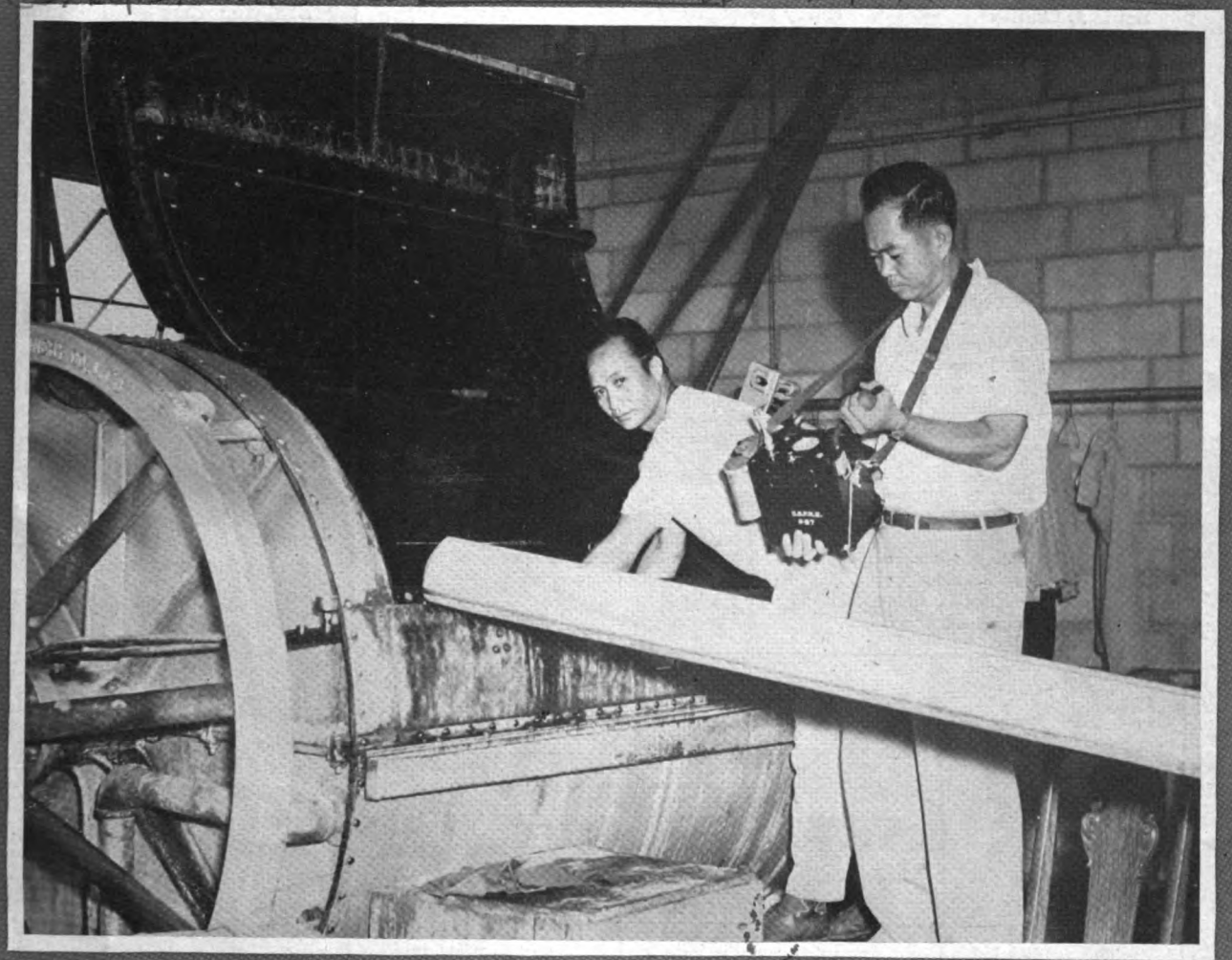
The Industrial Hygiene newsletter



INDUSTRIAL HEALTH IN HAWAII **JANUARY 1951**

FEDERAL SECURITY AGENCY Public Health Service

INDUSTRIAL HYGIENE NEWSLETTER

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FEATURES

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Local Health Staffs Urged to Encourage Industrial Programs

OPPORTUNITIES for local health officers to serve their industrial populations are numerous and rewarding, according to Dr. Herbert K. Abrams in an article in the October 1950 number of the *American Journal of Public Health.** Dr. Abrams as chief of the Bureau of Adult Health in California's Department of Public Health has made an intensive study of the ways and means to improve health services for industrial workers.

Believing that local health departments have certain responsibilities in the industrial area, Dr. Abrams explains how he tries to stimulate their interest. Among the many approaches are these:

(*1*) The Bureau of Adult Health sends reports on all industrial hygiene studies made to the local department in whose jurisdiction the plant is located.

(*2*) Wherever possible, personnel from the local department participate in the actual conduct of the study.

(*3*) All local departments receive periodic reports of occupational disease incidence according to location, industry, diagnosis and other categories. Several local departments which have potentialities of building their own program, or already have a partial program, receive and utilize individual case reports of occupational diseases.

