The Industrial Hygiene newsletter

Dermatitis From the New Fabrics—page 5

AUGUST 1949

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Dr. Scheele Appoints Committee To Advise On Industrial Hygiene

A 10-member national advisory committee to the Public Health Service on all phases of industrial hygiene has been appointed and will hold its first meeting early in the fall. The committee members, all leaders in various fields of industrial hygiene, will bring together the viewpoints of management, labor, the health professions, and State health and labor departments.

In announcing formation of the group, Dr. W. Palmer Dearing, Acting Surgeon General of the Public Health Service, said, "This is a committee that has long been needed and one that will be of great value to the Public Health Service. Especially now, with the new importance of the field of air pollution in our industrial towns and cities and the increasing interest of labor unions in health and welfare plans, is the Division of Industrial Hygiene in need of broad policy guidance from national leaders in the field."

Members of the committee are: Andrew Fletcher, president of the St. Joseph Lead Co., New York, N. Y.; Vincent P. Ahearn, of the National Sand & Gravel Association, Washington, D. C.; Nelson H. Cruikshank, of the American Federation of Labor, Washington, D. C.; Harry Read, of the Congress of Industrial Organizations, Washington, D. C.; Theodore F. Hatch, research director of the Industrial Hygiene Foundation, Pittsburgh, Pa.; Dr. R. H. Hutcheson, Commissioner of Public Health for the State of Tennessee; Harold A. Vonachen, medical director of the Caterpillar Tractor Co., Peoria, Ill.; Dr. Leo Price, director of the Union Health Center of the International Ladies Garment Workers Union, New York, N. Y.; and Mrs. Margaret Lucal, of Willoughby, Ohio, of the American Association of Industrial Nurses. A tenth member, from one of the State labor departments, is yet to be appointed.

Parathion a Toxic Insecticide, Can Be Used With Precautions

The dangers of parathion, one of the new insecticidal chemicals, have been called to the attention of State and local officers and industrial hygiene officials by the Division of Industrial Hygiene of the Public Health Service.

The warning was sent out in a statement agreed on after a meeting attended by Industrial Hygiene Division officials, experts from the Department of Agriculture, and representatives of the manufacturers of parathion. Part of the statement follows:

"Parathion is one of the newer insecticides which has attracted much interest owing to its pronounced insecticidal properties. Parathion is the common name of the liquid known chemically as O,O-diethyl O-*p*-nitrophenyl thiophosphate. It has to be mixed with other materials to be used as an insecticide. When properly formulated and applied, it has been proved to provide one of the most effective insecticides known for the control of many agricultural and horticultural pests.

"Some of the newer organic insecticidal chemicals are highly toxic substances and parathion is no exception. Therefore, attention is called to the fact that thoughtless or careless handling of parathion liquid or formulations containing it may cause serious illness or death. Skin contact with the liquid or with impregnated dusts must not be permitted, and inhalation of the diluted dusts, mists, aerosols, or sprays containing it must be avoided. It can, however, be handled with safety *if and only if* all precautions are strictly observed. A leading chemical manufacturer of liquid parathion, by strictly adhering to the principles of industrial hygiene in the work-room areas, has produced over 2,000,000 pounds without employee illness.

"The potentiality of illness following exposure to organic insecticides must be fully realized, and care in handling should be exercised at all times by persons engaged in manufacture, dust impregnating, blending, dilution mixing, or in distributing or applying in the field.

"Any operators handling parathion or its formulations and developing symptoms of headache, shortness of breath, tightness of the chest, pinpoint pupils, giddiness, nausea, diarrhea, or related symptoms, should be seen by a physician immediately. It may be that the physician should be informed that pulmonary edema may develop in serious cases of poisoning even after 12 hours, and that this condition should be carefully watched for. At the first sign of pulmonary edema, the patient should be placed in an oxygen tent. Likewise, because the effect of parathion is stimulation of the parasympathetic system, atropin in large therapeutic doses should be administered, repeated as necessary, to the point of tolerance."

Vermont Legislature Establishes Division of Industrial Health

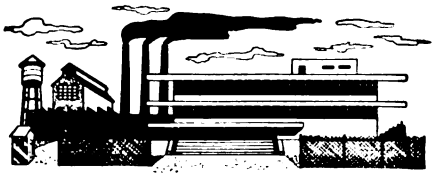
In the spring session of the Vermont Legislature, a measure was adopted that establishes by law the Division of Industrial Hygiene in the Health Department. An appropriation of $63,000 was allowed for operating during the next biennium.

Two engineers and a chemist are needed to carry out the expanded program. Grades and salary ranges for these positions are as follows:

Grade 5—Bachelor of Science with no experience	$2,400–$3,000
Grade 6—Master of Science with no experience	2,800– 3,480
Grade 7—Master of Science plus 2 years' pertinent experience	3,360– 3,480

Two years' general experience in the field of chemistry or professional engineering may be substituted for the Master of Science degree. The 2 years of pertinent experience listed for grade 7 must be in the field of industrial hygiene either as chemist or engineer.

Anyone who wants more information about these positions should write to Harry B. Ashe, Director, Division of Industrial Hygiene, Barre City Hospital, Barre, Vt.



ATTENTION, ENGINEERS

The American Public Health Association, in cooperation with the National Security Resources Board, is preparing a roster of sanitary and public health engineer citizens of the United States. Its uses will be manifold, but the immediate interest of the National Security Resources Board in such a roster is to provide a means by which trained sanitary and public health engineers can be assured of proper utilization of their professional training should another national emergency arise.

Any engineer who does not receive a copy of the questionnaire within the next 2 or 3 months should notify the Engineering Section Project, American Public Health Association, 1790 Broadway, New York, so that his name can be entered in the master file and a questionnaire sent to him. In this way his name can be included in the roster.

COVER PICTURE—A scene at the pulp and paper mill of the Houston Division of the Champion Paper & Fibre Co. Photograph by courtesy of the company and the Houston Chamber of Commerce.

PERSONNEL NEWS OF USPHS STAFF

Dr. Paul C. Campbell, Jr., has been certified as a specialist by the American Board of Dermatology and Syphilology.

Mr. Lucian E. Renes, engineer, has been assigned to the division of Public Health Engineering, Idaho Department of Public Health, to help build up the industrial hygiene program in that State.

Carbon Tet Causes Two Deaths in Industry

By A. P. Bell, Louisville & Jefferson County Board of Health, and
W. A. Mitchell, Kentucky State Department of Health

On November 15, 1948, a plant in Louisville, Ky., initiated an operation of removing paint from aluminum pans. The stripping process consisted of dipping the pans in a 55-gallon oil drum containing approximately 40 gallons of methyl-ethyl ketone for 10 to 12 minutes to remove the paint. They were then taken out of the drum, still wet with the solvent, and hand-swabbed with a rag containing methyl-ethyl ketone. The pans were then transferred to a rack in a degreasing tank containing trichlorethylene vapors. This tank was equipped with a centrifugal circulating pump and spray nozzle for assisting in the removal of any obstinate particles resisting vapor action. After removal of all grease and dirt particles the pans were removed and placed on a carriage for removal to other parts of the plant.

From November 15, 1948, until December 4, 1948, trichlorethylene was used in the degreasing tank. On December 4, 1948, 10 gallons of carbon tetrachloride were added to the degreasing tank in 2 batches of 5 gallons each. This substitute solvent was reportedly added in the absence of additional trichlorethylene supplies.

The operation was performed in a building having dimensions approximately 20 by 50 feet. The degreasing tank was one of several tanks on a platform 2½ feet above the floor and located in the south end of the room. There was a small 3- by 4-foot skylight in the center of the ceiling used for general ventilation. Entrance to the building was through two sliding doors, approximately 15 feet wide and 12 feet high, located at the northeastern end of the room.

The operation required a minimum of four men. Two employees worked at dipping barrels containing methyl-ethyl ketone, a third man worked at the degreasing tank, while the fourth man was required to stack the pans on the transfer rack for removal from this room. Records indicate there was a maximum of 6 persons in this room at any one time. Throughout the duration of this operation some 35 to 40 employees participated in this activity

A home-made degreasing tank.

for varying periods of time. Reportedly, the employees frequently rotated positions in the operations and rarely worked 2 consecutive days in the room.

