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VII

SUMMARY AND CONCLUSION

Looking back to the beginning of our existence as an independent nation we have every reason to be gratified by the large gains in longevity that we were able to record in the past 100 years, and more particularly in the last forty years. This is an achievement which probably even a confirmed optimist would hardly have been sanguine enough to foresee in anticipation. Undoubtedly the position gained must be credited very largely to the account of modern organization of public health service, with all its ramifications. It has freed us from the threat of typhoid fever, it has placed in our hands highly efficient control of malaria, it has made diphtheria a wholly preventable cause of death, it has immensely reduced our infant mortality, and to it also must be ascribed largely our winning fight over tuberculosis. The most effective measures have undoubtedly been the preventive measures, but we should be singularly in error if we should forget to mention also the innumerable lives that have been saved by the success of modern medical and surgical practice which annually save many lives by therapeutic and operative means. Nevertheless, those who interest themselves in the health program from a demographic standpoint will probably be inclined to emphasize the utility of preventive measures on the old but not worn out principle that prevention is better than cure.

The outlook for further improvement in the average length of life is entirely favorable, since we have not yet fully availed ourselves of the knowledge which we now possess towards reducing mortality. At the same time there is a limit to what we can hope to accomplish on the basis of existing knowledge. A hypothetical life table constructed to represent as nearly as possible what may reasonably be expected to be achieved in prolongation of life leads to a figure of seventy years for the expectation of life at birth, which coincides with the biblical three score years and ten.



UNITED STATES DEPARTMENT OF LABOR
FRANCES PERKINS, Secretary
BUREAU OF LABOR STATISTICS
ISADOR LUBIN, Commissioner

BULLETIN OF THE UNITED STATES BUREAU OF LABOR STATISTICS No. 582

INDUSTRIAL ACCIDENTS AND HYGIENE SERIES

OCCUPATION HAZARDS AND DIAGNOSTIC SIGNS

A GUIDE TO IMPAIRMENTS TO BE LOOKED FOR IN HAZARDOUS OCCUPATIONS

(Revision of Bulletin No. 366)

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Preface

The first edition of this guide to the hazards of occupations and to the symptoms of the diseases they cause was intended primarily to aid the medical examiners of the Metropolitan Life Insurance Co. in the discovery of impairments among applicants for insurance. The pamphlet soon attracted the attention of others not immediately interested in insurance medical examinations. Large numbers of industrial physicians, directors of compensation boards, factory inspectors, safety engineers, industrial rehabilitation agents, faculties of medical colleges, and, most important of all, general practitioners of medicine have made a call for this work and have expressed their approval of it. The favorable response encouraged us to proceed with the preparation of a second and much enlarged edition. This edition[1] was equally well received. Published 10 years ago, it is still in constant demand. It has been reproduced either in whole or in part in a number of works by authorities on the subject of industrial hygiene. The authors are convinced by their experience with these earlier editions that this pamphlet has served a useful purpose, and that there is a vital need for a work of this kind, which makes readily available the most recent findings on industrial hazards to those who have not the time for a thorough study. Obviously, the extension of the compensation laws of the several States to include all occupational diseases, or an increasing number of them, has made it necessary for physicians to be familiar with at least their most common symptoms.

The 10 years which have elapsed since the publication of the second edition of this guide have seen wide expansion and a marked increase in activities in the field of industrial hygiene. They have been noteworthy for the large number of scientific investigations undertaken to determine the causes of ill health among workmen and the effects of exposure to specific industrial hazards. Complete reports have been published not only on the effects of such poisons as radioactive paint, methyl bromide, and other refrigerants, and tetraethyl lead, which have become of importance only recently, but our knowledge of well-known health hazards has also been enriched. To mention only a few, benzol, spray painting, and exposure to asbestos dust and to dusts containing free silica, have been thoroughly studied and reported upon.

In preparing this, the third edition of the pamphlet, the authors have endeavored to present the most recent thought on occupational hazards expressed in this vast literature on industrial hygiene. They realize full well the inadequacy of existing knowledge of the effects of many industrial hazards, and the amount of scientific research necessary before these effects are definitely known. They have not presumed to attempt to settle controversial questions, nor have they

[1] U.S. Bureau of Labor Statistics, Bul. No. 208: Occupational hazards and industrial hygiene. Washington, 1923.

attempted to set up standards for the guidance of those whose responsibility it is to pass upon claims for compensation or damages. The symptoms, conditions, or diseases cited are those which are reported in the best works available on the several hazards. They have not been listed in the order of their importance, and many are perhaps of rather rare occurrence. Similarly, the occupations and industries listed are those which have been reported as offering exposure to such hazards, and not necessarily those in which specific cases of injury have occurred.

The form of the pamphlet has been changed somewhat to facilitate reference to the symptoms and occupations listed under each hazard. While the number of hazard groups remains the same, we have completely revised the method of presenting some of the hazards. "Extreme light", now listed as "radiant energy", has been subdivided to show separately the effects of "X-rays and radium", and of "ultraviolet and infrared rays." "Abnormalities of temperature" is now subdivided to show the effects of "heat and humidity" in addition to those of "extreme dry heat" and "sudden variations of temperature." The hazards covered now include "abnormalities of temperature"; "compressed air"; "dampness"; "defective illumination"; "dust"; "infections"; "radiant energy"; "repeated motion, pressure, shock, etc."; and the "poisons." The section on "skin irritants" is now listed under the heading "dermatoses." The number of poisonous substances considered has been increased from 88 to 94. The number of hazardous occupations listed has been increased to approximately 900.