(Continued on page 4)

*Reprints are available from Dr. Herbert K. Abrams, chief, bureau of adult health, California Department of Public Health, 2002 Acton Street, Berkeley 2, Calif.

COVER PICTURE—One of the 55 photographs used in the new booklet, "Industrial Hygiene in Hawaii." The caption for this photo reads: "Periodic tests are made to curb the more serious hazards which otherwise would result from solvents and their vapors. The vapor indicator shown here utilizes a delicate electrical circuit to provide readings as low as a few parts of solvent vapor in a million parts of air." Other photographs reproduced from the booklet appear on page 5, by courtesy of the Bureau of Industrial Hygiene, Hawaii Department of Health.

Civil Defense, Public Health and Industrial Hygiene

A Brief Report on the 1950 Convention of the American Public Health Association

By Walter J. Lear, M. D.[1]

ABOUT 4,000 specialists in public health and related fields met in St. Louis recently to consider the health problems of a Nation faced with increasing demands of both a military and civilian character.

The session on civil defense planning was the most popular both in terms of attendance and interest to all the professional groups at the convention. Dr. W. Palmer Dearing, Deputy Surgeon General, and Dr. J. O. Dean, Assistant Surgeon General, of the U. S. Public Health Service outlined the objectives of our country's efforts during this critical period, saying, "Our national policy is based today on the fundamental conclusion that war is not inevitable, and that the way to keep it from coming is a threefold program: First, to develop adequate military defenses; second, to inaugurate a program of civil defense; and third, to extend technical and economic assistance to the underprivileged peoples of the world so that they may withstand the false promises of communism. Since these programs must be maintained for an indeterminate time in the future, we must inevitably add a fourth, namely, the maintenance of a sufficient level of necessary services to our people so that they will have the strength and the heart to accomplish the tasks before them."

The basic principles of Federal civil defense planning, contained in the recently published booklet "United States Civil Defense," were summarized by Dr. Norvin C. Kiefer, Director of the Health Resources Office, National Security Resources Board. The health aspects are amplified in a civil defense health services manual which, he reported, will be available soon. Both he and Dr. Howard A. Rusk, Chairman of the Health Resources Advisory Committee to the National Security Resources Board, emphasized the necessity for health departments to give civil defense work top priority.

[1] Dr. Lear is a physician with the Division of Industrial Hygiene, Public Health Service.

With manpower conservation programs again coming into prominence, the stress placed on the total health and medical care needs of workers assumes new significance. Dr. C.-E. A. Winslow, editor, *American Journal of Public Health*, told the industrial health personnel that they must subscribe to this broad concept of industrial hygiene. He said, "Your stake in this field * * * goes beyond industrial toxicology, your horizon is not limited by enveloping clouds of fumes and dusts. Public health, as a whole, began with sanitation. Its vision has broadened with every passing year, and so must yours * * *. You [must] have the courage and determination to convince the health officer that the function of industrial hygiene is to promote in every possible way the advancement of the physical and emotional health of the worker in industry."

Drs. Dearing and Dean translated this into terms of civil defense activities: "One might say that the basic aim of [wartime] disease control is to maintain the maximum effective manpower physically fit for work and production at home—on the farm as well as in the factory * * *. This means, then, attention to the problems of adequate balanced nutrition to maintain health and prevent disease * * * availability of personal health services * * * minimizing the effects of disease and disability by rehabilitation, and bringing to bear of medical skill and judgment on the placement of the handicapped, including the older population, to the end that their productivity may be increased, both in amount and over a long period of time."

Several of these points were explored more fully in other sessions. For example, in a joint meeting of the Industrial Hygiene and Food and Nutrition sessions, the New Jersey State Department of Health presented the results of a survey on in-plant feeding programs in New Jersey. The speaker concluded: "It would appear that at this time of national emergency a special effort should be made by all industrial groups and departments of health to recognize the hazards of poor nutrition and the potentials of outbreaks of active food poisoning and infections [and to stop] the unconscious 'sabotage' now going on in our plants by keeping workers at the peak of health and working efficiency in so far as possible, through safe and nutritionally adequate meals."

Medical Programs

New developments in general medical programs for industrial workers were presented at a joint session at the Industrial Hygiene and Medical Care Sections. Different speakers reported on the rapid growth in coverage of industrial workers by Blue Cross and Blue Shield Plans, and commercial insurance and by the provision of these and other health insurance programs through collective bargaining agreements. Dr. E. Richard Weinerman, medical director, Permanente Health Plan, Oakland, Calif., and Dr. Herbert K. Abrams, chief, Bureau of Adult Health, California State Department of Public Health, described the opportunities for widening and coordinating preventive and curative health measures afforded by industrial medical care plans. In effectuating these developments, they stated that the "collective bargaining contract is a potential ally of public health."

With dramatic case presentations, Dr. Rusk and Dr. D. Elliott O'Reilly, chief, physical medicine and rehabilitation, St. Louis University School of Medicine, gave convincing evidence of the ability of modern rehabilitation services to convert a seriously crippled patient into a productive and socially effective individual. The panel discussion which followed brought out two important problems—bringing together the person with physical disabilities and the rehabilitation services and getting industry to employ rehabilitated workers. The hope was expressed that official industrial hygiene agencies, the bridge between industry and public health, would help in their solution.