Prior to the addition of the carbon tetrachloride on December 4, 1948, there was only one reported illness among the employees assigned to this operation. Available information concerning this one case was not conclusive as having any relation to the occupation. On December 6, 2 days after the addition of carbon tetrachloride, the first illness was reported. This patient died on December 16, 1948.

A second employee reported to the first aid station on the same date. This patient was sent home and remained away from employment for 4 days, reporting back to work on Monday, December 13, 1948.

A third employee reported to his foreman at 2 p. m., December 7, 1948, as being nauseated and was immediately sent home. This patient remained at home without medical attention for a period of 4 days, or until December 11, at which time his illness was reported to the company doctor by a member of his family. Subsequent to medical examination he was immediately hospitalized under the care of his private physician. This patient died on December 13, 1948, six days after first reporting illness.

On December 17, 1948, the company had physical examinations made of 25 employees who had been exposed to the solvents used in this operation. Under direct questioning these men recalled general discomfort and vague stomach disorders at various times during their employment on this operation, but no conclusions could be formed.

Protective devices supplied by the employer consisted of two modified sand-blast helmets supplied with outside air. One of these air-supplied helmets was used during some periods by the persons assigned to the degreasing operation, although testimony indicated the use of this helmet was not continuous. A portable 24-inch propeller blade fan was placed in the vicinity of one methyl-ethyl ketone tank and directed upward toward the small ventilating skylight located in the roof of the building. This fan was installed at the request of the employees.

SUMMARY

Investigations revealed the contributing factors to the hazardous conditions responsible for the death of two employees and illness of at least one additional employee to be:

(*1*) Insufficient number of protective devices and lack of enforcement of their use. Although the operation required a minimum of four men, air-supplied helmets were limited by the existence of only two air lines.

(*2*) Failure to provide proper local and general ventilation. Local ventilation was not supplied at the solvent tanks. The installation of a portable fan resulted in the general distribution throughout the room of all solvent vapors.

(3) The degreasing tank was not of proper design and was lacking in safeguards.

(*a*) The dimensions of the degreasing tank were larger than those generally recommended.

(*b*) The failure to supply a thermostat on the heating coils precluded the possibility of maintaining a balance between heat in-put and condensation capacity.

(*c*) The placing of the pans in the degreasing tank and their subsequent re-

(*Continued on page 13*)

DERMATITIS AMONG THE PUBLIC FROM NEW FABRICS, DYES, AND FINISHES*

By Louis Schwartz, M. D.
Medical Director (Retired) USPHS

Fabrics are among the most innocuous materials with which we come in contact. However, it is true that isolated cases of dermatitis are reported from time to time as resulting from sensitivity to various articles of wearing apparel. Occasionally, as in 1941, there are large outbreaks of dermatitis traceable to contact with wearing apparel. In that year the outbreak was due to the comparatively new synthetic resins used as finishes.

In that year a questionnaire sent out by the NRDA showed that there were 486 complaints of dermatitis from wearing apparel reported by 110 stores and that 133 other stores reported that they had such complaints but did not specify the number nor the year in which the complaints were made. For comparison there were 61 complaints against cosmetics in the same period from 110 stores and only 10 out of the 133 other stores reported complaints against cosmetics.

Fabrics can be placed into three large classes, according to derivation of the fibers. These are vegetable, animal, and synthetic.

Among the vegetable fibers, dermatitis has been reported from flax, hemp, sisal, and jute. These cases occur among workers preparing the fiber from the plants and are mostly due to mechanical irritation of the lint or dust.

Respiratory diseases, such as byssinosis from cotton, flax dresser's disease from flax, mill fever from hemp also occur among workers preparing or working with the raw fibers.

Among fibers derived from animal sources, cases of dermatitis have been reported from silk, wool, and camel's hair. Anthrax, a systemic bacterial disease, may be contracted from infected wool as well as from hides.

Glass is now spun into fibers and woven into fabrics. Cases of dermatitis have been reported from glass fabrics which were used for coat linings when rayon was scarce. The cases were caused by the mechanical irritation of the skin by the sharp fibers, but dermatitis may also occur from sensitivity to resin binders used to hold together the filaments that make up the fibers. The large majority of cases of dermatitis among the public from natural fabrics are due to the chemicals used to convert the fibers into the finished fabrics.

Synthetic fabrics

The principal synthetic fabrics are: regenerated cellulose, cellulose acetate, and nylon. Others of less importance are cellulose nitrate, Vinyon, and fibers made of polystyrene and casein.

No cases of dermatitis have been reported from unprocessed synthetic fibers, but workers engaged in making them into fabrics occasionally develop dermatitis from sensitivity to the finishing oils used in twisting and coning.

The principal causes of dermatitis from wearing apparel made of natural or synthetic fabrics, have been the dyes, mordants, and finishes.

Dyes

Some years ago it was the common impression among physicians that most of the dermatitis from wearing fabrics was caused by the so-called aniline dyes and that the aniline dyes were powerful skin irritants. When we consider the fact that nearly all of the people in the civilized world wear fabrics processed with synthetic dyes (which is a better name than aniline dyes) the percentage of people affected by them is almost infinitesimal.

When dermatitis is actually due to a dye in the fabrics, it is due to allergy or idiosyncrasy to the dye or to a faulty dyeing process. The dyes on fabrics are rarely if ever primary skin irritants.

When idiosyncrasy to the dyes is the actual cause of dermatitis, it is usually found that the dyes "bleed." Conditions on the skin may be partly responsible for bleeding. For instance some dyes will bleed in highly acid perspiration while others will do so in alkaline perspiration. Some dyes will bleed on an oily skin. Under certain conditions of heat as in ironing, some dyes may decompose into irritant intermediates.

Free mordants and oxidizing agents such as the alkaline bichromates, remaining on the fabric because they are used in excess and not properly washed off, may cause dermatitis.

Special dyes used for dyeing rayon and nylon may cause dermatitis. Some of the yellow, orange, and red azo dyes used on nylon hose have recently been reported as having caused dermatitis. Some of the cases of dermatitis shown to be sensitive to the dyes were also sensitive to *p*-phenylene diamine and it was concluded that the dyes of the nylon hose decomposed on standing to *p*-phenylene diamine, and there was, therefore, cross sensitivity between *p*-phenylene diamine and these dyes. The cases occurred in New York where furs are largely worn and in my opinion it is more likely that some of the patients were sensitive to the nylon dyes and also to *p*-phenylene diamine, rather than that the azo dyes decomposed to p. p. d., because if the dyes had decomposed to p. p. d., there would have been a marked change in the color of the stockings and such change in color was not noted.

A list of dyes which have caused dermatitis and systemic poisoning is given in *Occupational Diseases of the Skin.* (Schwartz, L., Tulipan, L., Peck, S. M., pp. 275–6, Philadelphia, Lea & Febiger, 1947.)

Fabric finishes

In most instances dermatitis from wearing of fabrics is caused by the

*Reprinted from *Chemical and Engineering News*, American Chemical Society, Vol. 27, p. 1358, May 9, 1949.

finishes rather than the dyes or the fabric itself.

Finishes are placed on fabrics to give them a better appearance, such as luster, better feel, or better wearing properties; to prevent runs and unraveling, to make fabrics noncreasing, to hold the crease, and to make them waterproof, mothproof, flameproof, moldproof, and insectproof. Some finishes stay more or less permanently in the fabric. Others are easily removed by the laundering, and only a small part may remain after many washings.

Starches and sulfonated castor oil were the first finishes used and were applied to enhance the appearance and the feel of the fabric and thus increase its selling appeal. Dermatitis has never been reported from starch, but Schwartz showed that an improperly neutralized sulfonated castor oil (alkalinity) was the cause of a dermatitis from socks.

