Public Health Reports

Vol. 64 • APRIL 15, 1949 • *No. 15*

The Work of State and Local Industrial Hygiene Agencies

By VICTORIA M. TRASKO*

Maintenance of the health of the Nation's labor force is a direct responsibility of State and local industrial hygiene agencies in the country. How well this responsibility is carried out may be ascertained from the annual reports of 45 of these agencies in 38 States. These reports tell of industrial hygiene services provided almost 6 million workers in the interest of maintaining a healthful working environment. They strongly reflect the fact that no other public health field presents such a multiplicity of problems and situations involving the health and welfare of so large a segment of our population or offers such diversified activity. These annual reports are used for obtaining a picture of industrial hygiene activities in this country, carried on by the reporting agencies during the 1947 calendar or 1948 fiscal year.

Administrative Organization

At the present writing, 58 State and local industrial hygiene units are functioning on a full or limited basis in 44 State health departments, 2 State labor departments, 8 local health departments, the District of Columbia, and the territories of Hawaii, Puerto Rico, and Alaska. The appropriations for 1948 fiscal year totaled $2,500,723, of which 53.5 percent was derived from Federal sources, and 46.5 percent from State and local sources.

Approximately 400 professional personnel are employed by these agencies. Of this number 66 percent are engineers and chemists, and another 11 percent are sanitarians and inspectors. Physicians make up 10 percent of the total number, and nursing consultants another 10 percent. The remaining 3 percent consist of a miscellaneous group of professional and technical personnel.

In addition to direct industrial hygiene services, the agencies bring to industry more or less complete health programs by integrating their

* Health Program Analyst, Division of Industrial Hygiene, Public Health Service.

work with that of other divisions in the State government, such as sanitation, venereal disease and tuberculosis control. When feasible, they maintain working relationships with local health departments in their investigative work in industries in their areas, and utilize their facilities as headquarters for branch offices. They cooperate with labor departments and industrial commissions through exchange of reports of occupational diseases and reciprocal arrangements for field investigations. Cooperative relationships are also maintained with professional organizations such as the medical societies and nurses' organizations, particularly concerning in-plant health services, and with labor unions in enlisting management and employee cooperation and in arranging for studies and health services. State and local programs are integrated with that of the Division of Industrial Hygiene, Public Health Service, through such activities as consultative services on administration and technical phases of programs, the application of standard practices, and in the conduct of research field studies.

Field Services

Most of the field activities are devoted to routine investigations and evaluations of environmental health hazards and recommendations for their control. When the agencies are staffed with medical and nursing personnel, the services are extended to medical evaluations of industrial diseases, and to improvement of in-plant health programs. However, each service, each investigation, is unique in itself and demands individual attention and solution, often taxing the ingenuity and knowledge of staff members.

Atmospheric Pollution Control

In the past, investigation of so-called nuisance complaints, especially those dealing with atmospheric contamination, was a routine though comparatively minor activity of most industrial hygiene agencies. Today, it is fast becoming one of their important activities. This growing emphasis is due in part to the transcendence of atmospheric pollution from the nuisance stage to problems of public health implication. The Los Angeles smog and the Donora disaster, among other local and less publicized situations, have focussed much attention on problems of this nature, making people more aware of air contamination than ever before, and demanding action for abatement. In addition, the increased centralization of large industries in the same area, or in areas which heretofore have been free of industry, is presenting air pollution problems of greater magnitude than in previous years.

Most of the reporting agencies are experiencing notable increases in requests for assistance in abating and controlling atmospheric

nuisances due to gases, vapors, fumes, and dusts. They are asked to assist because they have the necessary equipment and technically trained personnel for scientific collection and evaluation of air contaminants. These investigations are not only time-consuming, but, where personnel shortages are still felt, they may seriously hamper their in-plant activities. Even in those localities where special agencies are set up to deal with pollution control, the industrial hygiene personnel are called in to assist with the field and laboratory work, and in the preparation of ordinances and regulations to control the nuisances.

Numerous investigations were reported, some involving air contamination of communities by groups of industries, others by single industrial establishments. For example, the West Virginia division has completed a soot-fall study of 2 years' duration in the Charlestown area. Another study is under way in a Utah town of 20,000 to study the effects on the health of the community of sulfur dioxide discharged into the air by smelters.

Everyone is now familiar with the smog condition in the Los Angeles area, which had its beginning in the war-time industrial boom. Industrial fumes which were polluting the atmosphere. caused irritation of the eyes and nasal passages of the residents, Because of the complexity of the situation, a special agency has been set up to work on the problem. However, this was effected only after much effort had been expended by local and other industrial hygiene agencies in determining the source and nature of pollution.

Another situation in which atmospheric pollution may present even more serious and tragic implication is exemplified by the recent Donora [1] disaster in which 20 persons lost their lives. A study is being currently conducted by the Public Health Service and the Pennsylvania State Department of Health in order to determine the nature of the atmospheric contaminants in that area and their pathological effects on the residents.

Among other industries which have been investigated because they were polluting the atmosphere are lead smelters, metal reclamation plants, chemical plants, talc mills, stone crushing mills, paper mills, rendering and fertilizer plants, and varnish cookers. Even food products such as rice, alfalfa and other grass crops prepared for stock feeds were found responsible for nuisance dust problems. An unusual instance was reported by the Georgia division, which assisted in the abatement of a neighborhood dust pollution problem created by the peanut industries. In harvesting the peanut crop, most companies use pneumatic unloaders which, as a rule, are not constructed to handle finely divided dust. Consequently, the dust is discharged

[1] The Donora disaster occurred in October 1948.

into the atmosphere. A sample of the settled dust in this particular town showed a silica content of approximately 52 percent, indicating that large numbers were exposed to high silica dust.

In addition, several divisions have reported the development of necessary laboratory procedures and even the construction of equipment for collection of samples of air. For example, the Illinois division worked out a method for evaluating atmospheric soot concentrations in the air. This work was undertaken because of the increased demand for services with regard to nuisances and inadequacy of procedures for measuring dust and soot pollution by local abatement agencies.

Radiation

The utilization of atomic energy is of paramount interest to industrial hygienists in the State and local agencies. At present very little use is made industrially of radio-active isotopes apart from radium and other naturally occurring ones. Technical studies are limited chiefly to the evaluation of possible health hazards from excessive or stray radiation involved in luminous painting, static eliminators, industrial X-ray installations, shoe store fluoroscopes, and in laboratories and clinics where X-ray pictures are taken. Plants using radium paint, as in dial painting, are under the constant surveillance of industrial hygienists since divisions recently noted a laxity in safe health practices established during the war. On occasion assistance is given to other agencies engaged in research with radio-active materials in the establishment of health programs for workers exposed to dangerous rays, or in the evaluation of associated health hazards.

