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IN THIS ISSUE

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Administrative Changes Designed to Facilitate Services to State Units

IN a continuing effort to improve consultative services and assistance to the state and local industrial health units, several personnel changes have been made in the Public Health Service's Division of Occupational Health.

Henry N. Doyle, formerly of Salt Lake City, is now located in Washington, D. C., as head of the State Aid Branch of the Division. He is directing state consultation work, including program reviews and grants-in-aid, and health education and information services, as well as liaison with other Federal and State organizations.

Lewis J. Cralley, Ph.D., is the new chief of the Occupational Health Field Station in Salt Lake City. This office maintains close relations with the western states and provides more immediate services, both consultative and laboratory, to the states than would be possible from Washington. With the rapid growth of industry in that area, responsibilities of this field station have increased manyfold since its opening 3 years ago.

W. Clark Cooper, M. D., senior surgeon in the commissioned corps of the Public Health Service, is the new chief of the Division's Field Headquarters at Cincinnati, Ohio. Dr. Cooper was formerly deputy chief of the medical unit of the PHS Marine Hospital at San Francisco. Having had a wealth of experience in conducting research, especially in malaria, he is well qualified to head the research and investigative work of the Cincinnati office. A graduate of the University of Virginia, Dr. Cooper has done advance study in malaria at the Universities of London and Puerto Rico.

Dr. Dale C. Cameron, who has been on a special, six-month assignment for the Public Health Service has returned to his position as chief of the Program Development Branch of the Division. This branch is responsible for the development and promotion of new programs and techniques to be recommended for plant health programs.

Research in Fungicides Results in Protection for Fruit Packers and Sorters Against Dermatitis

By J. Leon Sealey, M. D.

IN A DERMATITIS study of about 1,500 apple pickers and sorters, the Environmental Research Laboratory at the University of Washington found that with good environmental hygiene practice two different fungicides could be used on the fruit satisfactorily with minimal dermatitis hazards to the workers who sorted and packed the fruit.

The study started in October 1950 to determine the incidence, cause, treatment and prevention of dermatitis among packers and sorters in those plants using fungicides containing sodium chloro-2 phenyl phenate. In a later study, the dermatological aspects of one expérimental formulation containing sodium ortho phenyl phenate as the fungicidal agent were investigated by the Laboratory.

"Left Arm Dermatitis"

The problem of occupational dermatitis among packers and sorters of apples and pears in the Pacific northwest was first called to public attention by Scott (*1*). This was from a study conducted by the Industrial and Adult Hygiene Section, State of Washington Department of Health.

Between 1948 and 1950 there were numerous claims of so-called left arm dermatitis filed with the Washington State Department of Labor and Industries. Many of these claims were from employees working in plants using a fungicidal formulation, first placed on the northwest market in 1948, containing sodium chloro-2 phenyl phenate. Besides dermatitis, irritation of the eyes, throat and nose was also reported.

Investigations by the Industrial and Adult Hygiene Section of the State of Washington Department of Health indicated that a large factor in the difficulties probably was failure to recognize or appreciate the need for safeguards including protective garments, frequent laundering of garments, practice of good personal hygiene, temperature control of wash solution and good ventilation. The investigators concluded if both workers and employers cooperated in observing these relatively simple precautions, it should be possible in the future to use the fungicide, sodium chloro-2 phenyl phenate, treatment safely and obtain control of both the fruit mold and the workers' "left arm dermatitis."

From late October 1950 to February 1951, 28 plants, employing 548 sorters and 837 packers, were visited in Washington and Oregon. All of the plants had used the fungicide, sodium chloro-2 phenyl phenate, in the wash tank, followed by a fresh-water rinse.

An occupational history of dermatological complaints was obtained from 7.5 percent, approximately half of whom were or had been under a physician's care. Many treated themselves with home remedies and continued to sort or pack with their ailment well under control. About one-half percent of those affected became so sensitive to a material with which they came in contact on the job that they were advised to change employment.

Approximately 4 percent had existing skin complaints and when examined, about half appeared to have an active contact type of dermatitis, presumably from a sensitizer with which they had come in contact on the job. Thirty of these were patch-tested with 0.3 percent solution of sodium chloro-2 phenyl phenate, a concentration in excess of that which they should ever expect to be exposed to. Three showed a positive reaction.

Many of the sorters and a few of the packers complained of throat discomfort. These complaints usually were associated with plants where ventilation over the washers was poor or where the fruit wash room was not well isolated from the packing or sorting line. In many plants good personal hygiene was difficult due to a lack of adequate washing facilities convenient to sorters and packers.

As a result of the 1950 study it was concluded that formulations contain-

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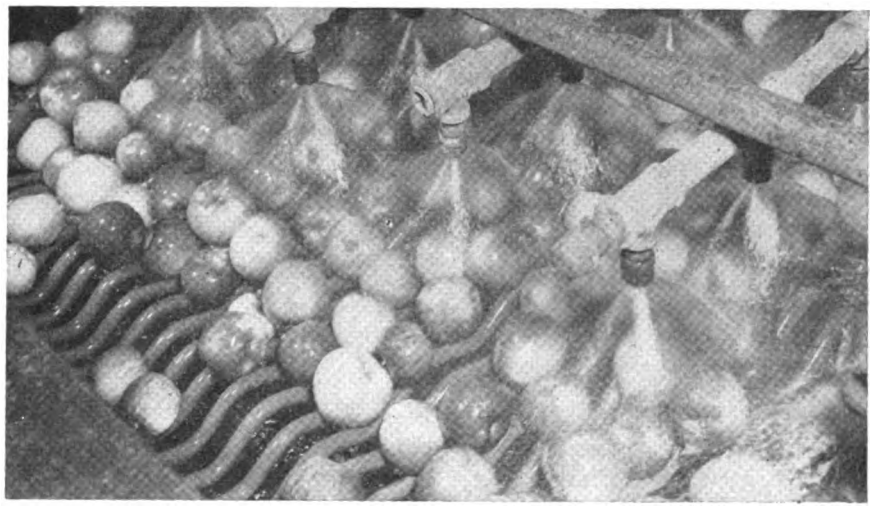

COVER PICTURE—Cases of dermatitis which occurred among apple pickers, sorters and packers in the Pacific northwest were caused by the use of a fungicide on the fruit. After a study was made it was concluded that if both workers and employers cooperated the disease could be prevented.

Photograph at right—Controlled temperatures for the wash solution used to clean the apples was one of the methods recommended to prevent the occurrence of dermatitis among apple sorters and packers. Photographs by courtesy of the Washington State Apple Commission.

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ing sodium chloro-2 phenyl phenate could be safely handled and the incidence of dermatitis among packers and sorters could be reduced if relatively simple improvements in plant design and operation were made, personal protective devices were provided and used, and washing facilities were convenient to all workers.

New Formulation Tried

In an effort to reduce the incidence of dermatitis among packers and sorters of apples and pears, a study of other fungicides that would reduce the decay of apples and pears was made by one manufacturer. The dermatological aspects of one experimental formulation containing sodium ortho phenyl phenate as the fungicidal agent was studied by the Environmental Research Laboratory.

In November 1951, 28 women (11 sorters, 2 stampers, and 15 packers) were employed for 1 month packing and sorting apples that had been treated with a formulation containing 0.5 percent sodium ortho phenyl phenate in the wash; this wash was followed by a fresh-water rinse. Only one of the women wore gloves (rubber gloves and sleeve coverings had been recommended in former years with formulations containing sodium chloro-2 phenyl phenate). Nine of this group of 28 had formerly experienced "skin rash" when packing apples treated with sodium chloro-2 phenyl phenate.

Each was questioned and examined at the beginning, after 2 weeks, and again at the end of the month's run with the experimental formulation. None experienced a skin reaction to this formulation during the 4-week period when it was used in the wash followed by fresh-water rinse. None complained of unpleasant odor, eye or throat irritation during this period. Five of the 15 packers showed an obvious friction "wear and tear" reaction to the hands in the area of rapid contact with the wrapping paper. This reaction, they stated, always cleared up after the end of the packing season.

A dermatological study of ortho phenyl phenate, employing the patch test method, was reported by Hodge and others (2), concluding that 0.5 percent sodium ortho phenyl phenate produces simple primary irritation; a 0.1 percent solution failed to produce irritation or sensitization.