More recently certain resins have been applied as finishes to make the fabric resistant to wrinkling or to hold its crease and, in the case of stockings, to prevent runs. These resins are usually applied in the dye bath and consist of modified natural or synthetic resins. An outbreak of dermatitis thought at first to be due to nylon hose was really due to a finish containing an ester gum. This finish was also used on cotton shorts and pajamas and caused dermatitis.

The new synthetic resin finishes have caused a number of cases of dermatitis. The resins are applied from solutions or emulsions which leave a thin film of the resin on the fabric after evaporation of the solvents. The heat of subsequent operations such as drying or boarding may cure the resin finish.

Completely cured resins do not as a rule cause dermatitis. When complete polymerization and stabilization do not occur, there may be enough free monomers or uncured resins remaining on the fabric to cause dermatitis in sensitive cases. I have recently had in my consultation practice a case of dermatitis involving the penis caused by the finish on a certain brand of rayon shorts.

Waterproof finishes

In some of the older methods of waterproofing fabrics the fabric was placed in the soap bath followed by alum or other aluminum salts in watery solution in order to deposit aluminum soap on the fabric, or an application of aluminum or lead soap from an organic solvent such as benzene was made. There are no recorded cases of dermatitis from waterproofing agents consisting of insoluble metallic soaps.

In still another method of waterproofing, the fabric after dyeing and drying is then passed through a solution of paraffin dissolved in a petroleum solvent and again dried over hot cylinders. When Japan wax was used instead of paraffin, dermatitis was seen from such coated fabrics because Japan and China wax are derived from a tree of the poison ivy family (*Rhus vernicifera*).

Flameproofing finishes

Cotton and silk are flameproofed by treating with chlorinated naphthalenes, ammonium sulfamate, boric acid and borate, diammonium phosphate, antimony chloride, or other substances. Although workers making these materials sometimes develop dermatitis and workers processing fabrics with chlorinated naphthalenes may develop chloracne, cases of dermatitis among the users of these fabrics have not been reported.

Delustering agents

Zinc sulfate, barium sulfate, aluminum sulfate, and titanium oxides are some of the chemicals used as delustering agents. No dermatitis has been reported from their use.

Mothproofing and lousicides

Silico fluorides (or fluosilicates) are most frequently used for mothproofing, although the chloronaphthalenes, naphthalenes (naphtha balls), chlorobenzene, chlorophenols, synthetic camphor, and others also are used. The solutions of silico fluorides (or fluosilicates) are usually sprayed on the fabrics. The silico fluorides may cause dermatitis. The chloronaphthalenes and camphor used in the form of flakes or balls are placed in the clothes or closets. Dermatitis has not been reported from fabrics exposed to camphor and naphtha balls.

Since the outbreak of World War II, it has been found desirable for sanitary reasons and as a protective measure against typhus to treat clothing of our armed forces with chemicals known to kill lice and other related insects. The most widely used and effective agent at present is DDT (dichlorodiphenyl trichloroethane). It can be used alone or in combination with other insecticides. Other insecticides such as pyrethrum, rotenone (the active principle of derris and cube), and synthetic insecticides may be used.

The synthetic insecticides are usually primary irritants in strong concentrations, and may also be sensitizers. The natural insecticides are sensitizers, but not primary irritants.

Antimildews

With the advent of the war it was found necessary to mildewproof many articles of clothing and equipment made of fabric and leather to prevent their deterioration in tropical climates. Tenting, hammocks, camouflage and mosquito netting, knapsacks, canvas covers of all types, interlinings of shoes, and many other articles have been treated with mildewproofing agents. They are so precipitated on the fabrics that they will be retained after many washings. While many chemicals are excellent fungicides, they cannot safely be incorporated into articles of clothing or equipment which are to be in close contact with the skin because they are primary skin irritants and sensitizers in the concentrations in which they satisfy antimildew performance specifications. Even if such irritant chemicals are incorporated into materials which are not to be in contact with the skin, such as sandbags and tenting, they have been the causes of dermatitis to some workers making those materials. This does not imply that such chemicals should not be used in fabrics which will not be worn next to the skin.

Diagnosis

Dermatitis from wearing apparel is not difficult to diagnose. The eruption begins at the place of contact with the offending material, usually 5 days or more after the garment has been worn. This is the period of incubation for the sensitivity to be established. The eruption may appear sooner if the person is already sensitive to the chemical in the wearing apparel which causes the dermatitis. The eruption is usually confined to the areas of the skin touched by the offending material. In exceptional cases, however, a generalized eruption may be present and sometimes systemic symptoms such as elevation of temperature, may accompany the dermatitis. Patch tests confirm the diagnosis.

The offending chemical on the fabric should be determined. In some instances it will be found to have been put on the fabric by some one other than the manufacturer; for instance a high boiling solvent remaining in the fabric from drycleaning, or an insecticide or an antimildew put on by the wearer.

Patch test

The patch test, properly carried out and interpreted, is the most practical method for demonstrating the actual cause of a contact dermatitis. It is now also being used by manufacturers to determine the possible skin-irritating or sensitizing properties of wearing apparel containing new chemicals before placing them on sale to the public.

The patch test consists in applying a small portion of the suspected substance to a site of normal skin of the patient. This is covered with innocuous impermeable material, which is then sealed to the skin by adhesive plaster. It is usually sufficient to leave the patch on for 24 hours, but sometimes when patching with low concentrations or with weak sensitizers it may be necessary to leave the patch on for 3 to 5 days, but not for more than 5 days, as the patient may by that time become sensitized to the patch itself. This is especially true of fabrics which contain no strong irritants and to which most people do not react. The reactions should be read not only on the removal of the patches but every day for at least 3 days thereafter. This is of special importance in testing fabrics. A later or delayed reaction indicates a lesser degree of sensitivity than an early reaction. It requires considerable experience to correctly interpret patch test reactions.

Prophetic patch test

The patch test for the purpose of foretelling whether a substance will or will not produce dermatitis may be called the "prophetic patch test." It was devised by the author to determine possible irritant qualities of new chemicals used in the manufacture of wearing apparel, cosmetics, or other articles coming in contact with the skin. The patch test is made on 200 or more individuals in the usual way. Since the chemicals or compounds to be tested are new ones, it is presumed that there has been no previous contact with them.

Two series of patch tests are carried out on the same individuals 10 to 14 days apart. The first series of tests would give reactions only with a primary irritant or on subjects who have been sensitized by previous contact with the chemical. The second series performed 10 to 14 days after the first series is completed, shows the number sensitized by the first series.

Experience has shown that even one positive reaction in the second series, which did not occur in the first series, may indicate that the test substance is a sensitizer which might lead to outbreaks of dermatitis if allowed to be used by large groups.

A control patch with a material long used by the public without causing dermatitis should always be used on all the subjects. There should be no more reactions from the substance tested than from the control substance.

If no reactions of sensitivity occur in the second series or there are no more reactions from the test substance than from the control substance, then the new fabric should be made into undergarments and several thousand should be distributed for trial wear in a community of 5,000 to 10,000 for several months. Any cases of dermatitis attributed to the undergarment should be carefully investigated.

Sometimes dermatitis attributed to a fabric may be caused by dry-cleaning chemicals, bleaches, strong washing powders, and detergents which may remain in the fabric from laundering. Certain after rinses used in laundering (mercuric compounds, cationics) to make the fabrics antiseptic may also cause sensitization dermatitis. In investigating cases of dermatitis attributed to the new fabric these facts must be considered.

If it is definitely established that the new garment is the cause of many cases of dermatitis, the new fabric or new chemical used in processing it should not be placed on the market.

The "prophetic" patch test followed by trial usage in a small community has proved its value in preventing dermatitis from wearing apparel and cosmetics and is now routinely used by many large manufacturers before placing their new products on the market.

Chemists are continually developing new chemicals which when applied to fabrics may add to their usefulness and appearance.

Before such chemicals are actually applied to fabrics and sold to the public, it is the duty of the manufacturer to employ recognized toxicologists and dermatologists to determine the chemicals' toxic and skin irritant possibilities, and only place them on sale if they are found to be harmless.

Workers Complain of Effects From Lights

An example of an unusual request received by the Texas State Department of Health, Industrial Hygiene Section, developed in Austin when two women complained that they believed poisonous gases were emanating from the basement of their office building.

