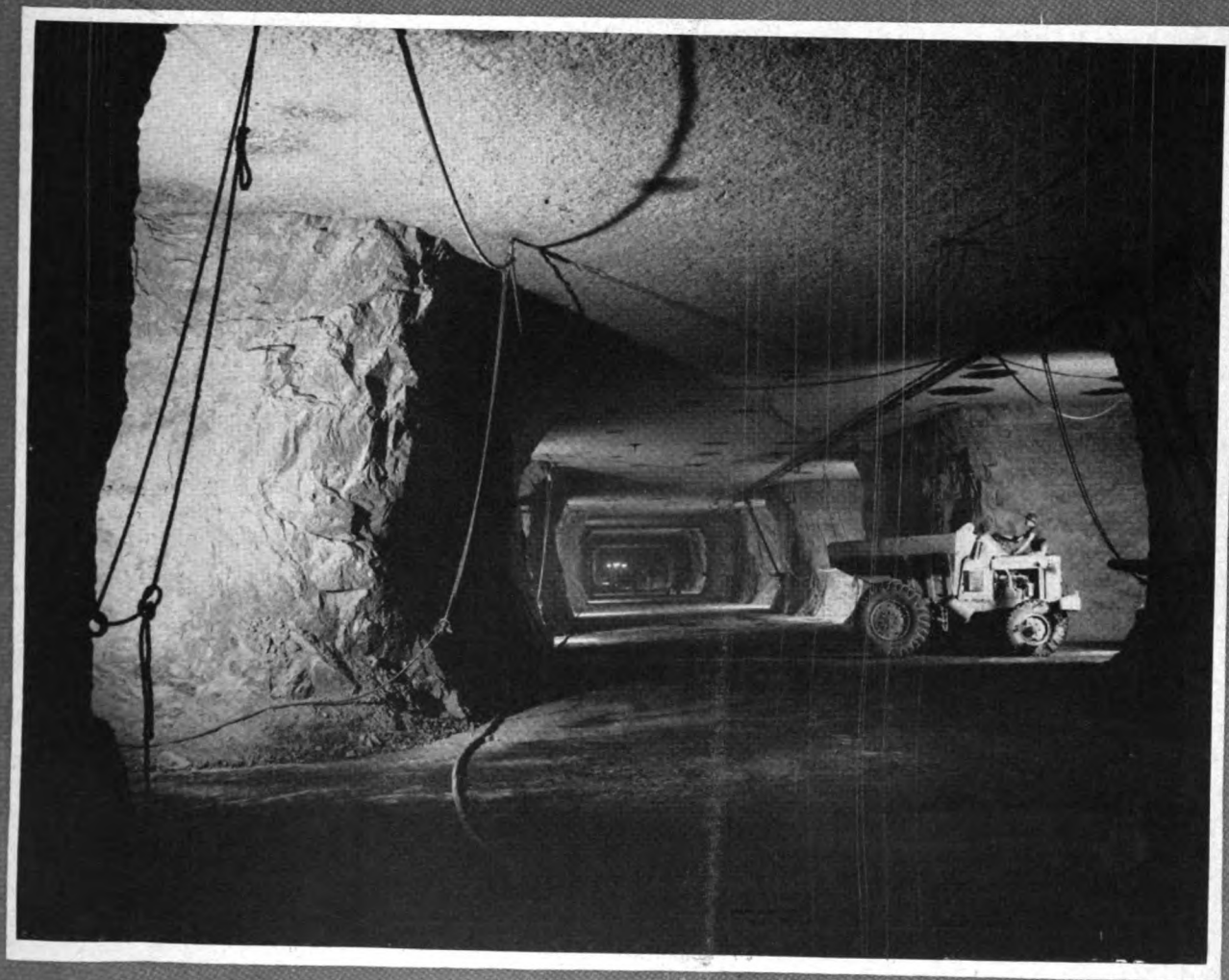
The Industrial Hygiene newsletter



A Study of the Workroom Environment—Page 3

SEPTEMBER 1950

FEDERAL SECURITY AGENCY ... Public Health S...

INDUSTRIAL HYGIENE NEWSLETTER

Volume 10 September 1950 Number 9

Issued monthly by
FEDERAL SECURITY AGENCY
Public Health Service
Industrial Hygiene Division

FEATURES

This publication is free to persons engaged in industrial hygiene in governmental agencies (Federal, State, or Local). For sale by Superintendent of Documents, Government Printing Office, Washington 25, D. C. Rates—$1 a year (Domestic); $1.25 (Foreign).

The printing of this publication has been approved by the Director of the Bureau of the Budget March 3, 1948

National Conference on Aging Held in Capital

Called by the President, National Conference on Aging was held in Washington, D. C., August 13, 14, and 15. Recognizing the quantitative increase in the number and proportion of older people in the United States' population and the need for action programs, the Federal Security Agency invited professional, business, and lay persons to meet and discuss this changing pattern of living.

Four work sessions were held in each of the following fields:

(*1*) Aging and research; population changes—the social and economic implications.

(*2*) Employment, employability, and rehabilitation.

(*3*) Income maintenance.

(*4*) Health maintenance and services, including rehabilitation.

(*5*) Education for an aging population.

(*6*) Family life, living arrangements, and housing.

(*7*) Creative and recreational activities.

(*8*) Religious programs and services

(*9*) Community organization.

(*10*) Professional personnel.

One of the chief purposes of the forum was to evaluate the potentialities of older people toward ensuring their useful and satisfying participation in the life of the community. Employment policies, hiring practices, vocational counseling, and rehabilitation were among the subjects discussed. Other phases, such as retirement insurance programs and employment opportunities were also considered.

All discussion groups met in a joint session at the conclusion of the 3-day meeting to submit their recommendations. These findings will help develop guide lines of activity for the States and local communities, public and private organizations, and other interested groups.

COVER PICTURE—This is a view of deep limestone mine operation at Barberton, Ohio. Limestone is an essential in the production of soda ash and other heavy chemicals. Photograph by courtesy of Pittsburgh Plate Glass Co.

The Study of the Workroom Environment

By J. J. Bloomfield

In view of the constant demand for basic material on industrial hygiene techniques and for practical help in this field, a series of articles on the fundamental principles and practices of industrial hygiene will be printed in the "Industrial Hygiene Newsletter."

State and local industrial hygienists are called upon often for lectures to graduate and undergraduate students in both engineering and medicine. Industrial personnel also make frequent demands upon governmental industrial hygienists for information based upon long experience. New, inexperienced personnel in both government and industry have need for orientation and training courses. Since these are not always accessible, it is hoped that the information in these articles will supplement other available material.

This first article is one of a series of lectures by Mr. J. J. Bloomfield, assistant chief of the Division of Industrial Hygiene, PHS. The lectures were given to a class of 50 physicians in Rio de Janeiro, Brazil, during the summer of 1949. Since industrial hygiene is still in a developmental stage in Brazil, the lectures had to be basic material. Emphasis has therefore been placed on etiology and prevention.

RECONNAISSANCE SURVEY

One of the functions of an engineer in the field of industrial hygiene is the study of the workroom environment in an effort to determine any relationship between that environment and the health of the worker. In all such investigations there are certain preliminary steps of fundamental importance which must be undertaken in order to serve as a guide in the more detailed studies which may be indicated. These preliminary steps are the basis for the reconnaissance survey and consist of the sanitary appraisal and the occupational analysis of the workroom and its inhabitants.

The sanitary survey of the workroom consists in noting items of a general sanitary and hygienic nature, such as provisions for ventilation, illumination, protection from exposure to specific poisons, such as dusts, fumes, vapors, and gases, fire protection, accident prevention, fatigue, and so on. In other words, the sanitary survey yields information concerning the presence of various health hazards and serves as a guide in determining which hazards require further detailed study for actual quantitative determinations. One should look upon this type of survey as a listing of the facilities afforded the worker in the industrial environment, and it may be likened to the stock inventory which a business establishment usually undergoes periodically.

The occupational analysis, which is also a part of this inventory or reconnaissance survey permits one to learn the activities involved in, and the particular hazards associated with, each occupation as well as the number of persons engaged in each occupation.

To assist the engineer in the conduct of such reconnaissance surveys, certain forms are recommended. The forms that have been developed are the result of experience during the past two decades in numerous investigations of industrial establishments throughout the United States. It has been found that, in nearly all instances, the filling out of these forms has proved a valuable guide and starting point in the subsequent studies of the workroom environment.

The first form lists data of a general nature. It covers items of a sanitary character in order to provide information on housekeeping; personal services, such as cloak room, locker rooms, showers, and toilets; and control measures which may be in use, such as ventilation and safety devices. Space is also provided for the listing of exposures to certain hazards arising from fumes, gases, dusts, and specific poisons.