The authors desire to acknowledge their indebtedness to the members of the medical profession of the United States and Canada, who have so graciously received the previous editions, and who have so enthusiastically cooperated in extending its scope. It would be impracticable to make personal acknowledgment of all the assistance which has been received in preparing this revision. Mention, however, should be made of the following authors and organizations from whose published works so large a part of the information used in the pamphlet was secured: Drs. Alice Hamilton, George M. Kober, Emery R. Hayhurst, Yandell Henderson, Howard W. Haggard, R. Prosser White, Carey P. McCord, Henry H. Kessler, Ralph W. Webster, Frank P. Underhill, W. Gilman Thompson, and also the International Labor Office of the League of Nations, Harvard School of Public Health, United States Bureau of Labor Statistics, United States Public Health Service, United States Bureau of Mines, and the Bureau of Industrial Hygiene of the New York State Department of Labor.

The authors are especially indebted to Dr. Anthony J. Lanza and Dr. William J. McConnell, assistant medical directors of the Metropolitan Life Insurance Co., for reviewing the entire manuscript, for assistance in the preparation of the text, and for many valuable criticisms suggested by their broad experience in the field of industrial medicine.

The detailed work of this compilation was carried out by Thomas Dublin, Lawrence Wolff, and Sol Ungar, of the Statistical Bureau of the Metropolitan Life Insurance Co.

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ROBERT J. VANE.

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OCCUPATION HAZARDS AND DIAGNOSTIC SIGNS: A GUIDE TO IMPAIRMENTS TO BE LOOKED FOR IN HAZARDOUS OCCUPATIONS

Introduction

Many occupations have injurious effects on the physical condition of those engaged in them. The health of those who work with the poisons, such as lead, arsenic, mercury, picric acid, etc., or those who are exposed for long periods to dust, heat, humidity, or to the infectious materials, may be impaired seriously as the result of their work. The occupation is now recognized as of the very first importance as a factor in the causation of disability and even of death. We see this reflected in the frequent revisions of compensation laws to include an increasing number of occupational diseases. Dr. Edsall has shown that in the clinic he conducted at the Massachusetts General Hospital many of the conditions for which treatment was sought by men of working ages were the effects of occupation. Other industrial clinics are reporting similar results. With their attention directed to occupation as a possible factor, industrial physicians are able to diagnose a great many obscure cases which previously had puzzled even the most competent clinicians. In this way they discover a great many more cases of disease of occupational origin than had before been thought possible. Thus, in 1917, about 180 cases of lead poisoning were discovered at the Massachusetts General Hospital, which are more than were recorded by this clinic during the 8-year period prior to the adoption of the more intensive methods of study. It is generally recognized that patients come to physicians with pains and complaints of an indefinite character, and it is only when consideration is given to the occupation and its possible effects that many of these cases are cleared up.

The medical examiner should therefore be very careful to see if any of the usual diagnostic signs of poisoning, dust, heat, or other hazards which are known to be inherent in occupations are in evidence among their patients, where no other explanation of the case is readily available. In the case of those exposed to lead, such as employees of storage-battery plants, white-lead workers, paint mixers, painters, etc., the blue line on the gum, the pale, sallow appearance, and the trembling fingers are significant as indications of chronic lead poisoning, and the physician should look for these signs. Physical symptoms and conditions which ordinarily might be passed by, in this way become very important if they point to the possible effect of the occupation.

This handbook has been prepared to aid physicians in general practice, industrial hygienists, safety engineers, and others who come into close professional contact with those who are engaged in industrial processes. Nine major hazards of employment are listed; namely, "abnormalities of temperature"; "compressed air"; "dampness"; "defective illumination"; "dust"; "infections"; "radiant energy"; "repeated motion, pressure, or shock"; and the "poisons." A separate section of the bulletin is devoted to a discussion of the dermatoses. Long exposure to any of these will usually leave definite physical signs which the medical examiner can discover if he will look for them. To aid him in detecting the hazards and their effects on the worker, two lists are presented. The first consists of the more common hazardous occupations, arranged alphabetically; the second consists of hazards, together with their effects or symptoms, as well as the occupations affected. After each occupation in the first list is a reference in code to the particular hazard in the second list. The capital letters after each occupation, A, B, C, etc., refer to the general hazard. The arabic numerals signify the particular hazard, as E 1, inorganic dust; E 2, organic dust.

The following example will show how this guide may be of value to the general practitioner: A man, who works in a garage, suffering from continuous headaches visits his physician. The latter can find no cause for the patient's illness. The patient shows no sign of disease other than the subjective symptoms which he describes. Perhaps the physician will recommend an examination of the subject's eyes, ears, and sinuses, which will prove negative. A correct diagnosis in a puzzling case such as this is much easier to determine when the occupation is ascertained and this guide is utilized. Alongside of "garage workers" in the Alphabetical List of Hazardous Occupations, the physician finds the symbols J 15, 24, 51, 55. "J" represents the hazard "poisons", and 15, 24, 51, 55, the particular poisons—gasoline, carbon monoxide, lead, and tetraethyl lead, respectively. Upon looking up the symptoms of these poisons in the second list, he finds that all produce headache. In such a case an effort should be made to discover which of these poisons exists as a hazard in the plant where the patient is employed. The remedy consists in the removal of the etiological factor—the specific poison.

The following procedure is therefore recommended: The medical examiner or physician should ascertain the occupation of the person undergoing examination. He should then look for it in the Alphabetical List of Hazardous Occupations (p. 4). If found there, it is possible that the person has been exposed to and is possibly suffering from the effects of some hazard of his occupation. The numerals will indicate the particular hazards of the occupation. The physician should then make special effort to discover the symptoms or signs referred to in the second list. By this means he can readily determine whether the person examined is in fact suffering from the effect of his occupation. His examination is in this way made more illuminating. Physicians, not specialists in occupational hygiene, can thus learn to detect the effects of industry and, conversely, can eliminate the occupation as the cause when certain symptoms are observed which do not fit the usually observed effects of the occupation.