The prophetic patch test is used for the purpose of predicting to what extent a substance might or might not produce dermatitis. It has been used extensively by manufacturers of wearing apparels and cosmetics.

Six male and 115 female volunteers between ages of 14 and 54, giving a negative history of previous exposure to sodium ortho phenyl phenate or sodium chloro-2 phenyl phenate, were selected for this study. Solutions containing 0.5 percent sodium ortho phenyl phenate and sodium chloro-2 phenyl phenate respectively, were applied to opposite forearms in ¼-inch filter paper disks, and covered for 24 hours by an adhesive or cellophane tape patch. The skin of the forearm was first cleansed with acetone, then with ether to assure maximum cutaneous contact. Three sets of patches were applied to most of the volunteers at 7- to 14-day intervals.

Reactions due to tape irritation or sensitization were separated from chemical sensitivity by a ¾-inch disk of untreated cellophane in the center of each "elastopatch" covering. Reactions to the Scotch tape were infrequent.

Under these conditions of cutaneous contact less than 1 percent of the tested persons showed primary irritation from either 0.5 percent sodium ortho phenyl phenate or 0.3 percent sodium chloro–2 phenyl phenate. In contrast, approximately 15 percent of the same group had a skin irritation from the adhesive tape, and approximately 4.5 percent of this group had irritation from cellophane tape.

Approximately 1.5 percent of the volunteers became sensitized to two or more 24-hour contacts with 0.5 percent sodium ortho phenyl phenate at 7- to 14-day intervals; and approximately 2 percent of the volunteers who became sensitized to 0.3 percent sodium chloro–2 phenyl phenate seemed somewhat worse than the reactions observed from the sodium ortho phenyl phenate.

In conclusion, one should expect the frequency of dermatological sensitization of persons packing and sorting fruit treated with a fungicide formulation containing 0.5 percent sodium ortho phenyl phenate to be less than 2 percent. Cases of primary dermatological irritation from fruit properly rinsed following treatment with 0.5 percent sodium ortho phenyl phenate should be rare. One would expect no lung, nose or eye irritation from this chemical.

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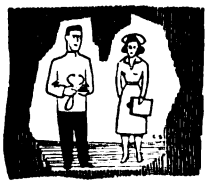
Worker in Insecticide Plant Dies From Parathion Poisoning

Three workers in a Kentucky plant manufacturing agricultural insecticides were poisoned by parathion, and one of them died. Two of the three persons, including the one who died, had removed their respirators because of the heat, despite strict company rules requiring the wearing of respirators, coveralls, and gloves at all times. They were employed as packaging laborers in the dry insecticide department.

At first the fatal case was diagnosed as pulmonary edema and diabetic coma, but later as parathion poisoning. Pulmonary edema was not evident on autopsy. The woman who recovered after being hospitalized a week was at first diagnosed as having been prostrated by the heat. She displayed typical parasympathomimetic symptoms and was treated with atropine. The third case was less severely ill than the other workers and recovered quickly.

Although the plant has attempted to control exposure to parathion by a worker hygiene program, the management has now installed a program of pre-employment and periodic physical examinations, including cholinesterase level determinations for all employees handling parathion. The management is also taking engineering measures as recommended by the Kentucky Division of Industrial Health to safeguard the health of the employees.



PHS Time Study Uncovers Ways To Extend Nurses' Services

By Eleanor C. Bailey and Elizabeth S. Frasier

REALIZING the shortage of nurses, the National Security Resources Board asked the American Nurses Association to estimate the number of nurses needed in the various fields of nursing. This request was referred by the American Nurses Association to the joint board of the six national nursing organizations. At a meeting called to discuss this question, the president of the American Association of Industrial Nurses expressed the hope that some objective studies could be made for establishing valid ratios for estimating the number of nurses needed in the industrial health field.

To meet in part the obvious need for more information on nursing activities in industry, the Divisions of Occupational Health and Public Health Nursing agreed jointly to initiate a study. Because of limited funds and time, it was decided to confine this study of nursing services to a sample of small manufacturing plants. The majority of these plants have limited, on-location, medical consultation, and the major part of the responsibility for the administration and the direction of the health program is vested in the plant nurse.

Objectives

The objectives of the study were:

(1) To determine the scope of nursing activities in a sample of plants.

(2) To apply a time study method for the determination of the amount of nursing time spent on nursing functions and related activities.

(3) To secure additional information useful in formulating a methodology for determining the number of nurses required to meet employee health service needs.

The industrial hygiene bureaus of the Georgia and Connecticut state health departments were requested to select the plants for the study. Moderately hazardous manufacturing industries in which the plants had relatively good health services were agreed upon for the sample.

Every effort was made to select plants of comparable size, but because of the scarcity of plants having on-location medical consultation, the sample finally included 12 plants of fairly diversified size, ranging from 76 to 1,479 employees. They manufactured such articles as food, food containers, textiles, chemicals, clothing, cosmetics, metal novelties, railroad equipment and testing instruments.

Under such widely varying conditions, it was not possible to say that the nursing services studied in this small sample were representative of other health services in Georgia and Connecticut or that they represent the optimum in occupational health programs. No attempt was made during the study to evaluate the quality of nursing services.

In 11 of the plants, a physician was employed to visit the plant and to give consultation on medical questions and problems. In the twelfth plant, a physician was on call for emergencies and available to consult with the nurse.

Each of 11 plants employed one full-time nurse, and the other plant employed two full-time nurses. Seven of the 13 nurses had some college work and their experience in industrial nursing ranged from 3 months to 14 years.

During the study, 7 working days were spent at each plant. The first day was spent in meeting and becoming acquainted with plant personnel concerned with the health program and in explaining the purpose of the study. The nurses were requested to follow their usual routine and disregard the observer, insofar as possible.

The following 5 days were devoted to keeping a record of the actual time, in minutes, spent by the nurse on each separate activity which she performed. Activities which required less than 1 minute were not included, and the time was charged to the activity that preceded or followed. This did not exclude a single visit made by an employee to the health service facilities. A job description, which included those activities for which the nurse was responsible, was prepared on the seventh day.

Services by the nurses were divided into direct, and indirect services, and other activities. Direct services included care for industrial and nonindustrial injuries, care for medical complaints, interviews regarding health problems, immunizations, health examinations, home visits, interpretative services in behalf of individual employees, recording the above services, review of records for follow-up purposes, and any other service to the individual employee.

Indirect services included those in education, sanitation, safety, administration, housekeeping, recreation and clerical duties such as telephoning, typing and filing.

Findings

Direct services accounted for 43 percent of the nurses' time; indirect services for 29 percent; and all other activities for 28 percent.

As the size of the plants increased, the percent of the nurses' time spent on direct services increased and the average number of minutes per service decreased.

There was wide variation in the way in which nurses' time was utilized, even in plants of comparable size. For example, there was considerable variation in the demand for services from the employee groups. In one plant, with an employee population of 300, a total of 46 services were rendered in connection with injuries, medical complaints, and health examinations; while in another plant with 363 employees, a total of 190 services were rendered. The amount of time spent on providing these services ranged from 17 to 32 percent.

In the area of indirect service, there also was considerable variation from plant to plant in the utilization of nurses' time. This was probably due primarily to the size of the employee population, differences in the scope of the health program as they affected the functions of the nurse, the amount of clerical and housekeeping assistance which was provided to the health serv-

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The complete report of this study has been published by the Division of Occupational Health, U. S. Public Health Service, Federal Security Agency, Washington 25, D. C. A limited number of free copies are available. Copies have been placed in all large libraries.

Mrs. Bailey is a nurse and Miss Frasier a statistician with the U. S. Public Health Service.

ice, and managements' philosophy as it relates to the nurses' function.

Recommendations

Because knowledge as to the extent of the actual need for health services is basic to the determination of the amount of nursing time required in industry, it is obvious that valid conclusions cannot be drawn from the use of the time study alone. Such studies reflect what is now being done in existing programs without considering whether or not these programs are meeting current employee health service needs.

To determine how much nursing service can profitably be used by industry, the employee health service needs should first be defined. This would mean establishing criteria for predetermining the health service needs of employee groups. Demonstrations of plant health programs which would provide all types of occupational health services in a situation where management and the nursing and medical professions are cooperating fully would also contribute much practical information.

