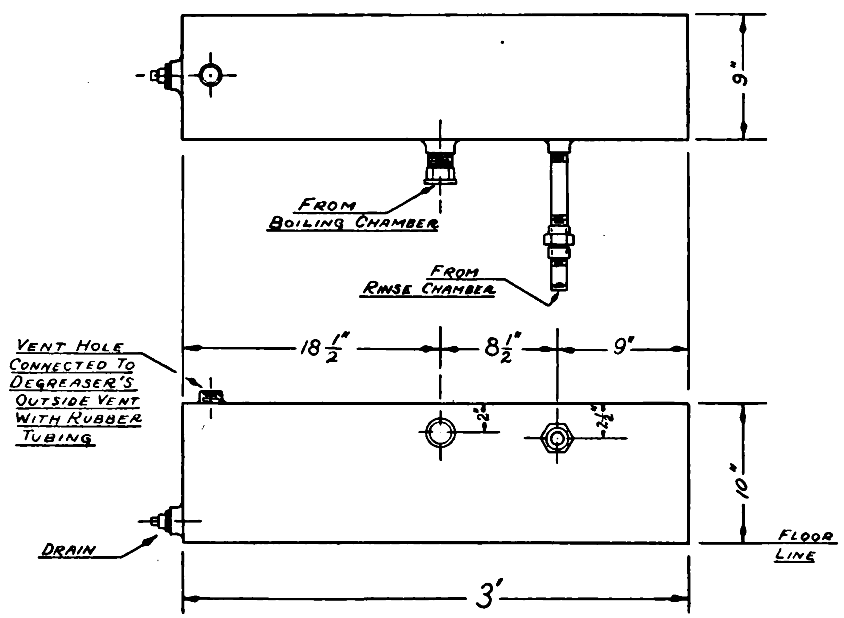
A PLANT in Manitowoc, Wisconsin, solved a problem involving trichlorethylene vapors by a method of control which seems worthy of note.

The degreaser was automatic in that the operator had only to load the conveyed baskets with small machined parts. Air samples taken in the breathing zone of the operator and in areas around the machine yielded less than 5 p. p. m. of the offending substance.

After continued operation, small chips from the machined parts accumulated in the bottom of the two degreaser tanks. The normal procedure was to pump the trichlorethylene into storage tanks, but an appreciable amount still remained in the tanks after chip level was reached. An open pan was placed under the two tank outlets, and the hot trichlorethylene was allowed to drain. This draining operation, generally lasting three or four hours, was the subject of considerable complaint from employees in that area.

To control these vapors, a rectangular metal container was made, 9 inches by 10 inches by 3 feet long. On one side, fittings were installed to connect with the boiling chamber and the rinse chamber, respectively. A vent hole at the top of the container was connected to the degreaser's outdoor vent with rubber tubing. With this arrangement, it is possible to drain the trichlorethylene, trapped in the chips overnight, without the presence of objectionable vapors in the vicinity.—**Edward J. Otterson, Engineer, Industrial Hygiene Division, Wisconsin State Board of Health.**

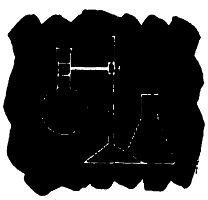
VAPOR ARRESTOR TANK USED WHEN DRAINING DEGREASER



The Contributions of Physicochemical Methods to the Solution of Industrial Hygiene Problems

By H. E. Stokinger*

The last two decades have seen the development and the application of many new types of apparatus and methods for the evaluation and measurement of the physical attributes of matter. Among the many that have come into general use during this time are: Electronmicroscopy, polarography, infrared spectroscopy, chromatography, autoradiography, ion-exchange methods, counter-current extraction procedures, and surface-area measurement of particulates by inert gas adsorption.



Such physical methods provide valuable tools in the hands of experimenters because of their potentialities of (1) providing heretofore unsuspected vistas, (2) coping with extremely minute amounts of highly complex mixtures through separation and identification procedures, and (3) providing information often more rapidly and inexpensively than is possible by chemical procedures.

Industrial hygienists and toxicologists have been alert to the possibilities of the application of many of these newly developed physical methods, and reports of such applications to industrial problems are appearing in increasing numbers in the toxicologic literature. *Electronmicroscopy* is now considered an indispensable method for the visualization of submicroscopic particles (0.25 μ diameter and below). Both the size and shape and something of density characteristics of particulates are revealed by such an instrument.