Radiological Hazards

The control of radiological health hazards, a new task for industrial hygiene with important civil defense implications, was evaluated by Dr. Abel Wolman, professor of sanitary engineering, Johns Hopkins School of Hygiene, in the following clear-cut terms:

"The atomic energy program is now sufficiently widespread to result in exposing large numbers of individuals to beneficent as well as to malignant potential effects of radiation. Since the numbers so exposed are likely to increase rather than to decrease, the areas of operations have assumed a public health significance * * *. Whether for reasons of the mystery of the industry and its products, or of the secrecy which has hitherto surrounded many of its operations, or whether because the measurement of effects is still complex, it is difficult to say, but most of the official agencies have decided consciously or subconsciously to ignore the existence of the trade, its products and its wastes. It may be predicted that this ostrichlike attitude toward atomic energy will result either in the substitution of another official agency for the health departments in the regulatory features of this industry or in increasing difficulties to the public because of the failure to exercise any control * * *.

"A minimum requirement for State and local activity in this field would appear to be the development of at least a few key professionals in each department, familiar with and skilled in the atomic energy field. These individuals should gradually evolve both peacetime and wartime rules of action which would gradually encompass responsibility for the control of the hazards, potentially inherent in nuclear fission operations and in the use of their products. Even with such a modest beginning, official health agencies would recapture a responsibility which historically has always been theirs * * *."

Absenteeism Records

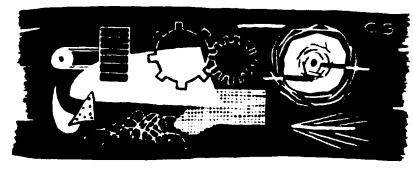
Another potential civil defense job for industrial health personnel was pointed out by Drs. Dearing and Dean. They considered the improvement of the present system of communicable disease reporting as of greatest importance to wartime disease control and in this connection said, "As a part of epidemic intelligence, local health officials undoubtedly should consider, at least on a sampling basis, records of absenteeism in selected places of employment, such as industrial or educational establishments. Significant illness would show up first in absenteeism from usual places of employment."

This problem also received further consideration by others. At a joint session of the Industrial Hygiene and Statistics Sections, a special resolution and several papers deplored the inadequacy of data on occupational morbidity and mortality. Proposals for meeting these needs were outlined by Miss Victoria Trasko, of the Division of Industrial Hygiene, U. S. Public Health Service and Dr. Ruth Puffer, director of the statistical service, Tennessee State Department of Health.

Health Examinations

One of the most interesting developments in the field of preventive medicine—the multiphasic health examination—was the subject of a special panel discussion. Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, warned that although "the concept of multiple screening has a brilliant future * * * the only valid approach at the present time is experimental." It was apparent from the reports of recent pilot demonstrations in various parts of the country that the official industrial hygiene agencies took an active part in carrying out some of these projects. In many cases groups of industrial workers were used for reaching large segments of the population.

The discrepancy between the already inadequate number of governmental industrial health personnel and the rapidly expanding responsibilities of official industrial hygiene programs was brought into sharp focus by Dr. Leonard Greenburg, executive director, Division of Industrial Health and Safety Standards, New York State Department of Labor, in his address as Chairman of the Industrial Hygiene Section.



LOCAL HEALTH STAFFS—

(Continued from page 2)

(4) The Bureau carries on systematic education of local department personnel in industrial health practice. For example, the sanitation consultant holds orientation courses with local sanitarians, including actual work in the factory. Formal training institutes are conducted for local sanitarians and sanitary engineers by the Bureau in collaboration with the University of California. Similarly, the industrial nursing consultant has developed institutes and collaborated with the university in planning courses for industrial and public health nurses.

(5) In one county, on invitation from the local health department, the bureau organized a county-wide survey of the industrial health needs of the community as a demonstration project. The team of surveyors included personnel from the local department, the State department of labor, the State health department and the U. S. Public Health Service. It was an exemplary instance of cooperation of various governmental agencies. The study helped to create wide public interest in an industrial health service and it is hoped thereby to enable the local health department to develop its own complete service. At this writing, this department has already been authorized to employ an industrial hygiene engineer and some services have been started.

Dr. Harriet L. Hardy Lectures in England

Dr. Harriet L. Hardy, consultant to the Massachusetts Division of Occupational Hygiene, gave a talk recently before the Royal Society of Medicine, in London, on the "Clinical Character and Distribution of Disease in American Industries Using Beryllium."

Dr. Hardy also lectured on "Medical Aspects of Radiation" at the National Institute of Public Health in Sweden, and at Leiden University in Holland. She also spoke at the London Hospital, at the Harewell Laboratories, which is the atomic energy project in England, and at the pneumoconiosis research center in Wales.

