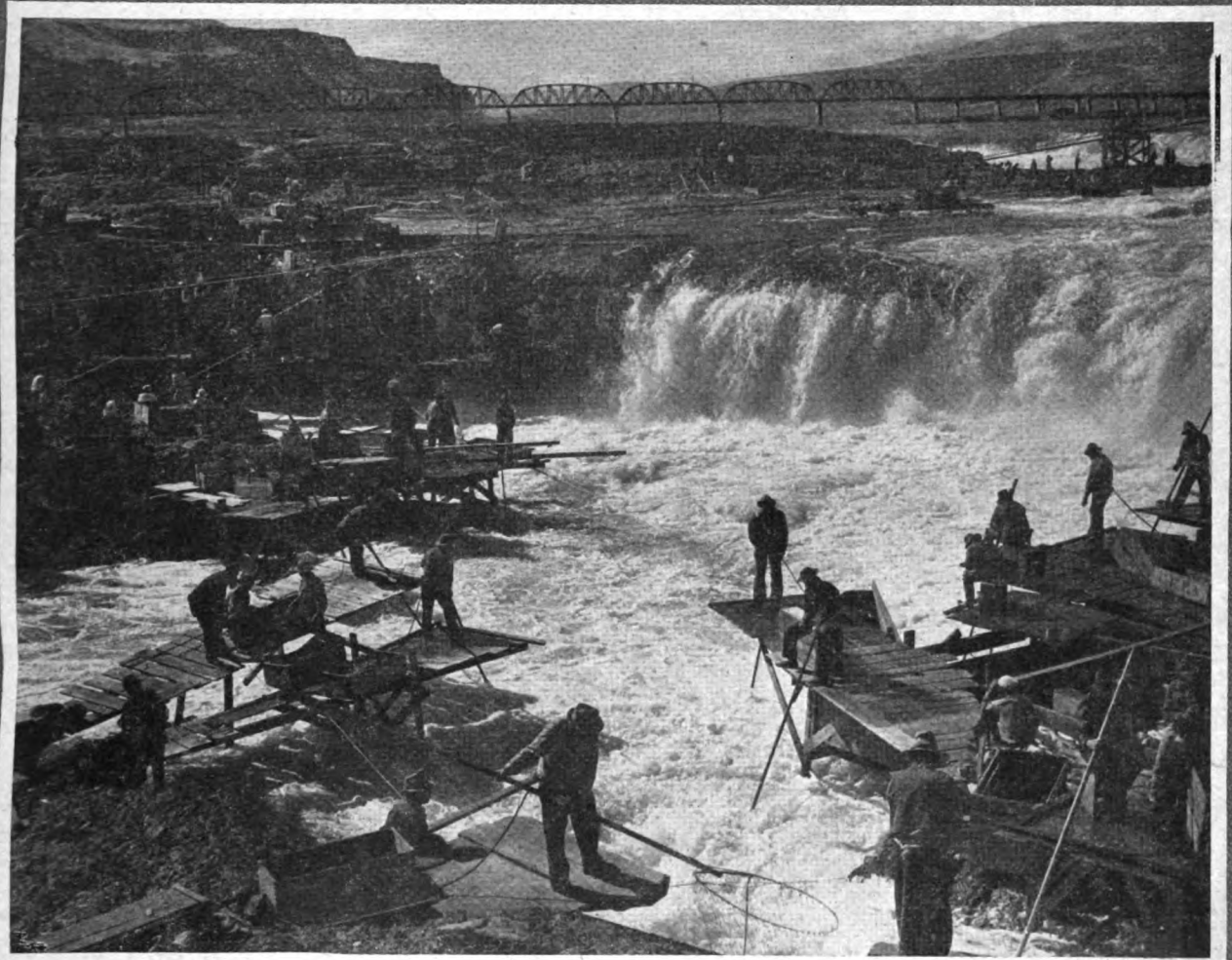


The Industrial Hygiene

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WORKERS IN CLEANING PLANT ILL—SOLVENT CONTAINS CARBON TET

An unusual group of carbon tetrachloride poisoning cases was recently investigated by the chemical and medical sections of the Massachusetts Division of Occupational Hygiene.

One of three workers was brought into a hospital by ambulance, while two others were later admitted through the Out-Patient Department. The first patient gave a history of cleaning jackets by dipping them in a cleaning fluid. Investigation revealed that this was being done in a very narrow room ventilated by small windows. The operation consisted of dipping nylon jackets in a solvent which was contained in a 3 gallon open bucket. The jackets were drained on a cardboard, then hung up to dry. The workers were not protected in any way from the vapors of the cleaning fluid.

Although an earlier analysis of the solvent showed it to consist entirely of petroleum hydrocarbons, examination of the sample obtained at this plant revealed about 10 percent carbon tetrachloride. As soon as the presence of this solvent was confirmed, work was stopped until suitable respirators could be provided.

Air analyses taken subsequently, with only one worker engaged in cleaning, indicated concentrations averaging 180 p. p. m., with a maximum value of 350 p. p. m. Presumably higher concentrations prevailed when two men were working simultaneously. The men who were affected had worked from 1 to 3 days at this operation.

The clinical picture presents an interesting point. Two of the three hospitalized patients gave no indication whatever of kidney damage, while the kidney function tests of the third patient were inconclusive. All three, however, showed diffuse hepatic damage, based on liver function tests.—**Dr. Hervey B. Elkins, Chief of Laboratory, Div. of Occupational Hygiene, Mass. Dept. of Labor and Industries.**



COVER PICTURE.—Fishing for salmon on the Columbia River.

Industrial Health Programs Recommended for Federal Workers

A health program for Federal workers was the subject of a conference held in Washington, D. C., recently under the sponsorship of the Federal Personnel Council and the Society for Personnel Administration. Representatives from the Bureau of the Budget, the Public Health Service, and several other Government departments having outstanding health programs spoke during the session.

Mr. Jennings Randolph, one of the sponsors of the Randolph-Downey Act, which became Public Law 658¹ (79th Cong.), was chairman of the Conference on Federal Employees' Health program. Dr. Anthony J. Lanza, director of the Institute of Industrial Medicine, New York University, Bellevue Medical Center, was one of the principal speakers.

Health Services Save Money

Government once lagged far behind industry in setting up industrial medical programs, Dr. Lanza told the meeting, but World War II stimulated Government establishments into active measures based upon the standard and accepted industrial medical program. Dr. Lanza quoted a statement made last month in which an executive of a large corporation described how his company had effected very large savings in the costs of accidents and in compensation. The executive added, "I believe that if we are willing to spend money for improved medical service the improvement in health will show even greater dollar savings for employees, stockholders, and communities than was earned by the safety program." Dr. Lanza said that if for stockholders we substitute taxpayers we can apply this statement to the discussion of the Federal employee health programs.

Miss Klem is a public health specialist in the Division of Industrial Hygiene, PHS, and secretary of the safety and health committee, Federal Personnel Council. Mrs. Niles is assistant to the chairman of the Federal Personnel Council.

¹"A Suggested Plan for a Preventive Medical Program in a Federal Employees' Health Service", *Public Health Reports*, Vol. 61, No. 46, November 13, 1946, pp. 1641-1654.

Margaret C. Klem and
Mary Cushing Niles

Mr. Donald S. Dawson, administrative assistant to the President, spoke on the White House concern in the program. He emphasized the responsibility of Federal management people to increase efficiency and reduce costs in order to make the tax dollar go further. He placed great emphasis on getting the right person in the right job and in obtaining teamwork for production. It is recognized, he said, that the happiness of the employee in his job is a most important factor in production, and that happiness and security are fostered by good safety and health programs. It is his opinion that in general the safety programs are well developed. Mr. Dawson said, "We talk about selling programs to top management. This is a program which top management is selling to us. It is our responsibility to carry it out. I believe we can profitably go forward and I predict that we will. It is up to us to make these first steps a success."

The President's Statement

Congress and the President have expressed their belief in the values to be obtained from better health programs. The program under the President's policy was developed within the framework of law through teamwork of the Federal Personnel Council, the Public Health Service, and the Bureau of the Budget.

The President's policy statement covering the establishment and operation of Federal employee health programs states that "the maximum permissible cost of the health service will be \$8 per year per employee to be served unless special industrial conditions or other abnormal health or accident risks exist which warrant an additional allowance. In the case of small agencies, due allowance will be made for meeting the cost of the minimum health service.

"The services furnished shall consist of treatments of on-the-job illnesses which usually are administered by a physician or nurse without the need for

extensive diagnostic and therapeutic clinical equipment; preemployment and fitness for duty examinations; referral to private physicians and dentists or existing community resources; and administration of treatments or medications upon the request of the employee's private physician in the interest of keeping the employee on the job."

The statement also specifies that in the interests of lower costs and uniform services to employees, the agencies are encouraged to consult with the Public Health Service on their requirements for such programs, contract with the Public Health Service in communities where it has adequate and acceptable out-patient facilities, or arrange with other Government agencies for a medical department or to operate their own facilities where other Federal medical facilities are not available.