Wherever possible, studies of health services should be approached on a team basis. This means that medical and nursing service should be studied together because a large portion of the nurse's area of function is dependent upon the experience and philosophy of the plant physician, and the policies and practices which he establishes.

The plant physician, nurse, and management, together with available consultants, should review periodically their health service programs to determine how effectively health service needs are being met; and to determine what activities are being performed by nurses which could be done more economically by other personnel. This type of review is essential in all health service programs if we are to spread the services of the nurses we have to serve most equitably the community as well as industry.

Before hiring a nurse for their plant, management and the plant physician, together with available nursing consultants, should critically review the proposed work load and determine whether or not a nurse's professional skills can be fully utilized. When a small plant cannot effectively utilize the services of a full-time nurse, management may consider sharing the services of a nurse with another small plant rather than depleting further its community nursing resources.

Studies of nursing consultation services should be made to determine: (a) What methods, techniques, and procedures now employed are effective in assisting the nurse to improve her performance, and what methods can be devised for sharing with other consultants those concepts and techniques which are successful.

(b) To what extent such measures as group conferences, work shops, and institutes can be employed to give the plant nurses opportunity to share experience and ideas for providing optimum health services.

(c) To what extent orientation programs can be established for the purpose of assisting the new nurse entering industry to function more effectively and with more security.

Bureau of Standards Issues Publications On Radioactivity

The National Bureau of Standards has had published several pamphlets on phases of protection against radioactive substances. They are as follows, and may be obtained at the prices indicated from the Government Printing Office, Washington 25, D. C.

Control and Removal of Radioactive Contamination in Laboratories, National Bureau of Standards Handbook 48, iv, 24 pages, 15 cents.

This handbook gives detailed information on laboratory procedures designed to minimize the possibility of any accident involving radioactivity and to minimize the effects if such accidents do occur.

Recommendations for Waste Disposal of Phosphorus-32 and Iodine-131 for Medical Users, National Bureau of Standards Handbook 49, iv, 11 pages, 10 cents.

This handbook deals primarily with the problem of the disposal of wastes of radioactive phosphorus and radioactive iodine from hospitals located in metropolitan areas.

X-ray Protection Design, by Harold O. Wyckoff and Lauriston S. Taylor, National Bureau of Standards Handbook 50, 36 pages, 7 figures, 18 tables, 15 cents.

This handbook contains primary factual data and basic principles necessary for designing shielded X-ray installations. It is based on the recommendations of the National Committee on Radiation Protection. Architects and designers of buildings and rooms in which X-rays will be used for fluoroscopy, radiography, or therapy can derive much helpful information from the handbook's discussion of these recommendations and from its sample design problems and methods of computing barriers for real installations.

Radiological Monitoring Methods and Instruments, National Bureau of Standards Handbook 51, iv, 33 pages, 6 figures, 15 cents.

Users of radioactive materials and other sources of radiation must take adequate measures to avoid overexposure. Any effective radiation protection program may require a variety of types of measuring instruments; and trained personnel must be available to insure the use of suitable instruments in the proper way, to interpret the readings obtained, and to make necessary recommendations for reducing hazards. Representing the best current knowledge of the subject, this report establishes some basic guides for methods of determining radiation hazards and of selecting suitable instruments for measuring them.

AVAILABLE PUBLICATIONS

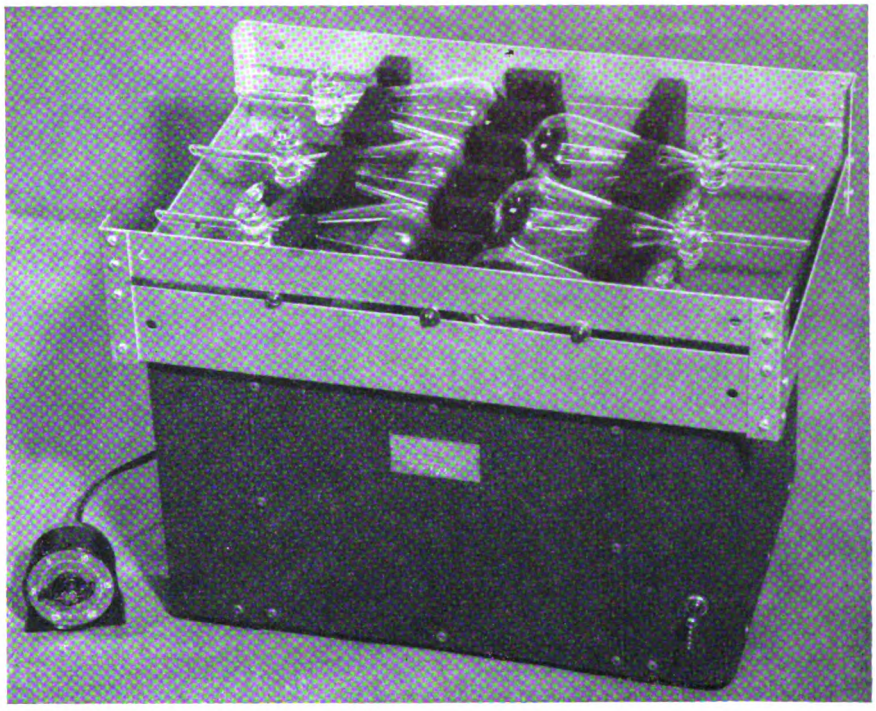
Measuring Your Public Relations is a guide to research problems, methods and findings. It is written by Herman D. Stein and published by the National Publicity Council, 257 Fourth Avenue, New York 10, N. Y. The price is $1.25.

Eye Care is a handy pamphlet, easy to read, and practical in its advice. Prepared by J. H. Grove, M. D., it is distributed by Information Services Division, Department of National Health and Welfare, Ottawa, Ontario, Canada.

SHAKING MACHINE RACK FOR SEPARATORY FUNNELS

By B. E. Saltzman

Many of the commonly used procedures in the industrial hygiene laboratory require extractive operations. For example, one analytical procedure for lead requires as many as eight shaking operations for each sample. When numbers of samples are to be analyzed, machine shaking of the separatory funnels is practically mandatory. No commercially available device appears to be suitable for this purpose without the construction of a special rack to hold the funnels. After considerable experience with various shaking machines and racks which were constructed for them, the apparatus shown in the photograph was found to be very satisfactory for shaking six 125-ml Squibb separatory funnels.



The shaking machine is a two-speed Eberbach laboratory shaker with the utility box carrier. This machine has adequate capacity for most laboratory operations and because of its suction cup feet does not exhibit any objectionable creep along the laboratory bench. A 30-minute adjustable time switch was added to control the power.

The rack which was constructed for holding the funnels in the shaking machine was designed with the following objectives in mind: (a) Simplicity of construction, (b) ease of insertion and removal of the funnels, (c) allowance for the small variations in size between different funnels of the same capacity, and (d) provision for readily using the machine for other shaking purposes.

It was found that if the funnels were gripped at a point somewhat above the stopcock rather than at the stopcock the slight variations in size were minimized. A capacity of six funnels was chosen because the usual separatory funnel supports hold multiples of six.

The rack is made of three strips of wood. The two outside strips were constructed of 1 by 4-inch lumber by boring 1¼-inch holes, cutting 1-inch slots to the top edges and rounding off the top central corners of the holes. The central strip for the heads of the funnels is constructed from 2 by 4-inch lumber and has 1⅛-inch wide U-shaped slots each rounded at the entrance side to fit the contours of the upper portions of the funnels, so that the funnel enters deeply enough to have the top of the stopper protrude about ⅛ inch.

Spring clips were fastened to the opposite sides of the slots to apply pressure to the stoppers which seat in cup-shaped depressions in the clips. These clips were made of wood and are similar to half of ordinary clothes clips except that they are somewhat broader; however, spring metal clips would probably be just as satisfactory and easier to construct.

The three strips of the rack are fastened to the carrier at their ends by wood screws and washers through the slots of the carrier. The bottoms of the strips rest snugly on the bottom of the carrier, preventing rotation about the screw axis. By proper adjustment of the spacing of the three strips (and proper rounding of the top central corners on the holes of the outside strips) the funnels enter the rack freely, yet with a minimum of end-play, which is taken up by the spring clips.