Hawaiian Story of Industrial Health Told Pictorially

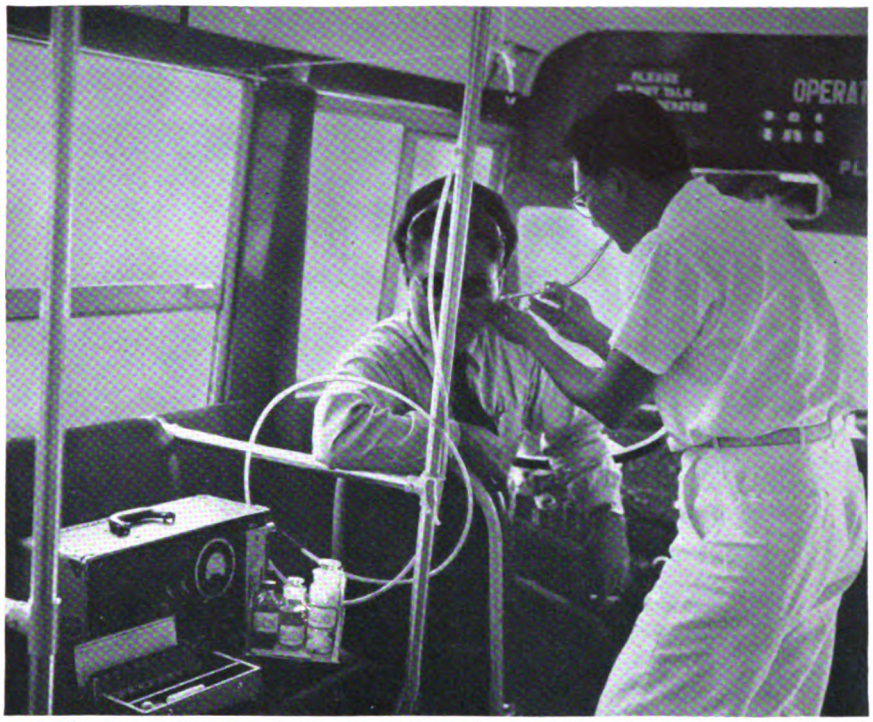
INDUSTRIAL plants can be made entirely safe places to work, according to the pictorial story told in a new publication entitled, "Industrial Hygiene in Hawaii." Assembled in a very attractive 32-page booklet, 55 photographs with descriptive captions give not only an account of industrial hygiene activities in Hawaii, but also a clear explanation of the varieties of occupational exposures and their controls.

The introduction tells briefly that "the Bureau of Industrial Hygiene of the Territorial Department of Health is responsible for the planning and administering of programs in the fields of occupational hygiene, fumigation control, air conditioning and ventilating control, atmospheric pollution control, and radiation monitoring."

With the opening picture, which shows F. A. Schramm studying a blueprint, is the explanation that it is simpler, cheaper, and more effective to prevent a hazard during the planning stage than to attempt correction at a later date.

Accompanying the next two photographs is the following comment on occupational dermatosis prevention: "The increased use or release at worksites of chemicals, heat, dusts, and infectious substances augments the already serious problem of skin hazards. Exposures presently existing here may cause eczema, inflammation, blebs, blisters, cancer, ulcers, pus infection, and structural injury. About 60 percent of the occupational illnesses which occur here are skin diseases."

Brief discussions of the general sub-



A blood sample taken from the ear tells how much carbon monoxide, if any, has been absorbed. The carbon monoxide in this case may come from the combustion products of the gasoline-driven bus itself or from other liquid-fueled motor vehicles on the road.

Tests of air velocities made at the worksite make sure that the engineering control of poisonous vapors is adequate. Where a localized exhaust system, as shown, is provided, each process needs a specific air velocity at the point of air entry.

Radioactive materials must be disposed of with extreme care. Disposal procedures which may affect the atmosphere, the soil, and the underground waters are investigated. Some isotopes are radioactive for thousands of years.

X-ray machines are being used in stores as shoe-fitting devices. The measuring devices used are an "r" condenser and an ion chamber. At the point where the feet are inserted is a 25-roentegen chamber. Few machines have adequate protection.

jects appear with each group of illustrations, that is, atmospheric dust, solvent and solvent vapor determination, gases at worksites, toxic metal problems, and other aspects of the industrial hygiene program.

The worksites and work operations in the pictures were selected to show the large variety of occupations in which Hawaiians are employed.

The Bureau of Industrial Hygiene was established in 1940 and is now manned by three nonmedical professional workers, Mr. F. A. Schramm, chief of the bureau, Mr. R. S. Nekomoto, and Mr. Sadamoto Iwashita.

University of Pittsburgh Plans Course for Nurses

A workshop on the topic, "Staff Education for Supervisors of Industrial Nursing Services," is planned for January 22 through February 2, 1951, by the University of Pittsburgh School of Nursing.

Enrollment will be limited to 24, and for those whose preparation and ability meet the educational standards of the University, two credits may be earned. The fee is $31.50 per individual, payable at the time of registration, January 22.

The following subjects will be discussed by selected members of the University faculty: Social Roles; Social Case Work Methods; Educational Psychology; Interpersonal Relationships; Integrating Services of the Health Team; Guidance and Counseling; Staff Education; and Supervision.

The next workshop for industrial nurses will be held May 21 through June 1, 1951. The subject for discussion will be "Special Health Problems in Industry."

LETTERS from the READERS

In this column, readers of the *Industrial Hygiene Newsletter* express their personal opinions. The appearance of a letter does not necessarily mean that the Division of Industrial Hygiene, PHS, endorses the view expressed.