The statement continues, "Health services under this program shall be provided in health rooms staffed with personnel qualified in public health work to as large a number of Federal employees as is reasonable and feasible to undertake (1) in metropolitan Washington, (2) in those cities outside Washington which have large concentrations of Federal employees, (3) at industrial type installations or similar activities presenting abnormal health and accidents risks to employees, and (4) at other locations where an agency employs a large number of personnel in a single building or an adjoining group of buildings." At least 300 employees in a single building or an adjoining group of buildings are required to warrant the establishment of a program.

Employees in Small Plants

Government as well as industry recognizes the importance of making in-plant medical services available to small groups of workers and it is equally aware of the difficulty of developing such programs. In the general discussion it was urged that the policy should be extended to cover groups of less than 300 employees.

A large majority of employees in the Departments of Agriculture and Inte-

rior work in 3,000 counties of the United States in groups of less than 300. Mr. T. Roy Reid, Director of Personnel, Department of Agriculture, pointed out that these employees have even greater need for the protection of this program than do those working in cities where extensive community facilities are available. These facts were brought out in that portion of the conference, chaired by Mr. Wade Latham of the Department of Interior, in which existing programs were discussed.

Mr. Frederick J. Lawton, Director of the Bureau of the Budget, again stated that the interest of the President is a positive one. Today there is clear recognition that the health program represents a constructive approach to employee morale and sound personnel management. He stated that we are now spending 6½ million a year on the employee health programs, but that we have a considerable distance to go before the services are available to the nearly 2 million Federal employees in widely scattered areas. He stated that the Bureau of the Budget's job is to insure that the development of the programs in cooperation with the Public Health Service is meeting immediate needs throughout Government.

Mr. Lawton emphasized the following three essential points in the President's policy statement on the Federal employee health program: (1) Each individual agency should develop a program to meet its specific needs. (2) Additional health service beyond that provided for under the policy should be added only when agencies are convinced that these are desirable and are meeting a designated need. (Mr. Lawton called attention to the experimental program of the Denver Center which is being followed carefully and it is anticipated that this experiment will indicate the necessary steps to be taken in the further development of Government-wide service.) (3) This statement affords a basis on which to establish the program of different agencies and to justify to the Congress and to the public each step in the development of the employee health program.

Mr. F. A. McNamara of the Estimate Division, Bureau of the Budget, gave details on the operation of the program with special reference to processing budget requests.

Teamwork Necessary

Mr. Jess Larson, Administrator of the General Services Administration, stated that industry has paved the way in demonstrating the value of health programs for employees and that government has been woefully slow in recognizing that value. He said that nothing contributes more to happiness and security than good health programs and the feeling that top management, including the Congress, is interested in the well-being of employees. He believes that, if anything, these programs are all too modest. He emphasized the importance of preemployment and periodic physical examinations and the need for the health, safety, and personnel work to be tied closely together.

This point was vigorously reinforced by Dr. R. C. Williams, Assistant Surgeon General of the Public Health Service, who has been a leader in developing occupational health programs for government employees. He said that at a time when all public-minded citizens are becoming more and more interested in the promotion of health, it is important that special attention be given to providing health services to Federal employees. The maintenance of positive physical and mental health requires health examinations for detecting symptoms of disabling illnesses, referral of employees for needed medical care, health counseling, education and guidance, and the maintenance of work environment free from health hazards. It entails close cooperative interaction and planning with agency officials concerned with safety, personnel and production. As public servants of the taxpayer, he said, we have a grave joint responsibility for promoting efficiency, reducing the incidence of chronic disabling illnesses and accidents which place such heavy costs on our society, and for providing the quality of health services which will improve the health status of our nation.

Commissioner Paul A. Walker, of the Federal Communications Commission, cited some interesting examples of the way in which the health program had aided his agency. The health services, he pointed out, were used not only by the rank and file of employees but also by the Commissioners themselves, thereby saving much valuable time.

Existing Federal Programs

Col. Wesley C. Cox outlined the extensive program of the Department of the Army which provides a number of health services throughout the country. Mr. Harris Shane, of the Department of Labor, described a similar program available to the several thousand employees of that department in Washington. Mr. George Sweet, assistant administrator of the Veterans' Administration, referred to the service given employees in connection with veterans' hospitals and the extension of some of these services to the employees of the offices of the Veterans' Administration located throughout the country. During the fiscal year 1952, he said, the Veterans' Administration hopes to further develop its program in Washington and throughout the field organization. He made special mention of the cooperation of the Veterans' Administration with five other Federal agencies in the pilot program at the Denver Federal Center, which is paralleling the experience of industry in demonstrating that the benefits derived from the employee health programs outweigh their costs.

As has been mentioned previously, during the general discussion, several Government leaders referred to the excellent results obtained at the Denver Federal Center.² Federal employees in Denver are concentrated in two areas, in the city proper and about 14 miles out. In Denver no preventive health services are available to the employees as a whole, but at the Federal Center, outside of town, complete services are provided for the employees working there.

Sick-leave records for a six-month period (October 1947 through March 1948), before either group had health services, were compared to those during the same period one year later, after the health center had been established. While at the Denver Federal Center there was a reduction in the number of requests for sick leave and the amount of sick leave taken, there was an increase among the employees in the city proper.

The study demonstrated that the health service effected a saving at the Denver Center in sick leave which

(Continued on page 16)

² "The Effect of Health Services on Sickness Absentee Rates of Federal Employees in Denver," Division of Federal Employee Health, PHS.

X-Radiation Exposures in Diagnostic Procedures

In 1895, Roentgen discovered rays other than "cathode rays" which penetrated opaque bodies—the degree of penetration depending on the atomic weight of the substance. Since they also affected photographic plates, it was possible to make a record of any mass of varying densities by placing a plate underneath, and exposing it to the tube for a certain time. This is the simple principle that underlies the whole science of radiography. Medical science rapidly put X-rays to work. During this period, many early pioneers suffered severe X-ray burns, which were later found to be incurable. Today, 55 years later, the effect of X-rays upon the human body still is not known in its entirety.

The study we made at the mental institutions in Michigan offered an unusual opportunity for the determination of the magnitude of X-radiation exposures to radiological personnel in diagnostic work. This was of especial interest, because we felt that attendants and technicians in mental institutions, due to their abnormal handling

By Donald E. Van Farowe
Division of Industrial Health
Michigan Department of Health

techniques, were subjected to high radiation exposures.

The purpose in making a study of this kind can be stated briefly by the following points:

(1) X-ray equipment is used more and more extensively for diagnostic procedures, and in many cases by technicians not specially trained in roentgenology, whose main interest is producing a diagnostic roentgenogram, with too little consideration for safety.

(2) The mental institutions performed practically all the possible types of diagnostic X-ray procedures.

(3) A wide variety of X-ray and fluoroscopic machines were used in these institutions, including machines for general and special work, machines of recent manufacture and those of early manufacture, some with exposed X-ray tubes.

(4) Due to the necessity of holding mental patients in position, the study afforded a good opportunity to determine what average maximum exposures can be encountered in diagnostic roentgenology.

(5) The use of so-called rayproof apparatus often results in a false sense of security.

(6) The greatly increased use of diagnostic X-rays makes the accumulated dose received by patients and radiological personnel significant, from the health point of view.

The instruments used in the study were the Victoreen Condenser R meter, Kelly Koett dosimeters, and film badges. Film badges were worn for a period of 1 month, the number and type of all roentgenograms during that month were recorded. The estimated radiation exposure was calculated by multiplying the readings for each particular type of roentgenogram, by the number taken during the month the film badges were worn. These calculations were correlated with the film badge results.

By proceeding in this manner, we eliminated untenable errors in our calculated results due to instrument variations. Film tests have another advantage, in that they may also serve as an indication of the ray quality in parts of the film covered with different filter materials. A knowledge of the ray quality serves to indicate the origin of the stray radiation, whether it is due to high energy or low energy X-rays. Measurements of scattered radiation were taken under actual diagnostic conditions.

Hazards of X-radiation are caused by exposure to the direct beam and to the scatter. Protection against the direct beam radiation is an obvious necessity. This protection is achieved in the modern machines by shielding around the tube. Shielding materials may be applied most advantageously close to the X-ray tube. A definite saving is realized by using "rayproof tubes" which shield the direct beam, except the "used" beam passing through the aperture.

In mental institutions the attendants, and at times the technicians, are required to assist in holding excited and

(Continued on page 7)

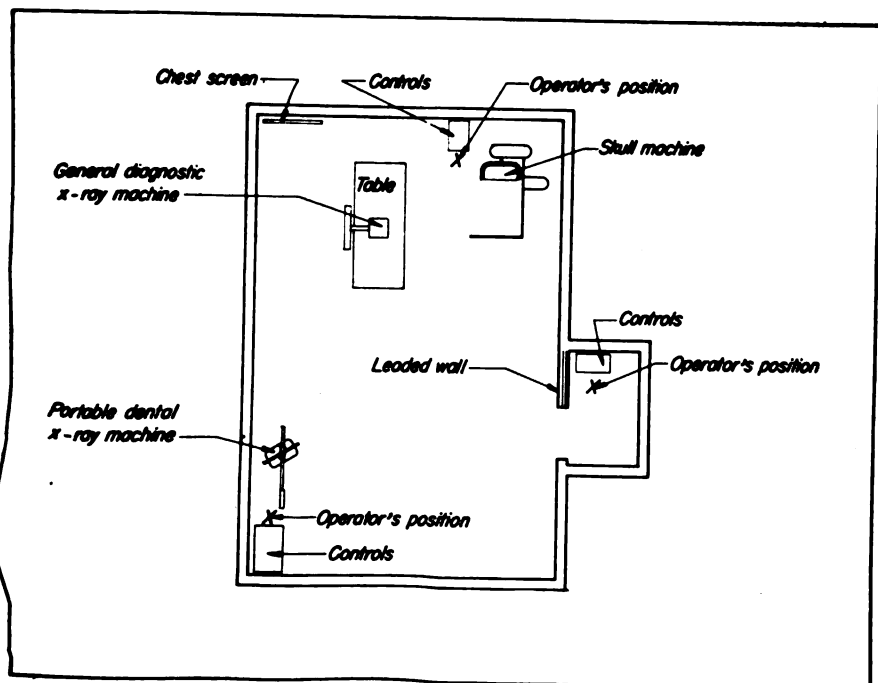


Figure A.—This room is considered well designed for diagnostic work. It has a lead-shielded booth for the operating controls of the main machine, and yet permits the technician to watch the movements of the patient through a leaded-glass window. The operator's exposure was 0 mr in all of the hospitals using this type of installation.