Agriculture

The introduction of new toxic chemicals and the addition of mercury and other organic compounds in seed treating, fertilizers, insecticides, and fungicides have drawn the attention of industrial hygiene officials to the potential health dangers in the agricultural industry. Many places of employment were visited in order to determine the extent to which the toxic chemicals are being used and whether adequate control methods are in force.

For example, the California State division has done considerable experimental work with ethylene chlorhydrin in the treatment of seed potatoes to break their dormancy period and speed up the time required under normal procedures for sprouting. Their attention was called to the use of this chemical after one worker was killed and five others were hospitalized. Information on the toxic limit for this chemical is not clearly established, and the division in cooperation with other agencies is investigating the concentrations to which workers

may be exposed without injury, and the means for controlling the exposure. The material is used experimentally at the present, but because of the economic value in shortening the dormancy period of seed potatoes, its use will no doubt be extended in the future.

Environmental Control

The annual reports mention numerous studies of the familiar types of occupational hazards, such as lead and silica exposures in potteries, fumes and dusts in foundries, solvents in degreasing operations and in dry-cleaning establishments; exposures to abnormal factors in the environment, such as excessive temperatures and humidities, continuous vibration, and improper lighting in offices and schools. The West Virginia division, among others, reported dust surveys in the bituminous coal mines, conducted in order to better acquaint the coal-mining industry with the extent of silicosis-producing dust exposures. The New Hampshire and Washington divisions made sanitation surveys in lumber camps in order to improve conditions in the sanitation and construction of these camps.

New methods in processing food products are not without their hazards, many of the activity reports reveal. The use of ultraviolet lamps for prevention of mold and bacterial contamination of products, especially meat, is growing more common. Many of the studies revealed excessive radiation from the lamps resulting in serious eye irritation among the persons exposed.

The unguarded use of potentially toxic fumigants was among other common investigations. For instance, a study was made in a plant using methyl bromide for fumigating various food products and raw materials for vitamin preparation. It was found that the plant did not provide for removing the methyl bromide vapors before the workers entered the fumigating chambers, thus endangering their lives. It was necessary for the industrial hygienists to devise ways for controlling this exposure.

The carbon monoxide hazard in garages, automobile repair shops, buildings and even in homes creates much work for industrial hygiene divisions. Many times these investigations are made only after persons have been overcome by carbon monoxide gas. Dangerous conditions were caused by improper installations in homes and in buildings, poor ventilation in garages, lack of adequate exhaust ventilation and the use of gasoline powered-lift trucks in enclosed areas. Several divisions have prepared bulletins for distribution outlining hazards and means for their control in automobile repair shops and garages.

The investigation of industrial fires and explosions resulting from the manufacture of chemicals is reported as a regular feature of the work of the New York division's chemical unit. For example,

an investigation was made of two explosions in a plant engaged in powdering aluminum by a dry ball mill process. After the first explosion, the unit recommended the use of inert gases, but management objected because of the cost. It was not until after the second explosion with the serious structural damage resulting that management agreed to install the inert gas process in departments where aluminum powder was processed.

Among health problems investigated which did not emanate directly from the production or service industries were: Checking the efficiency of air conditioning equipment to be used on planes while on the ground; and a study of the extent of construction workers' exposure to hazards of silicosis at operations on an irrigation project on the west coast. During the construction of numerous highway and river bridges, industrial hygiene units checked on the adherence to rules of standards of operation where men work under compressed air conditions.

Every year some division reports the investigation of cases of deaths or illness due to lead poisoning among children as a result of burning old storage battery boxes as fuel at home.

At the request of the Industrial Commission, the Florida division investigated three deaths from hydrogen sulfide poisoning in a well in the Everglades. This study resulted in the writing of preventive procedures for the protection of well cleaners.

The Illinois division investigated several deaths which occurred in a fire in a trailer equipped with automatic carbon tetrachloride fire extinguishers. Studies showed that phosgene may well have been a contributing factor, pointing to the dangers in the use of such extinguishers in domiciles.

Numerous divisions made investigations to determine the extent, if any, of the hazard to students and instructors in trade and vocational schools. As a rule, the hazard is at a minimum since the exposure to toxic products is not prolonged. The California division, in addition to studying the potential health hazards in such schools, utilizes the opportunity for educating the individuals in the recognition of hazards which may be associated with their work and means for their control.

The New Hampshire division made a study of mercury exposures to instructors and students in universities and high schools. Exposure in high schools was found to be negligible in most cases, as very little mercury is used and only for short periods. In colleges and universities, however, excessive concentrations were found in both physics and chemistry laboratories chiefly from spilled mercury lodged in floor cracks, in benches and equipment, and on the back of mop boards. Methods for removal were suggested, and physical examinations were made on all persons with high exposures.

In-Plant Health Services

An extensive variety of activities was likewise reported by medical and nursing personnel in the State and local industrial hygiene agencies. In addition to medical evaluation and assistance with diagnosis and treatment of occupational illness, considerable work was done in assisting individual plants in organizing or improving health services for their workers.

It is not known how many industries have started new health programs during this period, but isolated reports indicate that such programs are being initiated. For example, the South Carolina division reported the establishment of 13 new health programs with medical and full-time nursing services. Tennessee reported that 17 plants for the first time employed graduate nurses for their dispensaries.

As a rule, small plants either cannot afford full-time medical services for their employees or are not aware of the benefits to be derived from such services. As the bulk of industrial establishments in this country falls into this category, efforts are exerted by State and local divisions in devising ways for bringing essential medical services to workers in small plants and in demonstrating the value of the services. The problem is approached in numerous ways. In Connecticut a group of small industries which have full-time registered nurses and the necessary medical facilities employed a full-time physician who spends a number of hours at each plant in order to provide adequate medical service. In Los Angeles City a public health nurse with industrial experience, assigned from the Division of Public Health Nursing, made weekly visits to a group of participating plants as part of a project to demonstrate the value of part-time service in order to induce the plants to initiate their own programs. In Syracuse, New York, a similar project was undertaken with the cooperation of the Visiting Nurses Association. In Georgia, the Winder clinic, established in 1942 and maintained cooperatively by a group of neighboring industries, is continuing to operate successfully. The chief drawback in starting similar plans among other industries is the shortage of medical and nursing personnel.

During the recent year, projects were undertaken to determine the status of the health of workers as a whole through state-wide or industry-wide studies. The New Hampshire division made a comprehensive study in cooperation with other health agencies in the State department and uncovered many unsuspected health hazards, notably serious heart conditions in employees working on dangerous moving machinery, active tuberculosis cases, syphilis, and trench mouth. Individuals working in key positions which require alertness and good hearing were found to have defective hearing.

827189—49——2

The Pennsylvania division is investigating the status of dental health among workers handling such products as sugar and flour; lead, mercury, and other chemicals. The division has its own portable unit and has made 2,144 dental examinations, including X-rays. Studies conducted by this division, as well as those being conducted by the Public Health Service in specific industries, may throw considerable light on the association of oral manifestations with industrial exposure to certain materials.