Concerned primarily with the individual occupation, the second form provides space for designation of the occupation, the number of persons involved, the nature of the work itself, and the raw materials and byproducts associated with each occupation. Space is also provided for noting control measures associated with each exposure and individual occupation.

In practice, the reconnaissance survey consists of carefully filling out the two inspection forms and jotting down any additional notes on items which may not be provided for in the forms. Under certain conditions, such as may exist in a coal mine or a cement mill, some of the items listed on these forms may obviously be omitted. After filling out survey forms for each workroom in an entire plant, a detailed analysis of the data contained in the forms is then in order. It is such an analysis that enables one to furnish a complete picture of the hygienic conditions in each

The operator is loading his machine with aluminum cast binocular bodies, preparatory to closing the hinged-drop door in which the rubber gloves have been inserted. Next he will "blast" by holding each part directly in the path of a sand "shower bath" to roughen the inside surfaces of the binocular bodies which in smooth condition would allow too many light reflections and distort the image. The gloves and enclosed operation protect the operator from the sand, sprayed under 40 pounds of air pressure. Photograph by courtesy of Westinghouse Electric Corp.

of the workrooms studied and in the plant as a whole. Perhaps one typical illustration from actual experience will demonstrate the value of a reconnaissance survey of an industrial establishment.

The Division of Industrial Hygiene of the U. S. Public Health Service has been receiving reports from industrial sick benefit organizations since 1922. A study of these reports from the steel industry showed consistently higher incidence rates for pneumonia in all forms than were found for employees of other industries. For the period 1922 to 1928, inclusive, the pneumonia case rate in the steel industry was nearly 70 percent above the rate in the reporting public utilities, and nearly 50 percent higher than all other reporting industries as a group.

A 5-year inquiry into the causes of high pneumonia rates among iron and steel workers in a representative mill disclosed the fact that the largest number of cases occurred in certain departments, such as the blast furnace and open-hearth steel mills. When one realizes, however, that these departments contain anywhere from 60 to 100 different occupations, the task of a preventive program is almost a hopeless one, unless definite information is obtained concerning such important items as the number of persons in each occupation, the activities associated with each occupation, the health hazards associated with each occupation, and the incidence of pneumonia for each occupation. Such information may be readily obtained from a reconnaissance survey.

For example, in the reconnaissance survey made in this plant, it was found that the most important factors associated with the various occupations were exposure to heat with wide changes in temperature, gases (sulfur dioxide, hydrogen sulfide and carbon monoxide), and siliceous dusts, as well as the performance of strenuous work and outdoor labor in all kinds of weather. The survey focused attention on these exposures in the occupations in which they occurred. It was obvious that the highest pneumonia rates occurred among those occupations exposed to one or more of the potential hazards cited. The actual number of cases for those occupations not associated with these five exposures was found to be even less than the expected number of cases of pneumonia for such workers.

The reconnaissance survey indicated that in the blast furnace department attention should be centered on the occupations in the casting and general labor sections in an effort to determine the degree of exposure to gases, dusts, extreme temperature changes, and so on. Such studies are carried out by the engineer and chemist, whose task it is to determine the extent of the occupational exposure to the materials and conditions enumerated. Thus, the engineer is concentrating on the important factors and omitting the unimportant.

In this particular study, it was necessary to evaluate the working environment for but a few of the more than 60 occupations in the blast-furnace department. It was these few occupations that accounted for the high pneumonia incidence for the entire department; and, once the occupational exposure factor had been evaluated, the engineer was in a position to initiate control measures for the minimization or the elimination of the hazards demonstrated to be deleterious to health.

THE DETAILED SURVEY

To determine a worker's exposure to materials or conditions incident to his employment, it is necessary to have precise data on such exposures. In some cases the difference between a hazardous and a nonhazardous condition may depend entirely on whether the worker is exposed continuously to concentrations of materials bordering on

An industrial hygiene engineer measures the rate of air movement into the hood. Exhaust ventilation protects the worker from the fumes of the acid into which he is dipping metal parts.

Wet drilling should be used in many stone-cutting operations to protect the workers from harmful dusts. Cold weather and inaccessible water supplies make it very difficult at times.

A ventilating tube at the working face of a copper mine provides cool, fresh air for the miners. Photograph by courtesy of Anaconda Copper Mining Co.

the threshold limit. For example, in the case of exposure to certain lead compounds, for which the threshold limit has been set as 1.5 milligrams per 10 cubic meters of air, it is very important to know whether the workman is inhaling lead dust approximately above or below this limit. Quite often a difference of a milligram or so may spell the difference between a safe and an unsafe condition.

Detailed appraisals of exposure may be said to serve a threefold purpose. First, they enable one to determine the extent of a hazard. This is accomplished by obtaining occupational exposures, by precise methods, to the toxic materials or conditions under consideration. Today, the engineer and chemist have at their disposal delicate instruments and methods of analysis unprecedented in the history of industrial hygiene, and our knowledge concerning such matters is increasing from day to day. The guesswork as to actual exposure has been fairly well taken out of industrial hygiene.

A second purpose served by the detailed study is the fact that, if clinical investigations are made concurrently with environmental studies, the findings on occupational exposure may indicate the permissible amounts of the toxic materials which may be tolerated with safety.

And, finally, the third purpose served by this type of study deals with the control of the hazard. In other words, one is in a position to determine the efficiency of any device which may have been introduced for the minimization or elimination of the hazard. Some examples illustrating each of the three purposes served by the detailed study follow:

Extent of hazard.—In a study of lead poisoning among storage battery workers, it was important to determine the relationship between the amount of lead dust inhaled by the men and the incidence and severity of plumbism. Such a study is valuable in that it may indicate the maximum amount of lead which may be inhaled with impunity.

From data showing the fundamental correlation between the lead dust in the air and the rate of plumbism in the major departments of the plant in which a study was made, it is evident that a close correlation exists between the lead exposure of workers in different departments and the risk of developing a case of lead poisoning.

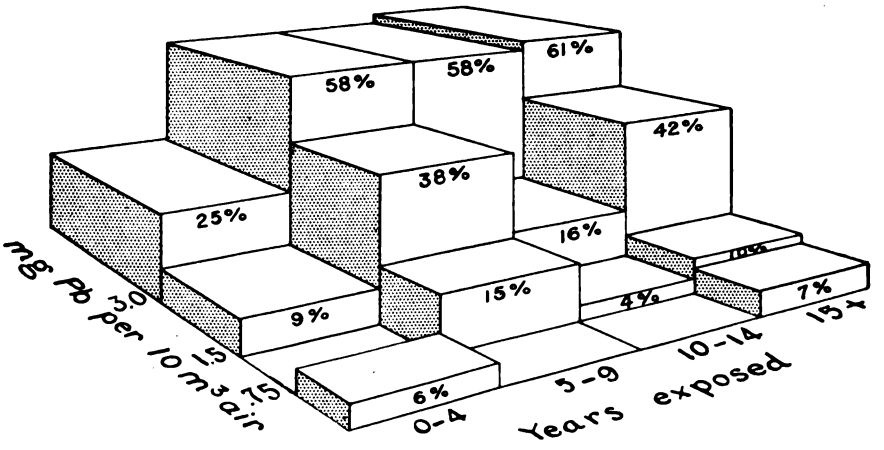


Figure 1.—The percentages of storage battery workers in each of 16 exposure groups diagnosed as cases of early plumbism are represented by the heights of blocks. Thus, of the workers exposed more than 15 years to atmospheric lead concentrations in excess of 3 mg. Pb per 10 m³ of air, 61 percent were found to have early plumbism.

Correlation with clinical data.—Figure 1 illustrates the relationship between lead dust exposure, years of exposure, and the percentage of workers diagnosed as having early plumbism. It is evident that 1.5 milligrams of lead dust per 10 cubic meters of air, except for very prolonged exposure, is the limit of safety under the conditions encountered in these studies. This important finding is of great value to the engineer, since it gives him a basis upon which to develop protective devices in the way of exhaust ventilation, respiratory protection, good housekeeping, and so on.

Efficacy of control.—The detailed survey which studies the efficiency of various methods employed for the control of a hazard will be treated in more detail in the example which follows.

STUDY OF MERCURIALISM IN THE HATTERS' FUR-CUTTING INDUSTRY

Methods and instruments used in study.—Thirty-six plants in the United States employing 2,000 persons, were engaged in preparation of hatters' fur.

The first step in the survey consisted of collecting information on industrial welfare, sanitation, processes and occupations, cooperation of employers and employees in the conduct of the study, and other general data. Special forms were employed for this preliminary work.

With these data available, six representative plants were selected for detailed study.

A preliminary survey of the industry showed that a major occupational hazard was exposure to mercury vapor and dust.

Results of surveys.—The majority of plants were small establishments of backshop variety. A sanitary study showed that 57 percent of the plants were in poor and bad state of sanitation; 33 percent, fair; and 10 percent, good or excellent.