The two top end plates and the sliding bar clamp of the utility box carrier were removed. If it is desired to use the shaking machine for other purposes, these parts may be replaced and the three strips slid to one side by loosening the wood screws.

Two coats of Carbo-Kote bakelite paint were applied to the wood to give a solvent and acid-alkali resistant finish. Operation of the rack has been very satisfactory.

Mr. Saltzman is an engineer with the Division of Occupational Health Field Headquarters, U. S. Public Health Service, 1014 Broadway, Cincinnati 2, Ohio.

Engineer Writes Booklet on Industrial Hygiene

Selling Industrial Hygiene is the title of a booklet recently printed by Walter H. Poppe, Jr. It contains articles and photographs on various plant investigations which illustrate the work of the Industrial Hygiene Division. Written informally, the booklet is designed to interest the general public in the available means for making the working environment more healthful. Single copies may be obtained for $1 each from the Industrial Hygiene Division, Wisconsin Board of Health, Madison, Wis.

INDUSTRIAL TOXICOLOGY

By Lawrence T. Fairhall, Ph. D.

MONOFLUOROACETIC ACID

MONOFLUOROACETIC acid, FCH_2COOH, a crystalline substance at room temperature, melts at 33° C. and boils at 165° C. It may be obtained by the hydrolysis of its methyl ester (b. p. 104° C.) which in turn is prepared from methyl iodo-acetate by heating with either silver fluoride or mercurous fluoride at 170° C. (*1*). The acid is to a certain extent combustible, burning with a greenish flame.

The C–F bond of fluoroacetic acid is very stable, and the fluoroacetates do not yield the fluoride ion by hydrolysis with water alone and even boiling with alkali splits off only a fraction of the fluoride portion of the molecule. As a consequence the determination of small amounts of fluoroacetate in biological material is fraught with difficulty.

Monofluoroacetic acid is the strongest acid of the monohalogenated acetic acids. It is also by far the most toxic of the group. The LD_{50} for mice following oral administration of the sodium salt is 17 milligrams per kilogram of body weight. For comparison, that of the corresponding salt of iodoacetic acid (the next most toxic of the group), and which incidentally has the lowest dissociation constant of the monohalogenated acetic acids, is 63 milligrams per kilogram of body weight. Furthermore, the rupture of the C–F linkage is difficult, and the fluoroacetates do not exert their toxic effects by the liberation of fluorides, but instead produce these effects apparently as molecular entities.

Although monofluoroacetic acid had first been synthesized more than forty years previously, it was not until the early years of World War II that this acid and its derivatives received any attention relating to their physiological properties. These unusual properties soon became evident in an investigation of the fluoroacetates and allied compounds which was carried out at Cambridge University in the early years of the war (*2*). It was shown that,

provided the correct groupings are present, many of these substances are highly toxic (by inhalation, ingestion, and to some extent by skin absorption) and may be described as convulsant poisons with a delayed action. The original conclusion that this toxic effect is entirely due to fluoroacetic acid, which is formed either by hydrolysis or by oxidation, is now considered to be not invariably true.

Chenoweth (*3*) has pointed out that the toxicity of compounds forming fluoroacetate *in vivo* is not due entirely to the formation of fluoroacetate. He states that γ-fluorobutyrate exerts a toxic action independently of any fluoroacetic acid which may be formed by the β-oxidation of γ-fluorobutyric acid. The mechanism of the toxic action of the two acids differs markedly.

Sodium fluoroacetate has been found to inhibit the spontaneous contraction of smooth muscle (*4*) and markedly inhibits the oxygen consumption of isolated rabbit intestinal smooth muscle in the presence of glucose (*5*). However, it apparently does not affect anaerobic glycolysis. Clarke and Riker (*6*) found that the fluoroacetate salts cause a progressive decrease in the contractility of the frog sartorius muscle.

The use of sodium fluoroacetate, also known as "1080," spread rapidly for a few years following its discovery as a powerful rodenticide. However, not all rats are equally susceptible to this poison. Kalmbach (*7*) found the LD_{50} dose for the wood rat to be 5 milligrams per kilogram of body weight, 5 mg/kg for wild Norway rats, 2.5 mg/kg for tame white rats and 0.1 mg/kg for wild black rats.

On the other hand, Dicke and Richter (*8*) found the median lethal dose of sodium fluoroacetate for wild Norway rats to be 0.22 mg/kg of body weight. These investigators compared the lethal dose of this salt with that of Antu and found the median lethal dose of the latter to be 6.9 mg/kg for wild Norway rats.

Hagan and his associates (*9*) found some evidence to indicate that the rat possesses the capacity for metabolizing sodium fluoroacetate. Distribution in the tissues is rather uniform throughout the animal poisoned with sodium fluoroacetate. It is of interest that Hutchens and his associates (*10*) found that when ethyl alcohol was subcutaneously injected in certain animals (mice, rabbits and guinea pigs, but not dogs), the mortality following the administration of sodium fluoroacetate was significantly lowered.

Scales (*11*) has made the interesting observation that 1080 when used as a rat poison was very deadly to dogs that ate rats poisoned by 1080. Fatalities occurred from eating rats eight to ten weeks after the rodents were poisoned with 1080.

Cases of poisoning among children have occurred as a result of accidental contact with sodium fluoroacetate. For instance, Gajdusek and Luther (*12*) report a case in which a two-year old child licked crystals from the stopper of a bottle of 1080 and became ill with symptoms closely paralleling those observed in animal experiments. The child recovered and was discharged as well on the eleventh day.

Partly because of its very toxic nature, but chiefly because it has been replaced by more suitable rodenticides, the use of sodium fluoroacetate has decreased considerably.

Analysis

While monofluoroacetic acid and its salts present certain analytical difficulties, some progress has been made in the direction of their determination. Eisenberg and Wilson (*13*) have found that the barium salt $Ba(CH_2FCOO)_2$ is convenient for crystallographic identification, while Hutchens and Kass (*14*) have developed a colorimetric microanalytical method. The latter is based upon the fact that soluble lanthanum salts react in the presence of acetates

Dr. Fairhall is with the Public Health Service, but at present is on leave at Yale University.

to form basic lanthanum acetate, which in the presence of iodine, adsorbs the latter with the formation of a blue color.

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Dollars and Cents Value of Industrial Hygiene in Industry

By Andrew Fletcher

SOME PEOPLE believe that the Navy is the Nation's first line of defense, but I believe that our country's first line of defense is the health of its citizens, especially that of the workers in industry. What good is a machine which is 90 percent efficient in the hands of a man who is only 50 percent efficient because of physical ailments.

In the mining operation of the St. Joseph Lead Co., we have over the past few years increased the output per underground man by approximately 50 percent. I can attribute 45 percent of the improvement to better equipment and 55 percent to improved morale. I know of no better way for improving labor-management relations, which is the underlying productive base, than by developing ways of improved working and living conditions.

The development of St. Joe's industrial hygiene program has been one of gradual adoption of new and better control measures through education of management and labor. At the outset of any program, suspicion arises from either or both of these groups, and only through a planned selling program is acceptance possible.

The industrial hygiene program in its infancy was nothing more than dust sampling. Then as problems arose and control measures had to be met, the program developed rapidly into the engineering phase. Within the last 2 years, problems arising in ventilation have been solved which have not only improved working conditions but have actually afforded direct operating savings.

At the outset of using diesel equipment underground, the workers were skeptical of the safety involved. They had read of carbon-monoxide poisonings and supposed that they could be subjected to the same experience. Personnel of the industrial hygiene department are always underground with the first day's operation of any new diesel equipment. Extensive tests are made and the results shown to the workers on the spot. The workers are informed on the different gases and their psychological effects.

The same has been true in our extensive water checking of today. Any contaminated source is labeled such for protection to the workers. The employees have come to respect the work in these two fields because education has accompanied the proper engineering to develop the workers to a higher level of understanding.

Rapid Turnover Is Costly

It is our primary feeling that most every man is proud of what he knows. He likes to relate to others why a water source is bad, why we are checking the air, or why drill holes should be collared wet in silicious areas. The time for hiding results is past; today all our results of gas, water, ventilation and dust are posted on the bulletin boards at the respective change rooms.