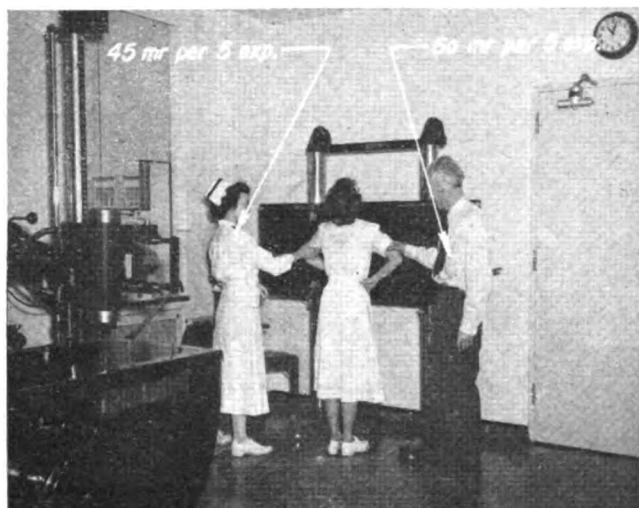


Figure 1

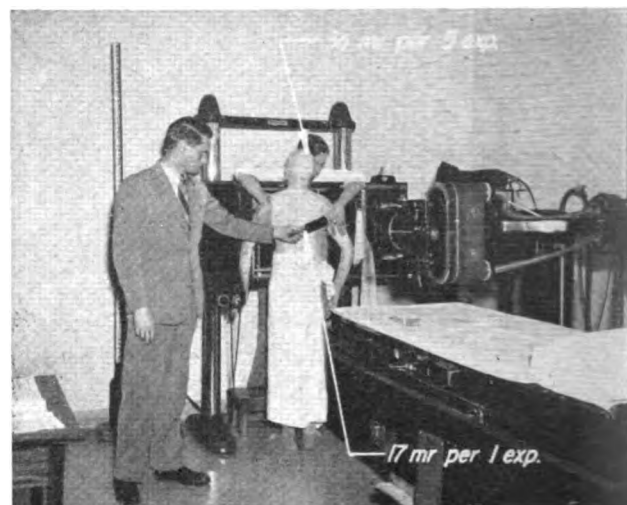


Figure 2

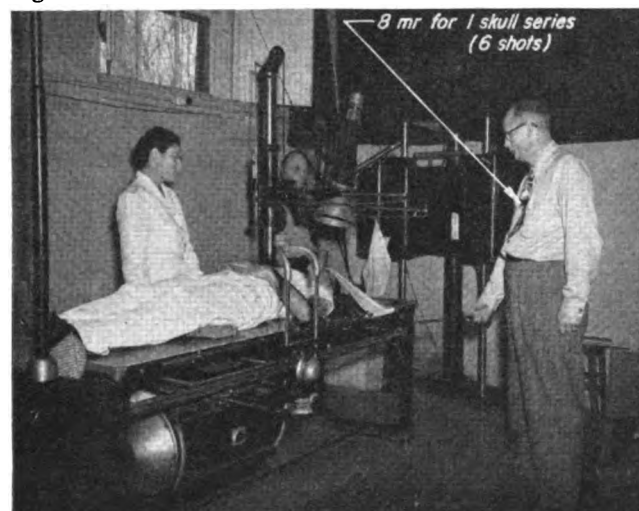


Figure 3

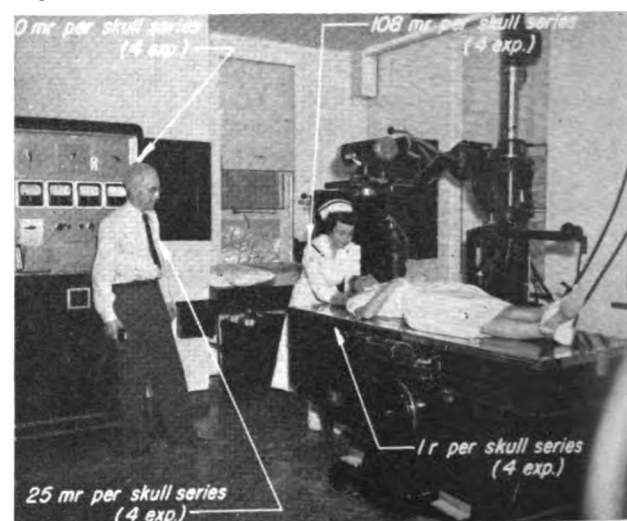


Figure 4

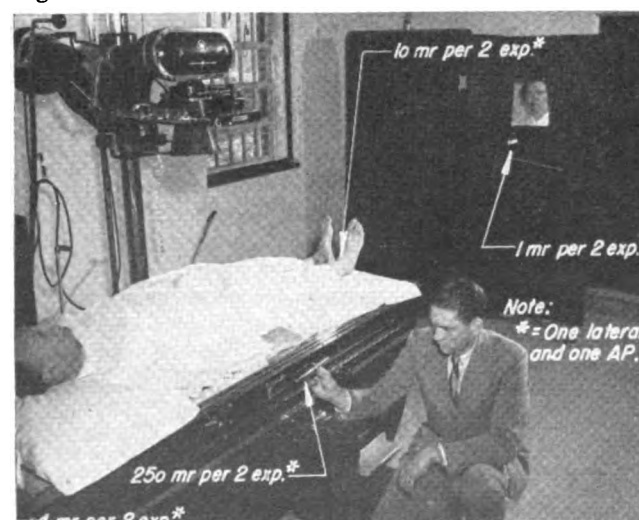


Figure 5

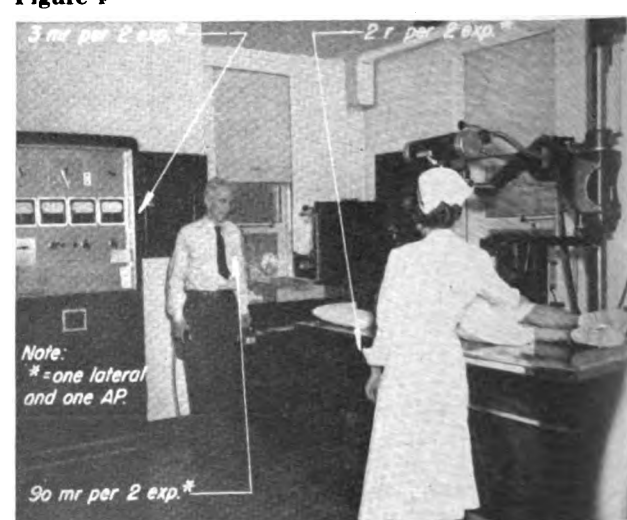


Figure 6

unmanageable patients and are, therefore, exposed to large amounts of "used" radiation. Older machines are not provided with adequate protection around the tube, resulting in direct beam radiation throughout the room.

When an incident beam of X-rays strikes an object, some of the rays are absorbed and some pass through, but a considerable percentage is scattered in all directions by the electrons in the atoms composing the object in the beam, similar to light in a fog. Exact specifications minimizing this radiation in the most economical way are difficult to formulate because of the uncertainty of the numerous contributory conditions.

The principal sources of scattered radiation are the patient, table, floor, and walls. The dosage rate and quality of this radiation vary widely with the size of the field, angle of scattering, and nature of the material. The intensity of the scattered rays depends upon the distance of the material and the dosage rate of the incident radiation. It is obvious since so many variables are present, universal application of protection data for scattered radiation is not available.

Experimental evidence sets the scattering ratio at about 1 percent of the intensity of the main beam at a point 1 meter from the patient at right angles

to the beam. The scatter is a softer form of energy. This fact may be used in the shield design. Below 200 kilovolts, which is the range encountered in diagnostic work, the saving is not great.

Other variables which affect the radiation exposure of radiological personnel are the type of machine, the age of the machine, the volume of roentgenograms, the type of roentgenograms, the amount of protection, and the technique of the operator.

In addition to possible radiation hazard, an electrical hazard may also be present. The voltages used to energize X-ray tubes are highly dangerous, and the best assurance of safety against hazard from them is the enclosure of the high-voltage parts in a shockproof container. Most X-ray generators for diagnostic work are of shockproof construction but, where the design is such that high voltage con-

ductors are exposed, operators should keep at a liberal distance from them, and should guard against the possibility of spark-over to other conductors with which a person may be in contact.