Percentage distribution of plants: Twenty percent of 36 plants employed 100 or more persons.

Welfare facilities were very limited in this industry.

Natural illumination was poor, but ample floor space was provided.

Results of sanitary surveys.—In 87 percent of the rooms the glass area was less than 20 percent of the floor area. In other words, natural illumination was poor in those workrooms.

Per capita space allotment was ample.

Occupational analysis of major occupations: 580 of the 2,000 employees were engaged in sorting, and this occupation accounted for most of the females in the industry.

Occupational exposure to mercury

vapor and dust.—The samples for mercury vapor and dust were obtained simultaneously and the two results totalled for occupational exposure.

One hundred twenty-four samples of vapor and dust were obtained. Additional samples were taken for special studies, such as ventilation.

The medical studies showed that approximately 8 percent of all employees could be diagnosed as having chronic mercurialism.

The symptoms on which greatest weight was laid in making the diagnosis were fine intention tremor, exaggerated forms of psychic irritability, gingivitis, other types of oral pathology, coppery discoloration of the mucous membranes of the mouth and throat, and certain characteristic neurological and vasomotor disturbances.

The incidence of mercurialism was greatest in the occupations in which exposure to mercury vapor and mercury impregnated dust was greatest.

This makes it reasonable to assume that a reduction of mercury concentration by the introduction of engineering control methods would result in a reduction of the health hazard.

Engineering and chemical studies showed that the exposure of these workers ranged from 0.6 to 7.3 milligrams of mercury per 10 cubic meters of air, and that by the methods of segregation and local exhaust ventilation the occupational exposure to mercury could be reduced to less than 2 milligrams per 10 cubic meters (1 mg. is threshold).

Case hardening parts in molten cyanide. The exhaust hood enclosing the pot removes toxic fumes and the operator is also protected against cyanide splashes by goggles, face shield and gloves. Photograph by courtesy of the American Telephone & Telegraph Co.

In other words, this study showed that it was possible to control the hazard in this industry by methods already employed in some of the plants producing hatters' fur.

Control studies.—Three methods found successful in diminishing exposure to mercury in this industry are:

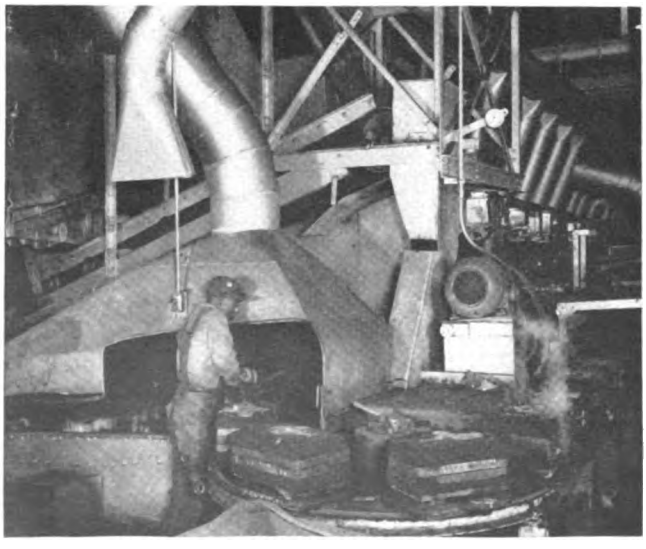
a. Segregation.
b. Local exhaust ventilation.
c. General natural ventilation.

Segregation is one of the most effective methods of control. Twenty-three percent of fur workers may be eliminated from exposure by segregation. The workers are openers, drummers, skin sorters, and clippers.

No data are available on air movements required for controlling mercury vapor and dust by local exhaust systems. The efficiency of the air volume used has never been studied.

In fact, brushers, cutters, and blowers have been exhausted chiefly to eliminate nuisances caused by dust in these occupations.

However, the presence of exhaust



This well-enclosed and ventilated shakeout station in the Chevrolet-Grey Iron Foundry at Saginaw, Mich. has an inward flow of air from 200 to 250 linear feet per minute. Photograph by courtesy of General Motors Corp.

Spraying is another process that requires local exhaust ventilation to protect the worker against the toxic vapors. Photograph by courtesy of the Tennessee Conservation Department.

systems was found to decrease considerably mercury exposure.

By controlling exposure from cutting machines, 36 percent of workers in industry are affected.

Air flows of approximately 2,000 cubic feet per minute reduced concentrations from 4.6 to 0.7 mg. per 10 cubic meters for blowing machines.

General good ventilation in storerooms was found to reduce mercury exposure to a trace.

RECOMMENDATIONS

The recommendations which follow are based on what has been found to be good engineering practice in the industry itself.

(*1*) Segregation eliminates 23 percent of the workers from mercury exposure.

(*2*) Local exhaust ventilation reduces exposure of brushers, cutters, sorters, and blowers.

(*3*) Good natural or mechanical ventilation decreases mercury exposure for pilers and shippers.

(*4*) The practice of storing treated fur in workrooms should be abolished, and such material should be stored in well-ventilated rooms.

(*5*) Good housekeeping and general sanitation should be practiced, since the study showed that accumulations of treated skins and dust in rooms serve as source of mercury vapor. Hence,

sweeping daily of floors, benches, and other objects, and also general weekly cleaning were recommended.

POSTSCRIPT

For many years the hatters' fur-cutting industry had been experimenting with a substitute for mercury nitrate in the preparation of hatters' fur—one which would not employ any toxic chemicals. Finally, several years after our study was completed, the industry had developed a successful carroting solution, consisting of Glauber's salt and hydrogen peroxide.

To make certain that the entire industry would utilize this new compound in place of the more toxic mercury compound, the Surgeon General of the U. S. Public Health Service called a conference of the industries preparing hatters' fur, the labor union, and State health officials. At this conference a written agreement was adopted in which the industry agreed to stop the use of mercury compounds in the processing of hatters' fur. Later, many of the States adopted legislation or rules and regulations outlawing the use of mercury compounds in the hatting industry.

REFERENCES TO LECTURE ON BASIC SURVEY PROCEDURES

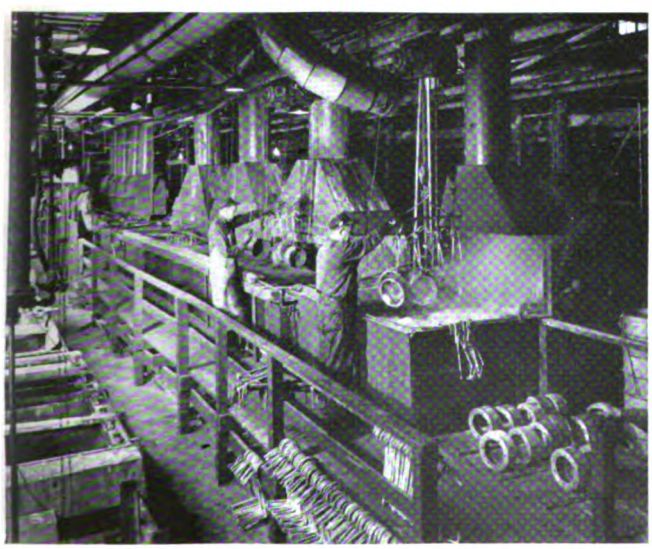
Bloomfield, J. J.: Preliminary Surveys of the Industrial Environment. *Public Health Reports*, **48:** 44 (November 3, 1933). U. S. Government Printing Office, Washington, D. C.

Brundage, D. K.; Russell, A. E.; Jones, R. R.; Bloomfield, J. J.; and Thompson, L. R.: Frequency of Pneumonia Among Iron and Steel Workers. *Public Health Bulletin* No. 202. U. S. Government Printing Office, Washington D. C., 1932.

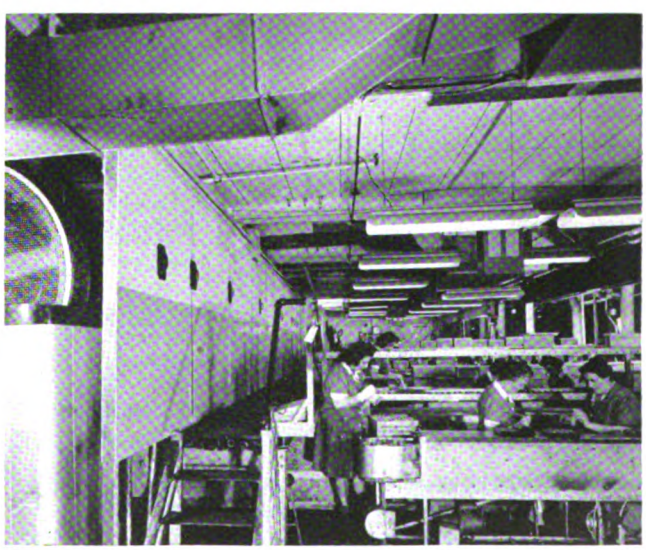
Dreessen, W. C.; Edwards, T. I.; Reinhart, W. H.; Page, R. T.; Webster, S. H.; Armstrong, D. W.; and Sayers, R. R.: The Control of the Lead Hazard in the Storage Battery Industry. *Public Health Bulletin* No. 262. U. S. Government Printing Office, Washington, D. C., 1941.