Upon investigation of the premises, the basement proved to be free of carbon monoxide and hydrogen sulfide, yet the women insisted that they experienced a sweet taste in their mouths after a short time in the room, and that this sweet taste later turned to a brassy, metallic taste.

Study of their working room disclosed that it was illuminated by 4-foot industrial type fluorescent luminaires at a distance of about 8 feet from the floor and that their desks were placed before a large mirror. The two women submitted to dental examination which revealed bimetallic fillings in their teeth, and, with that clue, a theoretical explanation was reached.

The fluorescent lights hanging too closely to their desks produced such a ghastly appearance on their mirrored faces that it was concluded that their reaction produced a purely psychological trouble. Their fear and worry over their ghastly appearance resulted in a reduced pH of the saliva. This in turn accounted for the brassy, metallic taste they experienced, since this taste is common where bimetallic fillings are present and there is a low pH of saliva.

When the situation was explained to the two women they agreed to use an incandescent desk lamp until the fluorescent luminaires could be raised to at least a 10-foot level, and different tubes providing more red color could be installed. When this had been done, the symptoms disappeared entirely.

PREPLACEMENT PHYSICAL EXAMINATIONS IN INDUSTRY

By Leo Price, M. D., Director
Union Health Center
New York, N. Y.

Preplacement examinations in industry have aroused much discussion. Worker opposition to this practice stems from the period when "pre-employment examination" was the term used. At that time the primary function of the industrial medical departments of some big industries was to weed out applicants physically unfit for employment.

Over the years a great change for the better has taken place in industrial medical practice. Yet some of the criticism of the preplacement examination still exists so far as the interests of labor are concerned. Employers may set high health standards for employment, from which previously there was no appeal. Consequently, the examination barred the employment of handicapped workers, although the findings may have had no realistic relation to the job requirement. Industry found it easier to refuse employment than to alter job patterns to fit the individual needs of physically substandard workers.

Now there is an attempt by labor, through collective bargaining, to clarify the subject of health standards. Apparently in this way labor hopes to remove the primary contention that health examinations are used to discriminate against active union members, or to set unnecessarily high standards as requirements for a job.

Although abuses may have developed in the use of preplacement examinations, basically the purpose of this procedure is of great value. Good job placement must give consideration to the mental and physical capacity of the individual worker. Health standards are particularly essential in hazardous industries for the safety of personnel. The control of infectious or contagious disease is an industrial as well as a public health problem.

Big industry has recognized the value of preplacement examinations to secure the most physically fit workers and place them in the most advantageous positions. Smaller industries, which do not maintain medical service, are likely to employ less fit workers who have greater need for medical supervision.

Social legislation could be developed to make industrial medical programs more generally available. The impaired worker is in a far better position to maintain optimum health when he has free access to medical assistance. With medical supervision, cardiacs may be helped to avoid doing heavy physical work; workers with arrested tuberculosis may be assisted in finding employment which will avoid the dangers of reactivation. Handicapped workers, rejected from employment because they are unable to meet the health standards of hazardous industries, could be afforded an opportunity to produce effectively in other fields of effort. The preplacement examination becomes valuable to both management and labor as part of such an industrial medical program.

Life expectation has lengthened considerably over the last century and the working population of America is rapidly becoming an older group of people. Longer years inevitably bring physical impairments. Industrial medicine has much to contribute in helping older and impaired workers retain their productivity. Preplacement examinations could be an excellent tool for use in this important public service.

Detroit Recommends New Solvent Mixture Minus Carbon Tet

The use of carbon tetrachloride in cleaning electric motors without disassembling the unit is fairly common. Carbon tetrachloride has been preferred because of the low fire hazard and the quick evaporation properties of the solvent. If the operation is done without adequate ventilation, illness in the worker may result from the high toxicity of carbon tetrachloride. Other solvents have not been successfully substituted because it is difficult to find a solvent with low flammability, good grease-dissolving properties, and low toxicity. Also, many solvents tend to dissolve the electrical insulation in the motor.

The following suggested mixture appears to have good characteristics for motor cleaning; the fire hazard is moderate; and the toxicity appears to be considerably less than that of carbon tetrachloride. The composition of this mixture is as follows: *

25 percent methylene chloride.
70 percent Stoddard Solvent.
5 percent perchlorethylene.
(Percentages are all by volume.)

The mixture has been examined by the Underwriters' Laboratories, and the conclusions drawn from that report ***(Rept. MH–4278)*** are given here in order to define clearly its physical properties:

(1) The material was found to be neutral.

(2) There was no flash point as determined by the Tagliabue closed tester up to the boiling point of the original mixture, and there was no flash point after 10 percent of the mixture had been evaporated. After 20 percent of the mixture had been evaporated, the flash point was 55.6° C. and from that point through 50 percent evaporation, flash points ranging from 45 to 55.6° C. were obtained. No tests on flash points were run after more than 50 percent had been evaporated.

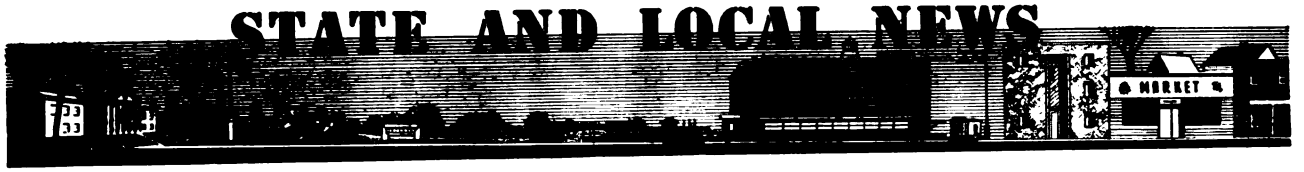
(3) Explosion box tests indicated that mixtures of this cold cleaner with air could be made to explode over a rather wide range of concentrations at temperatures as low as 43° C. for the richer mixture.

The product is stable in the following respects: It is not likely to change in composition or toxic qualities when tightly sealed in its container. The product, if allowed to evaporate in open container, will increase in flammability until approximately 40% of its volume

(Continued on page 11)

***Chlorine Products Bulletin S 6–748, Electro-chemicals Department, E. I. du Pont de Nemours Co., Inc., Wilmington 98, Del.**

STATE AND LOCAL NEWS



CLEVELAND, OHIO

Silicosis—Arrangements were made with the Tuberculosis Bureau of the Division of Health so that all occupational diseases found as a result of X-ray work would be sent to the Bureau of Industrial Hygiene. At the end of a year (1948), 86 cases of silicosis had been reported and 3 cases of stannosis. The Tuberculosis Bureau is carrying forward an intensified X-ray program during 1949. Through a cooperative study, it is hoped to locate a high percent of the silicosis cases existing in the Cleveland area. It may also be possible to correlate qualitatively the sources of silicosis cases.

GEORGIA

Conference—The entire professional staff of the Division of Industrial Hygiene attended the annual meeting of the Georgia Public Health Association. The Governor of Georgia, who addressed the convention, gave particular recognition to the industrial health program.

LOS ANGELES

Ultraviolet ray—A large commercial bakery had installed a series of ultraviolet lamps in the proofroom to keep down mold formation, especially on the walls. Several workers suffered eye irritation but did not associate the effect with exposure to the germicidal lamp radiation.

Subsequently, more severe eye irritation was developed by one of the painting crew who were refinishing the proofroom walls while the ultraviolet lamps were in operation.

At this stage the ultraviolet lamps were discarded, primarily because they had failed to reduce mold formation on the walls, and, only incidentally, because of the eye irritation suffered by exposed workers. Management claimed that the firm which had installed the germicidal lamps had failed to warn them of possible eye hazards. We found in the firm's promotional literature some obscure mention of potential harm to the eyes if not protected by tinted goggles. However, the warning was buried in an involved discussion of the virtues of their equipment.

The newly revised general safety orders issued by the California Division of Industrial Safety covers the eye hazard from ultraviolet radiation in article 54 of group 6, entitled "Actinic Radiation."