Effect of Ultraviolet Rays on Eyes

Hedwig S. Kuhn, M. D., Secretary of the Joint Committee on Industrial Ophthalmology of the A. M. A., has taken issue with the statement in the October 1950 issue of the *Newsletter* to the effect that severe exposure to ultraviolet rays may result in serious eye damage and cause cataract formation.

Dr. Kuhn, who is the author of a new book on industrial ophthalmology, *Eyes in Industry*, had this to say:

"It is known that the ultraviolet rays do not penetrate to the lens of the eye, in any situations that a human would be subjected to. One of the basic principles on which industrial commissions' expert testimony by ophthalmologists has been based with reference to cases claiming intraocular damage from ultraviolet rays, is to deny this possibility. Research work indicates that very few (if any) rays penetrate even the cornea and those few do not get past the aqueous humor.

"I have been struggling before Industrial Commissions, as have all the other ophthalmologists that do industrial eye work, to counteract the false conception that ultraviolet produces cataract formation. It does not. Infrared heat rays do if the exposure is over many years of a certain degree of intensity, and a certain distance from the ray, but it has been proved again and again that ultraviolet does not produce any intraocular damage and rarely produces any permanent damage at all. It is only the most careless welder who exposes the external eye to repeated doses of ultraviolet that gets some clouding of the corneal tissue. This is doubly rare because such exposures are painful, and people that weld continuously do protect themselves. No onlooker, as described in this area, such as carpenter or painter, would have any type of effect other than an occasional flash."

(The statement with which Dr. Kuhn disagrees was contained in an article noting that the New Mexico Department of Health had issued a bulletin warning welders of the dangers of severe exposures to ultraviolet rays. The statements made in the New Mexico bulletin reflect a widely held impression, and the Publications Board of the *Newsletter* agrees with Dr. Kuhn that efforts should be made to correct it.)

Mechanical Gage

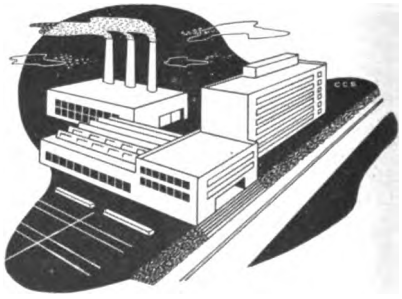
Why don't we start a column called "Who Makes It"? For instance, we use a mechanical gage that can be used the same as a water manometer and gives plus, minus, or differential readings. It is accurate, sensitive and sturdy, and not easily thrown out of adjustment. We have used four of the gages extensively during the last six months and have not had to make adjustments on any of them. Calibration is frequently made against a water manometer. The gage is a so-called magnehelic gage, manufactured by the F. W. Dwyer Manufacturing Co., Chicago, Ill., and may be obtained in any style range from 0 to 0.5 inch of water up to 0 to 24 inches of water.—**Harry B. Ashe, Director, Industrial Hygiene Division, Vermont Department of Health, Barre, Vt.**

Wisconsin Groups Plan Conference

The Wisconsin Council of Safety and Industrial Nurses Section of the Wisconsin State Nurses Association are collaborating on another joint conference scheduled for February 1-3, 1951, in Milwaukee.

This second joint meeting has been arranged as a result of the success of the 1950 conference. Both groups agreed that the joint effort provided an opportunity for increased understanding and teamwork.

Joint sessions will include topics covering problems of the older worker, the handling of cardiacs in industry, and a group dynamics procedure discussion. Separate sessions of specific interest will also be held for the two groups.



CULPRITS *in Industry*

Engineers Discover Cause of Eye Trouble

Occupational disease is sometimes a subtle enemy which infiltrates the ranks of the workers before either they or their employers are aware of its presence or its debilitating and death-dealing effects.

The function of industrial physicians and engineers is to detect and expose the enemy's presence. An invitation is extended to any industrial physician or engineer who has had an interesting experience in tracking down the cause of ill health on the job to submit his account to the managing editor for publication in this column.

IT IS often the unusual condition in the usual process of an industrial plant which presents a problem to those concerned with the health of industrial workers. Consider, for instance, the case of a plant in Pennsylvania where the management was at a loss to account for the great increase in the number of cases of conjunctivitis among its employees. All efforts to solve this problem, both from a community and a

plant angle, were negative. There was complete absence of any sign of infection and the use or presence of any contaminant. An ophthalmologist was summoned and he made an extensive examination, even inquiring into the possibilities of an outbreak of conjunctivitis in the area of the city adjacent to the plant. None was found.

Representatives of the Bureau of Industrial Hygiene, called to the plant by the management and the ophthalmologist, were able to discover the source of the trouble. An epidemiological survey indicated that the conjunctivitis appeared to be confined to those workers who operated compressed air apparatus. Compressed air was and had been used for many purposes in this establishment for some length of time and had seemed to produce no undue results or unhealthy conditions.