Neal, P. A.; Jones, R. R.; Bloomfield, J. J.; DallaValle, J. M.; and Edwards, T. I.: A Study of Chronic Mercurialism in the Hatters' Fur-Cutting Industry. *Public Health Bulletin* No. 234. U. S. Government Printing Office, Washington, D. C., 1937.

Russell, A. E.; Jones, R. R.; Bloomfield, J. J.; Britten, R. H.; and Thompson, L. R.; Lead Poisoning in a Storage Battery Plant. *Public Health Bulletin* No. 205, U. S. Government Printing Office, Washington, D. C., 1933.



Operators of these rinse and pickle tanks are well protected by exhaust ventilation. These rims are ready for brass plating. Photograph by courtesy of Firestone Steel Products Division.



Sound conditioning and good lighting contribute to the efficiency and well-being of these workers. Note movable baffles between the workers on a packaging line and heavy machinery. Photograph by courtesy of Celotex Corp.

ARKANSAS DIVISION OF INDUSTRIAL HYGIENE URGES INDUSTRIES TO UTILIZE ITS SERVICES

THERE is an Industrial Hygiene Division in your State Health Department. You may ask, "Why?" or "How does it affect me as a manufacturer or operator of a processing plant?" The first of these questions may be answered by a statement of the primary purpose of the Industrial Hygiene Division, and that is: To study and control environmental conditions which may affect the health of workers. In answer to the second, it is a proved fact that few industries are entirely free of processes or environmental conditions which may be harmful to employees. Hence, management has a responsibility for recognizing such dangers and instituting control measures.

Since your primary objective is production, your key men are trained specifically for that purpose. Likewise, personnel of the Industrial Hygiene Division are trained for their specialty. At the present time the field staff consists of two chemical engineers and one chemist with special training and experience in solving health problems in industry. Some plants maintain their own industrial hygiene program, but many are not economically justified in employing trained personnel or in maintaining laboratory and field equipment needed for this purpose.

The Division of Industrial Hygiene has been set up to aid industry in Arkansas. Services available include:

(1) Distribution of information on health problems in industry.

(2) Plant surveys for the discovery of potentially harmful working conditions.

(3) Collection of dust, fume, mist, vapor, gas, liquid, and solid samples for analysis.

(4) Laboratory analyses.

(5) Evaluation of plant health conditions.

(6) Planning and testing of control measures.

The division acts as a clearing house for information on industrial hygiene. From a variety of sources, its library is kept up-to-date on all phases of this subject. Inquiries will receive prompt and thorough attention. Upon request, the Division of Industrial Hygiene will provide competent speakers to lecture on the various subjects in the field of industrial hygiene to medical, engineering, nursing, management and labor groups, and to the general public.

Is your plant one of the few which can point with pride to healthful working conditions? Or do you have processes which you know or suspect to be harmful? The division has the necessary personnel and facilities for making a survey of your industry to remove these doubts. A survey includes study of the physical plant lay-out, a break-down of work into unit operations, the discovery of potential hazards, the exposure of workers, and the collection of atmospheric, liquid, or solid samples for identification of contaminating substances.

In the laboratory, samples are broken down to identify harmful components and evaluate the effects on exposed workers. New and better methods are constantly sought to improve sampling technique and to test various samples.

Studies have revealed that certain toxic materials are common to many industries. Of these, the most widely used are solvents such as benzol and carbon tetrachloride. Most solvents cannot be identified from the label because solvents are sold under trade names which bear no relation to the actual components. In addition to solvents, metal fumes and dusts, silica dust and many other toxic chemical compounds are potentially dangerous in industry.

Assuming that toxic materials were found to be present by the plant survey, interpretation of the findings would answer these questions.

(1) How toxic is the substance?

(2) What was the concentration of the toxic substance?

(3) How many workers are exposed?

(4) What are their periods of exposure?

(5) Have any of the workers been affected?

(6) What protection is provided for the workers?

(7) Are existing control measures adequate?

(8) If a real hazard exists, how can it be controlled?

Ventilation designed for the specific process is the most widely used control measure for the removal of contaminating material. Local or exhaust ventilation is effectively used for spot contamination where the offending substance may be collected and removed at the point of generation. General ventilation often is used to dilute the objectionable material with large quantities of outside air.

Since ventilation is of prime importance in the control of industrial contaminants, the division encourages requests to work with plant engineers on the study, design and testing of ventilation systems. For new installations or changes in operations requiring ventilation, preliminary study of the process and design of the system may prevent costly changes at a later date. It is urged that plans of proposed ventilation be submitted to the division for study and approval.

Other control methods may be used separately or in combination with local or general ventilation. At times a harmless or less toxic material may be substituted in the process. This method is limited because of the factors of efficiency of the substitute for the job, cost, availability, flammability and other inherent properties.

Some processes may be isolated, as for example, the sand blasting operation, thus reducing exposure of all workers except the sand blasters who may be provided with personal protective equipment. Other processes, such as spray painting, may be enclosed either completely or partially and controlled with exhaust ventilation.

Some dusts may be reduced materially by the use of wet methods. Ventilation combined with wet drilling and wetting with water containing detergents is used frequently and effectively.

Personal protective devices such as respirators, goggles, and shields are used as supplemental controls.

From the *Arkansas Health Bulletin*, March 1950.

LOS ANGELES (CITY), CALIF.

Carbon tet.—A local chain of paint stores ran a large advertisement in the Sunday papers, inviting the public to share their luck in obtaining 10,000 gallons of war surplus "carbon tet." It was offered at an attractive price in 5-gallon containers, with no limit on quantity to each customer. The ad featured this solvent as the "all-purpose household cleaning fluid" for clothes and many other uses, "finest, safest, dries quickly, and leaves no odor."

Because two men were killed, and one seriously harmed in the spring of 1947 from using "carbon tet" to clean the floor of a small shop, it was feared that widespread sale of this solvent in large containers would encourage similar misuse and result in further deaths or severe illness. A letter from Dr. Uhl to the paint firm warned of these dangers and advised them to affix prominent warning labels, modify the advertisements to indicate that there is danger from inhaling the vapors, and divide the stock into smaller containers (preferably of one quart capacity) to discourage indiscriminate use of large quantities.

The firm promptly responded—printed up warning labels with red letters stating "Volatile Solvent, Vapor Harmful, Use Adequate Ventilation"; deleted the phrase "Finest, safest" from the ad, and in its place substituted, "See directions on label for caution in using", and agreed to repackage the material into smaller containers.

Respirators.—The need for education in the proper types and uses of respiratory protective equipment was again emphasized during a recent study in an auto-painting shop. All the equipment for spray painting and for baking on the new finish was of the latest type. Real effort had been directed to prevent the spray booth and infra-red oven ventilating systems' effluent from creating a neighborhood nuisance.

But the spray painters working inside the exhausted spray booth were given practically no protection; they were furnished gauze masks because "they are comfortable to wear and it's the only kind of mask they'll wear." It was pointed out to the shop owner that he would have to furnish supplied-air respirators or their equivalent to prevent illness among the spray painters.

KENTUCKY

Nurses.—Mrs. William A. Armstrong is a new member of the staff, having accepted the new post of industrial consulting nurse. She has spent 7 years in general public health nursing and recently completed 3 years as traveling nursing consultant for Liberty Mutual Insurance Co.

MASSACHUSETTS

Seminar.—The staff of the Division of Occupational Hygiene has been invited to give an all-day seminar in August for students at the New England Field Training Center of the University of Massachusetts. The first of such seminars was held in April, and members of the medical, nursing, and engineering sections of the division took part.

Guest.—The latest addition to the division's guest book is the name of Gabriel Camargo, from the Department of Labor, Bogota, Colombia.

MINNESOTA

Nurses' survey.—An industrial nurse section of Minnesota Nurses' Association was organized a year ago at the request of a number of industrial nurses in Minnesota. The object of the section is "to promote the interests of industrial nurses, to improve the type of nursing service which they render, and to provide an opportunity for the consideration of problems of special interest to industrial nurses." One problem of special interest to many industrial nurses is the establishment of fair employment standards. Because a survey of industrial nurses' working conditions has not been made since the war, there is a definite need for information on current salaries and the prevailing personnel practices of nurses employed in industry. A recent polling of industrial nurses who are MNA members revealed a definite interest in having such a survey made. Accordingly, survey questionnaires will be mailed to every industrial nurse.