In Mississippi, the division is sponsoring a state-wide physical examination program whereby private physicians examine workers referred to them by industries. The examinations are paid for by the companies, and the standard physical examination forms are supplied by the State industrial hygiene division. Copies of the examinations are sent to the division to permit a study of the physical conditions revealed by the examinations.

About one-half of the agencies reported a continuation of cooperative activities with the divisions of tuberculosis control in case-finding surveys. As a result of such cooperative programs, approximately 400,000 workers received chest X-rays during the period covered by this summary. As a rule, the industrial hygiene divisions make the necessary arrangements for holding the clinics. Pennsylvania is an exception in that the entire program and work is the responsibility of the industrial hygiene division. An outgrowth of these surveys is the development of arrangements, as in St. Louis, whereby it will be possible for plant physicians to have applicants receive a small film chest X-ray through the health centers as part of the pre-placement physical examinations. The case-finding programs have proved valuable in uncovering not only cases of tuberculosis but also cases of suspected silicosis with history of dust exposure.

Statistical Summary of Activities

Evaluation of the volume of work performed for industry, or even selection of those activities that are indicative of accomplishment in industrial hygiene are not simple matters. A voluntary project aimed at developing standard reporting of industrial hygiene activities has been in effect for 9 years, as a cooperative activity of the Division of Industrial Hygiene, Public Health Service, and a special reports committee of the American Conference of Governmental Industrial Hygienists. This plan provides for voluntary submittal of periodic activity reports, including a statistical summary of activities, compiled according to a standard form. It is only as the result of this project that national summaries providing some indication of the scope and extent of industrial hygiene activity are possible.[2]

[2] Last summary entitled "In Industry's Service", was published in Occupational Medicine, April 1947.

During the period under study, the 45 State and local agencies located in 38 States gave 37,336 different services to 25,700 industrial establishments, involving 5,938,470 workers. The estimated labor force in the 38 States with divisions of industrial hygiene covered by this report is approximately 55 million, indicating that these agencies reached only 11 percent of the labor force in their States. When this number is projected against the entire civilian labor force of 60 million, the proportion is not quite 10 percent. In this connection, it must be mentioned that, while practically every industry is represented by the services, major emphasis continues to be placed on industries with potential health hazards, such as manufacturing, mining, and related service industries.

A summary of the number and type of general services given to 25,700 industrial establishments is presented in table 1. The services are grouped according to broad categories in order to facilitate a summarization. The classification does not attempt to evaluate the length or extensiveness of the various services. For instance, a plant survey may require only one visit for completion; a lead study may require series of visits over weeks, involving much detailed field and laboratory work.

Table 1. *Summary of field and related services given to industrial establishments by 45 industrial hygiene agencies*

Total number of field services 37, 336
Total number of agencies reporting 45

	Percent of total services	Number of agencies reporting
General type of field service:		
Plant surveys	22	45
Technical studies of occupational health hazards	10	44
Nuisance complaints investigated	1	33
Other environmental types including routine inspections, sanitation inspections	37	33
Services pertaining to promotion, establishment or improvement of:		
In-plant health programs	6	27
Nursing services specifically	8	28
Occupational disease investigations	1	20
Miscellaneous services pertaining to in-plant feeding, case finding surveys, etc	2	19
Follow-up on status of recommendations	13	40
Related services:	*Number*	
Physical examinations of workers	2, 226	13
Dental examinations of workers	2, 144	1
Examination of plans for ventilating and other control equipment	2, 649	12
Laboratory examinations and analyses	39, 665	40
Field determinations of atmospheric contaminants	15, 656	37
Field determinations of physical conditions	14, 633	35

Of the 37,336 services reported, those dealing with environmental control predominated, accounting for approximately three-fourths. This predominance is not surprising as basic industrial hygiene services center on environmental control of health hazards, and the divisions are staffed with a large proportion of engineering and chemical personnel. Twenty percent of the services consisted of plant surveys in which an evaluation of plant facilities, processes and exposures was made. All 45 units reported carrying on this plant activity. Ten percent consisted of technical studies of occupational health hazards, examples of which have been given in the fore part of the report. One percent of all the services comprised investigations on the control or abatement of nuisances and atmospheric pollution problems. A comparatively large proportion, or 37 percent, consisted of routine plant inspections, sanitation inspections, and consultations on problems of the working environment. However, over 20 of the 37 percent of these services were contributed by one large State division whose staff concentrates on routine or preliminary type of plant inspections.

Of the other types of services listed, one percent was investigations of occupational diseases involving assistance in diagnosis and treatment. Services pertaining to the promotion, establishment or improvement of in-plant health services accounted for 6 percent; and those relating specifically to nursing services, for another 8 percent. Another 2 percent comprised services pertaining to nutritional advice and in-plant feeding facilities, the promotion of, or participation in, case-finding surveys, and other not specified health activities. Follow-up visits for ascertaining the status of recommended improvements made up 13 percent of the total, reflecting little change when compared with the proportion of this type of activity reported in other years.

Among the related field services listed are 2,226 physical examinations of workers and 2,144 dental examinations which were performed in connection with technical studies and investigation of claims for occupational diseases. The examination of ventilating and other control plans prior to the installation of equipment in plants is a legal function of one division which reported most of the 2,647 plans examined. The other ten agencies examine such plans only occasionally and upon request from industry or agencies.

Recommendations

Not all 45 units submitting activity reports gave information consistently regarding improvements recommended to industry as a result of their services and investigations. However, information from 31 units indicates there is still considerable need for corrections

and improvements and that industry is carrying out the recommendations in accordance with expectations.

For instance, the 31 divisions for which this type of information is available gave services in 20,129 plants affecting 4,453,000 workers. They recommended 13,660 different improvements in the working environment or for in-plant health services in 30 percent of the plants, covering one-third of the workers.

It is not practical to expect complete compliance with recommendations during a definite period of time, even if follow-up visits are made in every case, as it takes time to put the recommended improvements into effect. Reports from the 31 units show that one-third of the recommendations were carried out for 40 percent of the workers in 37 percent of the plants in which they were made. Unfortunately, shortages in personnel, and the demand for direct services curtail the amount of follow-up work done by the agencies. In fact, some units do practically no follow-up work; whereas others check each plant routinely.

Laboratory Services

In connection with the field studies of occupational hazards, a total of 39,665 laboratory examinations and tests was reported by 40 units. These consist of analyses of airborne contaminants, materials used in industrial processes, and biological materials. Sometimes the tests are made directly in the field in order to determine the degree or extent of contamination of gases, solvents, and other air-borne contaminants. These are not always recorded, but 37 agencies reported over 15,656 measurements of this type. Thirty-five divisions reported 14,633 other measurements of physical conditions such as ventilation velocity, illumination, radiation, etc.