Several reports of the use of the *polarograph* for the determination of micro-amounts of chromium, lead and arsenic either in airborne samples or in tissues and fluids of biologic origin have appeared in the last 2 years. *Chromatographic* procedures are beginning to be applied with some success in the separation of extremely minute quantities of airborne materials from highly complex mixtures. *Infrared spectroscopy* is finding increasing usefulness in the fingerprinting for positive identification of complex organic molecules of industrial interest.

Autoradiographic, in combination with histologic, techniques, especially as applied to alpha emitters, are finding increasingly broader use for the localization of radioactive substances in cellular sites. *Ion-exchange* and *counter-current extraction* procedures will in time undoubtedly find a useful niche in the evergrowing physical armamentarium of the industrial toxicologist.

It would be perhaps illuminating to cite a specific example to show how the application of physicochemical procedures may contribute in a major way to the satisfactory solution of a perplexing industrial toxicologic problem. It is felt that the contributions provided by these physical methods toward the solution of this particular problem could not have been afforded through other scientific procedures.

The problem presented for solution was this. Reports were being received that individuals working with beryllium oxide were getting beryllium poisoning. Closer scrutiny of the reports indicated that the poisoning originated either in a particular plant or in plants utilizing the product of this particular plant. The plant in question made the fluorescent grade of beryllium oxide powder. The fact that the housekeeping was superior in the fluorescent powder plant to that in the plants making other grades of beryllium oxide added another perplexing note.

Inasmuch as greater exposure among workers with the fluorescent powder could definitely be ruled out, the obvious question arose, what is peculiar to this particular form of beryllium oxide?

One fact was known. The time and temperature of calcining differed for the different lots of oxide. The first approach to the solution of the problem was sought in possible differences in chemical composition. Four different grades were examined—two refractory lots from one plant, one fluorescent grade from another, and a fourth, a low-fired (400° C.) preparation from a third plant, was added for the purpose of furnishing a more extreme experimental test material.

Analysis by both chemical and spectrochemical procedures revealed a high purity (97–100 percent) for all samples of beryllium oxide irrespective of their source. Moreover, no appreciable differences in possible toxic impurities were found in any of the lots; impurities never exceeded more than 1 percent and were for the most part 0.05 percent, or below. Obviously, no solution to the toxicologic problem was forthcoming through the chemical approach.

Concommitantly with the chemical investigation, an extensive study of the inhalation toxicity of the four grades of oxide was made in animals to see if comparable differences in toxicity could be found and thus in a measure confirm plant experience. Toxicity tests showed the following: (1) Refractory grades, inappreciable toxicity by any criterion used. (2) Fluorescent grade, evidence of acute toxicity at comparatively high levels of exposure (90 mg/m^3) as characterized by weight loss in certain of the larger species (monkey and cat), and (3) Low-fired oxide killed approximately 30 percent of the exposed rats at 90 mg/m^3 and produced weight loss in this and other species as well as other physiologic changes.

These distinctly different toxicologic responses of the various lots of oxides thus confirmed in a general way the experience of industry; the order of toxicity, however, only roughly paralleled the firing temperatures at which the oxides were prepared. Obviously, a complete and satisfactory solution was not yet at hand; some undiscovered facts remained.

Accordingly, four physicochemical methods comprising electronmicrographic studies, specific surface-area determinations, and particle-size measurements of the beryllium oxide particles and solubility-rate studies were