The results of the survey will be referred to the section policies committee of the Industrial Nurses' Section of Minnesota Nurses' Association. It is hoped that the results can be used by the section as a basis for establishing current minimum standards of employment for nurses in industry.

NEW HAMPSHIRE

Nurses.—Four hundred nurses attended the annual conference of the New England Industrial Nurses' Association held in Portsmouth, N. H., June 23, 24, and 25. Mrs. Queenie La Brecque, nursing consultant for the Division of Industrial Hygiene, New Hampshire Department of Health, was chairman of the meeting.

Education.—Frederick J. Vintinner, director of the Division of Industrial Hygiene, recently received the degree of doctor of science in environmental medicine from the School of Hygiene and Public Health, Johns Hopkins University.

Ragweed studies.—A pamphlet showing the ragweed free area of New Hampshire has been issued as a part of the study of ragweed pollen. In connection with the drive to eliminate ragweed from the State, the Division of Industrial Hygiene is holding schools in various localities throughout the State to demonstrate the application and use of chemical spraying solutions for the control of ragweed and poison ivy. Different towns and cities are sending representatives, who will return and carry out the control programs in their respective localities. In addition to these classes, the general public is informed through a series of spot radio broadcasts.

CLEVELAND, OHIO

Forum on amputees.—Industrial nurses of Cleveland were invited to the Fourth Industrial Forum of Possibilities Unlimited, Inc., a nonprofit organization for the advancement of amputees. Mr. Carl Long, superintendent, Cleveland Dental Manufacturing Co., spoke on "The Return to Productivity"; and Mr. Edward J. Moriarity, district supervisor of the Bureau of Vocational Rehabilitation spoke on "Losing a Limb on the Job—Then What?" These talks were followed by a case history of an amputee, with the patient and those present who participated in his recovery to tell their part of the story. Those who aided him were the social service worker at the hospital, two members of Possibilities Unlimited, workers from the Bureau of Vocational Rehabilitation and the Cleveland Rehabilitation Center, and the employment manager from the company for which the amputee works.

PENNSYLVANIA

Autometer.—The Air Pollution Division of the Pennsylvania Bureau of Industrial Hygiene is now equipped with a Thomas autometer which has been manufactured especially for the bureau by a leading maker of scientific apparatus. The instrument has been made in portable form and is for the purpose of measuring the concentration of sulfur dioxide in the atmosphere. Equipped with a recording apparatus, concentrations of sulfur dioxide of from 0 to 5 parts per million may be determined.

Sulfur dioxide has long been known to be one of the most irritant gases polluting the atmosphere of industrial communities. This new equipment will materially assist the Air Pollution Division in conducting long-range studies in a community with a view toward determining the magnitude of the sulfur dioxide content of the atmosphere. The equipment will also be available for on-the-spot recordings of sulfur dioxide concentrations in localities where conditions are such as to favor the build-up of atmospheric pollution. It is hoped that the data thus obtained may serve as a means of comparing the sulfur dioxide content of the air of urban areas with that of rural areas and to indicate conclusively the magnitude of the sulfur dioxide problem in larger cities in the State.

Georgia Studies CO Problem from Heaters In Tourist Courts

A number of deaths have been reported in tourist courts from the use of space heaters burning carbonaceous fuels such as liquified petroleum gas, oil, and the like. As a result, the Division of Industrial Hygiene, Georgia Department of Health, has been asked to write a regulation covering the requirements for approval of heaters for tightly sealed rooms. Dr. L. M. Petrie, director of the division, says in his annual report:

"Explanations often offered for these deaths are: (*1*) that the concentration of oxygen in the room becomes so low as to be unable to support life, or (*2*) that the concentration of oxygen in the room becomes so low as to be unable to support combustion, thus allowing the flame to be extinguished and fill the room with gas. We feel, however, that the cause of death in nearly all instances is due to carbon monoxide. This is supported by the fact that usually the flame is still burning when the victims are removed.

"It is reasonable to believe that a gas burner which is regulated to give perfect combustion on an air supply containing 21 percent oxygen may become unbalanced when the oxygen content is lowered by depletion due to combustion of the fuel. When the oxygen content is reduced, combustion becomes incomplete with the production of carbon-monoxide. Unless fresh air is admitted, either by separate air intake from the outside to the combustion chamber of the heater or by an opening from the outside to the room, to replace the air consumed by the heater, the products of combustion will not pass out through the exhaust vent, but will mix with the room air. In other words, even though an exhaust vent to the outside is provided, the products of combustion cannot escape unless fresh air is admitted to replace the combustion gases.

"We have, so far, been unable to find in the literature any studies since the Bureau of Mines' work in 1923 giving actual experimental evidence of the oxygen, carbon dioxide and carbon monoxide content of the air for varying intervals of time when a heater is burning in a tightly sealed room. We, also, are unable to find reliable information as to the minimum quantity of air intake necessary to maintain the normal atmospheric oxygen content of the room where such a heater is burning even though the heater may be adequately vented to carry off the products of combustion.

"A research project is being conducted in cooperation with Georgia Tech to investigate the combustion products formed by the burning of gas heaters in an enclosed space. The crux of our problem is to determine: (*1*) the minimum ventilation requirements to make an unvented heater safe in a sealed room, and (*2*) the minimum quantity of air needed to be introduced into the sealed room with a vented heater to maintain the normal concentration of oxygen and allow for complete removal of the products of combustion.

Texas Engineer Finds One of 14 X-Ray Shoe Fitting Machines Safe

In Fort Worth, Tex., an industrial hygienist from the State department of health made a study of all of the X-ray shoe fitting machines in Fort Worth and found only 1 out of 14 that was acceptable by the recommended standards. The report of the study is summarized as follows:

Primary beam intensities ranged from 9 roentgens to 48 roentgens per minute. Two machines were below the recommended level of 12 roentgens per minute.

For scattered radiation, four machines tested less than 12.5 milliroentgens per hour, the recommended level.

All machines except one exceeded the recommended level for scattered radiation at a point 10 feet in front of the machine and 3 feet above the floor.

Nine machines were below the recommended value for scattered radiation at the viewing port, 12.5 milliroentgens per hour.

Thirteen machines were equipped with automatic-timing devices but only two were satisfactory with reference to the recommended limit of 5 seconds.

Five machines were equipped with the recommended screen, type B–2.

CHOLINESTERASE TEST AID IN DIAGNOSIS OF PARATHION POISONING

By William L. Garlick, M. D., F. A. C. S.

A great amount of the organic phosphate insecticides is being sprayed throughout the United States, Canada, South America, and England on fruit trees, plants, vegetables, and in hot houses. Just as in the case of nicotine which produced a number of fatalities 20 or 30 years ago when it was first introduced as an insecticide, so with the organic phosphate materials (TEPP, DFP, and parathion) a number of deaths have resulted from the failure to recognize and protect the plant and field worker against their toxic effects. Typical clinical manifestations are produced by the absorption of these chemicals which when known can be easily recognized and adequately treated. There is a specific laboratory diagnostic aid to diagnosis, namely cholinesterase determination, which, when properly performed and interpreted, corroborates the diagnosis. Treatment is specifically with atropine, and otherwise, symptomatic.

The ideal is to protect any worker from exposure sufficient to poison. In Maryland in a plant where the workers spray pure parathion on dust, then package the material, the workers wear protective clothing, boots, gloves and masks. This plant has prepared parathion for two years with these precautions and has had no clinical evidence of poisoning. The workers have been tested each work-week with cholinesterase determinations. Any appreciable drop from the mean normal, usually a 15 to 25 percent drop, has resulted in their removal from possible contact until a subsequent check has shown a return to normal values. Plasma cholinesterase values fall rapidly with the exposure; the red cell cholinesterase value fall is usually slower. The return to normal follows the same course in both factors, the red blood cell cholinesterase being slower to return.

There is no evidence in our experience or in the reported literature to show any chronic effects following recovery from acute poisoning or following the repeated small absorptions by the worker who is daily exposed to the organic phosphate insecticides, chiefly parathion. When the cholinesterase activity is around one-third of normal, no clinical symptoms are evident. When the cholinesterase has returned to the mean normal there is no damage detectable by any clinical or laboratory method. This fact has great legal importance. In the State of Maryland, the judgment of compensation for acute poisoning has been based on the time cholinesterase activity has returned to normal.

Cholinesterase levels in normal persons can be easily determined to establish a mean normal in the hands of the same technician or biochemist performing the test. Individual variations and changes after exposure can be adequately interpreted.

The test for cholinesterase is a definitive laboratory diagnostic aid. In certain disease states such as severe anemia and liver damage, it is found to be low.