Medical examiners should remember that it is often necessary to keep in mind not only the present occupation but the former one as well. Persons suffering from certain ailments may no longer be engaged in the industry which was responsible for their condition. But careful inquiry into their occupational history will sometimes result in the recording of an occupation the effects of which are clearly those from which the patient is suffering. The medical profession must give occupational findings greater weight in forming their judgments regarding physical conditions and in diagnosing and treating disease.

It is hoped in this way that the medical profession will become more and more acquainted with occupational diseases and help in the movement to discover and eliminate cases thereof. In our country, it is still true that very large numbers of working people are constantly exposed to serious occupational hazards and suffer, often unnecessarily, very seriously from the effects of such exposure. The greater interest of medical practitioners will help materially in the campaign of prevention. Medical schools can aid greatly in bringing about this result by giving due weight to the subject in their courses of study. Already the form and content of the pamphlet have recommended it to several schools, which report its value. In the same way, plant executives and safety engineers must take cognizance of the existence of these occupational diseases and look carefully into their own establishments to see to what degree the processes in their shops are devoid of the dangers which are usually associated with industrial operations. Factory inspectors, labor officials, and workmen's compensation boards will find it helpful in inspecting and evaluating the hazards of numerous industries. Many hazards may be revealed which they have not known were associated with the processes of manufacture and of which the employers themselves have been ignorant. The rapidly expanding field of industrial rehabilitation should find this bulletin an aid in selecting occupations for those with arrested cases of tuberculosis and for others weakened by disease.

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Section I.—Alphabetical List of Hazardous Occupations

Abrasives workers, H 1.
Acetaldehyde makers, J 1, 24.
Acetanilide workers, J 10.
Acetic-acid makers, J 47, 24.
Acetone workers, J 3, 24.
Acetylene workers, H 1, J 3, 7, 18, 22, 24, 27, 31, 72.
Acid dippers, C, J 13, 26, 47, 64, 69.
Acid foulders (glass), J 47, 51, 69.
Acid makers. *See* particular acid.
Acid mixers, J 47, 64, 69.
Acid recoverers, J 47, 64, 69.
Acid transporters, J 47, 64, 69.
Acridine workers, J 4.
Acrolein workers, J 5.
Airplane-dope makers, J 3, 5, 6, 16, 26, 64.
Airplane-wing varnishers, J 64. *See also* Varnishers.
Alcohol-distillery workers, J 8, 9, 16, 19, 24.
Aldehyde pumpmen, J 1, 65.
Alkali-salt makers, C, J 22, 26, 47, 70, 79.
Aluminum extractors, J 40.
Alum workers, J 26.
Amalgam makers, J 24.
Amber workers, J 61.
Ammonia workers, J 7, 24.
Ammonium-salts makers, A 1, J 7, 26, 55, 47, 69.
Ammonium-sulphate makers, J 26.
Amyl-acetate workers, J 5, 9.
Amyl-nitrite makers, J 9.
Anesthetic makers, J 40.
Aniline-compound workers, J 10, 21.
Aniline-dye makers. *See* Dye makers.
Aniline makers, J 10, 16, 19, 47, 61, 64.
Animal-hair dressers. *See* Hair workers.
Animal handlers, F 1, 3.
Annealers, A 1.
Antifreeze makers, J 65.
Antimony extractors (refiners), A 1, J 11.
Antimony fluoride extractors, J 40.
Antipyrin makers, J 26.
Arsenic roasters, A 1, J 12.
Arseniuretted-hydrogen makers, J 12.
Art-glass workers, J 8, 16, 46, 61, 65, 90.
Artificial-amber makers, J 44.
Artificial-flower makers, H, J 12, 21, 51, 54, 55.
Artificial-gem makers, J 26.
Artificial-ice makers, A 3, C, J 7, 70.
Artificial-leather workers, A 2, J 3, 8, 10, 12, 16, 20, 64, 90.
Artificial-measure makers. *See* Fertilizer makers.
Artificial-pearl makers, J 8, 51, 64, 84.
Artificial-resin makers, J 24.
Artificial-silk makers, A 2, C, J 7, 8, 18, 22, 23, 26, 44, 47, 65, 77, 79, 80, 84.
Artificial-stone makers, J 52.
Art-printing workers, J 26.
Asbestos workers, A 1, H 1.
Asphalt workers, A 1, J 25, 52.
Auto painters, C, J 64. *See also* Painters.