Both housekeeping and safety practices were excellent. The employees were clean, well dressed, and well trained in their work. Air was supplied by two large diesel compressors and one gas compressor located in a building separate from the main workroom. It was learned that these compressors had been enclosed recently and that up until this time everything seemed to be functioning smoothly. It was not long after this, however, that the epidemic of conjunctivitis appeared among the workers.

Upon examination of the diesel compressors and the room in which they were installed, it was found that the exhaust gases from the engines were being piped to the outside atmosphere through flexible tubing which extended to a point only slightly above the roof. The intakes for the compressors drew air from the small room in which the compressors themselves were located. Examination of the flexible tubing indicated that there were numerous leaks which allowed a goodly portion of these fumes to escape into the compressor room. In addition, some of the fumes which ultimately were exhausted above the roof found their way back into the room through air currents.

It was concluded by the Bureau representatives and the ophthalmologist that the components of the exhaust fumes from the diesel engines, which were being drawn in through the intakes located in the compressor room, were subsequently being reflected into the eyes of the workmen as they used the compressed air apparatus throughout the plant. After the installation of intakes which drew fresh air from the outside of the building, after repair of all leaks in the exhaust pipes, and after the height of the exhaust pipes had been increased to a point approximately twenty feet above the roof, the conjunctivitis epidemic subsided and no further difficulties have been experienced.

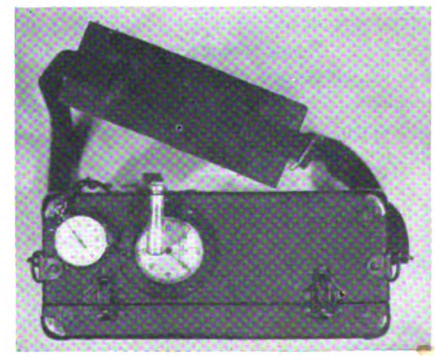
Truly, the apparently insignificant change in a routine process may result in harmful effects, as is evidenced by this example. Only by constant application of the principles of a sound industrial health program can the well-being of the worker be protected.

Wisconsin Engineers Suggest Accessories For Midget Impinger

When midget impinger apparatus is carried around and pumped all day, the strap has a habit of biting into the right shoulder. A broad piece of rubber, double-slitted at two places and slid onto the strap makes a world of difference.

As an aid in the timing of air samples, a stop watch is mounted on the top of the pump case in the right-hand corner. This simple sheet-brass mount is commonly found on time-study boards and can be screwed onto the case with ease.

Possibly some states are using this same idea; however, we believe that those of you who are not will find that these two features will greatly enhance a foundry study.—**Industrial Hygiene Division, Wisconsin State Board of Health, Madison, Wis.**



Studies of Health Hazards in Industry

By J. J. Bloomfield

SOLIDS PRODUCING PNEUMOCONIOSIS

[Continued from December 1950 issue]

Dust Concentration.—During the past few years, in the course of the numerous dust studies we have conducted, we have collected samples of dust suspended in industrial atmospheres. These dusts ranged from that present in sandblasting operations to the dust present in slate-and-talc milling plants, where the material is ground to a very fine state of subdivision by recirculating the dust in a closed system for many hours. An analysis of the measurements obtained on these 26 samples showed that only 2 percent of the particles were less than 0.5 micron, 21 percent less than 1 micron, and the majority of the dust (71 percent) was found to be between 1 and 3 microns in average diameter.

From the evidence just presented on the particle-size distribution of industrial dusts in air, as well as from the previously mentioned studies of dust recovered from lung tissue, it is apparent that we need only be concerned with those dust particles between ½ and 5 microns in size; and, from a practical viewpoint, the lower limit of particle-size to be counted may well be taken at about 1 micron. The method of dust counting which we have been using for the past 30 years is capable of revealing particles as small as 1 micron quite readily, and in the hands of an experienced observer this method reveals quartz particles as small as 0.7 micron in size.

Many methods have been devised and used for the purpose of determining the quantity of dust in air. For the purpose of dust sampling in either high or low dust concentrations, the Greenburg-Smith impinger apparatus now finds universal favor. This instrument has been used by the United States Public Health Service in all of its dust studies during the past 30 years and is also being used by other workers in this field in this country and abroad.

In this instrument, the air to be sampled is drawn through a glass tube and impinged at a high velocity on a glass plate which is kept beneath the surface of the water or other suitable fluid in the collecting flask. The dust is momentarily arrested, wetted by the collecting fluid, and in this manner trapped.

The impinger apparatus consists essentially of two portions: First, a source of sufficient suction to draw the air to be sampled through the sampling device; and second, the sampling device, or impinger itself, which consists of a container and the impinger tube and plate. As a source of suction one may use either an electrically driven pump or a compressed air ejector device. The essential portions of the apparatus consist of a straight piece of Pyrex glass tubing 13 millimeters in outside diameter and approximately 325 millimeters in length. The tube is drawn down in stream line form at its lower end to a tip with 2.3 millimeter orifice. A circular glass impinging plate approximately 3 millimeters in thickness and 25 millimeters in diameter is attached to the lower end of the impinger tube at a distance of 5 millimeters from the orifice by means of three glass rods.