The most dangerous situation is to permit the body to form a part of the high-voltage circuit, either across the tube terminals, or between a high potential lead, a low potential lead, or grounded conductor. Although high potential circuits do not extend into the processing room, low potential electrical outlets and fixtures may present a hazard under some circumstances. As a safeguard, the exposed portions of switches, plug outlets, lamp sockets, and the like, should be composed of insulation material. No electrical device should be touched with wet hands.

While some concern has been expressed about the ozone and oxides of nitrogen concentrations in diagnostic X-ray rooms, in only two of the oldest

	KV	M.A.S	Average Beam Intensity	Distance
Chest	60-70	10-15	22 mr	72"
Skull	60-70	75-150	1.8 r	36"
Lumbar spine AP	60-68	100-150	3 r	30"
Lumbar spine Lateral	72-84	192-400	6 r	30"

Figure 1.—A new installation and the usual technique. In this hospital, technicians ran 1,000 mr plus—for the 2-week period. The position of the technician on the right illustrates the way technicians received the high exposures.

Figure 2.—Here is an example of the best technique for holding patients for chest X-rays. Very little of the radiation penetrates the film holder, and a minimum amount of the attendant is exposed to radiation because he is partially protected by the patient.

Figure 3.—This technique used for skull X-rays is good; it should be used whenever possible. The age of the machine and the poor installation combine to cause a radiation hazard.

Figure 4.—Poor technique in holding the patient for a skull X-ray is illustrated by the fact that the nurse is not wearing lead gloves and a lead apron. This is a new machine which indicates that machines are being installed with inadequate protection to radiological personnel. Notice the position of the controls and the exposure of the technician.

Figure 5.—The spinal roentgenograms are the hottest type of diagnostic X-ray. If a patient requires holding, the best precaution is to stand at the end of the table and as far away as possible. Lead gloves and aprons should always be worn. Scatter is usually highest at the sides of the table. Note readings on the ends and on the sides.

Figure 6.—Notice the high reading of scatter on the sides of the table and the exposure of the technician which means that this installation is inadequately shielded.

installations did we detect the odor of ozone. In my opinion, diagnostic machines are operated for too short a period to produce ozone and oxides of nitrogen in significant quantities.

In our study we were concerned mainly with the type of diagnostic procedures that were most common. The kilovolts, milliamperes seconds, and beam intensities for the common type roentgenograms are given in the table above.

A few suggestions we have found helpful in reducing radiation exposures are:

- (1) Proper enclosure of the X-ray tube.
- (2) Large rooms are safer than small ones since the amount and concentration of scatter is reduced and the distance between operator and tube may be increased.
- (3) Use of proper cones. Not only is proper coning of the beam desirable to reduce the amount of scatter of the attendant's exposure but also to reduce the area of the patient's exposure.

RHODE ISLAND LEGISLATES FIRST AID IN INDUSTRIES

- (4) Proper shielding of operator.
- (5) Planned rotation of attendants if patients must be held.
- (6) Every hospital should have several pairs of lead gloves and several lead aprons. These articles should be used when radiological personnel are being exposed to radiation.
- (7) Be sure the beam is filtered through 1 millimeter of aluminum. The importance is illustrated by the fact that 300 r is the erythema dose for unfiltered X-rays. Four hundred r is the erythema dose of X-rays filtered through 1 millimeter of aluminum (Magnus Smedal, M. D.).
- (8) Periodic check on stray radiation received by radiological personnel. This may be accomplished by use of pocket ionization chambers in conjunction with film badges calibrated at about 85-kilovolt energy range.
- (9) Planned training of technicians on proper techniques and dangers of radiation.

NAM Industrial Health Group Takes Field Trip

Featuring a field trip to study at first hand a comprehensive health, medical, and safety program in a manufacturing company, the National Association of Manufacturers' Industrial Health and Safety Committee held a 2-day meeting in Birmingham, Ala.

Committee members, together with a number of well-known physicians and Birmingham community leaders, toured the nearby Avondale Mills and studied the many different health and safety activities of that company.

Hugh M. Comer, president of Avondale Mills, was the host. A NAM director, he is also chairman of the association's industrial health group.

This field trip is part of the program of fact-gathering undertaken by the committee for 1950, in line with the following resolution adopted at its first meeting this year:

"In light of the increasing public concern about health and medical care, the Industrial Health and Safety Committee is convinced that its first responsibility during 1950 is to gather the facts with respect to the scope and character of health and medical care that industrial companies provide for their employees and dependents."

Legislation providing for administration of first aid and/or other medical services in places of employment was enacted during the recent session of the Rhode Island General Assembly. It will become effective July 1, 1951.



In brief, the new law requires that any person, firm or corporation, employing from 25 to 399 persons in any factory, shop, mechanical, or mercantile establishment, shall provide for administration of first aid by either a trained first-aid worker, a practical nurse, or a registered nurse. Any person, firm or corporation, employing 400 or more persons in any factory, shop, mechanical, or mercantile establishment, shall furnish an accident room or similar accommodation. This accident room, its facilities and services shall be under the direction of a registered nurse. Important inclusions in the law are definitions of "registered nurse", "practical nurse", "first aid worker", "first aid", and "standing orders."

The need for legislation to provide adequate first aid and nursing care on the job to ill or injured workers was first recognized several years ago. An injured employee developed serious complications following improper administration of first aid by an untrained worker. At a later date, the Industrial Code Commission also became interested in legislation to protect worker health. Beginning in 1937 and continuing through 1943, a bill for such first aid and nursing services was introduced into the Rhode Island General Assembly. Each year the bill was defeated. Again in 1949, 2 bills were introduced, 1 requiring nursing service for 100 or more employees and the other for 250 or more employees.

The Rhode Island Industrial Nurses Association became interested and solicited the help of the Rhode Island State Nurses Association in working for suitable legislation. As a result, the Rhode Island State Nurses Association Legislative Committee, of which an industrial nurse is a member, and Dr. James P. Deery, director of the Division of Industrial Hygiene, drafted

a substitute bill for presentation to the House Labor Committee. The bill was never brought out of this committee. However, in March 1950, the Rhode Island Industrial Nurses Association resubmitted the same bill and it was passed with only two minor revisions.

Passage of the new legislation has been favorably received by management. The Congress of Industrial Organizations has expressed enthusiasm. The medical profession has made no statement regarding the matter. The nursing profession, as represented by the Rhode Island State Nurses Association, has declared itself wholeheartedly in favor of this new advance in community health protection.

The Rhode Island Department of Labor will be responsible for enforcing provisions of the new law and will be assisted by the Director of Health in arriving at acceptable standards for accident rooms and first aid chests.

It has been estimated that approximately 3,300 first aid workers or practical nurses will be needed to meet the demands for first aid services in establishments employing from 25 to 399 workers. Courses in first aid, taught by American Red Cross instructors, will be made available for first aid workers. Although the law requires no special training of practical nurses, they too may pursue the first aid course. Approximately 70 or more registered nurses will be needed. Since most of these nurses will have had no previous industrial nursing training or experience, the Rhode Island Industrial Nurses Association hopes to be able to offer a course in industrial nursing, sponsored by Boston College, in September 1950.

The new legislation will insure more adequate care of ill or injured workers in establishments employing 25 or more persons. Unfortunately, no provision is made for such care of workers in the hundreds of establishments employing fewer than 25 persons. Also, if the aims of the legislation are to be met, employers must exercise judgment in selecting nursing personnel. Although legislation is not the most desirable method of insuring worker protection, it appears to offer the only solution at present.—**Marjory Wilbur, Div. of Industrial Hygiene, Rhode Island Dept. of Health.**



CULPRITS in Industry

BALTIMORE PLANT SEEKS SOLUTION TO TANK CAR ILLNESS

In the shipping of ethyl alcohol by rail, tank cars are reserved for this purpose to avoid contamination of the solvent. Over a period of many years, an effective procedure for cleaning empty cars at an alcohol plant in Baltimore had been established whereby a worker could flush out any residual alcohol with a copious amount of water before he would enter the car with a hand broom to sweep out the excess water. The car would then be ready for reloading. Such a procedure had precluded hazards from explosion or exposures to high concentrations of vapors; nevertheless, two near fatalities occurred several months ago.

Toward the end of a work day, an employee was following the cleaning routine and had entered the car to sweep out the water. Several minutes later a second worker found the first man unconscious inside the car and attempted to rescue him without protective equipment. No sooner had the first man been lifted out of the tank car than his rescuer collapsed on the inside. A third man, unprotected, managed to remove the second man and get out of the tank himself but not without becoming ill.

On the following day, management of the alcohol plant requested the services of the local industrial hygienists who were told that the tank car had been returned to the plant from an industry in a neighboring southern State, and it was believed that the customer had used an inert gas to force the solvent from the tank car. Tests made of the air contained in the car on the following day showed that carbon monoxide was present in concentrations of 0.015 percent. This finding indicated the valid-

ity of the management's opinion and it was decided that tests would be made of the atmosphere contained in the next empty car returned by the customer, and an effort would be made to secure information from the southern State's industrial hygiene unit on the customer's method of emptying the car.