Babbitters, J 51.
Babbitt makers, J 44, 69.
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Balloon (hydrogen) workers, J 10.
Balloon inflators, J 24.
Barbers, H.
Barium carbonate makers, J 14, 70.
Bar-mill workers (iron and steel), A 1.
Barometer makers, J 64.
Basic-slag (artificial-measure) workers, H 1.
Batch makers (glass works). *See* Glass mixers.
Batch makers (rubber works). *See* Compounders (rubber).
Beaters (laundry), C, F 1.
Battery (dry) makers, H 1, J 6, 10, 24, 47, 51, 52, 54, 82.
Battery (storage) makers. *See* Storage-battery makers.
Beamers (textiles), H 2.
Beamhouse workers (tannery), C, F 1.
Beatermen (paper and pulp), C, J 26.
Bed rubbers (marble and stone), H 1.
Bench molders (foundry), H 1, J 17, 51.
Benzene purifiers, J 60.
Benzol-still men, A 1, J 10.
Bessemer-converter workers (iron and steel), A 1.
Beta-still operators (beta-naphthol), A 1, J 60.
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Bicyclists, H.
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Bisque-kiln workers, A 1, H 1, J 26.
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Blast-furnace workers, A 1, J 22, 24, 26, 70, 79.
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Bleaching-powder makers, J 13, 27, 60.
Blenders (motor fuel), J 30.
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Blenders (tannery), J 61.
Blooming-mill workers (iron and steel), A 1.
Blowers (felt hats), H 2, J 24.
Blowers (glass manufacturing). *See* Glass blowers.
Blowers-out (zinc smelting), A 1, J 27.
Blueprint makers, J 31.
Blues (revolvers), A 1.
Boiler cleaners and washers, C, J 24.
Boiler-room workers, A 1, J 22, 24.
Bonebleck makers, J 7, 71.
Bone renderers, J 5.
Bone workers, H 1, J 5, 24, 26.
Bookbinders, J 6, 12, 51, 55.
Bottle-cap makers, J 51.
Bottlers (mineral waters), J 70.
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Brass polishers, J 51. *See also* Polishers and cleaners (metal).
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Brasiers, A 1, J 27, 51.
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Brick makers, A 1, C, H 1, F 2, J 51, 70.
Briquet makers, J 12, 52.
Bromine makers, J 16, 20.
Bromine-salt makers, J 16.
Bronzers, H 1, J 7, 8, 12, 13, 15, 16, 17, 24, 47, 51, 54, 61, 70.
Broom makers, H 2, J 26, 44, 70.
Browners (gun barrels), J 26, 51, 54, 61.
Brushers (felt hats), H 2, J 24.
Brush makers, H 2, F 1, J 44, 54, 65, 66.
Buffers, D, H 1, 2.
Buffers (rubber), J 8, 15, 51.
Burners (enameling), A 1, J 51.
Burnishers (iron and steel), D, J 12, 51.
Burnishers (rifle barrels), J 12.
Burners (needles), H 1.
Burr fixers, H 1.
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Button makers, H 1, 2.
Butyl alcohol makers, J 29.

Cable makers, J 51.
Cable splicers, C, J 24, 51, 70, 90.
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Candle (colored) makers, J 6, 12, 31.
Candy makers, A 2, 3.
Cannon, A 2, 3, C, F 2, J 51.
Can (sanitary) makers, J 16.
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Carbide makers, A 1, H 1, J 7, 24.
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Carbon-brush makers, H 1.
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Cartridge dippers, J 47, 64, 90.
Cartridge felt and wad makers, C.
Cartridge makers, J 51, 54.
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Chlorine-compound makers, J 47.
Chlorine makers, J 28, 47, 53, 54.
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Colored-paper workers, J 12.
Colorers (white) of shoes, J 81.
Color makers, A 1, B 1, J 7, 11, 12, 16, 18, 21, 26, 81, 81, 84, 87, 89, 84, 88.
Comb makers, B 2.
Compositors, D, B 1, H, J 10, 11, 26, 81.
Compounders (rubber), B 1, F 10, 11, 12, 15, 16, 81, 81.
Concentrating-mill workers (lead and zinc), G, B 1, J 81.
Cones (felt hats), B 2, J 84.
Confectioners. *See* Candy makers.
Construction-camp workers, F 2.
Construction laborers, B 1.
Cooks, A 8, G 2, J 24.
Copper founders, J 12, 80.
Copper miners. *See* Miners.
Copper refiners and smelters, A 1, J 11, 12, 24, 28, 81, 78, 82.
Coppersmiths, J 29.
Cord makers, J 82.
Core makers, A 1, B 1, J 17, 24.
Cork workers, B 2.
Corn-products workers, A 1, 2, 8.
Cosmetic workers, J 84.
Cotton-mill workers, A 2, G, B 1, 2.
Cotton-seed-oil workers, A 2.
Cotton twisters, B 2, H.
Cranemen (glass industry), A 1.
Crassmen (iron and steel), A 1.
Crayon (colored) makers, J 81.
Creosoting-plant workers, G, J 82.
Cresol-soap makers, J 84.
Cresylic-acid makers, J 84.
Crucible miners, B 1.
Crucible-steel department employees, A 1.
Crushermen (clay and stone), B 1.
Cupola men (foundries), A 1, J 22, 24.
Curers, vapor (rubber). *See* Vulcanizers.
Curriers (tannery), B 2, F 1, J 12, 28.
Cut-glass workers, B 1, J 12, 81.
Cutlery makers, B 1, J 8, 81.
Cutters (oxyacetylene and other gases). *See* Welders.
Cyanamid makers, A 1, B 1.
Cyanide workers, J 7, 88.
Cyanogen makers, J 84, 78.

Damascening workers, J 64.
Dancers, H.
Decorators (pottery), J 12, 18, 16, 81, 88.
Degreasers (fertilizer; leather), J 18, 16.
Degreasers (textiles), J 28.
Denatured-alcohol workers. *See* particular denaturants.
Dental workers, J 81.
Dentists, J 84.
Depilatory makers, J 88.
Deliming workers, J 28.
Detector cleaners, J 64.
Detonator fillers, J 84.
Detonator packers, J 84.
Devil operators (felt hats), B 2, J 84.
Diamond cutters, B 1, H.
Diamond polishers, J 81.
Diatomaceous-earth workers, B 1.
Digester-house workers (paper and pulp), A 2, 8, J 78, 78.
Dimethyl-sulphate makers, J 12, 88, 85, 84, 88.
Dioxan makers, J 88.
Dippers (gun cotton), J 64.
Dippers (rubber), J 15, 16.
Dippers. *See also* Acid dippers.
Disinfectant makers, J 1, 18, 27, 28, 84, 85, 44, 64, 88, 78, 89.
Divers, B, J 22.
Doffers (textiles), A 2, G, B 2.
"Dope" workers. *See* Airplane-dope makers.
Dressers (glass), A 1.
Dresser tenders (textile), A 2, 8, G.
Driers (felt hats), A 8, J 85.
Driers (rubber), J 15, 16, 28.
Drier workers (foundries), J 24.
Drillers (rock), B 1.
Drivers, A 8, G.
Drop forgers, A 1.
Dry-battery workers. *See* Battery (dry) makers.
Dry cleaners, A 8, J 18, 16, 22, 28, 88, 66, 80.
Drying-room workers (miscellaneous), A 8, J 22, 24.
Dye makers, A 2, 8, J 1, 8, 4, 7, 20, 11, 12, 18, 16, 18, 27, 28, 81, 84, 86, 88, 44, 46, 47, 81, 88, 64, 66, 67, 68, 64, 66, 68, 69, 74, 78, 78, 79, 80, 88, 89.
Dyers, A 8, J 8, 7, 8, 10, 15, 81, 47, 48, 81, 88, 61, 66, 78, 81. *See also* Mordanters, and other preparatory process workers.