Simultaneously with routine analytical work, several laboratories are evaluating and developing new methods of analyses as well as improving old methods for the determination of toxic ingredients. Among the projects mentioned in the reports are improvement of methods for testing and analyzing samples for chlorinated hydrocarbons; microanalysis of body fluids for beryllium; evaluation of arsenic exposures in insecticide plants; and determination of mercury, sulfur dioxide, acetaldehyde, fluorides, chromium, and cobalt. As funds permit, the agencies are installing in their laboratories specialized equipment, such as spectrographs, polarographs, and X-ray diffraction apparatus, enabling them to do highly specialized analyses on crystal structure and trace elements.

Occupational Disease Reports

Reports of suspected or confirmed cases of occupational illness serve as a valuable source to industrial hygiene divisions for investigating

existing health hazards. The value of such reports to workers and employers is illustrated by the account of a follow-up of two cases of lead poisoning reported in a ceramics plant employing 350 workers. The industrial hygiene division which investigated the report learned from interviews with physicians attending the patients and other community physicians that there were several other cases which had not been reported as being of industrial origin. At the same time, a community chest X-ray survey uncovered several cases of silicosis with histories of employment at the plant. Technical studies by the local industrial hygiene division revealed that practically every production employee was exposed to severe silicosis or lead poisoning

Table 2. *Occupational disease reports received by industrial hygiene agencies in 18 States*

Cause	Number of cases
Poisoning due to:	
Metals:	
Arsenic	4
Cadmium	21
Lead	257
Mercury	4
Zinc	10
Metal fumes	7
Copper	3
Solvents:	
Benzol	25
Carbon tetrachloride	16
All other solvents	7
Gases:	
Carbon monoxide	65
Chlorine	31
Hydrogen fluoride	2
Phosgene	10
Methyl chloride	2
Gases not specified	24
Dusts:	
Silicosis	979
Silico-tuberculosis	33
Asbestosis	2
Byssinosis	2
Pneumoconiosis, not specified	270
Systemic poisoning, not specified	1, 228
Chemical poisoning, not specified	186
Dermatitis, skin diseases	18, 288
Conjunctivitis	4, 893
Pulmonary and bronchial affections	1, 616
Pulmonary tuberculosis	67
Inflammatory conditions due to repeated motion, pressure, or shock	2, 380
Heat exhaustion	112
Anthrax	8
Undulant fever	178
Nasal ulceration	137
Miscellaneous and not specified	533
Total	31, 400

hazards of which management was not aware. As a result of these studies, the company installed dust control equipment worth thousands of dollars. A workers' health service, with a registered nurse in charge was also inaugurated in order to prevent further occurrence of occupational illness. This is an account of one case. There are other instances similar to this one.

The situation regarding the reporting of occupational diseases in the country, as determined from available reports, shows little improvement. A summary of the number of cases by cause, reported to industrial hygiene divisions in 18 States, is shown in table 2. A total of 31,400 cases of suspected or actual illness was reported for the annual period. Dermatitis continues to be the leading occupational disease reported, accounting for over one-half of the 31,400 cases listed. However, it is difficult to draw any conclusions from the table on the occurrence of specific industrial diseases, owing to differences in classifying diseases. The summary is merely a combination of individual lists of cases compiled by the agencies, which sometimes gave specific causes and other times only broad categories.

Many divisions have taken definite measures to stimulate the reporting of occupational illness from all sources, but they likewise report that progress is slow. Even where regulations and statutes exist, the reporting of cases to State boards of health is still notoriously poor. Only five percent of the cases listed in table 2 represent reports made to boards of health. The remaining 95 percent consist of reports of claims submitted for compensation or morbidity reports made to compensation agencies and referred to industrial hygiene divisions.

Educational Activities

Each agency devotes considerable effort to informing labor, industry, civic and professional groups on different phases of industrial health. Various media, such as bulletins, posters, radio, exhibits, films and institutes, are utilized in furthering these informational and educational activities.

Numerous divisions publish their own news bulletins which are distributed to industry and other interested persons and organizations. In the past year, they prepared and issued bulletins on special subjects such as silicosis, carbon monoxide hazard in garages, manuals on records for plant nurses, and laboratory procedures. One division has just completed a manual on ventilation in industrial establishments. One of the West Coast States disseminated a series of informative bulletins on the subject of toxic insecticides. Another division published warnings for use of the public and responsible authorities on the effectiveness and hazards of ultra-violet and other

air disinfectants now in vogue. These are only examples, but it may be seen that much of this informational service is directed at the public as well as labor and industry.

The contribution of industrial hygiene agencies to training of personnel is likewise substantial. The need for industrial hygiene personnel, coupled with limited formal educational facilities, makes it necessary that staff members assist with the teaching of industrial health subjects. Over one-half of the reporting agencies indicated activity in this field. In addition to lecturing and assisting with development of curricula, they make available their laboratory facilities for demonstration purposes, and arrange for in-plant orientation with appropriate industries. The practice of employing university—especially medical—students for part-time work or during their vacations is growing more popular. On this subject the West Virginia report makes the following comment: "As a result of this brief indoctrination into the field of industrial health, they have a better understanding of industrial health problems. In highly industrialized States, it appears very desirable that every medical student who plans to practice, whether as a private practitioner or industrial physician, should be given some training in industrial hygiene."

Cobalt and the Dust Environment of the Cemented Tungsten Carbide Industry

By Lawrence T. Fairhall, Ph. D., Robert G. Keenan, B. S., and Hugh P. Brinton, Ph. D.

While cobalt has long been known and used in industry, until recent years it occupied a very minor place, being used chiefly in producing colored glass and glazes. It therefore remained negligible as an economic factor, particularly in comparison with its far more important chemical ally, nickel. Cobalt has, however, been steadily gaining in industrial importance. In 1947—the last year for which we have official figures—the total cobalt consumption in the United States amounted to somewhat over 4,000,000 pounds (*1*) and was 2.8 percent that of nickel. Although the total amount of cobalt used annually in this country is still less than 3,000 tons, the consumption is very great in comparison with that of 25 years ago.

A substantial tonnage of cobalt is diverted to use in alloy steels, especially high-speed and corrosion-resistant steels of the cobalt-chromium-tungsten type which are known as stellite. In addition, cobalt is now being used in iron-free magnets of the alnico type, in the manufacture of cemented tungsten carbide tools and dies, and as a catalytic agent for synthesizing gasoline from coal by the Fischer-Tropsch process. The latter two uses are the more important from the point of view of industrial exposure, since significant amounts of dust are engendered in the processing involved.

So far as we are aware, the recently completed field investigation of the cemented tungsten carbide industry made by the Division of Industrial Hygiene of the Public Health Service is the first survey in industry to be made of atmospheric cobalt concentrations. The plants engaged in the production of cemented tungsten carbide tools and dies are few in number and for the purpose of this survey, investigation was confined to three plants which employ the majority of workers in this industry.