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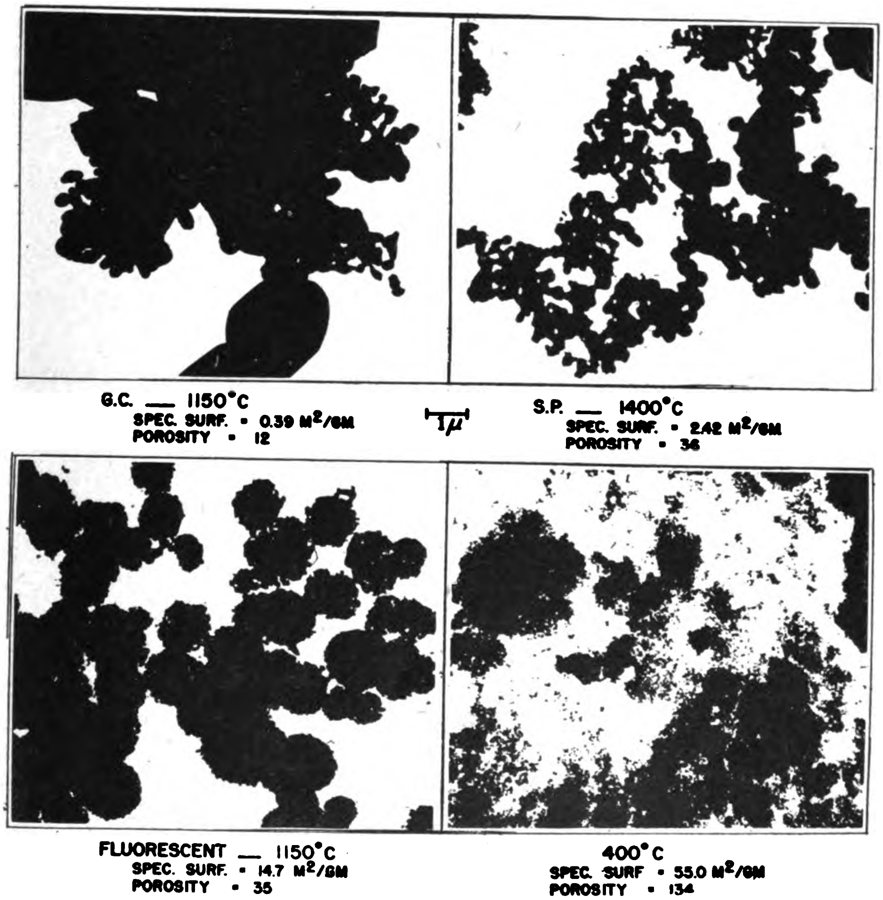
undertaken. These physical procedures brought a most satisfying revelation and offered practically incontestable evidence for the cause of the toxicologic differences.

The four electronmicrographs shown below displayed with ample clarity the marked differences in particle size, density, and surface area of the different grades of oxide. Moreover, "porosity" values (calculated as a ratio of the specific surface, measured by inert gas adsorption, to the surface calculated from optical measurements of particle diameters) furnished data consistent with those obtained from the electronmicrographs. It may be seen from the legends in the figure on this page that there was a 140-fold difference in specific surface between the low-fired oxide and that of the G. C. grade, and nearly a 40-fold increase in the fluorescent grade which gave the first definite signs of toxicity in animals.

With this information as a guide, data were also obtained on the rate of solubility of the two lots of oxide, the refractory and the 400° C. material, the possibility being explored that if greater differences of surface area really existed, these should be reflected in greater rates of solubility. Such was the case. Solubility measurements indicated that in a certain buffered medium at least a 25-fold greater rate of solubility occurred with the oxide of the greater specific surface.

It was amply evident, therefore, that the greater surface area (or some related property, such as wettability, or electric charge) of the different lots of beryllium oxide particles determined by physicochemical methods was responsible for the toxicity differences among different lots of oxides. Thus a rational basis for the observed industrial toxicity was found.

ELECTRON MICROGRAPHS OF BERYLLIUM OXIDE OF VARIOUS GRADES



HAVE YOU READ THESE ARTICLES?

Medical Care in Industry.[1]—By W. A. Sawyer, Medical Director, Eastman Kodak Co., Rochester, N. Y.

Excerpts: The need for adequate medical care in industry, small as well as large, is overwhelming. How to break through the indifference, the ignorance, and the fears is one of the imponderables. That some progress has been made is scant comfort when vision and initiative are lacking in so many quarters and there is so little of the will to give industrial medicine a trial. World War II did much to awaken recognition of its value. Must we have another world cataclysm, which will mobilize everyone, to place a proper evaluation on the need for optimum medical care? Shall we have to depend on legislation to provide what could be a purely voluntary effort? What of the future?

Industrial medical service might be approached through one of several ways:

(1) It can continue to be an employer provision, as it is now for the most part, and as it began.

(2) It can be on an insurance basis as a voluntary measure or as a governmental requirement.

(3) It can be financed by a tax on the product, as in the plan of the United Mine Workers, or by joint contributions of employers and employees, as in the International Ladies' Garment Workers' Union.