MASSACHUSETTS

Shoe X-ray—At the request of the Boston Better Business Bureau, the Massachusetts Division of Occupational Hygiene has been investigating the hazards arising from the use of X-ray fluoroscopic shoe-fitting machines, and as a result the department of labor and industries and of public health have issued a joint report covering the findings.

In the course of this survey, measurements were made on 15 machines in 11 retail shoe stores. Instantaneous scatter radiation due to leakage was determined by the Landsverk electrometer and the Victoreen survey meter, while the Landsverk dosimeter detected integrated dosage received by operators of the various machines.

As a result of this study, it was found that most machines leaked excessively, and this, together with the fact that the machines in many cases were not operated according to good safety practice, led to hazardous exposure to X-radiation both to the salesmen and the customers, many of whom are children and hence more vulnerable.

Conclusions reached may be summarized as follows:

(1) At the present time, the construction of most X-ray shoe-fitting machines and the methods of operating them are not satisfactory and do present a potential hazard to both the public and the employees.

(2) By reconstruction of old machines, proper precautionary measures and reasonable attention to safe practices, the potential hazard can be controlled.

[This is a resumé of an article written by Dr. Clarence C. Maloof, Mr. Harold Bayley and Mr. Richard I. Chamberlin.]

University—Dr. Harriet L. Hardy has done some field work with students in the industrial hygiene course at the Harvard School of Public Health, which included visits and tours through Massachusetts plants that formerly had unusual health hazards but minimized or completely eliminated them by means of medical control measures. Also, Mr. John B. Skinner, director of occupational hygiene, conducted a group of students studying bacteriology and public health at the University of Massachusetts through the Chapman Valve Co.'s iron and steel foundry in Indian Orchard. This latter experience demonstrated accepted methods of control of industrial health hazards in the foundry industry.

Speeches—Mrs. Sarah E. Almeida, R. N., has recently addressed a class at the Faulkner Hospital nursing school in Jamaica Plain. Dr. Clarence C. Maloof discussed radiation hazards from X-ray shoe-fitting machines before the Massachusetts Public Health Conference held at the University of Massachusetts.

PENNSYLVANIA

Cancer study—A study of environmental cancer in Pennsylvania industry is to be made by the Pennsylvania Department of Health, according to Norris W. Vaux, M. D., secretary of health. A grant-in-aid has been received from the National Cancer Institute to be used for this important work. An Environmental Cancer Section has been established in the Bureau of Industrial Hygiene and will function under Joseph Shilen, M. D., director of the bureau.

This project will include a statistical study and an environmental evaluation of all male cancer deaths which occurred in the general population of Pennsylvania during 1948, and a determination of the relative incidence of cancer in the various industries in the State.

James D. Purvis, M. D., has been named Chief of the Environmental Cancer Section and will supervise the work to be undertaken. Dr. Purvis is

(Continued on page 11)

Jobside Chats With Charlie

GET ENOUGH SLEEP

"What this country needs, Charlie, is an invention to make it easy to get out of bed in the morning—"

I'd just broken Jim into his job. I was a foreman then. He was a bright lad, fresh from the country and rarin' to go. His tales of nightly excursions to see the sights in town were lunchtime favorites. I thought he looked tired, but I didn't offer any free advice.

The next time I checked the boys' records, Jim's gave me a shock. His work was falling off—but fast. I didn't have to send for him.

"Look Charlie," he was saying 10 minutes later, "I'm not feeling so good. Can I take the afternoon off?"

"Ask the plant doctor. It's up to him."

The Doc asked Jim for symptoms and gave him a quick going over.

"Everything looks okay," he said. "What seems to be bothering you?"

"Jim is a newcomer in town," I said. "He's afraid he'll miss something if he isn't downtown every night."

"I was like that once, too," the Doc said. "Thought sleep was a waste of time." He smiled at Jim. "When did you get to bed last night?"

"Oh, around two."

"And the night before?"

"Tuesday? That's bowling night—I guess after midnight."

"So you average 5 or 6 hours a night. Right?"

"That's about right."

"How many hours of sleep did you get back home?" the Doc wanted to know.

"About eight . . . maybe nine sometimes. I used to hit the sack pretty early—wasn't much to do."

Doc looked serious. "That's the mistake too many young fellows make. They figure that sleep is all right only when there isn't something more exciting to do. Have you stopped to think that you need a certain amount of sleep—that maybe that's why your work is falling off?"

"Aw, Doc, I can take it. I'm just feeling a little bum now, but I'll get over it."

Jim needed to be told—and the Doc really gave it to him. "You'll get over it only when you get enough sleep," he said. "Most people need at least 8 hours of sleep—though a few can get away with 7. During normal activity, a substance which is poisonous to body tissue accumulates in the muscles. When you feel 'tired,' you are being warned that too much of this substance has accumulated. While you relax and sleep, the bloodstream slowly carries this substance away. If you don't heed the warning, you get overtired and you may have a harder time relaxing later. Short rests help you avoid over-fatigue. That's why you get two 10-minute breaks during the day. Take advantage of them. Eating something during the break may help, too."

Jim looked pretty sheepish after the lecture he got.

"I guess I was off on the wrong foot. I'd better get back to work," he said.

"Not today," the Doc said. "I'm not looking for any accidents caused by over-fatigue. Just remember what I said. Now go home and sleep on it."

ATTENTION, INDUSTRIAL EDITORS

This is the seventh in a series of articles about Charlie Craftsman, the man in your plant who knows the answers to his health problems. You are welcome to reproduce these articles and illustrations in your plant paper or magazine.

HELPFUL PUBLICATIONS ISSUED BY AAIN FOR INDUSTRIAL NURSES

The American Association of Industrial Nurses with the cooperation of the Division of Industrial Hygiene, Public Health Service, has published three pamphlets for industrial nurses.

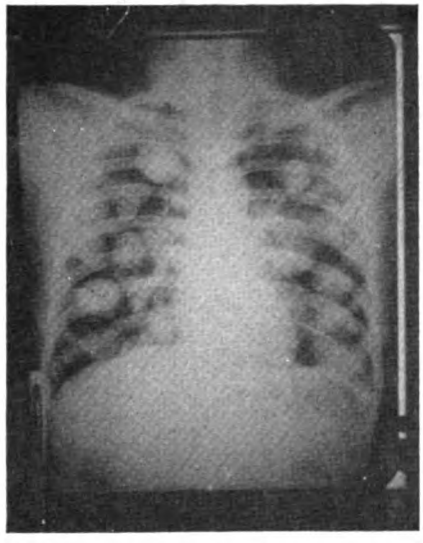
They are entitled *Criteria for Evaluation of Programs of Study in Industrial Nursing; Guide for Preparation of Recommended Personnel Practices and Policies for Industrial Nurses* and *The Industrial Nurse—Her Duties and Responsibilities.* Copies may be secured from the American Association of Industrial Nurses, 654 Madison Avenue, New York 22, N. Y.

Hydatid Cyst Found Among South American Miners and Herders

Mr. Marion F. Trice, director of industrial hygiene, Ministry of Public Health and Social Assistance, Lima, Peru, reports a little known occupational disease called hydatid cyst, which occurs among herd keepers as well as stock farmers and others closely associated with dogs. Mr. Trice reports that it is not unusual for a man to tend sheep part of the year and work in the mines part of the year, and as a result of a preemployment examination for mining, cases of hydatid diseases are discovered. This disease has been found also in miners making claims for compensation alleging silicosis.

Dr. Ramon D. Vallenas, consultant in occupational diseases for the Peru Department of Industrial Hygiene, describes the disease as follows:

"The echinococcus disease is caused by the larval stage of a cestode named *Echinococcus granulosus*.



"The cyst develops in man especially in the liver, but it can also be found in the lungs (as illustrated above), spleen, peritoneum, brain, bones, etc.