The manufacture of cemented tungsten carbide tools and dies is a somewhat complicated and highly specialized type of manufacture. It is a comparatively new and rapidly growing industry. The extreme hardness of carbide-tipped tools enables machining operations to be carried out with a rapidity unapproached by the best of high-speed steel tools. The demand for this type of tool is therefore insistent and growing. To meet this demand, the carbide tool factories are

From the Division of Industrial Hygiene, Public Health Service. Presented before the Industrial Hygiene Section of the American Public Health Association, 76th Annual Meeting, Boston, Mass., November 10, 1948.

rapidly growing also and, along with this expansion of facilities, various technical improvements have been and are being made. The problems of ventilation have also received attention, and it is usual to find each individual operation, from which dust may arise, carefully shielded or exhausted.

The manufacturing process may begin with the powdered metals, or, as in one plant, the raw materials or ores may be worked chemically and the reduced metals may be prepared in powdered form in the same plant.

The process of manufacture of tool tips and dies consists essentially in preparation of tungsten carbide which has a hardness approaching that of the diamond. To employ this usefully, it is necessary to bond the grains of tungsten carbide together in a metallic matrix which can then be attached to a steel shank or ring holding the tool or die. In practice, the carbides of other metals are used in addition to tungsten carbide. A typical commercial cemented tungsten carbide tool tip may therefore also contain titanium carbide or tantalum carbide with cobalt as the binder.

Tungsten carbide is produced by heating a metallic tungsten and carbon black mixture in a high-frequency vacuum furnace or in a resistance furnace in an atmosphere of hydrogen. Titanium and tantalum carbides are similarly prepared by heating the oxides of the metals with carbon black. Powdered cobalt metal and the proper proportions of carbides are ground in ball mills for long periods of time—as much as several days—to insure proper fineness and intimate mixing. This mixture is then pressed into blanks and presintered in hydrogen at about 1,000° C. which leaves the material sufficiently soft to be easily cut to approximate dimensions. Following this final shaping, they are sintered at a higher temperature of about 1,500° C. At this point the blanks are extremely hard and metallic in appearance. They are then brazed onto the steel shanks or holders and ground to final dimensions.

It is apparent that a substantial amount of dust will arise from working with these powdered metals, and in grinding and finishing the metal products. In most of the plants adequate ventilation is provided to meet the dustier operations and in some places the ventilation is very good. However, a certain amount of atmospheric contamination is inevitable. This survey was made to find the extent of dust contamination of the atmosphere and particularly the amount of cobalt present in the air at various operating areas.

In the initiation of the environmental sampling program, it was realized that wide plant-to-plant variations might be expected in the atmospheric dust concentrations produced by a given operation. An important factor contributing to this situation was the nature and proximity of the adjacent operations. It is essential to empha-

size that the operations are rarely segregated into individual workrooms and that those operations which produce the largest quantities of dust are not necessarily in the same relative locations in all plants. From an environmental viewpoint, an individual operator is exposed not only to the dust produced by his own work but also to a proportion of that produced by adjacent activities.

Additional factors contributed to the anticipated plant-to-plant variations in dust concentrations at specific operations. Among these, special mention should be made of the individual plant structure, ventilation, the layout of machines and processes, and the segregation of the dustiest operations from the others. Finally, mention should be made of adequate or inadequate local exhaust ventilation.

Two simultaneous samples were taken at a designated point; one at the breathing level of the worker as he performed his duties in his normal manner; the other in the aisle between the machines or processes. In this way, the first sample represented the operator's exposure; the second, the exposure in the general atmosphere. Only one set of samples was taken at each location on a given day and the time of sampling of a specific operation was varied over the shift period until a total of ten samples was obtained—five of the operator's exposure and five of the general atmosphere. Samples were taken of every possible employee activity in the industry.

The choice of 10 samples per operation per plant was an arbitrary one, determined by a preliminary investigation of job break-downs, the statistical value of the results, and expediency of the environmental program. Long sampling periods were employed, usually 30 to 60 minutes, to provide ample material for subsequent chemical analysis and to compensate for most cyclic operations. To compensate for sampling errors, the instruments were alternated on a daily basis. The instrument which sampled operators' exposures on one day was used for taking general atmosphere samples on the next and vice versa.

Since the major atmospheric contaminants were finely divided solids, the instrument chosen for most of the sampling was a modified electrostatic precipitator. Because the efficiency of the electrostatic precipitator is dependent upon the voltage applied (*2*), special coils and other instrumental improvements introduced by Clayton (*3*) were utilized. This instrument was efficient and had a high sampling rate. Moreover, the firm retention of the deposited dust sample on the walls of each collecting electrode, during shipment to the laboratory, eliminated the need for the transfer of samples in the field (*4*).

The dust content of the sampling electrode tubes was obtained by careful weighing with all the analytical precautions necessary for weight determination of the magnitude of these dust samples. The dust was then transferred quantitatively to pyrex test tubes, 25 milli-

meters in diameter, by means of a rubber policeman and 30 percent ethyl alcohol. The samples were evaporated to dryness in an oven at 110° C. and were then ready for fusion. In determining the weight of the samples, the outer tube surfaces were cleaned and allowed to come to equilibrium with atmospheric moisture by standing for 15 minutes before each of the two weighings; the sample weights, i. e., total dust values, were obtained by the difference in tube weights before and after transferring the dust.

Owing to the very refractory nature of the cemented tungsten carbide dust, an oxidation fusion was necessary to break it down. The dust is insoluble in alkalies and mineral acids, and is not broken down by either alkaline or acid fusion. However, oxidation fusion with potassium persulfate, $K_2S_2O_8$, was found to be successful in decomposing this dust (*5*).

Two modifications of the Nitroso-R-Salt method for cobalt analysis were used. For the determination of the smallest amounts of cobalt, the sensitive method of McNaught was employed (*6*). This method was inapplicable to sample aliquot portions containing a greater quantity of cobalt than 0.05 milligram. Most samples contained such quantities of cobalt that the measurements of the minute aliquot amount of liquid necessary for the application of McNaught's procedure caused too great an error. This method, however, was used for the analysis of about 134 of the lightest samples at the initial stage of the laboratory investigation. It was then modified by combining with it the method of Young, Pinkney, and Dick (*7*). The resulting procedure was found to be satisfactorily applicable for cobalt determinations ranging from 0.01 to 0.50 milligram of cobalt (*8*).

The average concentration of dust and its cobalt content in the initial powder processing and in the tool and die operations (the two more important divisions of manufacture) are given in the table.

Examination of these values shows that, roughly speaking, the total dust in the general atmosphere is about 20 percent of that at the operator's exposure in the powder processing operation; the cobalt content in both exposure groups amounts to practically 10 percent of the total dust. In the case of tool and die operations, the dust content of the general atmosphere is about 50 percent that at the operator's exposure, while the cobalt content is about 5 percent of the total dust.