In 1918, our labor turnover was 250 percent per year. In other words, it was necessary to employ 250 men each year to keep 100 on the job. If we hadn't improved, to keep our present force of around 5,000 men, it would be theoretically necessary to hire 12,500 new men per year.

Assuming that it takes 20 days to break in a new man, and I do not know of any job in our operations that would not require at least 20 days, and assuming that the value received from a new employee would be about 20 percent at the beginning of the 20-day period and 80 percent at the end, his average productive capacity would be 50 percent.

Assuming an average pay of only $12, the direct cost of replacing one man would be $120 (50 percent×20 days×$12). Therefore, to maintain a working force of 5,000 employees, the labor turnover alone would have a direct cost of $1.5 million ($120×12,500 men).

I might add that this would be the minimum figure, as it would not include

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Excerpts from a speech given at the U. S. Navy Fourth Annual Industrial Health Conference, April 21, 1952, Cincinnati, Ohio.

Mr. Fletcher is president of St. Joseph Lead Co. and chairman, Board of Trustees, Industrial Hygiene Foundation.

the indirect cost, such as additional supervision, increased accident hazard, decreased efficiency among experienced employees, because of the necessity of giving attention to new employees.

If any such condition existed today, St. Joe would be out of the mining business. By 1926, St. Joe's labor turnover in its Southeast Missouri mining and smelting divisions had been reduced from the 1918 percentage of 250 to 40 percent, by 1949 to 12 percent, and last year it was about 8 percent.

The actual dollars and cents saving indicated by the above 30 years' experience was in part due to the following:

By asking employees why they were quitting, we learned of numerous reasons, such as unhealthy and dangerous conditions, wages too low, unfair treatment by foremen, poor schools, no facilities for recreation, and no churches of their faith.

Before taking definite steps to rectify these apparent justifiable complaints, we made a study of wages, hours, training, safety, health, and living, plus economic security. As a result, we have spent considerable money over the last 30 years, but it was not all for physical assets but rather for the physical well-being of the employees. For example, a physical pre-employment examination was instituted to avoid placing men on jobs for which they were physically unfit.

Just as important, current examinations are now being made, and if one shows that an employee should not continue in his present job, he is shifted to a new job, and is paid the going rate of the new job, even if it is lower than his former base. If no job is available, or if he cannot work in safety to himself and his fellow employees, he is pensioned. I do not know of any case where the employee has been discharged because of his physical condition after once being employed.

St. Joe was one of the first companies to have pension and group-life insurance plans, and I might add that it is one of the few whose plans have been currently brought up to date by reason of increases in the cost of living and are completely funded or carried by a recognized insurance company.

Good housekeeping is an extremely valuable asset, and I, for one, continually emphasize this phase of St. Joe's operations. A good environment is, in my opinion, just as important, if not more so, than a few cents an hour additional in wages.

At one time it was our opinion that it was useless to paint our change rooms and bring them up to a higher standard inasmuch as the workers would not keep them that way. If one were to take a trip today through some of our newer change rooms, he would readily see the fallacy in this statement. Habits of the workers have been changed; they have improved their personal hygiene, and I believe this improvement will carry over into the home.

Safety is considered as one of the component parts of industrial hygiene.

In the period from 1920 through 1926, the average cost of accidents for our lead-mining and smelting operations was approximately $2.47 per $100 of payroll and salary roll, and the safety department expense was about 17 cents. Even though compensation rates have increased from $20 per week to $30, and even though most people believe that mining is very hazardous, our cost last year was 68 cents, and our safety department expense, 55 cents.

In connection with occupational hazards, for a period of 2½ years we have been making tests for lead in urine and lead in air at our Herculaneum smelter. So interesting have been our findings in urine leads that possibly some day urine leads will completely supplant air leads as an index to the working environment.

Absenteeism Can Be Reduced

It is but a short step from labor turnover and safety to absenteeism. Again, let us think in terms of dollars and from the viewpoint of the money that an employee loses in lower earnings and the company in lower production. Just as in the old days when the belief prevailed that accidents were bound to happen, so today the general feeling seems to be that sickness must be accepted.

Our company, however, believes that sick absenteeism can be lessened as well as accidents away from the plant—also, that the saving in dollars may be just as great as that obtained through lessening labor turnover and improved safety.

If in a period of a year it is found in a plant that the total time lost by each employee is, say, 5 percent of the total shifts worked, and the production of the plant remains the same, even if 5 percent of the shifts are not worked, then it follows that there must be 5 percent extra men carried on the payroll to take the place of the men who are absent. With a force of, say, 5,000 men, and using a 5 percent absenteeism figure, it can then be assumed that there are 250 extra men employed (5 percent $\times$ 5,000).

It can be conservatively estimated that a man under present conditions is earning $3,000 per year; therefore, the extra men are costing $750,000 per year (250 $\times$ $3,000), but this is only the direct loss. The indirect expense in the case of sickness is probably even greater than in the case of accidents, as a man does not do a full day's work just before he is forced to lay off because of illness or after he has returned.

Also, many men who are sick with heart disease, tuberculosis, and similar chronic diseases, may work when they should be at home. It is, of course, appreciated that no matter what precautions are taken, there will be some sickness and miscellaneous absenteeism, but if the direct cost of absenteeism in a 5,000-man organization can be reduced, the saving will approximate $150,000 ($750,000 $\div$ 5) for each 1 percent reduction.

I offer the following suggestions for lessening absenteeism: First, obtain competent information, and, for comparative purposes, the form used by the Public Health Service is satisfactory, but the reporting should be on the absences of 1 day, and not on the basis of 8 days.

In collecting the data, employees should be told why the study is being made, and that the information will not affect their personal liberties—also, that when data definitely show certain conditions in a particular department to be unfavorable, a serious effort will be made to develop remedies. It should be realized that in any plant that is working more than 40 hours per week, absenteeism will be greater, especially the time taken off because of personal reasons.

I do not know if the Navy takes any active interest in a civilian employee's family, but if it doesn't, it should, because a man's home life has a very

great bearing on his mental and physical condition. A wife is certainly an indirect member of any organization, as it is her responsibility to provide satisfactory food and home life for the family.

Rehabilitation departments are profitable, as men can more quickly be put to work, even if not in their regular jobs. The St. Joseph Lead Co. has found that the dollar value of the output of its rehabilitation departments is definitely greater than the wages paid to injured employees or those recovering from sickness—and men would much rather work than receive compensation.

LETTERS from the READERS

Sir:

We had the workshop with industrial nurses and I am sending their definition of a nursing consultant in occupational health. This perhaps is a first step toward outlining her duties. We felt that the workshop was a success in showing the nurses some of the things they must agree on before they can present a clear picture of their duties and responsibilities.

Here is the definition:

A nursing consultant in occupational health is a professional registered nurse whose knowledge, experience, preparation, personality and performance qualify her to give guidance, leadership and service to those with occupational health interests related to nursing.

I am also including our current definition of occupational health:

Occupational health describes the services of a team utilizing the professional skills of medicine, engineering, nursing, chemistry, health education, and biostatistics applied through the concept and discipline of public health toward the objective of protecting, conserving and promoting the health and effectiveness of individuals at, and through, their places of employment.

You are welcome to use these tentative definitions in any way you wish. We'll be eager to receive comments on them.—**J. Wister Meigs, M. D., Assistant Professor of Occupational Medicine, Yale Univerity School of Medicine, New Haven 11, Conn.**

Solvent Vapors Burned in Stacks Saves Company Money

To eliminate an air pollution nuisance from solvent vapors, a Pennsylvania manufacturer installed catalysts in the stacks which vented the vapors from drying ovens. According to the plant manager, the catalytic burning of the vapors not only eliminated all solvent odors but also furnished enough heat to supply the ovens and part of the plant. Plant officials estimate the installation will pay for itself in six months because of reduced fuel costs and that they will be able to increase production more than 40 percent because of the available heat from the catalytic chambers.

The company produces enamel paint coatings on metal strip in a continuous process. These coatings are applied by dipping a loop of a continuously moving strip in a bath of enamel paint, thinned with the proper solvent, which has commercial xylol as its principal constituent. The wet strip is air-dried with forced hot air in enclosed ovens. The excess effluent from this drying process was originally vented through a stack into the atmosphere.