The collecting medium (distilled water) in the sampling flask is of sufficient volume to keep the impinger plate immersed at a depth of approximately 3 centimeters. In sampling, the outlet of suction elbow of the sampling flask is connected with the source of suction by means of a suitable length (25 feet) of noncollapsible rubber tubing. The duration of the sampling period should be such as to yield a satisfactory suspension of dust for analysis and is thus dependent on the concentration of dust in the atmosphere. Under the usual industrial conditions, samples of from 10 to 30 cubic feet of air yield sufficient suspended dust for analysis. Since a sampling rate of 1 cubic foot per minute is maintained, this will require a sampling period of from 10 to 30 minutes.

The collecting efficiency of the apparatus is dependent upon adherence to the previously cited impinger tube dimensions and the sampling rate of 1 cubic foot of air per minute. Experimental tests of this instrument with finely divided silica dust suspensions in air have consistently yielded efficiencies of 98 percent at the specified sampling rate.

Since practically all dusts are, to some extent, soluble in water, it is good practice to analyze the samples as soon as possible. This tends to prevent any undue flocculation as well as any solvent action on the dust particles. In the laboratory the dust suspension in the sampling fluid is filtered through a 325-mesh screen and then diluted so that the number of dust particles in the microscope field is equal to approximately 50 to 75. Two or more 1-cubic centimeter portions are placed in Sedgwick-Rafter-type cells for counting.

The microscope is the ordinary type provided with a suitable eyepiece and objective and fitted with an Abbé condenser. A Whipple disk eyepiece micrometer is placed in the microscope eyepiece, and the microscope tube length is adjusted so that the side of the ruling in the eyepiece is 1 millimeter in length. (We employ a 7.5 × eyepiece, 16 millimeters objective and a tube length of 178 millimeters.)

As a source of illumination, we use an ordinary type of microscope lamp with the Abbé condenser system dropped below the usual focusing point

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

This is the fifth in the series. In the first article, which appeared in the September issue, Mr. Bloomfield discussed types of plant surveys, illustrating with the Public Health Service study of mercurialism in the hatters' fur-cutting industry. The second article covered the classification of environmental exposures. The third one dealt with metallic poisons, particularly lead. The fourth one, as well as the fifth, is devoted to a discussion of the properties of dusts.

and the iris diaphragm adjusted so as to provide a high degree of visibility for refractile objects. When counts are made the microscope should be focused throughout the depth of the cell since some of the dust particles may remain in suspension. Since the counting cell is 1 millimeter deep and the area in the microscope field is .1 square millimeter, each count represents the amount of dust in a cubic millimeter of the sampling fluid. Knowing the original dilution of the sample and the number of cubic feet of air sampled, it is an easy matter to compute the number of dust particles in the sample per cubic foot of air. It is, of course, necessary to make control dust counts on the sampling fluid.

When dust samples are taken, the location of the sampling place, the time during which sampling is conducted, and the duration of sampling are all selected with a view toward yielding the definite data required by the study in progress. It is impossible to specify any set rules for this portion of the procedure. Obviously the requirements of the study in progress govern the procedure to be employed; this procedure can best be judged by the investigator on the job.

General Considerations

Many dusts are now recognized as dangerous, and, in the extreme, it may even be doubted whether any dust can be treated as harmless. After all, it is rational to suppose that the lung cannot become a physiological dust trap and still retain its normal function. It may even be possible that, no matter how innocuous some dusts may be in low concentrations, in high concentrations they might overwhelm the natural defenses of the lung and accumulate in such quantities as to impair its function. This, of course, would be a mechanical type of damage. There are some dusts, however, which exert another type of damage, such as pneumonitis.

Inflammatory Changes.—Certain inorganic materials, such as manganese, beryllium, vanadium, and osmium, have been known to give rise to chemical pneumonitis. Certain organic dusts, such as decaying hay and grain bagasse, and cotton fibers, have also proved harmful to the lungs.

Mention has already been made of lung cancer produced from the inhalation of chromates and radioactive dusts. Arsenic and even asbestos have been indicated in this connection.

Certain dusts, such as iron, have resulted in X-ray shadows which at times have led investigators to feel that these dusts have caused pneumoconiosis. This type of shadow has been found among welders. However, many studies made in the United States, particularly those of the Public Health Service, have proved that these shadows will clear up in time and are not associated with disabling fibrosis.

In the past, certain types of silicates have been considered as harmless, but from the many studies made of silicates, and particularly those by the Public Health Service, it is now known that, with many years of exposure, fibrosis can be produced by such silicates as talc, mica, and kaolin. The most harmful and disabling of this type of silicate is, of course, asbestos.

The type of dust which has had the most study in the world has been free silica, which produces silicosis.

Definition of Silicosis.—Silicosis is a chronic condition of the lungs caused by the inhalation of fine airborne silica (SiO_2) particles in sufficient concentration and over a sufficient period of time to produce fibrous nodules in the walls of the air spaces which are readily recognizable in satisfactory roentgenograms and in pathological specimens.

The manifestations of uncomplicated silicosis are so different from those produced by the same condition complicated with infection that they must be defined individually.

Items necessary for a complete diagnosis of silicosis: Occupational history, past medical history, subjective symptoms, shortness of breath, cough, chest pain, hemoptysis, general complaints, general appearance, chest findings—both clinical and X-ray, and blood, urine, and sputum.