Electricians, G 2, J 66.
Electric-induction-furnace workers, J 64.
Electric linemen, G 2.
Electrode makers, J 88.
Electrolytic process (copper) workers, J 12.
Electroplaters, G, J 11, 12, 18, 28, 16, 21, 28, 88, 81, 86, 66, 47, 81, 64, 66, 66.
Electrotypers, A 8, B 1, J 11, 81. *See also* Electroplaters.
Elevator runners, H.
Embalmers, J 44, 64.
Embossers, J 64.
Embroidery workers, D, J 81.
Emery-wheel makers, B 2, J 81.
Enamelers, A 1, G, H, J 8, 12, 15, 16, 22, 24, 81, 81, 88, 84, 89.
Enamel makers, J 8, 11, 18, 16, 18, 22, 24, 81, 47, 81, 88, 84, 86, 89.
Engineers (stationary), A 1, 8, B 1, J 24.
Engravers, B 1, H, J 16, 47, 66, 66. *See also* Steel engravers.
Etchers, J 12, 47, 48, 64, 66, 89.
Ether makers, J 89.
Ethyl benzene makers, J 89.
Ethyl-bromide makers, J 66.
Ethyl-chloride makers, J 66.
Ethylene-dibromide makers, J 28, 61.
Ethylene dichloride makers, J 62.
Ethylene oxide makers, J 62.
Explosives workers, G, J 1, 8, 7, 8, 9, 10, 15, 22, 81, 84, 44, 64, 66, 61, 62, 64, 66, 78, 89. *See also* particular occupation.
Extractor operators (soap), A 8, G.
Extractors (gold and silver), J 28, 85, 84.
Extractors (oils and fats), J 18.

Farmers, F 1, 2, J 12, 81.
Fat renderers, A 2, J 8, 78, 89.
Feather curers, B 2, J 12.
Feather workers, B 2, F 8, J 10, 12, 15, 16, 85, 67, 78, 80.
Felt extractors, A 2.
Felt-hat makers, A 2, 8, B 2, J 12, 84, 85, 89. *See also* particular occupation.
Felt makers, A 2.
Ferrosilicon workers, J 12, 18, 72.
Fertilizer makers, G, B 1, F 1, 2, J 7, 15, 22, 26, 47, 49, 58, 64, 71, 78, 79, 80. *See also* Phosphate-mill workers.
Fiber workers, B 2.
Filament makers and finishers (incandescent lamps), J 24, 66, 68.
File cutters, B 1, J 81.
Filers, B 1, J 11, 81.
Filling-station workers, J 81, 82.
Film makers. *See* Pyroxylin-plastics workers.
Filter-press workers, G.
Finishers (leather), B 2.
Fire-extinguisher makers, J 28.
Firemen (city), A 1, 8, G, J 24, 26.
Firemen (stationary), A 1, 8, B 1, J 24.
Fireworks makers, J 11, 22, 66, 64, 71, 78. *See also* Explosives workers.
Fishermen, A 8, G.
Fitters (shoes), J 81.
Flangers (felt hats), A 8, J 84.
Flatteners (glass), A 1.
Flax-cutting workers, J 78.
Flax spinners, A 2, B 2.
Flint workers, B 2.
Floor molders (foundry), A 1, B 1, J 17, 81.
Floor-polish makers, J 61.
Floor workers, B 2.
Flue cleaners, B 1, J 24, 78, 82.
Flush tenders (aluminum), G.
Forgemen, A 1.
Formaldehyde workers, J 64.
Formers (felt hats), B 2.
Formic-acid workers, J 65.
Foundry workers, A 1, B 1, J 22, 24. *See also* particular metal.
Fracture (glass and pottery), J 81.
Fruit-essence makers, J 8, 9.
Fruit preservers, J 78.
Fulminate miners, J 66, 84.
Fumigators, J 24, 84, 66, 78.
Fur cutters, B 2, F 1.
Fur clippers, B 2, F 1.
Fur cutters, B 2, F 1.
Fur handlers, B 2, F 1, J 12, 84.
Furnace workers, A 1, G 2, J 22, 24.
Furniture polishers, B 2, H, J 8, 15, 81, 66, 67, 68.
Fur preparers, B 2, F 1, J 12, 84, 64.
Fur pullers, B 2, F 1.
Fusel-oil workers, J 9.

Galvanizers, A 2, G, J 6, 7, 12, 18, 17, 47, 61, 64, 78, 80.
Garage workers, J 15, 24, 81, 82.
Garbage workers, F 8.
Gardeners, J 12, 81.
Gas (illuminating) workers, A 8, J 7, 15, 16, 24, 25, 66, 78, 82.
Gasoline blenders, J 81, 66.
Gasoline-engine workers, J 15.
Gas purifiers, J 7, 25, 66, 78.
Gassers (textile), J 24.
Gatherers (glass), A 1.
Gelatine makers, J 78.
Germicide makers, J 10, 64, 78.
Gilders, J 8, 15, 16, 66, 64, 65, 64, 78.
Glass blowers, A 1, B 1, G 2.
Glass colorers, J 21, 81, 88.