To eliminate or appreciably reduce the amount of solvent which was polluting the atmosphere around the plant and in the community, the plant manager had been experimenting for several months with different catalysts which would result in complete combustion of the vapors. He finally had batteries of the catalytic units, each one being a 5½-inch long assembly of specially coated porcelain rods, installed in each of the stacks venting vapors from the enamel solvents in four drying ovens.

The ovens were previously heated by gas at an average monthly cost of $3,000. After the catalysts were installed, the plant saved 90 percent of the gas costs. The complete catalyst was installed by the company's employees and cost $16,000, of which $13,000 was for the catalytic units.

Tests made by Pennsylvania's Bureau of Industrial Hygiene after the installation was made showed that no concentrations of solvent vapors could be detected either at the stacks or in various locations in the neighborhood.

Plant Tours for Physicians and Nurses Recommended in Wisconsin

For the past 10 years, Wisconsin physicians, nurses and other workers in health and safety have been making tours through various industrial plants to learn at first hand about the sources of occupational diseases and injuries. Attendance at these industrial health clinics indicates that they are very popular.

Sponsored by the State medical society, the State nurses' association and the Industrial Hygiene Division of the State Board of Health, the tours have been considered an important educational opportunity for physicians and nurses whose patients are industrial workers.

During the past year, three such clinics were held in Wisconsin. The one at the Miller Brewing Company in Milwaukee was attended by 392 persons. At Eau Claire, 150 went through the United States Rubber Company's plant; and at Kenosha, 148 persons toured the Nash-Kelvinator plant.

The meeting at the Nash automobile plant included a 2-hour tour that covered a variety of departments and gave opportunity to observe the health and safety hazards in each department as well as the protective devices furnished the employees.

In the punch-press department, gloves and aprons were provided for the workers who were exposed to cuts from pieces of sharp metal. To prevent crushed fingers and hands, double press controls, enclosed guards and pull guards had been installed.

In the drop-forge department, sulfur dioxide fumes were carried off through roof ventilators. Tinted safety glasses protected the workers from radiant heat; and face shields, spark shields, and aprons were worn as a protection against flying pieces of hot metal.

Workers in the foundry department also wore tinted eye glasses and face shields to prevent flash eye burns. Local exhaust ventilation carried off silica dust and carbon monoxide as well as smoke and aldehydes.

Similar measures had been taken throughout the plant and were explained to the group as it made the tour.

Studies Made in Phosphate Fertilizer Plant Indicate Need for Efficient Protection

A phosphate fertilizer plant in Wisconsin had had a breakdown in their hydrofluoric acid gas scrubbing system and was forced to operate for a time without an adequate means of removing this gas from the mixer discharge.

To ascertain the danger from this exposure, the Industrial Hygiene Division of the Wisconsin State Board of Health was called in and a careful study made.

Air samples taken in the workers' environment showed fluoride concentrations ranging from 1.73 to 44.5 parts hydrogen fluoride per million parts of air. The maximum allowable concentration for prolonged exposure to hydrogen fluoride is 1.0 part per million parts of air.

Extreme irritation of the upper respiratory system was experienced by the engineers collecting the air samples, yet the plant workers did not seem to suffer the same degree of irritation. Some of the men were supplied with gauze type respirators while others wore the chemical cartridge type. However, the cartridges were for organic vapors and not for acid gases and mists.

At a later date, spot urine specimens were obtained from the employees. The fluoride content of these specimens varied from 3.0 to 15.6 milligrams of fluoride per liter, the accepted safe level being 2.0 milligrams.

Recommendations covering physical examinations of the employees, the proper chemical cartridges for their respirators, exhaust ventilation and equipment maintenance were made to plant management. A new fume scrubber, ordered before the study was made, will be installed in the near future and it is expected that this unit will alleviate these conditions.

Applications for Grants in Cancer Research Invited

The Committee on Growth of the National Research Council, acting for the American Cancer Society, is accepting applications for grants in support of cancer research. Applications for new grants received before October 1 will be considered during the winter, and grants recommended at that time will become effective July 1, 1953.

The committee feels that a clear understanding of cancer must rest upon a deeper insight into the nature of the growth process, normal and malignant. Therefore, the scope of the research program is broad and includes, in addition to clinical investigations on cancer, fundamental studies in the fields of cellular physiology, morphogenesis, genetics, virology, biochemistry, metabolism, nutrition, cytochemistry, physics, radiobiology, chemotherapy, endocrinology and environmental cancer.

During the past year the American Cancer Society, on recommendation of the Committee on Growth, has awarded approximately 250 grants totaling about $1,700,000. A program of similar magnitude is contemplated for the coming year.

Application blanks and additional information may be obtained from the Executive Secretary, Committee on Growth, National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

TEXAS PLANT BUILDS WELL-EQUIPPED KITCHEN

INDUSTRIAL feeding centers that have trouble with malodorous garbage cans would applaud the waste-food set-up installed in the new cafeteria at the Carbide & Carbon Chemicals Co. in Texas City. There, the garbage is placed in steam-sterilized cans in a special refrigerator that keeps the waste sanitary. In addition, the cans are emptied twice a day.

But the garbage-disposal system at the Carbide cafeteria is just one of the features that makes this food plant one of the most modern in the Gulf Coast area.

Opened for business on March 21, 1951, the cafeteria seats 250 employees in the main dining room, 48 in a smaller dining room, and 50 in a special fountain and grill room. Two serving lines, in addition to the short-order bar, dispense food.

Scientific food preparation and storage is facilitated by the large designed-for-convenience kitchen. Through the installation of numerous drains, the tile floor can be hosed down quickly, making the sanitation job a simple one. Hard-surfaced tile walls also contribute to ease of cleaning.

The kitchen is air-cooled for the comfort of kitchen operators. The tile construction allows for easy cleaning, and fluorescent lighting provides plenty of glareless light. All work benches, sinks, cabinets, and cooking utensils are constructed of the most sanitary of metals—stainless steel.

Dishes are washed automatically. Trays of dirty dishes are fed into the machine, where they are washed, rinsed, and sterilized with live steam. Finally the dishes are air-dried.

Carbon Tetrachloride in Hospital Oxygen System Causes Trouble

Among the features incorporated in a veterans hospital recently built in Indianapolis was a piped oxygen distribution system. This system had approximately 150 outlets at various points throughout the hospital. When this installation was completed, the system was flushed with carbon tetrachloride to remove the grease from the pipe.

Following the flushing procedure with the solvent, 10,000 cubic feet of oxygen was blown through the system, yet the odor of carbon tetrachloride was still present. The system was then connected to a vacuum pump and air was pulled through for seven days, then filled with oxygen and used. But the patients still complained about an odor associated with the oxygen.

The Division of Industrial Hygiene of the Indiana State Board of Health was called in to evaluate the carbon tetrachloride level still present in the system. Values of 7.5 to 45 p. p. m. were found.

It was evident that somewhere the material was trapped and was being vaporized. Since the values obtained were of hygienic significance, it was suggested that the system should not be used until the difficulty had been corrected.—**Louis W. Spolyar, M. D., director, Division of Industrial Hygiene, Indiana State Board of Health, Indianapolis, Ind.**

Contamination of Drinking Water Results From Cross-Connections With Machining Operations

By G. M. Hama and H. Jaworski

A CALL was received by the Detroit Bureau of Industrial Hygiene from a tool and die company to investigate the cause of illness among their machinists. The complaint from the workers was gastrointestinal disturbances, resulting in nausea and vomiting. A careful check was made of all possible exposures, such as solvent exposure and carbon monoxide from furnaces. Results of all tests on airborne exposure were negative.

An investigation of the machining and grinding operations revealed that these processes required soluble cutting oils. An inspection of the cutting oil systems on the machines showed that the waste cutting oils were removed from the tanks in a unique manner.

Figure 1 indicates the hydraulic system for removing oils and supplying water to tanks for diluting the oils. The system depends on ejector E for the removal of the oils from the tank. Valve A is closed; valves B and C are opened. Water flows from the city line through valve B into ejector E, creating a suction through open valve C which sucks the cutting oil out of the tank. If a negative pressure occurs in the water main, due to shutting off the water supply and opening a faucet in the basement or because of severe drain on the water supply from fire-fighting equipment, backflow into the public water supply will result.