Approximately 1 week later the customer had returned another car and at the same time word was received from the State industrial hygiene unit that automotive exhaust gas had been used to purge the car. An analysis of the gas in the second car returned to Baltimore was comparable to the information received from the out-of-State unit.

Gas	Balti- more (percent)	State unit (percent)
Carbon monoxide-----	2.7	2-3
Oxygen-----	12.2	---
Carbon dioxide-----	1.8	13
Nitrogen-----	---	84

It is obvious that the atmosphere within the tank car not only contained a toxic gas in large quantities but was also seriously deficient in oxygen content.

To avoid a recurrence of asphyxiation among their workers the local alcohol plant now fills the car completely with water, drains the tank and then allows the workers to enter.

Certainly, it seems advisable to placard any car that has been purged with a toxic or inert gas so that the next user may be warned as to its contents.

Had it not been for the prompt and full cooperation between the two industries and the two governmental industrial hygiene units, it is doubtful if the cause of these Baltimore asphyxiation cases would ever have been determined with certainty.—Charles E. Couchman, Director, Bureau of Industrial Hygiene, Baltimore City Health Department.

Connecticut Plant Nurses Ask for Another Institute

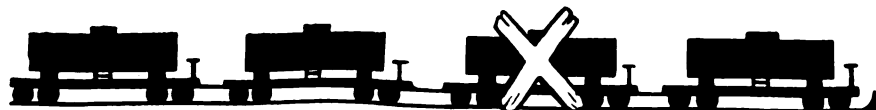
Plant nurses in Connecticut have expressed interest in another institute similar to the one held at Yale University May 20. Almost 100 nurses and physicians attended the meeting to discuss the "Medical and Legal Aspects of Nursing in Occupational Health."

A large majority of the industrial nurses present signified a desire to continue the type of informal group discussion meeting. Emily M. Smith, instructor in occupational health nursing at Yale, was chairman of the all-day institute.

Ira V. Hiscock, chairman of the Department of Public Health at Yale, introduced the moderator and participants in the panel discussion, "What Are the Responsibilities of the Nurse in Industry and Why?" The moderator was Fowler Harper, a professor of law at Yale; and those on the panel were John Q. Tilson, Jr., attorney; Louis Sachs, Workmen's Compensation Commissioner, Third Congressional District; Mary Delehanty, president, American Association of Industrial Nurses; Richard J. Hinchey, medical director, Scovill Manufacturing Co.; and W. P. Monson, director of Industrial Relations and Labor Counsel, the Yale & Towne Manufacturing Co.

The subject of the afternoon session was "What Is the Physician's Responsibility to the Plant Nurse and How May the Physician and Nurse Work Effectively as a Team?" The speakers were John N. Gallivan, medical director, United Aircraft Corp., and Jesse Williams, supervisor of nursing, Pratt and Whitney Aircraft, Division of United Aircraft. The discussion that followed was led by Helen P. Cranton, industrial nursing consultant, Bureau of Industrial Hygiene, Connecticut State Department of Health.

The May institute was sponsored by the Bureau of Industrial Hygiene, Connecticut State Department of Health; the Industrial Nursing Section, Connecticut State Nurses' Association; the Committee on Industrial Health, Connecticut State Medical Society; and the Occupational Health Section, Yale University Department of Public Health.



MEMBERS OF AMERICAN CHEMICAL SOCIETY HEAR TALKS ON INDUSTRIAL HYGIENE

Members of the American Chemical Society, Division of Industrial and Engineering Chemistry, who attended the annual meeting in Detroit, Mich., heard papers on a wide variety of subjects. Abstracts of three papers are presented here.

Industrial Hygiene Considerations in Industrial Plant Location and Design, by William R. Bradley, American Cyanamid Co., New York, N. Y.

Modern blueprints for industrial plant location and design, and also for manufacturing process installation and operation, show a definite trend of thinking by the engineers with respect to both worker health and public health. This trend is due in a large measure to the efforts of industrial hygienists. They have convinced the design engineer that the man who operates his process must have some consideration, since he spends one-third of his day in the plant. He may also spend the remainder of his day in the community adjacent to the plant, so the community interests must also be considered.

Dollars for plant construction pay additional dividends when industrial hygiene preventive engineering practices are used in plant design. These practices maintain employee and community health, reduce air and stream pollution, and produce good public relations.

Blueprints for new plants in the chemical industry now have complete details of equipment rather than general specifications. These details show scrubbers and condensers on vent lines rather than an arrow pointing upward from a reaction vessel, and waste disposal treatments rather than an arrow pointing downward to the sewer. Other details, such as dust collectors on pulverizing machines, exhaust ventilation at kettle manholes, and ventilation enclosures at filter presses are located clearly and prevent the escape of air-borne contaminants to the workroom.

Preventive engineering to protect workmen from potential industrial health hazards is made effective by close cooperation between the industrial hygienist and the design engineer. Sitting down together, they review chemi-

cal process plans and provide for control of substances that might otherwise have become health or nuisance problems in the plant and community.

Laboratory Safety, by H. H. Fawcett, General Electric Co., Schenectady, N. Y.

This paper presents four major considerations applicable to accident prevention in both colleges and industrial laboratories: (1) Knowledge and appreciation of the hazards involved. [An extended bibliography of available source material for laboratory safety was distributed to the audience, and methods of diffusing the information to students and technical graduates were discussed.] (2) Encouraging the use of precautions and protection. The problems of "selling safety" to technical personnel were considered. (3) Providing adequate facilities for safe work. Physical aspects of "safe" laboratories were discussed. (4) Emergency facilities and training for fire, first-aid, fume conditions, and other abnormal situations should be scaled to the size of the laboratory and to the relative hazards involved.

The paper was supplemented by color slides illustrating various aspects of safety in a large industrial laboratory.

The audience was urged to participate in the movement to eliminate laboratory accidents by publicizing unusual incidents through the chemical journals, through the Chemical Section of the National Safety Council, through the National Fire Protection Association, and through the National Safety Committee of the Alpha Chi Sigma Fraternity.

(Copies of this paper are available upon request to Mr. Fawcett.)

Medical Aspects of the Industrial Hygiene Program, by J. H. Sterner, Eastman Kodak Co., Rochester, N. Y.

The final measure of the effectiveness of a program for controlling hazardous environmental factors must be the medical examination of the exposed individuals. This sine qua non position of the medical evaluation in the industrial hygiene program has led to some confusion. The physician is likely to place too great an emphasis on the role of the medical and clinical laboratory

examination; the chemist and engineer too great reliance on the analytical and engineering phases.

The proper balance of medical, chemical, physical, and engineering aspects of industrial hygiene will vary considerably from situation to situation. The greater the acuity of our medical tools, the closer to the line of just detectable (and reversible) injury we could safely go. Unfortunately, in many instances, we do not have the clinical tests which will safely anticipate the early and reversible damage, and a greater margin of safety must be employed in defining a safe environment. Good operating practice today dictates an environment free from injurious effects and the great majority of our medical control programs should and do develop "negative" findings.

Some of the factors of a good medical control are:

- (1) A broad "screening" or coverage, so that all possible types of injury may be detected at the earliest possible time.
- (2) Serial application of this screening program, at adequate intervals, superimposed on pre-employment or base line data for comparative purposes.
- (3) The selection of tests which lend themselves to quantitative interpretation, and the statistical evaluation of results.
- (4) The use of such material as absentee data, causes of absence, causes of death, and pertinent information from the general medical department records such as requests for transfer.
- (5) A correlation of all medical findings with data on environmental factors.

ASA and IOS Exhibit at Trade Fair, Chicago

Recognizing that agreement on standards is a potent factor in smooth international trade relations, the American Standards Association and the International Organization for Standardization are planning an exhibit to further this idea at the International Trade Fair in Chicago, August 7-20. Many experiences have shown that interchangeable dimensions, uniform test methods, standard definitions of terms, and standard ratings of equipment and machinery may spell the difference between a satisfactory export trade and misunderstandings costly to both buyer and seller.



LOS ANGELES (CITY), CALIFORNIA

Radium Dial Painting.—A local firm which had considerable experience with radium dial painting during the war requested a survey of current operations for potential health hazards. We assisted them in the proper technique of obtaining breath radon and workroom air radon samples, and in interpreting the results of the reports submitted from the east. All samples were found to be below the currently proposed maximum allowable concentration.

However, several unsafe practices of personnel were found during the concurrent survey, and recommendations were made to eliminate them. For instance, the workbench drawer at one station contained a supply of radioactive paint, and it was believed that although the paint was within a few inches of the workers' knees, no danger was presented because the radioactive paint vials rested on a lead plate in the bottom of the drawer. Our tests immediately showed that even through the lead plate a dangerous rate of radiation was penetrating to the workers' station. We recommended removal of all active compound, not immediately needed, to a safe storage area, and the isolation of all radium compound handling operations to a separate area.

Television.—Through the Public Health Education Division, arrangements were made to acquaint the public with the services of the Industrial Health Division, on the 2 o'clock "What's New in Los Angeles," television program on Station KFI-TV. The Acting Director, with the aid of the exhibit material previously used during Disease Prevention Week, was able to show by individual sketches the functions of this division.