It should be emphasized that these are average figures. In some dusty operations, for instance in the calcination of cobalt nitrate in one plant, the total dust was as high as 123 milligrams per cubic meter while its cobalt content was 79 milligrams per cubic meter. Except for the dusty calcination operation, and in screening powders, weighing and milling, and in cleaning the mills, the usual exposure to dust and to cobalt is much lower. The lowest exposure at any point

Average dust and cobalt content of air in three cemented tungsten carbide plants in milligrams per cubic meter (based upon 977 analyses)

Plant	Operator's exposure		General atmosphere	
	Total dust	Total cobalt	Total dust	Total cobalt
	Powder processing			
A	14. 0	1. 67	3. 3	0. 12
B	13. 6	1. 05	2. 9	. 22
C	10. 6	1. 64	2. 0	. 16
	Tool and die operations			
A	5. 0	0. 23	2. 2	0. 07
B	1. 8	. 08	1. 0	. 03
C	1. 0	. 05	. 5	. 01

in the three plants was 3 or 4 micrograms of cobalt per cubic meter of air. It is apparent, therefore, that despite great care in controlling the amount of dust in the air of these plants, none of the workers quite escaped contact with cobalt dust.

It is significant that cobalt was invariably found in the atmosphere, even in places where no manufacturing operations were in progress, such as the office section. All individuals employed in the plants invariably breathed in some cobalt even though minute in amount. It should be noted, moreover, that ventilation was, in general, very thorough and that considering the type of manufacture, the plants were clean in appearance. The presence of cobalt was indicated only because of the extreme delicacy of the test applied in those areas where exposure was minimal.

Dust counts which were made on about 10 percent of the total number of samples taken were in general rather low. The average for all operations and all plants was 2.8 million particles per cubic foot. As might be expected, however, the powder processing proved the dustiest operation, while tool and die operations in general were the least dusty of the various stages of manufacture.

With such wide exposure to cobalt over such a range of concentration, it is of interest to consider the effects of inhalation of this dust or the dust of its compounds. Such effects have not been previously studied, although a certain amount of pharmacological data is available with reference to ingested cobalt compounds and to the intravenous injection of cobalt salts (*9*). While cobalt has been

found to produce a certain amount of physiological response, the experimental work so far reported in the literature does not indicate that any great danger is associated with it. However, many seemingly inert substances have proved dangerous on inhalation and further experimental investigation with reference to this phase of the problem is now in progress in this laboratory.

REFERENCES

(1) Davis, H. W.: Personal communication. U. S. Bureau of Mines, Washington, D. C.
(2) Keenan, R. G. and Fairhall, L. T.: The absolute efficiency of the impinger and of the electrostatic precipitator in the sampling of air containing metallic lead fume. J. Ind. Hyg. Toxicol. **26**: 241 (1944).
(3) Clayton, G. D.: Improvement of the M. S. A. electrostatic precipitator. J. Ind. Hyg. Toxicol. **29**: 400 (1947).
(4) Seifert, H. E., Keenan, R. G., and Fairhall, L. T.: A procedure for the handling of field samples of dust and fume. Pub. Health Rep. **60**: 441 (1945). Reprint No. 2618.
(5) Keenan, R. G. and Flick, B. M.: Determination of cobalt in atmospheric samples. Anal. Chem. **20**: 1238 (1948).
(6) McNaught, K. J.: The determination of cobalt in animal tissues. Analyst **67**: 97 (1942).
(7) Young, R. S., Pinkney, E. T., and Dick, R.: Colorimetric determination of cobalt in metallurgical products with Nitroso-R-Salt. Ind. Eng. Chem., Anal. Ed. **18**: 474 (1946).
(8) Keenan, R. G., and Flick, B. M.: loc. cit.
(9) Fairhall, L. T.: The toxicology of the newer metals. Brit. J. Ind. Med. **3**: 207 (1946).

— Review of Bulletin 300 —

Ten Years of Federal Grants-in-Aid for Public Health

As taxable wealth of the Nation accumulates more and more in comparatively few urban areas, the mechanism of grants-in-aid is increasingly recognized as a workable method of reducing inequalities in opportunity. At the same time, the use of such grants to stimulate the development of new programs, particularly in areas with special problems, has continued.

Public health programs in the United States have benefited in great measure through this device. Grants-in-aid for such programs on a Nation-wide scale were first authorized in 1935 by Title VI of the Social Security Act, and became available in February 1936. Section 314 of the Public Health Service Act, passed in 1944, and later amendments, have further expanded the scope of Federal-State cooperation in health work.

"Ten Years of Federal Grants-in-Aid for Public Health" records briefly the experience of the Public Health Service in the allocation of grants-in-aid to the States from February 1936 through June 30, 1946. It outlines trends in State and local health department development during the same period, as indicated by data on finances, personnel, organizational changes, and activities, and traces the growth in the States of specific types of programs.

State and local appropriations have risen surprisingly during the period of Federal grants-in-aid. Increased funds, in turn, made possible the development of stronger health departments providing new and improved services. At the local level, the figures show growth in numbers of full-time county and district health departments, particularly the latter, and a two-fold increase in personnel employed, while municipal health departments have tended to combine with county units.

Among supplementary activities of the Public Health Service covered in the bulletin are the following: Emergency health and sanitation measures during World War II financed by special funds; investigations and studies of public health methods which prepared the way for a Nation-wide Federal-State cooperative program in public health; and demonstrations of diagnostic techniques in large-scale case-finding programs, of preventive techniques, and of administrative methods. The report also describes procedures developed in the course of allocating funds and carrying out related functions. Among such procedures are allotment formulas; the review of plans, programs, and budgets; and provision of consultation service.

In addenda, payments to States and other data for 1947 or 1948 are summarized. Developments in cancer control, mental health, hospital surveys and construction, water pollution, and heart disease, for all of which specific grants were authorized after June 30, 1946, are described in so far as available data permit.

The first recommendation of the authors is extension of public health services to cover the entire country. The second is the development of "health service areas"—with sound finances, qualified personnel, enrichment of programs, objective State-local allocation formulas, and simplification of records and reports.

The bulletin includes an extensive reference list for the use of those who may be interested in further study of either the various aspects of grants-in-aid or development of public health services.

Ten Years of Federal Grants-in-Aid for Public Health. By Joseph W. Mountin, Emily K. Hankla, and Georgie B. Druzina. Public Health Bulletin No. 300, 84 pp., U. S. Government Printing Office, 1949. For sale by the Superintendent of Documents, Washington 25, D. C. Price 25 cents.

— Examination —

Regular Corps Sanitarians

Competitive examinations will be held June 8, 9, and 10, 1949, for appointment of milk and food specialists and bacteriologists as sanitarians in the Regular Corps of the Public Health Service. Applications must be received no later than May 18.