Although it cannot be definitely stated that contamination of the water supply caused the illness, yet the following facts indicate that contamination of the drinking water took place:

(1) Tests of the water at the drinking fountain showed an absence of chlorine residual.

(2) A pH of the water at this point showed it to be abnormally alkaline.

(3) After considerable flushing of the water supply by running water through faucets, a normal pH and chlorine residual were obtained.

The hydraulic system was found to violate the city plumbing code in two respects, as follows:

(1) It constitutes a direct connection between the city water system and the tanks containing cutting oils.

(2) It constitutes a permanent direct connection between the city water system and the sewer.

These violations were corrected without affecting the use of the ejector by the piping arrangement illustrated in figure 2. This involves the use of a backflow preventer (vacuum breaker) V between the ejector control valve and the ejector and another backflow preventer V between the refill control valve and the hose connection. A four-way valve D was installed to replace the tee between the hose connection, the ejector connection, and the refill connection.

The primary purpose of the four-way valve is to prevent the backflow breaker in the refill line from breaking the suction between ejector and hose. Check valve F is to reduce the possibility of back pressure against the backflow preventer if the hose is elevated above the level of the refill line backflow preventer.

Although there are other methods of correcting the faulty plumbing system, the above method involves very little expenditure of time and material, and affords ease of operation.

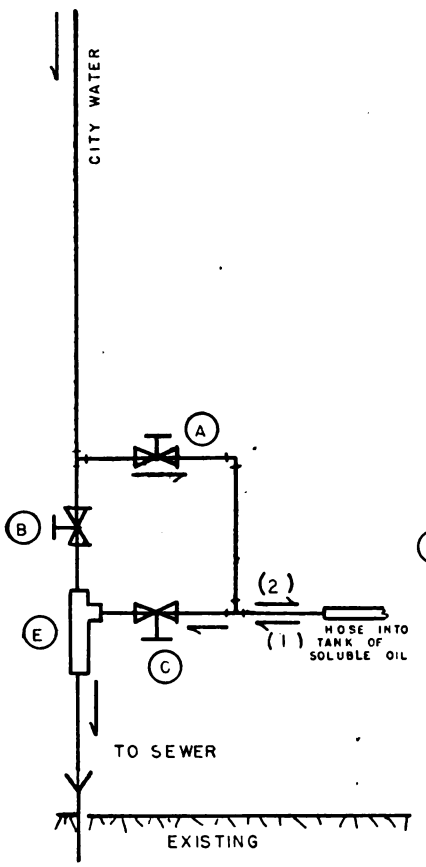

FIG. 1

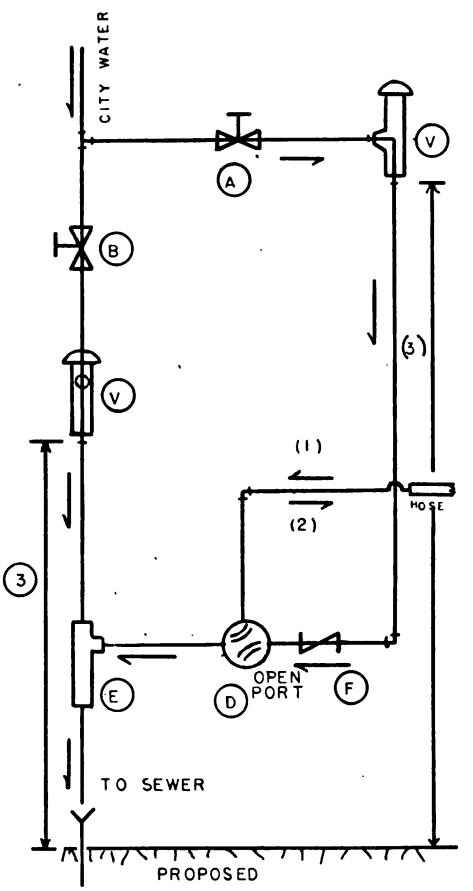

FIG. 2

Mr. Hama is an industrial hygiene engineer and Mr. Jaworski, an industrial hygienist with the Detroit Department of Health, 1151 Taylor Avenue, Detroit 2, Mich.

AVAILABLE REPRINT

Available upon request are reprints of the article entitled "Health Hazards of Electric Vaporizing Devices for Insecticides." It appeared in the *J. A. M. A.* for May 24, 1952, under the sponsorship of the Committee on Pesticides. The reprints may be obtained from the Committee on Pesticides, American Medical Association, 535 North Dearborn Street, Chicago 10, Ill.

CALIFORNIA

Radium Paint.—A study was made in a plant using radium paint on luminous dials. Three luminous dial paint booths, not properly exhausted, were located in the same room with other processes, thereby creating hazards for many employees. In addition, recommendations were made for the control of acid fumes and dust from brass polishing. This points up that while the Bureau personnel may be requested to make a study on one hazard, other conditions are found for which assistance can be offered to management before a hazard develops.

LOS ANGELES CITY

Eye Injury—A new employee had received an eye burn from the use of ultraviolet lights in a wholesale meat cooler walk-in box. This was the second time that an employee received eye burn injury from the use of ultraviolet light in this particular meat cooler. The regular employees within the plant were cautioned to turn off the ultraviolet lights whenever it was necessary to remain in the cooler for any appreciable length of time.

However, this latest injury occurred to an employee who was not regularly involved in duties connected with the walk-in box, and therefore he was not familiar with the hazards involved. It would be interesting to determine whether lesser degree burns are a common occurrence where ultraviolet lights are used in walk-in boxes. Ultraviolet lights in large walk-in meat coolers are commonly used for the control of mold in these coolers.

Carbon Monoxide.—Investigation of an occupational disease report revealed that an employee at the City Animal Regulation Department was overcome by carbon monoxide. The employee had opened the door to the carbon monoxide chamber to put in a struggling animal, and he was overcome by the gas. At the West Los Angeles shelter, dogs were destroyed in a chamber in which carbon monoxide was introduced. Apparently the method for airing the chamber was poor and all the gas was not evacuated before additional animals were placed inside the chamber.

The danger from carbon monoxide poisoning has been entirely eliminated since then. The Animal Regulation Department has installed small decompression high altitude chambers and dogs are now destroyed in 3 minutes by deprivation of oxygen. A partial vacuum is pulled on the chamber, and altitudes up to 55,000 feet are simulated. The dogs become unconscious at 32,000 feet.

Lighting.—A barber college was surveyed by this Division as a result of a complaint made by a student that there was insufficient light for hair cutting.

Even though light readings were taken on a bright sunny day, many areas were found far below the recommended requirements for good seeing ability for this type of work. Since this school was conducting night courses, the readings in the evening would be even lower than those taken during daylight hours.

Three recommendations were made to correct these conditions: (1) To paint the walls with a light-colored paint, (2) to clean the skylight glass, and (3) to provide and maintain sufficient lighting fixtures to obtain adequate light intensities for work areas and lecture classes.

Investigation of this complaint revealed the fact that no agency has specific regulations governing conditions in establishments of this type. The State Board of Cosmetology, although its regulations govern certain conditions within such establishments, has nothing specific on lighting. Our own inspection service of such establishments is primarily for proper sterilization of combs and brushes. It would appear that other hazards of an occupational nature, may be found within similar establishments. These should be considered in reviewing any existing regulation for health control in barber colleges and similar type establishments.

LOS ANGELES COUNTY

Medical Abstracts.—For the past 3 years the director of the division of industrial hygiene has prepared medical abstracts of current and technical literature every 2 or 3 months as a service to physicians in the area. The second issue for 1952, which is the fourteenth in the series, has been put into the mails recently.

MASSACHUSETTS

International Visitors.—Sister F. Elizabeth R. Jewitt, who received a scholarship awarded by the British Commonwealth and Empire War Memorial Fund for Nurses, was a guest of the division for several days. Plant tours and visits to educational institutions were arranged for her at the request of the American Nurses Association.

Another visitor interested in observing industrial health and welfare activities was Dr. Aaron Devasagayam from Madras, India. He was taken on trips to a fish-processing plant and a storage-battery manufacturing plant.