First, the broader aspects of worker maintenance around the clock, through health education within the plant, were stressed. Then it was pointed out that the principal function of this division

is to make available to industry the services of the Health Department, as well as specific industrial hygiene services, such as field surveys and studies, nursing consultation, chemical analyses, and assistance in engineering designs.

Finally, several of the field instruments used by this Division were demonstrated, and the program director allowed this discussion to exceed the allotted time.

Heat Hazards.—In response to requests from industry, notably industrial nurses, the leaflet on differential characteristics of heat sickness was run off again, with some modifications, and the new title is *Control of Heat Hazards*. Besides emphasizing the causes, warning symptoms and characteristic symptoms which serve to differentiate between heat exhaustion and heat stroke, the leaflet outlines the first-aid procedures for each, as well as general preventive measures.

OD Reports.—It is a truism in the field of industrial health that dermatitis accounts for most reported cases of occupational disease. This fact was verified by analyses of the 103 reports received, covering March 1950, in Los Angeles city area, of which 65 (or 63 percent) were attributed to dermatitis. The causative agents were soap and other detergents in nine cases, food handling in eight, and in the remaining cases the causes included spraying with chemicals: machinists exposed to oils, construction workers handling plaster and cement, and printers handling ink and solvents.

Of the 571 days reported as total lost time, from all causes, during March 1950, 211 days (or 37 percent of the lost



time) were due to dermatitis. The four exposures accounting for the greatest amount of lost time due to dermatitis were: dishwashing, 43 days; gasoline and oil products, etc., 42 days; food handling, 43 days; and exposure to poison oak, etc., 42 days.

MASSACHUSETTS

Legislation.—Gov. Paul A. Dever has recently signed the bill repealing section 11 of chapter 149 of the General Laws (Ter. Ed.), which provided payment of 50 cents for each physician's report of an industrial disease. It is hoped that more physicians' reports of occupational diseases can be secured, and the Department is considering ways to collect these reports.

Tetryl.—An article, "Evidence of Systemic Effect of Tetryl, With Summary of Available Literature," by Harriet L. Hardy, M. D., and Clarence C. Maloof, M. D., of the Massachusetts Division of Occupational Hygiene, has been published in the *Archives of Industrial Hygiene and Occupational Medicine* for May 1950. Reprints are available on request to the authors.

Lectures.—Dr. Clarence C. Maloof addressed the Massachusetts Public Health Association annual meeting on April 25 at Boston University, while John B. Skinner, Director of the Massachusetts Division of Occupational Hygiene, gave a lecture on the work of the Division before a group of sanitarians on May 3 at the Massachusetts Institute of Technology, as part of a University Extension course.

Training Center.—An all-day session was given on April 28, by the staff of the Massachusetts Division of Occupational Hygiene, for the students at the New England Field Training Center of the University of Massachusetts. Engineer Harold Baveley opened the program with a talk on "Scope of Industrial Hygiene," and Mrs. Sarah E. Almeida, R. N., discussed "Relationship Between the Industrial Nurse and the Sanitarian." Films were shown between talks, and the session concluded with a talk by Dr. Clarence C. Maloof on "Medical Aspects of Industrial Hygiene." In the afternoon the students went on a conducted tour through the Stanley Home Products Company, Easthampton, where plant officials explained the activities of the company and safeguards taken to prevent occupational diseases and accidents.

PENNSYLVANIA

Personnel.—Dr. Charles F. Engel, industrial hygiene physician, is a new member of the Pittsburgh staff. The appointment was announced by Dr. Joseph Shilen, Director of the Bureau of Industrial Hygiene in the Pennsylvania Department of Health. Dr. Engel recently retired after 34 years as medical director for the Westinghouse Electric Corp., East Pittsburgh, where he did outstanding work in the field of industrial health and hygiene. In 1940 he received from Westinghouse the Order of Merit and Silver "W" for his research into the effects of electricity on the human body. As a supplement to the preplacement examination, Dr. Engel was instrumental in installing a program of periodic examinations for workers employed in hazardous jobs.

Fluorescent Lamps.—During a recent visit to an industrial plant in Pennsylvania a rather unique and potential hazard relative to the disposal of burned-out fluorescent lamp tubes was discovered by an engineer of the Bureau of Industrial Hygiene.

In this particular plant the person in charge of lamp replacements was in the habit of giving burned-out fluorescent tubes to any and all employees who wanted them for decorative purposes. These decorative purposes were not described, but the possibility of breakage with its subsequent dangers is evident to the industrial hygienist. When the hazards under such circumstances were explained to plant officials, this practice of disposal was immediately discontinued. Safe methods are to be employed hereafter.

Visitors from Siam.—Dr. Boonchuay Subhamani and Dr. Kammuen Debmani of the Department of Public Health, Bangkok, Siam, have spent 2 weeks with the Pennsylvania Bureau of Industrial Hygiene. They are interested in first-hand information about an industrial hygiene service, hoping to establish one in their own country. Doctors Subhamani and Debmani have been in this country for 16 months taking postgraduate work in public health.

SOUTH CAROLINA

Nurses' Institute.—The first institute for nurses working in South Carolina industrial establishments was held May 9-10 in Greenville. The program

was conducted by Mrs. Rosa H. Clarke, R. N., and Mrs. Lula B. Exum, R. N., nursing consultants for the Division of Industrial Health, South Carolina State Board of Health. They were assisted by Miss Winifred Devlin, R. N., nursing consultant for the Division of Industrial Hygiene, PHS. Eighty-one persons attended, 57 of whom were nurses employed in 53 separate plants.

The central theme of the institute was the constantly broadening scope of the industrial nurse's activities, and the necessity for working as a member of a team rather than as an individual. This theme was developed by presentations from representatives of the various divisions of the State Board of Health such as Heart Disease, Tuberculosis Control, Venereal Disease Control, Industrial Health, and others. Both labor and management were represented on the program, advising nurses as to what they expected of them. Much interest was expressed in making the institute an annual occurrence.

TEXAS

Static Eliminators.—The Industrial Hygiene Section checked several plants where static eliminators had been installed. Of four plants visited, three had returned the static eliminator devices to the manufacturer; and one, while still retaining possession of two units, had removed them from the plant processes and placed them in storage.

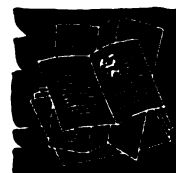
Plant personnel were either uninformed about the radiation hazard or careless, for they had thrown them haphazardly on a storeroom shelf. Fortunately, this particular type of unit contained radium rather than polonium, or the consequences might have been serious.

WASHINGTON

Nurses.—Miss Gladys Jahnecke, R. N., was appointed chairman of the Committee on Education of the American Association of Industrial Nurses at its annual conference held in Chicago the week of April 23.

Miss Jahnecke is industrial nursing consultant for the Bureau of Industrial Hygiene, Washington State Department of Health. She succeeds Miss Margaret Sinnott, R. N., supervising nurse of the Metropolitan Life Insurance Co., New York, N. Y., who was chairman of the committee for 2 years.

H. B. Elkins Author of New Book, *Chemistry of Industrial Toxicology*



Industrial hygienists will welcome Dr. Hervey Elkins' new book, *The Chemistry of Industrial Toxicology*.¹ In presenting data and methods of analysis of industrial poi-

sons, Elkins has made a distinct contribution to industrial hygiene literature. Instead of a cook-book collection of methods of analysis, the book gives modern procedures which bear the stamp of authority.

The early part of the book is devoted to brief discussions of the toxicity of a large number of inorganic and organic substances of industrial importance. The literature is freely quoted and the author frequently draws on his personal experience, both from the point of observed effects and also with regard to recommended maximum allowable concentrations in working areas. The definition and discussion of maximum allowable concentration values in industry, their evaluation, and the matter of control and prevention of industrial health hazards due to atmospheric contaminants are particularly thorough.

The industrial hygienist will be especially interested in that portion of the book concerned with air sampling, instrumentation and analytical methods and procedures. Such items as the preparation of reagents, the collection of samples, apparatus, standardization, calculations, sensitivity, and accuracy are all discussed in detail.

The book is well-indexed, the illustrations are clear, it appears to be free of significant errors, and the printing and editorial work are excellent. The industrial hygienist will find it a particularly useful manual and it is recommended highly for all interested in this field.—Dr. L. T. Fairhall, toxicologist, Division of Industrial Hygiene Field Headquarters, Public Health Service, Cincinnati 2, Ohio.

¹ 406 pages, 24 illustrations. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, 1950. Price, \$5.60.

Dr. Hervey B. Elkins is Chief of Laboratory, Division of Occupational Hygiene, Massachusetts Department of Labor and Industries.

TWO NEW INDUSTRIAL HYGIENE MOBILE UNITS



Thousands of miles are covered every year by the Carter Oil Co.'s medical trailer to make possible the physical examinations of Carter employees in the field. With a company doctor in attendance at all times, the mobile examination unit is taken wherever the employees work. Once a year it makes its headquarters at the refinery in Billings, Mont., for thorough examinations of all personnel.

Gov. James H. Duff of Pennsylvania accepts delivery of Bureau of Industrial Hygiene Mobile Laboratory to be used in study of State's air-pollution problems. Pictured are, left to right, Governor Duff, George H. Deike, Sr., president of the Mine Safety Appliances Co., builders of the unit; Dr. Norris W. Vaux, State Secretary of Health; and Dr. Joseph Shilen, Director of the Bureau of Industrial Hygiene.