Appointments will be made in the grades of assistant sanitarian (first lieutenant) and senior assistant sanitarian (captain).

An assistant sanitarian applicant (1) must be a citizen of the United States and at least 21 years of age; (2) have a bachelor's degree from a school of recognized standing in one or more fields in the biological, chemical, or physical sciences which, in the opinion of the examining board, are related to milk and food sanitation or bacteriology; (3) have a master's degree from an approved school in public health or in a science listed in (2) above; and (4) have at least 7 years of educational (exclusive of high school) and professional training and experience, including at least 1 year of experience which, in the opinion of the examining board, would qualify the candidate to perform the duties of an officer in either the milk and food or bacteriology fields. A senior assistant sanitarian applicant, in addition to the first three requirements listed for the assistant grade, must have at least 10 years of educational (exclusive of high school) and professional training and experience.

The written examinations for the different grades will cover the following subjects:

Senior assistant sanitarian (milk and food)—Milk and food sanitation; general sanitation; public health background, methods and procedures. The assistant sanitarian examination will cover, in addition, elementary material relevant to milk and food, in the basic sciences, chemistry, physics, mathematics, biology, and bacteriology.

Senior assistant sanitarian (bacteriology)—General bacteriology; bacterial metabolism, mycology, and virology; systematic bacteriology; infection and resistance, and sanitary and applied bacteriology. The assistant sanitarian (bacteriology) examination will cover, in addition, elementary material relevant to bacteriology in the basic sciences, chemistry, physics, mathematics, and biology.

Entrance pay for an assistant sanitarian with dependents is $3,811 per annum; for senior assistant with dependents, $4,489. These figures include subsistence and rental allowance.

Application forms and additional information may be obtained by writing to the Surgeon General, Public Health Service, Washington 25, D. C. Attention: Division of Commissioned Officers.

INCIDENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MARCH 26, 1949

The incidence of measles increased during the week from a reported total last week of 28,054 cases to 33,347 for the current week, an increase of 19 percent, as compared with 15 percent for the corresponding week of 1946 (from 29,812 to 34,300). The comparable 5-year medians are, respectively, 21,613 and 22,266. Increased incidence (ranging from 249 cases in the New England area to 1,662 in the Middle Atlantic) was reported in all geographic divisions except the Mountain area. States reporting the largest increases are Texas (from 2,774 cases last week to 4,118), New York (2,156 to 3,177), Pennsylvania (2,417 to 2,936), Kansas (1,238 to 1,735), and Connecticut (531 to 916). The total reported since the first of the year is 251,151 cases, a larger number than reported for a corresponding period since 1944 (272,325). The 5-year median for the period is 175,422.

A total of 3,616 cases of influenza was reported, as compared with 3,780 last week and a 5-year median of 4,054. The 4 States reporting more than 142 cases (last week's figures in parentheses) are as follows: Texas 1,597 (1,517), South Carolina 558 (754), Arkansas 319 (265), Virginia 307 (288). The total for the year to date is 52,703, 5-year median 157,694.

Of 51 cases of poliomyelitis, California reported 10 (last week 11), West Virginia 6 (last week 0), and New Jersey and Texas 5 each. Only 3 other States reported as many as 3 cases. To date 974 cases have been reported, same period last year 381, 5-year median 425.

During the week 2 cases of anthrax were reported, 1 each in Massachusetts and Oklahoma, and of 3 cases of smallpox 2 were reported in Texas and 1 in South Dakota.

Deaths recorded during the week in 94 large cities in the United States totaled 10,146 as compared with 9,799 last week, 9,703 and 10,841, respectively, for the corresponding weeks of 1948 and 1947, and a 3-year (1946–48) median of 9,703. The total for the first 12 weeks of the year is 118,822, as compared with 123,111 for the same period last year. Infant deaths during the week totaled 641, last week 676, 3-year median 681. The cumulative figure is 8,042, as compared with 8,357 recorded for the same period last year.

Telegraphic case reports from State health officers for week ended March 26, 1949

[Leaders indicate that no cases were reported]

Division and State	Diphtheria	Encephalitis, infectious	Influenza	Measles	Meningitis, meningococcal	Pneumonia	Poliomyelitis	Rocky Mt. spotted fever	Scarlet fever	Smallpox	Tularemia	Typhoid and paratyphoid fever [d]	Whooping cough	Rabies in animals
NEW ENGLAND														
Maine	1	1		490	1	10			16				14	
New Hampshire			1	40					5					
Vermont				284					11				5	
Massachusetts	8			1,158	5				257				85	
Rhode Island				321		6			5				5	
Connecticut			4	916	1	91			39				4	
MIDDLE ATLANTIC														
New York	8	3	(b)	3,177	7	341	2		[c]304		1	1	111	10
New Jersey	4		17	1,366		74	5		154			1	39	4
Pennsylvania	4	1	(b)	2,936	7				316			4	67	1
EAST NORTH CENTRAL														
Ohio	5		6	434	2	58			389				65	26
Indiana	6		1	190	2	5			74		2	1	13	17
Illinois	1		25	101	10	126			191				47	3
Michigan [c]	1		19	710	3	50	3		426				11	
Wisconsin			32	1,700	5	17	1		90		1		21	2
WEST NORTH CENTRAL														
Minnesota	2			194	2	4			42				1	
Iowa	3			59		1			32					4
Missouri	5		8	499	2	22			45			3	4	
North Dakota			44	41					6					
South Dakota	1		1	15					4	1				
Nebraska	1		7	111		2			12			1	1	
Kansas	4		1	1,735	1	11			12				4	
SOUTH ATLANTIC														
Delaware				22			1		20				3	
Maryland [c]	2		2	1,255	2	47			[c]49			1	9	
Dist. of Col				94	1	8			10				2	
Virginia	2		307	1,201	4	74			19		1	4	19	1
West Virginia	19		60	201	4	7	6		14			1	9	
North Carolina	6			1,097	1		2		15			1	45	
South Carolina	7	1	558	499	2	201	1		6			2	26	1
Georgia			29	825	3	35			10		6	1	35	15
Florida	5		20	114	1	25	2		9				10	