"The *Echinococcus granulosus* is a worm of 3 to 6 millimeters long that develops mainly in canines, especially in dogs, foxes, wolves, and jackels. The dog and other canines become infected upon eating the viscera of man or animals having the larva stage of the worm; this is, the hydatid cyst. Herbivores are the ones generally infected, such as cows, horses, lambs, goats, deer, pigs, etc. The excreta of an infected dog contains large quantities of echinococcus eggs, which may infect man by means of his own hands, food and water. The eggs, upon ingestion in the stomach, get rid of their cover, leaving the embryo free; this embryo then goes through the intestinal mucosa and is carried by means of the blood or lymphatic vessels, to a given organ where it remains and develops sometimes to almost the size of a grapefruit. It is supposed that some cases of pulmonary localization are due to direct infection through the respiratory system.

"There are countries in which hydatid diseases are considered as occupational illnesses."

STATE NEWS

(*Continued from page 9*)

a graduate of the Hahnemann Medical College and Hospital of Philadelphia.

Mrs. Elizabeth Robison has been appointed an investigator in the Environmental Cancer Section. Mrs. Robison is a graduate of Penn Hall School and has done extensive organizational work of a civic nature which includes 4½ years' experience with the Pennsylvania Division of the American Cancer Society.

TEXAS

Conference—The second annual Gulf Coast Industrial Health Conference will be held in Houston, October 6 and 7. The Department of Health, in cooperation with Baylor College of Medicine and several other agencies has planned an excellent program, which will be printed in the September issue of the NEWSLETTER.

WISCONSIN

Clinics—Industrial safety and health clinics were held at Kenosha, Wausau, and Green Bay with a record attendance at each place. At Kenosha, 75 delegates, representing industries in Kenosha, Racine, and the Milwaukee area, met for an all-day session to discuss problems with speakers on the program panels. These meetings have been so successful that other Wisconsin cities are planning them for next year.

NEW SOLVENT

(*Continued from page 8*)

has evaporated. The fire hazard of this material is judged to be in a class with that of kerosene, as determined by the Standard of Underwriters' Laboratories, Inc., for the Classification of Liquids, the rate of hazard being 30 to 40 as determined by the following schedule:

Ether class	100
Gasoline class	90–100
Alcohol (ethyl) class	60–70
Kerosene class (100 F Flash)	30–40
Paraffin oil class	10–20

The mixture appears to have three desirable properties—

(1) Mild toxicity.
(2) Low flammability.
(3) Rapid rate of evaporation.

It is a fast and effective solvent for oils and greases. Substantial amounts of this cleaning mixture have been used in full-scale electrical maintenance operation. Its performance has been closely observed, and the results indicate that it is entirely satisfactory for many such applications.

Although this material is less toxic than the carbon tetrachloride cleaning solvent, it should not be used indiscriminately without good general ventilation, preferably of the mechanical type. It is also suggested that precautions be taken to avoid cleaning articles with this material in small, unventilated rooms, garages, or basements. In addition to the toxicity of this material, the methylene chloride produces an odor sensation which will be slightly objectionable to the workers.

—George M. Hama, Bureau of Industrial Hygiene, Detroit Department of Health.

NURSE RECRUITMENT PAMPHLET AVAILABLE

An attractive, illustrated pamphlet entitled *The Nurse in the U. S. Public Health Service* has just been issued to interest young women in choosing nursing as a profession.

In terms of a career, the United States Public Health Service offers a high degree of permanence and opportunities for service in many fields. These advantages are clearly explained in descriptions of the nurse in the home and in the hospital.

Information concerning requirements for appointment, salaries, promotion, training, leave, medical care, and retirement is included.

Sample copies of the pamphlet are available from the Public Health Service, Federal Security Agency, Washington 25, D. C. Copies in quantity may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The price is 15 cents each.

INDUSTRIAL NURSES MEET IN LOS ANGELES

On May 7, 1949, in Los Angeles, the Western Association of Industrial Nurses, AAIN, again met jointly with the Western Association of Industrial Physicians and Surgeons. The program was interesting and informative, opening with an address by Dr. Jerome W. Shilling, president of the WAIP&S, on "Standing Orders for Nurses in Industry." Following the address, a panel discussion was presented on the State compensation laws, and their administration, procedures, and problems.

At noon, the industrial nurses held a luncheon at the Los Angeles Athletic Club, with 135 attending. Those present felt privileged in having the opportunity of meeting and hearing Miss Gladys Dundore, executive secretary, AAIN, who was the guest speaker. At the close of luncheon, tokens of appreciations were presented by the industrial nurses to Dr. Rutherford T. Johnstone and Dr. C. L. Lloyd for their constant interest in and support of industrial nursing.

Following the luncheon, the Western Association of Industrial Nurses attended a business meeting during which officers were elected. Miss Rose Workins, R. N., Pacific Press, Inc., Los Angeles, is the newly elected president.

One hundred and thirty-four industrial nurses attended the joint meeting, including one from Washington, two from Arizona, several from the northern part of California, and the balance from southern California. Most of the nurses from the southern California group also belong to the newly organized Southern California Industrial Nurses Club, branch of AAIN. From a small group which organized the club last December, the club has grown to one with 75 members to date, and has regular monthly meetings. A great deal of interest and enthusiasm is being shown and the club promises to be very successful.—**Marion S. Mayne, R. N., Industrial Nursing Consultant, Los Angeles.**

RECOMMENDED READING

Employee Benefit Plans Under Collective Bargaining. ***Bull. 946.*** U. S. Department of Labor, Bureau of Labor Statistics. (Reprinted with additional data from the January, May, and September 1948 issues of the *Monthly Labor Review.*) Government Printing Office, Washington, D. C., 1948. 29 pp. Price 20¢.

Greenburg, L.: Diagnosis and treatment of occupational metal poisoning. *J. A. M. A.*, **139:** 815–818. (March 26) 1949.

Schwartz, L., and Birmingham, D. J.: Skin cleansers for industry. *Safety Engineering*, **97:** 62, 64 (May) 1949.

Silson, J. E.: The significance of maximum allowable concentrations. *Monthly Review* (Division of Industrial Hygiene, N. Y. State Dept. of Labor), **28:** 5–8 (Feb.) 1949.

Spears, E. M.: Company Medical and Health Programs. *Studies in Personnel Policy No. 96.* National Industrial Conference Board, Inc., 247 Park Avenue, New York 17, N. Y., 1948. 72 pp. Price furnished by the Board on request.

Various authors: Tuberculosis in Industry. *Med. Ser. Bull. No. 9.* Industrial Hygiene Foundation, Pittsburgh, 1949. 27 pp.

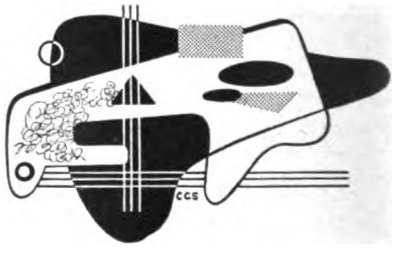
Anon.: Annual Report of the Chief Inspector of Factories for the year 1947. His Majesty's Stationery Office, London, 1949. 127 pp. Price 2s. 6d.

Dorn, H. F.: Forms that meet current needs. *Hospitals* **23:** 62–64, 66 (January) 1949. ("How a standardization committee simplified, in format and number, the clinical records for Federal hospitals.")

Hueper, W. C.: Environmental and Occupational Cancer. *Public Health Reports, Supplement 209.* U. S. Government Printing Office, Washington 25, D. C. vi+69 pp., 408 refs. Price 20 cents.

Kefauver, C. A., R. N.: Legality of industrial nursing. *Missouri Industrial Health Bulletin* (December) 1948.

Minton, J.: Occupational diseases of the lens and retina. *Brit. M. J.* **1:** 392–394 (March 5) 1949.



COMMITTEE COMPILES BIBLIOGRAPHY ON MEDICAL CARE

A list of 20 sources of information on medical care has been compiled by a subcommittee on medical care of the Committee on Administrative Practice, American Public Health Association.

Copies of this bibliography may be obtained by writing P. O. Box 5998, Bethesda, Md.

HERE'S HOW

To Zero the Davis Micro Gas Analyzer in a Contaminated Atmosphere

By Duane R. Stroud*

For those industrial hygienists who use the Davis micro gas analyzer for the determination of chlorinated hydrocarbons, the following information may be of interest.