(4) It can never be provided adequately by private practitioners, although it has been hoped that they could play a larger part in providing service for the smaller businesses. At all times, it must be remembered that any plan should be based on teamwork, participated in by all of the medical profession, general practitioners and specialists, by nurses, technicians, social workers, voluntary and official public health agencies, hospitals, social welfare groups, and any other organized and trained personnel which can contribute to the physical, mental, and social well-being of those who are gainfully employed.

[1] From *The Annals of The American Academy of Political and Social Science*, Philadelphia, January 1951.

Studies of Health Hazards in Industry

By J. J. Bloomfield*

This article is one of a group of lectures which Mr. Bloomfield gave to a class of physicians in Rio de Janeiro, Brazil. In view of the constant demand for basic material on industrial hygiene techniques and for practical help in this field, a number of these lectures are being printed in* Occupational Health. *This is the seventeenth in the series.

HEALTH MAINTENANCE

THE CONTROL of industrial health hazards is a function of both the medical and engineering professions. The physician and his coworkers recognize the existence of diseases resulting from the workroom environment. They exercise medical supervision and initiate studies designed to eradicate and prevent dangerous conditions. The engineer and his coworkers determine the extent of the hazard. Armed with knowledge of the toxicology of the material involved, they are in a position to consider methods and equipment for the control of the hazard.

In the present chapter only those methods employed by the medical profession and its allied workers in dealing with the human element in industry will be discussed. The control of environmental factors will be presented in the next chapter.

The purpose of medicine in industry is to promote the health and physical well-being of industrial employees. These objectives may be accomplished by:

(a) Prevention of disease or injury in industry by establishing proper medical supervision over industrial materials, processes, environments and workers.

(b) Health conservation of workers through physical supervision and education.

(c) Medical and surgical care to restore health and earning capacity as promptly as possible following industrial accidents or disease.

There is no industrial establishment too small to have an organized medical service. This has been definitely demonstrated in many countries. Organized medical services have been developed for very small plants, say those employing less than 500 workers, by organizing several small plants in close proximity to each other and furnishing them with an industrial medical service through the utilization of local resources. Without such a medical organization and supervision, additional time is lost from accidental injuries, medical compensation costs are increased, and the establishment itself lacks the supervision and advice it needs in order to have adequate measures for health conservation.

The scope and type of an industrial medical service will obviously depend upon the nature of the industry, its location, and the number of workers. In isolated communities it may be necessary to provide complete medical and hospital service for the workers and their families.

Before a discussion of the organization and administration of an industrial medical program, it may be advisable to state the functions which are required in such a program. These can be broadly classified as follows: (1) the prevention and treatment of occupational disabilities and treatment of emergency cases; (2) the prevention of nonoccupational disabilities and treatment of emergency cases; (3) investigations; and (4) professional education.

FUNCTIONS OF AN INDUSTRIAL MEDICAL DEPARTMENT

Prevention and Treatment of Occupational Disabilities

Prevention—The control or prevention of occupational disabilities is a combined function of the engineering profession and the plant medical department. The medical department should be routinely consulted by management before the introduction of new materials or processes or major alterations in the plant environment. The medical department should also make periodic inspections of potentially hazardous materials and processes throughout the plant. If there is a health and safety committee in the plant, the medical department should have membership on such a committee. Analyses of disability records of the plant and intensive studies of proved or suspected cases of occupational disabilities will also aid in the prevention of occupational hazards.

Although the placement of workers is often a responsibility of the personnel department, the final decision on the health aspects of placement should be left in the hands of the medical department. It is this department, too, which should act as a consultant to the personnel group in the analysis and classification of the physical and mental requirements of each job. In this connection, the medical department should evaluate the health of each new employee in terms of his fitness for the job. Followup of all placements should be a routine procedure for the medical department.

The medical department should take a very active part with other departments in the health and safety education of workers.

Treatment—The treatment of emergency cases of occupational disability is a basic function of the medical department. The treatment of non-emergency ambulatory cases of occupational disability may be done in whole or in part by the medical department, depending on many factors. Obviously, only under the most unusual circumstances is major surgery a justifiable function of an industrial medical department. However, the plant physician should keep in close contact with workers receiving major surgery.

The medical department with full- or part-time physicians should render medical care for all occupational illnesses and those emergency, on-the-job health problems. The workers who are receiving medical care for occupational diseases outside the plant medical department should be seen frequently by the plant physician.