CARTER OIL CO. SERVICES EMPLOYEES FROM MEDICAL TRAILER

The Carter Oil Co. has maintained a medical department for more than 32 years. The health program for employees begins with a preplacement examination to determine the type of work for which the man or woman is best suited from a physical standpoint.

While the examinations are offered on a voluntary basis, 99 percent of personnel in the company not only accept this service but are eager for it. In oil refining circles, the plan for regular physical checkups has been developed through a process of education. The examination gives the man a chance to correct minor defects before they assume possible major proportions. Occasionally men are changed to different jobs in line with health requirements.

The medical program for the 300 employees at the refinery also provides for constant attention to safety measures which protect the worker and a completely equipped first-aid station.

At the refinery, all personnel who are exposed to additional possible hazards are given examinations every 3 months, to maintain the company's vigilance against disease or mishap.

A registered nurse is in attendance at all times in the refinery first-aid station.

The medical station is completely equipped with every type of apparatus for examination and diagnosis. Resident physicians in Billings are on call when the necessity for treatment is indicated.

The company's health program includes a broad schedule of safety regulations and precautions. All pipes containing materials which might cause skin irritations are painted orange color. Likewise, men going into areas where there may be unseen hazards are required to have permits before proceeding into these areas. All water for personnel consumption is given bacteriological tests daily.

Employees as well as all members of their families are offered free inoculation for typhoid, smallpox, and for Rocky Mountain spotted fever. The spotted fever vaccinations must be given every year to be effective, the typhoid shots every 3 years, and the smallpox shots are offered in 3- to 5-year periods. In the first week of the 1950 program of inoculating for Rocky Mountain spotted fever, 500 employees and members of their families were given the inoculation.—A. Wallach, Division of Industrial Hygiene, Montana Board of Health.

DENTIST ASKS HELP OF INDUSTRIAL TEAM TO IMPROVE ORAL HEALTH

Dr. Vernon Forney of the Public Health Service, speaking before the American Association of Industrial Physicians and Surgeons during their annual meeting, urged the physicians, nurses, engineers, and management representatives to cooperate in promoting better oral health in industry.

Dr. Forney pointed out that people do not realize the effects of negligence in the care of their teeth and mouth and that they do not appreciate the importance of early diagnosis and treatment of oral diseases. Another factor which keeps many people from seeing their dentists when they should is the fear of pain. But probably the most influential factor, according to Dr. Forney, is the economic one.

By effective teamwork, Dr. Forney believes that many of these bars to good oral health can be removed. He emphasized the importance of expanded dental research, provision of informational and guidance services for industrial populations, and the development of oral health service as a part of the industrial health programs.

Dr. Forney's remarks were made as a part of the panel discussion on "Teamwork for Effective Industrial Health."

Johns Hopkins Adds New Department of Environmental Medicine

A new department of environmental medicine has been created at the Johns Hopkins University School of Hygiene and Public Health for research, combining medical investigation and hospital treatment of disease produced by environment, and work in hygiene and public health on such diseases as they affect the community. Joseph L. Lilienthal, Jr., has been appointed professor of environmental medicine but will continue as head of the physiological division of the Department of Medicine at Johns Hopkins Hospital and as associate professor of medicine at the Hopkins School of Medicine. Anna M. Baetjer, D. Sc., will serve as assistant professor in the new department.

HAVE YOU SEEN THESE PUBLICATIONS?

Careers With a Future—Industrial Hygiene. Information about the physician, nurse, engineer, and chemist covers their responsibilities, training, and experience requirements, employment opportunities, and where special training can be secured. Copies may be secured from the American Public Health Association, 1790 Broadway, New York 9, N. Y.

Proceedings of the Lead Hygiene Conference. Lead Industries Association, 420 Lexington Avenue, New York 17, N. Y. The meeting was held in Chicago, Ill., November 15-16, 1948. The publication includes the following:

Solubility and Particle Size in Lead Poisoning.

The Treatment of Lead Poisoning.

Preventive Medical Armor for the Lead Industry.

The Coordination of Industrial Medical Services.

Medical Control of Lead Workers—a State Viewpoint.

The Production Manager Looks at Industrial Health.

The Effect of BAL on Experimental Lead Poisoning.

Air Pollution Regulations in Los Angeles County.

Aluminum in Silicosis.

Urinary Porphyrins in Lead Poisoning.

Industrial Toxicology

By L. T. Fairhall, PHS

NICOTINE

The extent to which nicotine is used as an insecticide is not generally realized, yet this alkaloid is manufactured in relatively large amounts and is widely distributed. This substance, which is grouped amongst the most toxic insecticides, is marketed as the sulfate, and the annual production in the United States is stated to be more than 5,000,000 pounds (1). The export of nicotine during the first 10 months of 1949 amounted to 1,054,000 pounds (2). It is used principally as a contact poison and is applied in solution as a spray or as a dust when dried on various inert substances, such as talc, fullers earth, or kaolin.

Nicotine is commercially produced by treating tobacco stems and other tobacco refuse with alkali, followed by steam distillation. The distilled base is neutralized with sulfuric acid, and nicotine is usually marketed as the sulfate in 40 percent solution.

The present discussion is solely concerned with poisoning from the alkaloid nicotine and does not refer to the use of tobacco. The literature of nicotine poisoning is replete with cases of fatal or near-fatal effects arising from ingestion or skin contact with this substance. These cases include its administration with criminal intent, as in the famous case of Count Bocarmé, numerous cases of suicide, cases where nicotine solutions have been mistaken for innocuous material, and where nicotine solution has been spilled on the skin.

According to the Mortality Analysis Branch, National Office of Vital Statistics, PHS, the number of cases of fatal poisoning from nicotine in the United States from 1934 to date was 487, of which 307 were suicidal.

The extensive manufacture of nicotine sulfate and its wide application as an insecticide emphasize the need for more lively appreciation of the marked toxicity of this substance. The natural levo-form of nicotine is stated to be two or three times as poisonous as the synthetic dextro-form. The fatality and rapidity of poisoning with nicotine approach those of hydrogen cyanide. Death usually occurs within a few minutes or even seconds following the ad-

ministration of a large dose. The fatal dose in man has been variously stated as 6 to 60 milligrams.

The symptoms displayed are those of paralysis of the central nervous system, including the respiratory center. Smaller quantities cause salivation, nausea, vomiting, and sometimes purging. The breathing is labored, the pulse very irregular; mental confusion, muscular weakness, giddiness, and lack of coordination are marked and may be followed by partial or complete unconsciousness. Clonic convulsions may occur, followed by collapse with muscular relaxation, slow and weak respiration, which finally ceases although the heart may continue to beat for some time following respiratory failure. The effects of minute amounts of nicotine are familiar to most novices at smoking.

The metabolism of nicotine is still imperfectly understood. According to Werle (3), the lung, liver, and kidney of the rabbit effect a detoxicating action due to an enzyme. The liver was found to be outstanding in its detoxifying action and this was also found to be dependent upon the presence of oxygen. Only part of the total amount of nicotine administered is excreted. Haaz and Larson (4) found that when small doses of the order of 0.2 mg/kg. of nicotine were injected subcutaneously in dogs about 10 percent is excreted unchanged in the urine, while the remainder is found in the nicotinic acid fraction of the urine. However, although there was an increase in this fraction, this increase was found to be not due to nicotinic acid nor to nicotinic acid, nicotinamide, trigonelline or 1-methyl pyridinium hydroxide in measurable quantities.

The fate of nicotine in the body is naturally of great interest because of the extent of exposure of human beings to small amounts as a result of smoking.

In cases of nicotine poisoning, medical treatment should be prompt. It has been recommended that gastric lavage with activated charcoal, which adsorbs the alkaloid, or with tannic acid, which precipitates it, should be accompanied by artificial respiration if needed, including the inhalation of oxygen. Where nicotine solutions have been spilled on the skin, washing should be prompt and thorough. Davies (5) states that only cold water should be

used for washing the skin, since warm water causes vaso-dilation and thus increases absorption.

Although no maximum allowable concentration value for nicotine has been established, the industrial hygienist should be alert to the very toxic character of this substance, and of the necessary control measures for the safe production, handling and application of this material.

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- (1) U. S. Dept. of Commerce: *Chemicals and Drugs*. December 1949, p. 21; January 1950, p. 17.
- (2) Frear, D. E. H.: *Chemistry of Insecticides, Fungicides, and Herbicides*. D. Van Nostrand Co., New York, 1949, p. 129.
- (3) Werle, E.: Über die Entgiftung von Nicotin durch tierisches Gewebe. *Biochem. Zeitschr.* 298: 268 (1938).
- (4) Haag, H. B., and Larson, P. S.: *Studies on the fate of nicotine in the body. II. On the fate of nicotine in the dog.* *J. Pharm. Exp. Ther.* 76: 240 (1942).
- (5) Davies, T. A. Lloyd: *The Practice of Industrial Medicine*. J. & A. Churchill, Ltd., London, 1948, p. 112.

Industrial Hygiene Foundation Announces New Publications

A report summarizing legislative developments in workmen's compensation, State industrial hygiene codes, air-pollution regulations, and trends in health and sickness disability benefit is announced by the Industrial Hygiene Foundation.