This instrument, like many other direct-reading instruments, must be zeroed in an atmosphere uncontaminated by any of the gases or vapors for which it is sensitive. This makes testing time-consuming and inconvenient.

In order to be able to zero the Davis instrument in a contaminated atmosphere the following procedure may be followed: An M. S. A. all-service canister may be fitted with a one-hole rubber stopper with a short piece of glass tubing inserted. To this is fitted a short piece of rubber tubing of such size that the sampling line of the instrument may be inserted into it and removed as required.

The rubber tubing may be provided with a pinch-clamp to close it when not in use. The air intake of the canister is also closed with a piece of adhesive tape when not in use. In the field at the place where the testing is to be done, the Davis instrument is allowed to warm up for the required 30 minutes with or without the canister being attached. We do this without the canister in the line in order to prolong the life of the canister. Then the sampling line is inserted into the rubber tube of the canister and the instrument is zeroed. The line is then removed from the canister, and the instrument is ready for testing. After each test the canister is again attached, and the instrument is purged and zeroed again.

In our experience the resistance of the canister to the air flow is negligible. The canister will effectively remove all vapors of trichlorethylene, perchlorethylene, carbon tetrachloride, and ethylene dichloride. These are the only substances for which we have had occasion to test it.

The canister also may be used in a similar manner to zero the Davis vapotester, model-6, and the General Electric mercury vapor detector when they are being used in atmospheres containing interfering gases and vapors.

*Medical section, General Electric Co., Fort Wayne, Ind.

CARBON TET

(*Continued from page 4*)

moval was a hand operation necessitating close contact between the tank and the operator.

(*d*) The absence of mechanical means for raising and lowering the pans into the degreasing tank prevented the regulation of speed in the removal of the pans from the degreasing vapors.

(*e*) The free board above the condensation coils was insufficient to prevent the escape of vapors to the general atmosphere of the room at times due to the turbulence created by the forced spray and the plunging and removal of pans from the tank.

(*f*) The addition of carbon tetrachloride to the trichlorethylene, created vapors of a more volatile characteristic, thereby increasing the over-all inadequacy of tank design.

A review of the employment schedule and operational tasks showed that the two employees, who were fatally poisoned in this operation, were assigned to the degreasing tank during these periods when carbon tetrachloride was used as a part of the degreasing solvent.

Autopsy reports were characteristic of carbon tetrachloride poisoning; namely, uremic poisoning, enlarged liver, enlarged kidney, hemorrhage of the lungs, generalized edema, and necrosis of the liver.

At a coroner's inquest the following evidence was brought out:

(1) Several employees stated that they did not know of the dangerous properties of the solvent, nor had the company informed them of the characteristics of the solvents used.

(2) Most of the employees were told that the solvent had been changed, but did not know that it was dangerous to use.

(3) Additional respirators were supposed to have been available for them, but the men did not want them.

(4) The 24-inch "Airstream" fan was installed at the request of the employees.

As a result of the investigation the coroner's jury held that the men met their deaths as a result of carbon tetrachloride poisoning which was "due to improper supervision in the department, and failure of the men in the department to wear the safety equipment provided."

Where Health Education and Health Services Merge

By Tula Salpas, USPHS

The field of health education, especially as it applies to workers, is still in an amorphous stage of flux. There has been no definite crystallization of ideas and experiences into what constitutes a tested and proved—effective—health education program. I therefore can only attempt to give you some of the distilled thinking of leaders in this field.

What Is Health Education?

Perhaps one of the difficulties in arriving at a set pattern stems from the very nature of health education. It is the "act of making health information public by techniques which arouse, stimulate, and guide motivations for healthful living" (*1*). Or, to use a simpler definition, "Health education is something that happens inside to change actions in a certain direction."

One of the problems in health education is inherent in all types of learning. Learning is not a simple process, since it involves the complete man. It is not enough to teach the mind facts, the body skills, or the emotions attitudes. All three must function together. A learning situation cannot be entirely divorced from the emotional. If an appeal is made to the intellect alone, the worker will be prone to forget the facts imparted to him.

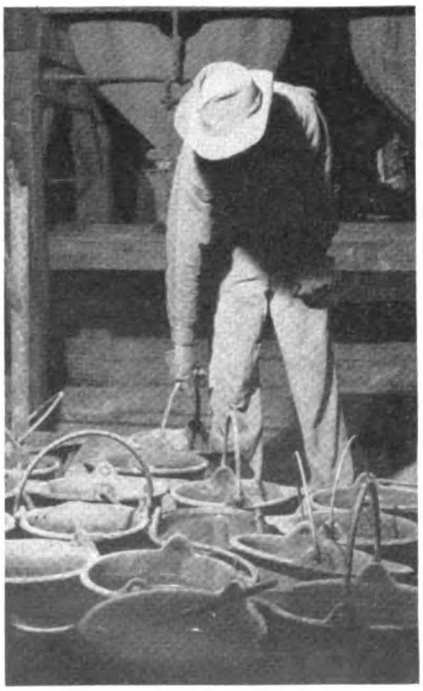
In teaching cleanliness as an aid in preventing dermatitis, for example, several emotional motivations are brought into play. First, there is fear of a dermatological condition that can get so out of hand as to cause distress and even disability. Second, cleanliness can be taught as a social asset. Since man is a social animal, he wants to acquit himself favorably in a society of his equals and peers.

Accident prevention may also use a combination of motivations in addition to the obvious one of fear. In several industrial plants in the United States, various types of safety clubs have been formed. A worker is eligible for membership only after he has demonstrated that he has avoided a serious accident through the use of safeguards. For example, an employee who presented a pair of safety goggles with a metallic chip imbedded in them would qualify. The wearing of the safety goggles obviously protected him from losing an eye.

The final test of health education is not how much information is distributed but how behavior is influenced.

Health education is all too often crammed down the recipient's throat without any attempt made to correlate it with his needs or desires. Frequently, too, it is presented without developing the right type of motivation first. In some cases people are governed by motivations that are absolutely hostile to modern health and medical service. These obviously must be changed.

In the future the development of constructive motivations will be more difficult because the leading causes of death will not be germ diseases. When these diseases were in their heyday, it was relatively easy to motivate an individual to seek protection from contagion. In the future, however, the chief causes of death will lie more in the individual and in his social environment. It will not be as easy to strike at these as it was to warn against spitting tuberculosis germs on the sidewalk. Furthermore, our measures of the success of health movements will no longer depend solely on mortality rates. Our ideal will be health in its fullest sense—something to be achieved not through alleviative or preventive medicine alone but also through constructive medicine—the upbuilding of health and not merely protection against specific diseases.



Worker health education efforts will be doomed to failure or will achieve only a small percentage of their maximum potential if the worker is made a recipient instead of a participant as well.

Although we distinguish between health education and health services, it is important to realize that both are essential components of an effective health program.

Pamphlets alone are not education; nor is an occasional lecture. There is need to supplement with action the written and spoken word (*2*).

It is at this point where health education and health services converge. One of the notable examples of the successful blending of health education and services is presented by the Union Health Center, serving 200,000 garment workers in New York. All techniques of health education were employed. Meetings were held with employees—individually and collectively. The distribution of pamphlets, posters, and other printed material supplemented these talks. Later these meetings grew to such proportions that public school halls were obtained for lectures on all phases of health. The lectures were illustrated, which helped greatly to secure the attention of the listeners.

Within the factories, health committees were organized to distribute literature and arrange for meetings. They convinced the apathetic and reduced indifference to a minimum. Radio talks were also added to complete the list of media used. The Union Health Center had its own press, in four languages, to reach its membership with the message of health education. This proved par-

ticularly effective because of the large foreign-born element in the garment industry. Dr. Leo Price, medical director of the union, attached even greater importance, however, to the fact that locals were invited to bring into the center large numbers of employees. There they were shown what a medical examination meant, what a chest X-ray survey would mean, what an eye conservation program would be. This procedure succeeded in breaking down deep-rooted customs, traditions, prejudices, and superstitions and in emphasizing the more elementary rules of health (*3*).