If the medical department is properly staffed and equipped, it may provide laboratory, X-ray, and other diagnostic services for occupational disabilities. The medical department may also provide nursing service for cases treated by

*Mr. Bloomfield is industrial hygiene consultant to the Institute of Inter-American Affairs, Lima, Peru.

physicians outside the medical department, if such an arrangement is desired by the physician and if he prepares detailed orders for such nursing services.

The medical department, when suitably staffed and equipped, should treat convalescent cases of occupational disability. Although a grossly neglected phase of treatment, rehabilitation can be of great value in restoring promptly the optimum health and full earning capacity of the disabled worker.

Prevention and Treatment of Nonoccupational Disabilities

Prevention—Individual programs for the promotion of positive health, when properly carried out, represent public health practice at its best. Starting with the findings of the individual health evaluations, they can be developed in many directions. Therefore, the medical department should promote an understanding in the individual of his health status, its strong and its weak aspects, and stimulate a desire in the worker to improve his health.

The medical department should control the placement and adjustment of the worker in his job so as to prevent the aggravation or precipitation of conditions ordinarily classified as nonoccupational, particularly emotional illnesses. The worker should be advised concerning his needs for nutrition, rest, recreation, personal cleanliness, and be encouraged in the formation of attitudes and habits concerning his other daily activities which will foster optimum health.

Mass programs for the promotion of positive health are, to a large extent, joint activities with local public health agencies. However, their full value will be realized only when the medical department participates wholly in the program and institutes adequate followup procedures. For such a program, the medical department should provide mass medical services for the prevention of specific nonoccupational diseases when these services are not available from the local public health agency or when they can be more effectively provided within the plant. This is especially true with regard to the detection of diseases, such as tuberculosis, diabetes, and others, in their incipient stages.

In connection with the prevention of nonoccupational diseases, the medical department should assume supervision of the general health aspects of the plant. This will involve periodic checks on the adequacy, functioning, and sanitary conditions of all eating, drinking, washing, bathing, and toilet facilities, as well as such environmental factors as air conditioning and lighting. The medical department should provide technical assistance to those in the plant who are responsible for nutrition, recreation, and welfare services.

Treatment—The treatment of emergency cases of nonoccupational disability is one of the basic functions of a medical department. However, as in the case of emergency occupational diseases, the extent of emergency care for nonoccupational diseases will vary greatly from plant to plant. In most instances, prolonged emergency type of treatment of nonoccupational diseases is not ordinarily a direct function of a plant medical department. Such care is usually referred to local practicing physicians.

However, in certain unusual circumstances, as in isolated communities, the plant medical department may provide complete service for nonoccupational diseases. But even in such cases the medical department should review carefully the availability and standards of existing community health resources, the applicable government laws and regulations, and the current attitudes of management, labor, and the health professions.

Investigations

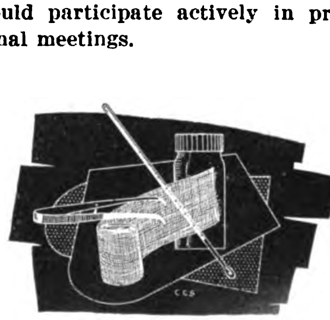
The study of occupational health hazards of the plant provides information of primary importance in the prevention of occupational disabilities. The medical department should, therefore, consult on or supervise experiments on new materials, processes, or environmental conditions to determine their effect on the health of workers. Likewise, new and improved control measures for new health hazards should be subjected to experimental trials. If the resources of the plant do not permit such original investigative work, then the medical department should obtain or arrange for comparable determinations by outside agencies.

The medical department should systematically accumulate and analyze appropriate information on the health status of the workers exposed to potentially hazardous materials, processes, and environmental conditions and make intensive studies of all cases of proved or suspected occupational disability. A study of sickness absenteeism can contribute to medical knowledge in a way hardly possible for any other method available outside industry. With such information, the nature and extent of illness in one of the largest and most important segments of the community can be clearly defined. A study of the effectiveness, efficiency, and cost of the medical department is also essential for a successful and progressive program.

Professional Education

Demonstrations in industrial medicine can promote awareness of and sympathy for industrial medicine and hygiene among those in training for the health professions and among health professions and among health personnel who are not in these fields. This can be done by bringing to the attention of medical, dental, nursing, engineering, and public health students general information about industrial medicine and hygiene and the opportunities in these fields. The medical department which is well developed can provide supervised in-service training in industrial medicine and hygiene for short periods of time to medical and nursing students who elect such opportunities.