Exhibit.—The AFL held its annual Union Industries Show in Boston from May 17 through May 24, at Mechanics Hall. A section of this huge exhibition hall was allotted to the Department of Labor and Industries, and a U-shaped table was set up to show examples of the wide range of Division activities in occupational health. The Division staff demonstrated a variety of laboratory instruments. Division members were present at the booth from noon to 11 p. m. to explain the duties of the Division and give visitors the opportunity to ask questions. About 12,000 persons visited during the eight-day period, and approximately 5,000 pieces of literature were distributed from the Division booth.

DETROIT, MICHIGAN

Personnel—Dr. William G. Frederick, director of the Bureau of Industrial

Hygiene of the Detroit Department of Health, spent June, July, and August in West Germany. Dr. Fredrick was sent there by the U. S. Department of State as special consultant to leaders of German industry, governmental agencies and labor groups on matters of health, hygiene and safety in industry.

PENNSYLVANIA

X-ray Shoe-Fitting Survey—Of a total of 31 fluoroscopic shoe-fitting devices inspected in Philadelphia shoe stores, relatively few showed stray radiation in excess of the amount deemed safe by health authorities. Approximately 350 persons have been operating these machines or working in areas near them and the purpose of the survey was to determine the extent of their exposure. Since protection of the public is the responsibility of the store employees, an educational program was recommended to safeguard both employees and customers.

New Publications—*Dusts* and *Noxious Gases* are the titles of two new publications issued in a series of booklets describing occupational health hazards. These are available from Dr. Joseph Shilen, Director, Bureau of Industrial Hygiene, State Department of Health, 432 South Office Building, Harrisburg, Pa.

Two new publications recently released are entitled *Know Your Bureau of Industrial Hygiene* and *Pneumoconioses*. The latter is a revised edition covering the etiology, pathogenesis, diagnosis and laboratory findings of silicosis, asbestosis, and other pneumoconioses.

TEXAS

Personnel.—Walter A. Quebedeoux, Ph. D., has rejoined the Texas industrial hygiene staff, which he left in January 1944 to accept a reserve commission in the USPHS.

QUESTIONS AND ANSWERS

Are Chrome Platers Exposed to a Toxic Substance?

THE principal toxic agent to which chrome platers are exposed is chromic acid which is evolved from the plating tanks in the form of a fine mist or spray. If the concentration of the chromic acid is low, any effect, if it occurs at all, is usually confined to the skin where a contact type of dermatitis appears particularly in individuals who have developed a hypersensitivity to chromic acid. If, however, skin is exposed to higher concentrations of mist or if some of the liquid splashes on the skin, lesions develop which are known as "chrome holes." These ulcers (*1*) occur especially at the roots of the nails, the skin between the fingers, knuckle creases, and the hairy parts of the hands and forearms and occasionally even on the feet in cases where the acid has splashed on the shoes. They began as painless elevations of pin-head size that slowly enlarge to punched out holes that are usually not inflamed. They are not painful, except when present at joints, and they heal at cessation of exposure within a few weeks, leaving a permanent scar, but if exposure continues they are quite difficult to clear up, sometimes requiring several months of intensive treatment.

Other effects of chromic acid concern the mucous membranes of the mouth and nose. In these locations have been described ulcers of a similar nature to those found on the skin. In addition, however, a characteristic lesion is found in the anterior cartilaginous portion of the nasal septum which consists of ulceration and inflammation of the nasal mucosa and results in many instances, particularly in those individuals encountering high concentrations of chromic acid mist, in complete erosion or perforation of the cartilaginous portion of the nasal septum. This is not attended with any nasal deformity or actual disability. It is not uncommon to find also that there is often rapid progression to septal perforation without antecedent nasal mucosa involvement and the converse is likewise true where concentrations of mist are at a lower level (*2*).

Chromic acid being a corrosive substance can, if inhaled in sufficient amounts, produce a tracheitis, bronchitis, or chemical pneumonia similar to that produced by other caustic agents. There have also been reports on possible kidney damage from chromic acid; that is, in a worker who accidentally got splashed in the face with chromic acid (*3*), but these reports are not numerous and require more confirmation before any definite conclusions can be made.

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MICHIGAN STAFF INSPECTS WATER SYSTEMS FOR METHANE

WHERE well water is being used as a coolant in air-conditioning systems in public and semipublic buildings, the Division of Industrial Health is asked to inspect the systems. The reason for this is that a rather extensive area of the State has underground water strata that also contain methane. To date, the samples obtained at the well or a nearby tap, have been composed of 100 percent methane. The recommendations usually made are as follows:

(1) The well casing should be capped so that it is impossible for gas to enter the well pit or room. Capping and venting by means of a 2-inch vent pipe to a point above the eaves of the building is recommended. This has been effective in preventing the release of gas into the well pit or room.

(2) The well pit or room should be provided with an effective method of venting so that no accidental leak can build up gas concentrations.

(3) The cooling coils and other points of possible leaks should be routinely inspected by the building custodian.

(4) Waste water should be piped to the roof of the building and released as a spray onto the roof. This has the twofold purpose of keeping methane-bearing water out of municipal sewers and increasing the use of the water in cooling down the building roof.

ACGIH Resolves to Aid in Labeling Dangerous Substances

RESOLUTION—Adopted by the American Conference of Governmental Industrial Hygienists at its annual meeting, April 22, 1952, Cincinnati, Ohio.

Whereas, the content, dangers and protective measures necessary for the handling of potentially dangerous substances is not limited by geographic areas; and

Whereas, the appropriate label on such substances can help to preserve and protect the public health; and

Whereas, the storage, transportation and use of these substances may need specific precautions for the protection of the public; and

Whereas, in the past the U. S. Public Health Service and the Manufacturing Chemists' Association have cooperated toward this end;

Now, therefore, be it resolved, that the American Conference of Governmental Industrial Hygienists approve the following principles:

(*1*) That adequate labels for warning and identification of harmful substances are necessary for the prevention and control of a public health problem,

(*2*) That requirements for adequate warning labels should be as uniform as possible, and

(*3*) That the American Conference of Governmental Industrial Hygienists work together with other official and non-official groups as well as with the Manufacturing Chemists' Association toward the development of an adequate uniform guide for the labeling of potentially harmful substances.

And be it further resolved, that the Executive Committee assign to the Chairman of one or more appropriate standing committees the responsibility for immediate action to implement these principles.

ACGIH Members Name Shilen Chairman-Elect

In a special election, Dr. Joseph Shilen was named chairman-elect of the American Conference of Governmental Industrial Hygienists. Dr. Shilen is director of the Pennsylvania Health Department's Bureau of Industrial Hygiene.

A special election was held because Mr. Fred R. Ingram who had been named chairman-elect had become ineligible to hold office as a result of a change to associate membership.

The next meeting of the organization will be held in Los Angeles, Calif., April 18 to April 25, 1953, with Mr. John C. Soet presiding. Other officers are Mr. J. E. Flanagan, Jr., Secretary-treasurer, and members of the Executive Committee, who are as follows: Dr. Shilen, Mr. Soet, Mr. Flanagan, Dr. L. M. Petrie, Mrs. Veronica Donnelly, Mr. Henry N. Doyle and Mrs. Pearl Walden.

Dates of Radiological Health Courses Announced by PHS

Dates have been set for the radiological health courses to be given this fall and winter at the Environmental Health Center at Cincinnati, Ohio. These courses are free of tuition and are offered to qualified applicants.

The course consists of three units of two weeks each, namely, Basic, Intermediate and Advanced. Basic courses are scheduled as follows: October 6–17, 1952; January 19–30, 1953; and April 20–May 1, 1953. Intermediate courses will be given as follows: October 20–31, 1952; February 2–13, 1953; and May 4–15, 1953. The advanced course is scheduled for February 16–24, 1953.

These courses are a part of the radiological health program which the Public Health Service is sponsoring. The primary objective is to assist health department employees and key personnel in other governmental or private organizations in achieving an understanding of the hazards and problems related to X-rays, radioelements, neutron fluxes, and particle accelerators.

Designed for professional people who are concerned with radiological health problems in their respective fields, these courses are open to qualified individuals. Further details and information can be obtained by writing the Chief, Radiological Health Training Section, Public Health Service, Environmental Health Center, 1014 Broadway, Cincinnati 2, Ohio.

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