CONCLUSION

In this brief discussion, it has been shown that, in addition to silica dusts, there are other types of dusts, both siliceous and nonsiliceous, which may give rise to distinct clinical diseases and distinct radiological appearances. No mention was made of the possibility of preventing or treating silicosis with aluminum dust inhalation—either the metal or the hydroxide. Suffice it to say that in the United States this method of preventing and treating silicosis is not in use as a mass application, but it is being studied in individual cases. The best procedure in the prevention of silicosis is still the orthodox method of keeping workers from inhaling harmful amounts of dust. For a good many dusts, standards or limits have been developed and are known. The medical and engineering techniques employed successfully in the prevention of dust diseases will be discussed in subsequent chapters.

Although much has been done all over the world on the study of dust diseases in industry, it should be evident from the data presented in this discussion that much more still needs to be known about this problem. Certainly, the conclusion that all dusts are potentially dangerous cannot be resisted. Neither can we resist the temptation to state that, if we apply our present knowledge with regard to the prevention and control of dust exposures the silicotic lung and, for that matter any lung diseased by dust, would in a short time become an anatomical curiosity.

Before closing this subject, it is pertinent to indicate that many new developments in this field are appearing which seem to point to the fact that particle-size of dust may be an extremely important factor in the causation of certain types of lung diseases. The recent findings in Canada by Dr. Shaver on the effects of finely divided dust or fume in the bauxite operations and some experimental work with beryllium dusts make it seem probable that certain dusts, when in sufficiently fine size, may be harmful, even though they are not siliceous. The student of this problem should be on the lookout for literature which will undoubtedly appear on this subject in the very near future.

Classification of Pulmonary Conditions, Roentgenograms of Which Simulate Those of Silicosis

A. From industrial dusts
  I. Organic
    a. Byssinosis
    b. Bagassosis
    c. Tabacosis
  II. Inorganic
    a. Anthracosis

b. Radiopaque deposits
Barium (baritosis)
Iron (siderosis)
Tin
(Toxic)
c. Reaction to beryllium
(Proliferative)
d. Asbestosis

B. From nonindustrial dusts
I. Mycotic
(Yeasts and molds)
a. Aspergillosis
b. Moniliasis
c. Wood dust spore infection
d. Coccidioidomycosis
e. Blastomycosis
f. Actinomycosis
II. Miscellaneous
a. Miliary tuberculosis
b. Sarcoidosis
c. Mitral stenosis
d. Cancers (metastases)
e. Vascular changes
f. Miliary calcicosis ("wheatena")
g. Erythremia
h. Bronchiolitis

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Michigan Offers Course In Radiological Health

At the request of the Michigan Health Officers Association, the University of Michigan School of Public Health is planning an intensive 4-day course in radiological health for individuals employed in public health work. The first session will begin at 9 o'clock the morning of February 5 and the last one will close February 8 at 4 p. m.

The course is designed to clarify and coordinate information on a subject deemed to be of increasing importance to public health workers. The members of the special faculty have been selected with respect to their known accomplishment in simplicity of presentation as well as their command of the science in which they are engaged. It is not a course in civilian defense. However, it will provide public health workers with information that should aid them in more readily understanding some of the problems in which they might sometime receive civilian defense training.

Applications for enrollment in the course should be submitted in writing by letter addressed to H. E. Miller, School of Public Health, Building 109, South Observatory Street, Ann Arbor, Mich.

Position for Industrial Physician Open In ILO

A position for an industrial physician is open in the Industrial Hygiene Division of the International Labor Office, which is at present located in Geneva, Switzerland. Qualifications include United States citizenship, a thorough knowledge of industrial medicine, both practical and theoretical, a good knowledge of French, and the ability to write well in English. The applicant should be at least 27 and not more than 35 years of age.

The initial salary for the appointment will be fixed at $5,000 unless age, experience, and qualifications justify a higher commencing salary. The post will be a permanent one, subject to a period of probation of 1 year.

Candidates for the position should apply to the Washington Branch of the ILO, 1825 Jefferson Place, Washington 6, D. C.

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Report of San Diego Industrial Health Survey Completed

Recently off the press is the complete report of an industrial health survey in San Diego County, Calif. A total of 415 industrial establishments employing 28,882 people were visited to find out what the major health problems were and what was being done about them. Only two of the plants studied had any kind of medical services and only 13 had nursing service.

The greatest need for health measures exists in agriculture, according to the report. Farm and ranch workers have no industrial physicians nor industrial nurses. Preplacement or periodic physical examinations were reported in only one agricultural working place. Sanitary facilities of farm workers were very poor compared to those which most city workers can use.

The survey points out that not enough is being done in San Diego County to protect workers from exposure to materials which may be harmful to health or to provide needed medical attention on the job.

The report was published by the California State Department of Public Health, 760 Market Street, San Francisco, Calif.

San Diego, Calif., Wants Industrial Hygiene Engineer

As a result of the industrial health survey in San Diego County, Calif., the City and County Health Departments want to employ an industrial hygiene engineer. Inquiries should be directed to either the City or County Health Department, San Diego, Calif.

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