Glass cutters, C, H 1.
Glass etchers, J 44, 49.
Glass finishers, C, H 1, J 47, 48, 51, 80.
Glass-furnace workers, A 1, C 2.
Glass mixers, H 1, J 11; 12, 47, 51, 59.
Glass polishers, J 51.
Glass workers, J 22, 76, 86.
Glaze dippers (pottery), C, J 11, 12, 31, 47, 51, 53.
Glaze mixers (pottery), H 1, J 11, 12, 31, 47, 51, 53.
Gloat-kiln workers, A 2, J 24, 51.
Glove makers (leather preparers), C, H 2. *See also* Tannery workers.
Glue workers, A 2, C, H 2, F 2, J 5, 7, 15, 16, 22, 23, 47, 73, 75, 80.
Glycerine refiners, J 65.
Gold beaters, H 1, 2.
Gold extractors, J 15, 19, 21.
Gold refiners, H 1, J 12, 20, 44, 60, 61, 61.
Grain-elevator workers, H 2.
Granite workers: *See* Stonecutters.
Graphite workers, A 1, H 1.
Grinders (colors). *See* Color makers.
Grinders (metals), C, H 1, J 11, 51.
Grinders (rubber), H 2, J 11, 51.
Guncotton dippers, J 64, 80.
Guncotton pickers, H 2.
Guncotton washers, C.
Gypsum workers, A 2, H 1, J 70.

Hair workers, C, H 2, F 1, 2.
Hammermen, H.
Hardeners (felt hats), J 64, 65.
Hardeners (rubber). *See* Temperers.
Harness makers, H 2.
Hat makers, felt. *See* Felt-hat makers.
Heater boys (riveters), J 51.
Heel makers (shoes), H 2.
Hemp workers, H 2.
Horn workers, H 1.
Hospital attendants, C 1.
Hothouse workers, A 2.
Hot-rod rollers (iron and steel), A 1.
House wreckers, H 1.
Hydrochloric-acid makers, J 67, 70, 80.
Hydrocyanic-acid makers, J 66, 80.
Hydrofluoric-acid makers, J 69.
Hydrogen-sulphide workers, J 70.

Ice (artificial) makers. *See* Artificial-ice makers.
Ice cream makers, A 2, C.
Imitation. *See* Artificial.
Incandescent-lamp makers, J 24, 51, 54, 55. *See also* particular occupation.
Incandescent-mantle hardeners, C 2.
Ink makers, J 15, 24, 28, 51, 44, 47, 55, 61, 63.
Insecticide makers, J 12, 28, 44, 51, 71, 81.
Instrument dial (luminous) painters, C 1.
Insulators, J 82.
Iodine makers, J 28.
Iron and steel workers (all departments), A 1, H 1, C 2. *See also* particular occupation.
Ironers, A 2, J 24.

Japan makers, A 2, J 12, 15, 51, 55, 60.
Japanners, J 12, 15, 51, 55, 60.
Jewelers, D, H 1, 2, J 2, 12, 20, 47, 51, 54, 64, 80.
Junk-metal refiners, A 1, H 1, J 17, 51.
Jute workers, H 1, 2.

Kiln tenders, A 1, J 24.
Knitters, H.
Knitting-mill workers, H 2.

Laborers (paint cans), J 51.
Laboratory workers (radium research), C 1.
Lace makers, H 2.
Lacquerers, J 2, 5, 9, 12, 15, 16, 25, 45, 51, 52, 75, 84, 85.
Lacquer makers, J 2, 7, 8, 9, 12, 15, 16, 25, 28, 29, 45, 51, 52, 75, 84, 85.
Lampblack makers, J 67, 68.
Lapidaries, H 1.
Lard makers, J 5.
Lasters (shoes), A 2, C, H 2, J 63.
Lathe turners, H.
Laundry workers, A 2, 3, C, J 24, 27, 29, 63.
Lead burners, J 19, 51.
Lead-foil makers, A 1, J 51.
Lead miners, J 51. *See also* Miners.
Lead-pipe makers, J 51.
Lead-salts makers, J 51.
Lead smelters, A 1, H 1, J 11, 12, 24, 51, 75, 80.
Leather workers, H 2, F 1, J 5, 67. *See also* Tannery workers.
Leer tenders (glass), A 1.
Letter sorters, D, H.
Levermen (iron and steel), A 1.
Lifters-over (glass), A 1.
Lime burners, A 1, H 1, J 12, 22, 24.
Lime-kiln cleaners, H 1, J 22, 24.
Lime pullers (tannery), C, F 1.
Lime workers, H 1.
Linen workers, H 2.
Linoleum colorers, J 12.
Linoleum makers, A 2, 3, C, H 1, J 5, 8, 15, 16, 21, 51, 53, 55, 59, 60.
Linotypers, J 11, 24, 51.
Linseed-oil boilers, J 5, 51.
Lithographers, H 1, 2, J 10, 12, 15, 16, 21, 47, 51, 54, 64, 65, 80, 84, 85.
Lithopone makers, J 21.
Lithotransfer workers, J 51.
Locksmiths, H.
Longshoremen, F 1.
Lumbermen, A 3, F 2.
Lutera (zinc smelting), A 1, J 17.

Machinists, H.
Mail sorters, D, H.
Manganese-dioxide workers, J 68.
Manganese grinders, J 68.
Manganese-ore separators, J 68.