Dr. Price attributes the success of this program to the fact that the center's extensive health education program was coupled with medical services. "Experience has convinced center workers," he says, "that health education without provision for frequent physical check-ups remains well-intentioned but ineffectual. Health education needs the vitality that comes from close association with a medical care program. The Union Health Center recognized the fact that so long as insufficient income stands as a barrier between hundreds of thousands of people and adequate medical care, so long will health education fall short of its mission. Bad housing, poor clothing, and inadequate diet are detriments to health which must be dealt with (*3*).

Health education and health services go hand in hand. Singly, they cannot do an effective job. Together, they complement each other and form an invaluable adjunct in the over-all health program. Health education without opportunities for medical consultation is sterile. Likewise, medical services exist in a vacuum unless they are called to the attention of the people.

"Health education rests on the premise that a scientific fact does not exert a favorable influence until it has been disseminated to those who will make use of it" (*4*).

The fact, for example, that wet drilling decreases the formation of dust in drilling operations did not result in reduced incidence of silicosis until it became known to labor and management and was applied by them.

Health Education Approaches

In considering the various approaches to health education, we must bear in mind again that teaching health is more than imparting knowledge. "It frequently means battling against concealed traditions, superstitions, and prejudices in the ever-hopeful effort of changing for the better those attitudes and practices which make the difference between whole and partial health" (*4*).

Although it is a challenging and difficult job, the results are rewarding, for once a person has been properly educated, he will not only protect his own health and that of his dependents, but he will also seek to improve the health of his community.

In attempting to perform a fruitful health-education job, we must then divorce what we want the worker to learn from what *he* wants to learn. We must first pay attention to his own interests and then gradually weave into the instruction other lessons that we want him to learn. Failure to do this will negate all efforts, for the health interests of the individual are centered around his personal problems. He will be interested in heart disease only if he thinks he has it or if someone near to him is afflicted. The fact that heart disease is the leading cause of death or that it is statistically interesting will not move him. For this reason a diversity of approaches in health education is necessary because a health message will appeal to only a limited number of potential recipients (*5*).

Of approximately 10,000 routine letters of inquiry received in 1939 by *Hygiea*, a popular health periodical published by the American Medical Association, the greatest number was on food. The second subject most frequently mentioned was skin, while the other more common ones were hair, drugs, eyes, and sex. Cancer, which is the second biggest killer in the United States, came further down the line (*5*).

The wisdom of first answering problems which are close to the worker, even though they may seem irrelevant to those in charge of the program, was illustrated by former Surgeon General Thomas Parran of the United States Public Health Service in a discussion during the last war. His instructions were:

"Talk about the program with your group, and find out what difficulties are bothering them. It may be that the outstanding complaint, at the moment, is transportation, or waiting in line at the cafeteria, or a shortage of towels in the washrooms. They may seem a far cry from sickness and health. But it is an old popular health rule to tackle first a problem in which the whole community (or the whole employee group) is interested.

"I recall my experience as a young health officer during the World War. The small city to which I was assigned had no safe milk supply, and the infant mortality and typhoid fever rates were very high. I was eager to put milk pasteurization into effect, but found the community apathetic. On the other hand, the whole town was up in arms about the odors from a nearby slaughterhouse. Although the nuisance had no effect upon sickness and death rates, the people felt that their new health officer should do something about it. As it happened, something could be done; and when the nuisance was abated, the entire community was wholeheartedly with me in securing a safe milk supply.

"The same method of recruiting support for the health program will work in your department. If any practical solution to problems in which the men and women are deeply concerned can be brought about through the joint action of the medical service and the administrative staff, the health program will be greatly advanced through ready acceptance of other procedures not so well understood by the employees" (*6*).

"The psychological phenomenon known as the 'functional autonomy of motives' accounts for many of the things a person does that are of no particular value except that he likes to do them and for the things he persists in doing long after the original need for them has disappeared or been transferred" (*4*).

A young boy, for example, may wash himself only because he fears disciplinary measures. Later, however, when his social awareness prompts him to groom himself, he no longer has to be led by the ear to the bathroom (*4*).

"The process of transformance or substitution of interests or desires and of processes and goals is especially important. An individual is never motivated by just one desire or one goal at a time. He is constantly functioning on the basis of many often inconsistent and conflicting desires and goals at the same time." Smoking may be cited as an example. Many a young man has taken it up not because he enjoys it but because he

wants to prove his manliness and to be acceptable to his group (4).

In the industrial environment, there are many parallels. A worker who has injured his finger may be reluctant to visit the plant dispensary because he fears that his coworkers will consider him a sissy. Health education can change that attitude. A reverse situation can be created, whereby the worker finds himself propelled to the medical department by employee pressure to prevent a serious infection. When a whole group has been indoctrinated in the importance of certain health principles and precautions, a desire for group identification further motivates the individual member to do what is expected of him.

Participants in Program

The worker has too long been left out of the planning of health education programs. He has had foisted on him what the "experts" think is to his benefit. In this way some of his very real needs have not been met, and this exclusion has also made him suspect of the program.

By calling upon the employee as a planner and participant, you gain from a first-hand recital of his wants, and you win his confidence and active cooperation. He will then give the program new impetus and drive. If the worker is relegated to a passive role, however, the education program will remain static. There are various reasons for this need for direct participation. The first is self-explanatory, since the value of "audience participation" is well-known. Second, an employee health committee can establish better rapport with fellow workers than a management group. Third, labor today is becoming more vociferous in demanding this type of recognition. It wants neither paternalism nor someone else to do its thinking.

A program intended for the benefit of the worker can succeed only if his dignity as an individual is accorded due respect. This is an important point. Worker health education efforts will be doomed to failure or will achieve only a small percentage of their maximum potential if the worker is made a recipient instead of a participant as well.

This type of participation on the part of the employee can be assured through joint labor-management health and safety committees. These committees can form a network, bringing health information to every worker in the plant and helping to implement the medical department's program. In companies where medical facilities exist, the medical department is the most logical selection to assume the leadership in a program of worker health education. Such leadership and coordination of all educational activities in the plant are requisite to an effective program.

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DR. C. D. SELBY RETIRES FROM GM

Dr. C. D. Selby, medical consultant, General Motors Corp., retired July 1, and Dr. Max Burnell has taken his place. Dr. Earl Lutz continues as Dr. Burnell's associate.

Dr. Selby plans to do some special work in occupational medicine and hygiene at the University of Michigan School of Public Health in cooperation with Dr. Henry F. Vaughan, dean of the school.

Workers Fail To Wear Helmets; Examinations Reveal Lead Absorption

A large manufacturing concern in Los Angeles County concluded that the best of mechanical protection is of little avail unless the worker cooperates. The company is very occupational disease conscious, providing adequate mechanical protective devices, personal protective equipment, and periodic physical examinations. Despite these precautions a large percentage of the workmen in a lead-grinding operation were exhibiting lead absorption in the periodic blood lead examinations.

The work is carried out in a booth. The men are furnished with clean (United States Bureau of Mines Approved) air-supplied helmets at least once every 2 weeks. They are instructed as to the proper usage of the equipment and in personal hygiene. Extensive sampling of the process, equipment, and the workmen's breathing atmosphere inside of the helmets was carried out. It was found that the lead content of many of the samples was excessive. However, air samples with clean hoods and clean clothes were lead free. Apparently the dust on the inside of the helmets and on the work shirts was contaminating the supplied air. In addition, several improper work practices were noted, such as, removing the helmets while inside the booth, laying them on the floor or other contaminated places, and not hanging the hoods in the place provided.

The high degree of correlation shown between the concentration of lead breathed and the amount of dust on the work clothes and inside the helmets demonstrated that protective equipment must be used and used properly if it is to be of any value to the worker and his employer.

REPRINT OF ARTICLE ON LEAD PAINT AVAILABLE

Reprints of a paper "Health Hazards from Lead Paint and Zinc Chromate Paint" by E. W. Brown, M. D., are available from him at 535 North Dearborn Street, Chicago 10, Ill. Dr. Brown is assistant secretary for the Council on Industrial Health of the American Medical Association.

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