In the field many thousands of acres of produce have been successfully sprayed with parathion and other organic phosphate insecticides without mishap by individuals properly alerted and properly protected from exposure. Such dangerous insecticides should not be used by the uninformed worker.

In summary, the organic phosphates are excellent insecticides. With the proper precautions in the manufacture and use in the field no minor, severe, or fatal poisonings need occur. The clinical symptoms of poisoning are exact and relatively easy to recognize. The test for cholinesterase is diagnostic and of reasonable specificity to warrant its use. Treatment is specific if instituted early.

Dr. Garlick is a practicing physician with wide industrial experience in Baltimore, Md.

Physicians with industrial experience are invited to submit pertinent articles to Publications Board of the *Industrial Hygiene Newsletter*.

GULF COAST CONFERENCE ON INDUSTRIAL HEALTH SCHEDULED FOR HOUSTON

October 12 through 14 are the dates set for the third annual Gulf Coast Regional Conference on Industrial Health. The meeting, which attracted more than 350 in 1949, will be in the Rice Hotel in Houston.

Sponsors pointed out that the mass migration of industries to the Gulf coast area throughout the past decade has caused increasing need for a close understanding by industries of the importance of industrial health.

At the same time, industrial wastes and stream pollution have been causing increasing concern in the region.

These important phases of the Gulf coast's business picture will be the theme of the conference. An industrial waste symposium, which will be conducted simultaneously with the health conference, is set for October 13.

Sponsors are arranging for the United States' leading authorities on the conference's specialized subjects to speak at the sessions. They will come from Washington, D. C., Ohio, New York City, California, Pennsylvania, Utah and other points throughout the Nation.

Primarily, the conference is being planned for the benefit of representatives of the medical profession, industrial nurses, safety engineers, public health departments, insurance companies, and utility, sanitary, and chemical engineers. Sponsors, however, pointed out that representatives of labor and management will profit from many of the discussions of current industrial problems.

The October sessions will be the third conducted in Houston. Inaugurated in 1948 by the Houston Chamber of Commerce public health committee, the conference drew 190 industrial representatives. In 1949, more than 350 attended. At least 500 are expected this year.

Joining the Chamber of Commerce in sponsoring the event will be the Texas State Health Department, Baylor University College of Medicine, Industrial Section of the American Medical Association, Gulf Coast Chapter of the American Society of Safety Engineers, American Association of Industrial Nurses, Houston branch, Industrial Hygiene Foundation of America, Inc., Texas Manufacturers Association, and the Houston City Health Department.

The Houston Chamber of Commerce will handle reservations.

Industrial Nurses Must Know Their Community Resources*

By Ann Petrovich

Emotional factors have an important bearing upon the physiological well-being of the individual. Nurses, since they work closely with individuals and their families, have long realized the effects caused by emotional tensions and conflicts. They have applied the principles of mental health in their daily work without realizing or understanding what was happening. In view of the increased knowledge of mental health and the rapidly increasing interest in this field, it is essential that they have a better knowledge and understanding of human behavior, of principles of mental health, and of themselves.

Skill and sensitivity in appraising the mental as well as the physical health of each person with whom the nurse works, must be used and developed to the end that she can decide what her part is in helping him and when she should refer him to other sources for more specialized psychiatric case work or other services. This emphasizes the need for a thorough acquaintance with available resources, whether on a local, State, or national level. Some services will be directly usable for psychiatric therapy or case work, others for consultation and planning of educational programs.

The average person recognizes and does not question that certain emotions affect his physical state, namely, anger makes him "fighting mad"; he gets "red with embarrassment"; his stomach "ties up in knots" when he's under tension; he "trembles like a leaf" when frightened; and a difficult situation gives him a "headache". All of these old common sayings acknowledge that physiologic changes take place because of emotional causes.

Industry has observed and accepted the fact that emotional reactions are of consequence. Witness the personnel counseling services, the attempts to keep employees happy through the use of musical programs, pleasant surroundings, color combinations in the workrooms, and other methods. All are an acknowledgment that emotional reactions are industrially important.

Miss Petrovich is a mental hygiene nursing consultant for the Division of Public Health Nursing in the Minnesota Department of Health.

* Courtesy of *Nursing in Industry*, June 1950, a monthly publication of the Minnesota Department of Health.

How Much Can the Nurse Do?

The industrial nurse has frequently felt frustrated and helpless in the face of numerous demands for aspirin to relieve headaches, backaches, and other vague pains which do not have an organic base as established by a medical examination. Last year more than 10,000,000 pounds of aspirin were used in the United States in an attempt to alleviate the Nation's hang-overs and headaches. Often the nurse knows or senses that worry, fear, frustration, anger, or depression lies behind the symptoms. Her problem has been: "What can I do about it?"

For years, nurses have known that family and personal tensions and relationships are important to efficiency, and adjustment to health as well as to illness. In the light of today's knowledge, understanding and techniques of working with mental health and psychosomatic conditions, it is becoming increasingly necessary for nurses to know and understand the dynamics of human behavior so that more meaningful help can be given, and so that preventive measures as well as treatment can be instituted.

Nurses not only need to have the knowledge and understanding, but they must go a step further and evaluate the role of the nurse in her relationships with, and responsibilities to, the individuals with whom she is concerned. Can she help the emotionally upset individual on a direct person-to-person basis? Should a specialized mental health service or other community resources be called in or used for referral?

Certainly the decision must be carefully considered in terms of the problem, that is, persistent headaches coupled with an unhappy home situation and no physical findings; an accident-prone individual with overaggressive behavior; or frequent nonorganic backaches in a quiet, retiring person. Aspirins and band-aids constitute part of their daily pattern. What can the nurse do?

Primarily, she needs to recognize what lies behind the demands and the behavior. Following this, she must determine how deep the problem lies, what kind of help is needed, and who can best give it. This means that she should have a knowledge of all available resources in mental health and counseling; what they are, how they function, who is eligible, what kind of service is offered, and where and how this service can be obtained.

The Nurse Is a Good Listener

The nurse can well start by considering herself as a resource. Frequently the fact that an individual has a place to go where he can talk, be understood, and not be judged, helps him to see his problem and work toward a solution. Perhaps this is enough and all that he wants, a place where he can come to verbalize his emotions, thus easing his tension and making it possible for him to clarify his thinking. More than one nurse has had experience of a person asking for an aspirin, staying to talk about his worries, and leaving with the words, "I feel better for just having talked to you." If the nurse finds that she cannot give the kind or amount of aid needed and that definite psychiatric or case work help seems indicated, then she must turn to some other resource.

The Nurse Evaluates The Resources

It is important for a nurse to recognize her own feelings and limitations both as a person and as a professional worker. Sometimes the nurse's own feelings toward an individual, or vice versa, block any constructive working together. When this is true, some other source of help should be used. There should be no hesitation in referring, since no one person can be "everything to everybody." Agency policies also may exert a limiting influence on what the nurse can do.

Community resources for referral may be many, well-established, and professionally sound, or they may be extremely limited. Rural areas and small towns are most likely to be without trained mental health or trained case work services. This situation imposes upon the nurse the necessity of ferreting

out available persons for referral. The family physician is an important one. Where the clergymen recognize their responsibility for counseling and have prepared themselves for it, they may constitute a valuable and useful resource.

The growing interest in mental health has stimulated some church denominations to give specific training to their clergy in understanding human behavior. It may also be that the clergyman, without benefit of formal training will have the best rapport with the particular person being considered, if he has a natural warmth, sincerity, and understanding which enable him to help his parishioner.

At times, the nurse and welfare worker (even though the welfare worker is untrained) may work together, each contributing her knowledge, understanding, and thinking toward helping the individual solve his problem. There may be someone in the school system, such as the visiting teacher (school social worker) who has had training in social case work and who may be used on a consultative basis. Occasionally a trained and experienced case worker who is now a homemaker can be discovered.

To summarize, nurses are becoming more and more aware of the importance of mental health problems. They need to increase their own knowledge and understanding of mental health principles and develop the necessary techniques in working with emotional conflicts within the limits of their professional setting. Skill and sensitivity are necessary in appraising the emotional as well as the physical health of individuals.

Facilities for referral on a local, State, and national level must be carefully evaluated in terms of the services offered, personnel, and how appropriate the services are to the problem in hand. Plans for further action should always be made with the person and by him as much as possible. As he is able to use his own forces in planning and acting, so he is better able to solve his conflicts. We do not do things *to* a person, but rather *with* a person to the end that he can mobilize his own strengths for emotional growth.

Women's Trade Union Pioneered for Health Services Back in 1912

Even in its very early days, the National Women's Trade Union League was interested in the health of workers, and constantly pointed out to industry what it could do to minimize health hazards for its employees. Industrial hygiene programs were encouraged and, on its part, as far back as 1912 the Women's Trade Union League under the leadership of Mrs. Raymond Robins operated a health program of its own in Chicago. A Health Committee was set up, to which women members of unions affiliated with the League could belong by paying an annual per capita tax of 25 cents.