Manganese-steel makers, J 68.
Manometer makers, J 54.
Marble cutters, H 1.
Marblers (glass), A 1.
Masons, C, H 1, 2.
Match-factory workers, C, H 1, 2, J 28, 34, 51, 53, 71, 74, 75.
Matrices makers, H 2.
Meat inspectors, F 1.
Mechanics (gas engines), J 24.
Melters (foundry; glass), A 1, C 2.
Mercurialism, J 77, 80.
Mercury-alloy makers, J 54.
Mercury-boiler workers, J 54.
Mercury bronzers, J 54.
Mercury miners, J 54. *See also* Miners.
Mercury-pump workers, J 54.
Mercury-salt workers, J 54.
Mercury smelters, A 1, J 24, 54, 75.
Mercury-solder workers, J 54.
Mercury-still cleaners, J 54.
Mercury-switch makers, J 54.
Mercury-vapor-lamp makers, J 54.
Metal polishers and cleaners. *See* Polishers and cleaners (metal).
Metal-polish makers, J 10, 21, 65.
Metal refiners, J 67.
Metal turners, H 1.
Metal workers. *See* particular occupation.
Methane (synthetic) makers, J 24.
Methyl-alcohol workers, J 5, 24, 66.
Methyl-bromide makers, J 66.
Methyl-chloride makers, J 67.
Methyl-compound makers, J 66.
Mica strippers or splitters, H 1.
Mica workers, H 1.
Microscopists, H.
Millers, H.
Millinery workers, J 10, 12, 24, 25, 27, 60.
Miners, A 2, 3, C, D, H 1, H 2, H, J 25, 34, 70.
Mirror silverers, A 2, C, J 1, 7, 10, 25, 44, 46, 51, 54, 76.
Mixers (felt hats), H 2, J 64.
Mixers (rubber), A 2, H 1, J 10, 11, 12, 24, 25, 51, 61.
Mixing-room workers (miscellaneous), H 1, 2.
Mold breakers (foundry), H 1.
Mold breakers (pottery), J 24.
Molders. *See* Bench molders; Floor molders.
Monotypers, J 11, 24, 51.
Morticians, J 3, 11, 15, 18, 24, 27, 51, 53, 61, 64, 82. *See also* Dyers.
Motion-picture-film workers, J 30, 34, 51. *See also* Pyroxylin-plastics workers.
Motion-picture-machine operators, C 2.
Motion-picture-studio workers and actors, C 2.
Moulders, A 2.
Mouthers (leather), J 5, 63.
Mule tenders, A 1.
Muriatic-acid makers. *See* Hydrochloric-acid makers.
Muriatic-acid miners. *See* Acid miners.
Musical-instrument makers, J 51.
Musicians, H.

Neon lights letter makers, J 24.
Nickel platers, C. *See also* Electro platers.
Nickel-purification workers (blood process), J 69.
Nitrocellulose workers, J 10.
Nitrators, J 64, 65.
Nitric-acid workers, J 7, 51, 64, 69.
Nitrobenzine makers, J 30, 80.
Nitrobenzol workers, J 65.
Nitrocellulose workers, J 8, 9, 10, 12, 24, 25, 64, 80.
Nitrocellulose makers, J 12, 51, 62, 64, 80.
Nitrous-acids workers, J 64.
Nurses, C 1.

Oilcloth makers. *See* Linoleum makers.
Oil extractors, J 5, 22, 42, 64.
Oil-distilling-plant workers, J 67, 72, 73.
Oil painters, J 80.
Oil refiners. *See* Petroleum refiners.
Oil-well workers, J 67, 72.
Open-hearth department workers (iron and steel), A 1.
Oxalic-acid makers, J 66, 68, 74.
Oxyacetylene cutters. *See* Welders.

Packing-house employees, A 2, 3, C.
Painters, H, J 3, 6, 8, 10, 12, 15, 16, 22, 32, 51, 53, 54, 55, 80.
Painters (luminous watch and instrument dials), C 1.
Painters' (zinc), J 80.
Paint makers, C, J 3, 6, 8, 9, 10, 12, 15, 16, 22, 31, 47, 51, 52, 54, 55, 62, 67, 68, 80.
Paint-remover makers, J 10, 65, 84.
Paint removers, H 1, J 3, 6, 8, 16, 51, 62, 84.
Pair hookers (tin plate), A 1.
Paper-box makers, H.
Paper glazers, J 12.
Paperhangers, H 1, J 12, 51, 61.
Paper makers, A 2, 3, C, J 12, 20, 41, 47, 77, 78, 79, 80. *See also* particular occupation.
Parasite workers, J 3, 10, 22, 25, 47, 82.
Paris-green workers, J 12.
Patent-leather makers, A 2, J 3, 24, 51, 62, 63, 80.
Pavers, A 1, H, J 80.
Pencil makers, J 10, 12, 51, 75.
Perfume makers, J 3, 6, 10, 20, 25, 34, 36, 46, 65, 61, 62, 63.
Petroleum refiners, A 1, C, J 7, 15, 47, 51, 67, 77, 78, 79, 80, 82.
Phenol makers, J 10, 62, 78, 80.
Phenyl-hydrazine workers, J 66.
Phosgene makers, J 24, 28, 70.
Phosphate extractors, J 67.