The 50-page bulletin contains material presented in connection with the Foundation's last annual meeting at Mellon Institute, Pittsburgh. The publication also includes a discussion of industrial noise effects and reduction by Dr. Leo G. Doerfler, Department of Audiology, School of Medicine, University of Pittsburgh.

Other articles and authors are: "Legislative Developments in Workmen's Compensation During 1949," by Theodore C. Waters, legal counsel for the Foundation; "Hygienic Standards for the Prevention and Control of Occupational Diseases," by J. J. Bloomfield, Division of Industrial Hygiene, United

States Public Health Service, Washington, D. C.; "Legislation Relating to the Control of Air Pollution," by R. F. Hansen, General Chemical Division, Allied Chemical & Dye Corp., New York; and "Current Trends Relating to Health and Sickness Disability Benefits," by Dr. John J. Wittmer, Consolidated Edison Co. of New York.

Copies of the report are available to the general public at 75 cents per copy.

Air pollution.—A handbook of helps on air-pollution control, including the assessing of smog hazards in narrow valleys, chemistry of smog and behavior of smoke from stacks, has been announced by the Foundation. This book is available at \$2 per copy from the Industrial Hygiene Foundation, 4400 Fifth Avenue, Pittsburgh 13, Pa.

RECOMMENDED READING

Annual Report of the Public Health Service, FSA. Government Printing Office, Washington, D. C., 1950. xiii+173 pp. Price 40 cents.

Brower, F. Beatrice: Group accident and sickness insurance. *Conference Board Management Record* 12: 2-4 (January) 1950.

Cruikshank, C. N. D. and Squire, J. R.: Skin cancer in the engineering industry from the use of mineral oil. *Brit. J. Indust. Med.* 7: 1-11 (January) 1950.

Johnson, Joanna M.: The plant nurse in the industrial hygiene program. *Tennessee Industrial Hygiene News* 7: 2 (April) 1950.

Legislative Report, A Current Summary on Labor Legislation. *Legislation Report No. 5*. U. S. Department of Labor, Bureau of Labor Standards, Washington, D. C., April 15, 1950. 25 pp. Mimeographed.

Various authors: Industrial wastes. *Transactions Bulletin No. 13*. Industrial Hygiene Foundation, Pittsburgh, Pa., 1949. 116 pp.

Various Authors: 13 papers presented at Air Pollution Institute, February 6-8, 1940, University of Michigan, School of Public Health. *Am. Indust. Hyg. Assoc. Quart.* 11: 7-94 (March) 1950.

Weiss, Abraham: Ford-UAW (CIO) pension and social insurance contract. *Monthly Labor Review* 69: 649-653 (December) 1949. Price 40 cents.

[Weiss, Abraham and Theodore,

Rose]: *Collective Bargaining Provisions—Safety, Health and Sanitation. Bulletin No. 980-14*. (81st Cong., 1st Ses. H. Doc. No. 208) U. S. Department of Labor, Bureau of Labor Statistics, Government Printing Office, Washington, D. C., 1949. v+48 pp. Price 20 cents.

NEW AIR POLLUTION COMMITTEE FORMED

The formation of an Air Pollution Committee to advise on research on this problem has been announced by the Industrial Hygiene Foundation at Mellon Institute, Pittsburgh. Organization of the committee was recently authorized by the Foundation's Board of Trustees, headed by Andrew Fletcher, President, St. Joseph Lead Co.

Members of the new committee are: Alex D. Bailey, vice president, Commonwealth Edison Co., Chicago; Ward F. Davidson, research engineer, Consolidated Edison Co. of New York; Henry F. Hebley, research consultant, Pittsburgh Consolidation Coal Co., Pittsburgh; Dr. George R. Hill, director, Agricultural Research, American Smelting & Refining Co., Salt Lake City, Utah; Dr. Raymond Hussey, scientific director, Council on Industrial Health, American Medical Association, Chicago; Dr. L. C. McCabe, Chief, Office of Air and Stream Pollution, United States Bureau of Mines, Washington.

Dr. H. H. Schrenk, research director, and W. C. L. Hemeon, engineering director of the Foundation's staff, will serve as cochairmen of the committee.

DR. PAUL CAMPBELL RESIGNS FROM PHS

Dr. Paul C. Campbell, Jr., dermatologist with the Division of Industrial Hygiene, PHS, for 9 years, resigned August 1 to go into private practice in Fayetteville, N. C. At the beginning of World War II, Dr. Campbell was the county health officer in Fayetteville. He joined the Public Health Service as a Reserve officer and was commissioned in the Regular corps in 1943. Dr. Walter Edmundson, who has been assisting Dr. Campbell for the past year, will continue the dermatological work of the Division.

LEGISLATION AFFECTING CARDIACS MAY BE OBSTACLE TO EMPLOYMENT

In a paper on "Rehabilitation and Heart Disease—Past, Present and Future,"* which was printed in the Dec. 1949 *Journal of Rehabilitation*, Dr. Leonard J. Goldwater and Martha Ashcraft point out the obstacles that may be caused by a certain type legislation. They say, in part:

"There appears to be a growing trend toward the awarding of workmen's compensation benefits to employed persons who suffer 'heart attacks.' In New York State for the first 6 months of 1948, compensation benefits paid for heart disease amounted to approximately half a million dollars. The relationship of effort and trauma to heart disease is not well understood. In many cases in which claims have been paid it is rather difficult for a neutral observer to see the basis for the finding, by a referee, of causal relationship. While compensation laws usually imply

*This study was presented at the States Council meeting in San Antonio by Dr. Goldwater, who is professor of industrial hygiene, Columbia University School of Public Health. Reprints of the article with the bibliography are available for ten cents from the *Journal of Rehabilitation*, Room 516, 1025 Vermont Ave., NW, Washington, D. C.

that reasonable doubt should be resolved in favor of the claimant, and while one's sympathy may be with the unfortunate victim of heart disease, the fact remains that every case in which benefits are awarded constitutes a new obstacle to the securing of employment for cardiacs.

"New York State now has a 'second injury' law which is unique in that it covers individuals who have 'any pre-existing physical impairment,' which, of course, includes heart disease. The law has been interpreted so as to apply only when the existence of heart disease in an employed person is known to the employer. Since workmen's compensation laws may have far-reaching effects on any rehabilitation program, they must be made a matter of concern to all who are interested in employment opportunities for the handicapped.

"A recent development in the field of social legislation may introduce an additional obstacle to the securing of employment for handicapped persons generally, and particularly for cardiacs. This new threat is found in the so-called sickness disability benefits laws, the first of which was passed in Rhode Island in 1942. California and New

Jersey followed in 1948, and New York and Washington in 1949. At least a dozen additional States are considering similar legislation at the present time and there is little doubt that many of these will enact some form of cash sickness benefits law in the near future.

"In many States, employers who hire certain handicapped individuals are afforded some measure of protection against possible excess workmen's compensation insurance costs by the so-called second injury laws. These laws were specifically designed to eliminate one of the barriers to the employment of the handicapped. Some of the new sickness disability benefits laws contain provisions which will make the employer liable for increased premium payments in the event of a poor 'experience.' In other words, excessive sickness absenteeism may result in extra insurance costs to the employer. This fact may very well lead to a general tightening of the physical standards for employment and result in new difficulties for those with physical impairments. The remedy would seem to be the inclusion in the new laws of something equivalent to the 'second injury' provisions of workmen's compensation laws."

HEALTH PROGRAMS FOR FEDERAL WORKERS—

(Continued from page 4)

amounted to seven-eighths of the first year's cost of operation. In estimating the savings at the center, it was assumed that the average Federal employee earns \$1.60 per hour. With an annual savings in sick leave of 6 hours per person and an average of 3,425 employees, the total savings equaled \$32,880. The cost of the program was \$38,000. About three-fourths of the requests for sick leave were made by one-half of the employees who used about four-fifths of all leave taken.

Health For Every Worker

Dr. Lanza agreed that there is no question but that health conservation is sound economy, but he stated that it also brings with it greater values in physical, mental, and spiritual well-being. "Our thinking and our practice have come a long way since we began to

restrict the employment of children and women," he said. "Good health and good working conditions are just as important to the office worker as they are to the worker in heavy industry. Both types of worker depend upon good health for satisfaction with their jobs and the employer is just as much concerned with the employees' health as they are," he added, pointing out that the interests of the employer and the employee are interdependent, that what helps one helps the other and whatever is detrimental to one in the long run will be detrimental to the other.

In concluding his discussion, Dr. Lanza referred to the cash-benefit program for nonoccupational illnesses and injuries recently enacted in New York State. This and similar programs are going to make imperative industrial medical service for all workers. He closed by saying, "Industrial medical service when well-organized and administered accomplishes two results—early diagnosis, which is one of the

major phases of prevention and actual preventive measures. We can lessen the burden of illnesses and lighten its cost. If we can do this, even to a limited degree, the savings in misery and in money loss will be tremendous. We know what to do and how to do it. The pattern of health service in industry is clearly defined and in this instance enabling legislation has been enacted. What remains as a needed item now is the will to do. If you are earnest about it, you can do it."

The Conference closed with remarks by Congressman A. Sidney Camp of Georgia and by Mr. Jennings Randolph. The latter said he believed the investment of the Federal tax dollar in the employee health program would pay dividends in greater productivity and good citizenship.