At first, members could consult the three participating doctors at their offices free of charge. Later, in order to help the fund and to enable the girls who needed frequent attention to feel that they were contributing proportionately, books of 25-cent tickets were printed and distributed to shop stewards, and each girl was required to buy a ticket for each visit she made to the doctor's office.

A hospital bed was made available through the doctors, and 12 girls made use of it the first 8 months of the program, several of the 12 having to undergo serious operations. The funds of the Committee, made up of dues from unions and also voluntary contributions from friends, paid the doctors and, in addition, provided a bed for tuberculous girls at Naperville, Ill. In 1912 one girl was under treatment there for 7 months and another for 5 months. Further, the Health Committee secured the consent of six well-known dentists to do work for its members at cost, paid for by the girls themselves.

In every case, detailed records were kept, and from a study of these records the Committee made recommendations to the Factory Inspector which resulted in the remedying of unsanitary conditions in several factories.—**Life and Labor Bulletin, May 1950.**

AEC Gives Training to Industrial Physicians

A fellowship program for training a limited number of industrial physicians will be started by the Atomic Energy Commission this fall if qualified candidates can be obtained.

During the 1950–51 academic year up to four qualified candidates will be selected for academic training in industrial medicine. The stipend for Fellows will be $3,600. During 1951–52 an additional year of on-the-job training at AEC installations will be offered to selected physicians who complete the first year of academic training. On-the-job training would carry a salary of $5,000 per year.

The need for qualified industrial physicians throughout atomic energy installations is critical, and at the end of the 2-year training period Fellows may find employment in the program. However, there will be no commitment on the part of AEC either to continue the applicant's training beyond the Fellowship year, or to provide the applicant with employment upon completing training. On the other hand, the applicant assumes no obligation to take the on-the-job year of training or to seek employment with the AEC or its contractors.

All candidates will be required to have a full security investigation and clearance before being appointed.

Two of the Fellows selected this year will be sent to the School of Medicine, University of Rochester, Rochester, N. Y.; and two will enter the Department of Occupational Medicine, School of Public Health, University of Pittsburgh.

Selection of candidates for the first-year Fellowships will be made by a committee under the chairmanship of Dr. James H. Sterner, consultant to the Division of Biology and Medicine, AEC. Prospective applicants should have completed a medical course and a satisfactory internship plus 1 year of residency in internal medicine or its equivalent.

Application forms for AEC Industrial Medicine Fellowships may be obtained from the AEC Industrial Medicine Fellowship Committee, Division of Biology and Medicine, Atomic Energy Commission, Washington 25, D. C.

CULPRITS *in Industry*

Los Angeles Staff Seeks Solutions To Perplexing Problems

PLASTIC FUME FEVER

Metal fume fever is well known in industry, especially in nonferrous foundries, where zinc oxide fume may cause symptoms suggestive of an influenza attack—headache, chills, and fever.

The superintendent in a Los Angeles machine shop, where no metal fumes are produced, was perplexed when his men developed these typical symptoms. After checking into all possible causes, the guilty operation was identified as a high-speed machining job on one of the new plastics known as polytetrafluorethylene. Apparently the localized heating of the plastic parts by the tool edge, caused the material to vaporize, and breathing of these vapors caused the workers' illness.

In the manufacturer's data sheets a warning appears, that the dust and vapors of this material are toxic and that exhaust ventilation is necessary wherever the material is processed.

The local plant had devised a high velocity exhaust system with narrow flexible ducts carried to the work. Our tests showed this system to be ineffective, and upon our advice the plant will modify the exhaust for greater efficiency.

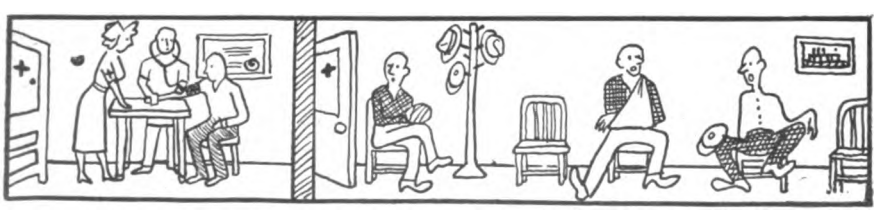
LEAD POISONING SOURCE UNKNOWN

Dogmatic statements in the field of health and safety carry their own peculiar dangers. We have consistently felt that one of the lead-storage-battery plants in this city is so well laid out in its new quarters, and the engineering controls have been so well designed, that there was no likelihood of lead poisoning among the workers in that plant. An occupational disease report, however, indicated acute lead poisoning in a worker who had been employed only from August 1949 to February 1950 (in the new plant).

We made a thorough study on a day when the exhaust equipment was not operating properly, and found that in only one location was the lead concentration in the air in the hazardous range, and this location was far removed from the work station of the affected worker. Subsequent tests at the downdraft packing table where this man had worked, showed relatively low lead concentrations in the range of 0.11 to 0.12 milligram per cubic meter.

The length of exposure and the concentrations of airborne lead found in our tests were not consistent with acute lead intoxication. However, we did find that some of the workers were in the habit of smoking or eating on the job, and we have concluded that the affected worker must have acquired the excessive lead through ingestion rather than inhalation.

What stands out most strikingly in this case is the lack of preplacement and periodic physical examinations, which would have indicated whether the affected worker had absorbed excessive lead in his previous employment or entirely in this plant. We recommended the establishment of a program of physical examinations, both preplacement and periodic, and improvements in practices which contribute to airborne lead and to the dangers of ingestion of lead.—**Los Angeles City Health Department.**



WEST VIRGINIA ISSUES NEW PUBLICATION

West Virginia's Bureau of Industrial Hygiene has started its own newsletter, called *Occupational Health*. A six-page publication with an attractive masthead, it contains articles of direct interest to West Virginia industries, and will undoubtedly do much to promote better health in the State. Present plans are to print *Occupational Health* twice a year.

J. J. Brandabur, M. D., Chairman of Industrial Health Committee for the West Virginia State Medical Society, in his contribution to the publication, says in part: "The expansion of the practice of occupational medicine and surgery and the continued development of industrial health, including industrial hygiene, is a community responsibility as well as a responsibility of industry. It should be based on the principle that sound and properly supervised industrial health programs should be organized in all communities and that the responsibility for implementation rests jointly on management, labor, the medical profession, and official and other recognized organizations concerned with improving the health and working conditions of all wage earners.

"While industrial hygiene service is directed at the improvement of working environment and control of all unhealthful exposures through properly qualified consultants and agencies—a health program should include:

"Prompt and dependable first-aid, emergency, and subsequent medical and surgical care for all industrially induced disability in accordance with the statutes governing workmen's compensation; it must also concern itself with health conservation of employees through physical supervision and health education.

"This can best be accomplished with close correlation with the family physician, dentists, and other community health agencies for early and proper management of nonoccupational sickness and injury.

"It is important to keep good records of all causes of absence from work as a guide to the establishment of proper preventive measures. Particularly is this true when a new development is taking place in this day when literally hundreds of new manufacturing processes are being discovered."

QUESTIONS AND ANSWERS

The Division of Industrial Hygiene, Public Health Service, receives many inquiries on medical, engineering, chemical, and nursing aspects of industrial health. Three questions and answers from the past month's correspondence were selected as being of interest to many *Newsletter* readers and worthy of reprinting.

What are the possible hazards to motion picture projection operators in unventilated booths?

About 10 or 12 years ago there was considerable work done on the possible hazards from inhalation of gases from carbon arcs and study of the combustion of the arc gases showed them to be primarily carbon dioxide with small amounts of oxide of nitrogen and traces of carbon monoxide. Carbon monoxide was not reported by all persons carrying on such investigations and was not considered a significant factor by any of the investigators. The carbon dioxide concentrations of undiluted gases arising from a carbon arc are approximately 0.2 to 0.3 percent.

The core materials of the electrodes are volatilized and subsequently deposited as a fine dust. This dust consists primarily of rare earth oxides and a small amount of fluorides. The particle size is less than 2 microns for the majority of the dust.

MacQuiddy and his coworkers exposed rats, mice, guinea pigs, rabbits, and cats to undiluted gases from the carbon arc in an ordinary type projector. There were resulting tissue changes and death which they believe to be due to the oxides of nitrogen. Their tests for the presence of fluorine or sulfur dioxide were negative. There was no evidence of carbon monoxide hemoglobin in the blood of the animals.

The State of Nebraska studied the problem of hazards in the projection booths in 1936. They concluded that there was sufficient danger to require control measures. In this study they stated that most of the theater projection booths were inadequately ventilated.