EAST SOUTH CENTRAL														
Kentucky	2	1	5	468	4	50			55			3	33	17
Tennessee	5		48	537	3	53			25		3		6	
Alabama	7		142	786	3	105			6				16	5
Mississippi [a]	3		51	233	1	20	2		7		4	2	9	
WEST SOUTH CENTRAL														
Arkansas	3		319	1,114		175	1		1		1	1	3	1
Louisiana	2		7	71	1	50			2		1	6	12	
Oklahoma			87	346	1	44	1		17				2	3
Texas	22		1,597	4,118	3	467	5		53	2		6	129	23
MOUNTAIN														
Montana			1	14					4				2	
Idaho	2		5	80		5	3		[c] 9				1	
Wyoming	1			34		6			5					
Colorado	1		20	407	1	29			12			1	2	
New Mexico		1	2	344		13			8				1	
Arizona		1	124	176		33	1		3			1	11	1
Utah [a]			4	75		2	1		4				26	
Nevada														
PACIFIC														
Washington	2		1	411	1	3	3		34				11	
Oregon			29	515		41	1		18				27	
California	14		32	1,833	4	35	10		[c] 121			2	43	7
Total	159	9	3,616	33,347	88	2,346	51		2,966	3	20	43	989	
Median, 1944-48	272	7	3,477	21,613	166		28		3,877	4	16	49	2,198	
Year to date, 12 weeks	2,098	84	52,703	251,151	1,028	29,321	974	12	34,450	25	336	503	12,330	
Median, 1944-48	3,510 (27th)	97	157,694 (30th)	175,422 (35th)	2,399 (37th)		425 (11th)	5	40,402 (32d)	99 (35th)	226	522 (11th)	26,857 (39th)	
Seasonal low week ends	July 10		July 31	Sept. 4	Sept. 18		Mar. 19		Aug. 14	Sept. 4		Mar. 19	Oct. 2	
Since seasonal low week	7,212		88,973	303,544	1,872		51		57,148	40		43	22,363	
Median, 1943-48	11,076		190,669	210,368	3,903		28		78,973	175		49	51,137	

[a] Period ended earlier than Saturday.
[b] New York City and Philadelphia only, respectively.
[c] Including cases reported as streptococcal infections and septic sore throat.
[d] Including paratyphoid fever; reported separately, as follows: Virginia 2; North Carolina 1; Texas 2; California 2; salmonella infections, not included, were reported as follows: Massachusetts 1; Maryland 1.

Anthrax: Massachusetts 1; Oklahoma 1.
Alaska: Influenza 32; measles 4; meningitis 1; pneumonia 1.
Territory of Hawaii: Diphtheria 6; influenza 3; measles 272; poliomyelitis 1; scarlet fever 3.

PLAGUE INFECTION IN UTAH AND WASHINGTON

Under date of March 23 plague infection was reported proved in fleas from rodents taken in Salt Lake County, Utah, and Kittitas County, Wash., as follows:

UTAH

Salt Lake County.—A pool of 16 fleas from 1 ground squirrel, *Citellus variegatus*, shot March 11 at a gravel pit west of Heughs Canyon between Wasatch and Holaday Boulevards near Salt Lake City.

WASHINGTON

Kittitas County.—A pool of 200 fleas from 107 short-tailed meadow mice, *Lagurus curtatus*, trapped March 10 about 18 miles east of Ellensburg, and a pool of 225 fleas from 85 white-footed mice, *Peromyscus maniculatus*, trapped on the same date at the same location.

DEATHS DURING WEEK ENDED MAR. 19, 1949

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended Mar. 19, 1949	Corresponding week, 1948
Data for 94 large cities of the United States:		
Total deaths	9,799	10,045
Median for 3 prior years	10,045	
Total deaths, first 11 weeks of year	108,676	113,408
Deaths under 1 year of age	676	629
Median for 3 prior years	624	
Deaths under 1 year of age, first 11 weeks of year	7,401	7,669
Data from industrial insurance companies:		
Policies in force	70,543,550	71,165,108
Number of death claims	13,535	15,487
Death claims per 1,000 policies in force, annual rate	10.0	11.4
Death claims per 1,000 policies, first 11 weeks of year, annual rate	9.8	10.7

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended March 5, 1949.—During the week ended March 5, 1949, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		32	4	251	593	54	31	61	276	1,302
Diphtheria				12		1		1	1	15
Dysentery, bacillary				1		2				3
German measles				186	44	1	47	19	14	311
Influenza					31	2	9		1	43
Measles		162	276	154	294	185	80	273	235	1,659
Meningitis, meningococcal					3	1			1	5
Mumps		8	4	113	483	57	16	28	147	856
Poliomyelitis								1		1
Scarlet fever				89	107	2	2	10	21	231
Tuberculosis (all forms)		7	7	102	27	14	5		69	231
Typhoid and paratyphoid fever				5	1					6
Undulant fever					1	1			1	3
Venereal diseases:										
Gonorrhea	2	14	1	67	49	33	17	41	60	284
Syphilis		13	5	83	32	4	5	4	19	165
Other forms									2	2
Whooping cough				36	23	7	7			173

MAURITIUS

Poliomyelitis.—Information dated March 5, 1949, states that a serious epidemic of poliomyelitis has been prevalent in the Colony of Mauritius in recent months. The increase in incidence was noted toward the end of November 1948. During the period November 20, 1948, to February 5, 1949, 470 cases were reported in the Colony. Statistical analysis indicates that more than 80 percent of the reported cases occurred in the age group from birth to 4 years. The death rate is stated to be lower than that of the last previous outbreak (in 1945).

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

Note.—The following reports include only items of unusual incidence or of special interest and the occurrence of these diseases, except yellow fever, in localities which had not recently reported cases. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

PLAGUE

Ethiopia.—Correction: The report of 9 cases of plague during the week July 12–19, 1948, in Shoa Province, Ethiopia (see Public Health

Reports for January 28, 1949, p. 116) was in error. Later information states that these cases were bronchopneumonia.

Indochina (French)—Cambodia—Pnom-Penh.—During the week ended March 12, 1949, 5 cases of plague were reported in Pnom-Penh in the State of Cambodia, French Indochina.

Portugal—Azores—St. Michaels Island.—During the period January 9–February 5, 1949, 2 cases of plague (1 fatal) were reported in Rabo de Peixe, Ribeira Grande, St. Michaels Island, Azores, Portugal.

SMALLPOX

Arabia—Aden Protectorate—Makalla.—During the week ended March 19, 1949, 6 cases of smallpox were reported in the port of Makalla, Aden Protectorate, Arabia.

India—Ahmedabad.—For the week ended March 5, 1949, 72 cases of smallpox with 54 deaths were reported in Ahmedabad, India.

Indochina (French)—Tonkin.—During the week ended March 12, 1949, 141 cases of smallpox with 40 deaths were reported in Laokay District, Tonkin State, French Indochina.

Turkey.—During the period January 1–31, 1949, 33 cases of smallpox were reported in Turkey.

TYPHUS FEVER

Belgium.—On March 14, 1949, 1 case of typhus fever was reported in Sprimont, Liege Province, Belgium. The report stated that this case was probably imported from occupied Germany.

Pakistan.—Information dated March 23, 1949, states that a recent outbreak of typhus fever in Dera Ghazi Khan District, West Punjab Province, Pakistan, has been brought under control. Up to March 9, 1949, 89 cases of the disease had been reported, 25 of which had proven fatal.

YELLOW FEVER

No reports of yellow fever were received during the current week.

×