Such experience would be equivalent to clinical training which these students ordinarily receive in the other medical specialties. Such supervised experience can also be presented to graduate physicians and nurses who may be preparing for careers in public health. Some medical departments may be in a position to provide 1 or 2 years' residency in industrial medicine to those who wish to specialize in this field. The same can be done for nurses and for trained attendants. It goes without saying that the staff of the medical department should participate actively in professional meetings.



Worker Dies After Trichlorethylene Exposure in Pit

A FATALITY traced to trichlorethylene exposure recently occurred when a 33-year old worker in an instrument plant was giving the degreasers their periodic cleaning.

Of the five machines, one was located in a pit. The worker entered the pit, removed the coils and other necessary parts, cleaned out the sludge and finally replaced the coils. He customarily wore no respirator, but came up every time he felt affected seriously by the fumes. The entire operation took approximately one-half hour, only half of which was spent in the pit. The trichlorethylene had been drained out the previous day.

At the time he was in the pit, the other workers in the area were on their relief period. Upon their return they found the victim slouched over inside the pit. The body was taken to the dispensary, where examination by the nurse detected no respiration or pulse.

Analysis of the victim's blood revealed 1.78 mg. percent of trichlorethylene. A burning sensation on the skin of the legs could be felt by others in the vicinity of the pit.

Engineers from the Massachusetts Division of Occupational Hygiene, having studied the dangers of such exposure, visited the plant to make chemical tests of the worker's exposure during this operation. Of six samples, five revealed atmospheric concentrations ranging from 900 to 34,300 parts trichlorethylene per million parts of air (Massachusetts maximum allowable concentration: 150 p. p. m.).

The layout of the degreaser was poor, as the pit was deep and narrow, and even the top of the pit was obstructed by other machines, making the ventilation poorer.

It was recommended that hereafter the workers use a respiratory protective device, preferably either a canister-type gas mask or an airline or other supplied air respirator. The plant manager was also informed that this operation should never be done alone, but always with a responsible individual in the immediate vicinity during the cleaning process. The worker should wear impermeable clothing to guard his legs against skin burns.

REPORTING MAKES HISTORY

Illustration by Garnet Jex, USPHS

Chimney-Sweeps' Cancer.—The chimneys of 18th century England were 6 to 24 inches in diameter, irregular, and tortuous. Children, called "climbing boys," who had to be small enough to negotiate these narrow flues, were used as sweeps to loosen and remove the soot from the walls. As these children grew larger, it became increasingly difficult for them to get up and down the chimney. This caused friction with consequent rubbing of soot into the skin. The lesion that followed, occurring on scrotum and adjacent parts, was called "Chimney-Sweeps' Cancer." This represents the first malignant neoplasm of occupational origin.

Percival Pott in 1775 was the first to describe chimney-sweeps' cancer of the scrotum. Flüterer recorded 47 deaths from scrotal cancer in chimney sweeps of England from 1808 to 1854. Butlin described 23 cases from 1880 to 1882. At the turn of the century, chimney-sweeps' cancer of the scrotum was the predominant type of scrotal malignancy described in English hospitals. From 1910 to 1912, 23 out of 107 deaths of chimney sweeps were caused by scrotal malignancy. As late as 1935, appreciable numbers of cases were still being reported.

Reporting Promotes Health

Many have reported on this example of man's inhumanity to man. In addition to the long list of scientific reports, legal and sociological writers described their respective aspects of this problem. Finally, professional writers included accounts in short articles as well as in novels and poems. The following by Blake is typical:

When my mother died I was very young,
And my father sold me while yet my tongue
Could scarcely cry, Weep, weep, weep, weep.
So your chimneys I sweep, and in soot I sleep.

In 1788, the Chimney Sweeps Act was passed in England with the intention of controlling activities of the trade as well as the existing hazard. This act was followed in 1834, 1840, and 1864 with amendments to further strengthen enforcement.

The numerous reports on the chimney sweeps thus served to bring forth not only a thorough and detailed study of the neoplasm but also changes in architecture and in type of fuel, the development of hygienic precautionary measures, and the evolution of one of the earliest and most complete reporting systems that any country has.

In the United States, report cards for occupational disease reporting are available through your State Board of Health or your local health department.

Report All Cases of Occupational Disease

No. 6 of a series prepared by A. Link Koven, M. D., USPHS