Drinker and Snell published a paper on the ventilation of motion picture projection booths and it is their recommendation that the projectors all be ventilated by a local exhaust system with an air flow of not less than 12 cubic feet per minute. They further stated that any ventilation, local or general exhaust which adequately removes the heat of the arc, will also control the potential hazards of oxides of nitrogen.

What are the likely health hazards from working with ethyl mercury chloride?

Ethyl mercury chloride is a powerful primary skin irritant and when used as a wood preservative causes considerable dermatitis among the workers applying it. Dermatitis has also been reported among workers manufacturing it.

Ethyl mercury phosphate is also a skin irritant. The weaker concentrations are skin sensitizers. To tell properly whether or not a one percent solution of this material by weight would cause dermatitis it would be necessary to do a series of patch tests. This would indicate whether or not in this concentration the chemical is a primary skin irritant or a sensitizer. It has also been our experience that most mercury compounds are also absorbed through the skin and are systemic poisons.

Can shoes be sterilized to prevent the spread of foot diseases?

During the war a meeting was held with the National Research Council and other Government agencies, of which this office was one, and it was agreed that there was not enough evidence that shoes transmit fungous infections of the feet to warrant their sterilization between issuing from one soldier to another. They did recommend, however, that when shoes are taken back to the factory to be rebuilt, and were in the process of being rebuilt, for esthetic purposes they could be sterilized. It was also proved that foots baths, fungicidal mats, and special fungicidal floors are of no value in the prevention of athlete's foot.

The treatment of this disease lies mainly in its prevention and the theme of prevention is proper foot hygiene. Proper foot hygiene means daily thorough washing of the feet followed by thorough drying, especially between the toes, and by removing all dead skin that collects between the toes at the time they are washed. It also means using dusting powder between the toes, in the socks, or in the shoes during the day to help keep the amount of perspiration at a minimum since it is the dead dried skin and the macerated tissues that act as a culture media for the fungi to grow.

Ultraviolet sterilization of shoes has been recommended but it is felt that ultraviolet rays do not kill the fungus organisms.

Outline for Medical Lectures Available

A limited number of copies of Dr. Harry Heimann's "Outline of Lectures on Industrial Health for Medical Students" is available from the Division of Industrial Hygiene, Public Health Service, Fourth and Independence SW., Washington 25, D. C. Almost half of the 103 mimeographed pages are devoted to the bibliography. The outline is written as a base-line from which a series of lectures can be prepared to be given to medical students, or to students in industrial health at the graduate level.

CORRECTION

In a speech made by Dr. H. K. Abrams of the Bureau of Adult Health, California Department of Public Health, on agricultural chemicals, he quoted Mr. E. B. White in an article in *The New Yorker*. When the speech was reproduced in the July issue of the *Industrial Hygiene Newsletter*, the section by Mr. White was omitted for copyright reasons, but the reference number, 4, was not deleted. Please correct your *Newsletter* accordingly on page 4 (column 1), and page 16 (column 3).

NEW STAFF MEMBERS

Dr. A. Link Koven, who was with the Division of Industrial Hygiene, Public Health Service, previously, has been reassigned to this division from the Coast Guard Hospital in Baltimore. He will assist Dr. Harry Heimann, chief of the Clinical Investigations Branch of the Division of Industrial Hygiene.

Dr. Mitchell R. Zavon is also a new member of the medical staff of the division. Dr. Zavon was formerly of Johnson City, N. Y.

Stocks of PHS Publications Available for Free Distribution

Stocks of the publications listed below have been received by the Division of Industrial Hygiene, PHS, and are available upon request as long as the supply lasts. To request copies of any of these publications, address the Information Section, Division of Industrial Hygiene, Public Health Service, FSA, Washington 25, D. C. **The abbreviations used below are PHR, *Public Health Reports;* NIHB, *National Institutes of Health Bulletin;* PHB, *Public Health Bulletin.***

Twenty-four-hour Output of Certain Urinary Constituents in Persons Exposed to Lead Arsenate Spray Residue. PHR Reprint No. 2318.

Public Health Administrator's Responsibility in Field of Occupational Disease Legislation. PHR Reprint No. 2325.

Coding and Tabulation of Medical and Research Data for Statistical Analysis. PHR Reprint No. 2346.

Clothing for Protection Against Occupational Skin Irritants. PHR Reprint No. 2383.

Practical Plan for Treatment of Superficial Fungous Infections. PHR Reprint No. 2453.

Dental Status of Adult Male Mine and Smelter Workers. PHR Reprint No. 2355.

Outbreak of Dermatitis From Airplane Engine Covers. PHR Reprint No. 2472.

Effect of Arsenates on Storage of Lead. PHR Reprint No. 2485.

Studies on Strains of *Aerobacter cloacae* Responsible for Acute Illness Among Workers Using Low-Grade Stained Cotton. PHR Reprint No. 2496.

Sickness Absenteeism Among Male and Female Industrial Workers During 1943 and Among Males During the First and Second Quarters of 1944, With a Note on the Respiratory Epidemic of 1943-44. PHR Reprint No. 2578.

Age Factor in Disabling Morbidity, 1940-44. PHR Reprint No. 2680.

Industrial Control Chart Applied to the Study of Epidemics. PHR Reprint No. 2748.

Sickness Absenteeism Among Male and Female Industrial Workers During 1945, With a Note on the Respiratory Epidemic of 1945-46. PHR Reprint No. 2755.

Formaldehyde—Its Toxicity and Potential Dangers. PHR Supplement 181.

An Evaluation of Neurologic Symptoms and Findings Occurring Among TNT Workers. PHR Supplement 196.

Thallium—a Review and Summary of Medical Literature. PHR Supplement 197.

Studies in Chronic Selenosis. NIHB No. 174.

Industrial Manganese Poisoning. NIHB No. 182.

Effects of Aliphatic Nitrous and Nitric Acid Esters on Physiological Functions With Special Reference to Their Chemical Constitution. NIHB No. 186.

Xylidine (C,C-dimethylaniline): Its Toxicity and Potential Dangers as Compared With Those of Aniline and an Appraisal of Potential Hazards From Its Use in Blending Gasoline. NIHB No. 188.

Phenol and Its Derivatives: Its Relation Between Their Chemical Constitution and Their Effect on Organism. NIHB No. 190.

Relation Between Toxic Action of Chlorinated Methanes and Their Chemical and Physiochemical Properties. NIHB No. 191.

Relative Toxicity of Lead and Some of Its Common Compounds. PHB No. 253.

Preliminary Survey of Industrial Hygiene Problem in United States. PHB No. 259.

Fatigue and Hours of Service of Interstate Truck Drivers. PHB No. 265.

Aromatic Amino and Nitro Compounds, Their Toxicity and Potential Dangers. PHB No. 271.

Toxicity and Potential Dangers of Nitrous Fumes. PHB No. 272.

Studies on Mechanism of Carbon Monoxide Poisoning as Observed in Dogs Anesthetized With Sodium Amytal. PHB No. 274.

Health and Working Environment of Nonferrous Metal Mine Workers. PHB No. 277.

Medical Study of Men Exposed to Measured Amounts of Carbon Monoxide in Holland Tunnel for 13 Years. PHB No. 278.

Toxicity and Potential Dangers of Toluene, With Special Reference to Its Maximal Permissible Concentration. PHB No. 279.

Aliphatic Alcohols: Their Toxicity and Potential Dangers in Relation to Their Chemical Constitution and Their Fate in Metabolism. PHB No. 281.

Toxicity and Potential Dangers of Pentaerythritol-tetranitrate (PETN). PHB No. 282.

Experimental Studies on Toxicity and Potential Dangers of Trinitrotoluene (TNT). PHB No. 285.

Carbon Monoxide: Its Hazards and Mechanism of Its Action. PHB No. 290.

Medical Study of Effect of TNT on Workers in a Bomb and Shell Loading Plant. PHB No. 291.

Toxicity of Molybdenum. PHB No. 293.

Control of Ringworm of Scalp Among School Children. PHB No. 294.

Health of Arc Welders in Steel Ship Construction. PHB No. 298.

Industrial Hygiene Problems in Bolivia, Peru, and Chile. PHB No. 301.

MORE PLANTS PERMIT REST-SNACK PERIODS

A STUDY of 836 companies by the National Office Management Association in a dozen different industries and in all parts of the country shows that the rest-snack period is growing more popular. According to the report of this study: "Employees were permitted to obtain between-meal refreshment by three out of four companies. The practice was most common in offices having fewer than 25 employees."

Only 26 of the companies had made actual surveys or tests, but half of all the companies had had 10 or more years' experience to substantiate their opinion that "snacks improved morale and increased efficiency." On the negative side, 7 out of 10 plants did not think snacks reduced turn-over, and 8 out of 10 could see no effect on absenteeism.

896722—50 U. S. GOVERNMENT PRINTING OFFICE: 1950