Phosphate-mill workers, A 2, C, H 1, J 71. *See also* Fertiliser makers.
Phosphine workers, J 72.
Phosphor-bronze workers, J 71.
Phosphoric-acid makers, J 36, 64, 70.
Phosphorus-compound makers, J 71, 79.
Phosphorus-evaporating-machine operators, A 2, C, J 60.
Phosphorus extractors, J 60, 71, 72.
Phosphorus (red) makers, J 72.
Phosphuretted-hydrogen workers, J 72.
Photo-engravers, J 16, 31, 55, 64.
Photographers, D, G 2. *See also* Photographic workers.
Photographic workers, J 1, 2, 8, 10, 16, 18, 20, 25, 31, 36, 44, 47, 54, 55, 78, 79, 80.
Photograph retouchers, J 51.
Photogravure workers, J 31.
Physicians, G 1.
Pickers, A 2, C, J 13, 26, 47, 54, 58.
Picric-acid makers, J 36, 64, 66, 78, 80.
Pigment makers. *See* Color makers.
Pipe fitters, J 51. *See also* particular liquid piped.
Pitch workers, J 12, 62.
Pit molders (foundry), A 1, H 1.
Planer men (stone; metal), H 1.
Plasterers, C, H 1.
Plaster-of-paris workers, H 1.
Platers. *See* Electroplaters.
Platinum extractors, J 18.
Plumbers, J 3, 24, 51. *See also* particular substance piped.
Pneumatic-tool workers, H 1, H.
Polishers and cleaners (metal), D, H 1, 2, H, J 16, 26, 47, 51, 65.
Polishers (furniture). *See* Furniture polishers.
Polish makers, H 1, J 8, 16, 66, 80.
Porcelain makers. *See* Pottery workers.
Porters, H.
Pot fillers (glass), A 1.
Pot fitters (iron and steel), A 1.
Pot pullers (foundry), A 1.
Pot-room workers (aluminum foundry; carbide plant), A 1.
Pot setters, A 1.
Pottery workers, A 1, 2, C, H 1, J 12, 22, 24, 47, 51, 53, 54, 76. *See also* particular occupation.
Pouncers (felt hats), H 1, 2.
Pourers (brass foundry). *See* Brass founders.
Powder (smokeless) makers. *See* Smokeless-powder makers.
Preparers (tannery), C, F 1, 2.
Preservative makers and handlers, J 44.
Pressers, H, J 24.
Pressmen (oil refining), C,
Pressmen (printers), H 1.
Pressroom workers (rubber), A 2, J 10, 11, 12, 15, 16.
Primers (explosives), J 54.
Printers, H 1, J 10, 11, 12, 15, 51, 60.
Pullers-out (felt hats), A 2.
Pulp-mill workers. *See* Paper makers.
Putty makers, H 1, J 15, 22, 51.
Putty polishers (glass), H 1, J 51.
Pyridine workers, J 76.
Pyrites burners, A 1, H 1, J 12, 76, 80.
Pyroxylin-plastics workers, H 2, J 1, 3, 5, 8, 15, 16, 20, 24, 30, 51, 53, 54, 76, 80.

Quarrymen, H 1, F 2.

Radioactive-paint makers, G 1.
Radioactive-water makers, G 1.
Radiologists, G 1.
Radium ore reduction workers, G 1.
Radium-research workers, G 1.
Rag workers, H 2, F 2.
Rayon makers, A 2, C, J 7, 8, 12, 22, 36, 44, 47, 53, 76, 80, 84.
Reclaimers (rubber), H 2, J 10, 16, 20, 47, 51, 60, 80.
Red-lead workers, J 51.
Refiners (metals), A 1, J 12, 13, 24, 51, 54, 64, 76, 80. *See also* particular occupation.
Refiners (sugar). *See* Sugar refiners.
Refrigerating-plant workers, A 2, C, J 7.
Refrigerator (mechanical) makers and repairmen, J 5, 40, 64, 67, 76.
Repairers (foundries), J 24.
Resin (synthetic) makers, J 1, 54, 64, 66.
Riveters, H, J 51.
Road repairers, A 1.
Roentgenologists, G 1.
Roller coverers (cotton mills), A 2, H 2.
Rollers (metals), A 1.
Roll setters (iron and steel), A 1.
Roll wrenchers (iron and steel), A 1.
Roofers, A 2, J 51, 52.
Roofing-material workers, A 1, 2.
Roofing-paper workers, J 52.
Rope-makers, H 2.
Roughers (iron and steel), A 1.
Rubber-cement makers. *See* Cement mixers (rubber).
Rubber-glove makers, J 15, 16.
Rubber (red) workers, J 11.
Rubber-substitute makers, J 1, 8, 22, 24, 51.
Rubber-tire builders, J 15, 16.
Rubber workers, A 2, H 1, 2, J 2, 8, 10, 11, 12, 15, 16, 23, 25, 51, 44, 45, 51, 55, 76, 79, 81, 84, 90. *See also* particular occupation.

Sagger makers, C, H 1, J 51.
Sailors, A 2, H.
Salt extractors (coke oven by-products), J 7, 60.
Salt preparers, A 2, 3, H 1.
Sand blasters, H 1.
Sand cutters, H 1.
Sanding-machine operators, H 1.
Sandpaperers (enameling and painting auto bodies, etc.), H 1, J 51.
Sandpaper makers, H 1.
Sand pulverizers, H 1.
Saw filers, H 1.
Sawmill workers, H 2, F 2.
Sawyers, H.
Scissors sharpeners, H 1, H.
Scourers (metals), J 64, 80.
Scourers, wood insole (shoes), H 2.
Scouring-powder makers, H 1.
Scrapers (foundry), H 1.
Screen tenders (pulp mill), C,
Screen workers (lead and zinc smelting), H 1, J 51.
Sealers (incandescent lamps), J 24.
Sealing-wax makers, J 12, 80.
Seamstresses, H.
Sewer workers, C, J 7, 22, 24, 76.
Sewing-machine operators, H.
Shade-cloth makers, J 12, 24.
Shale-oil workers. *See* Petroleum refiners.
Shavers (felt hats; fur; tannery), C, H 2, F 1, 2.
Shaving-brush makers, H 2, F 2.
Sheep-dip makers, J 12.
Sheet-metal workers, J 51.
Shellackers, J 8, 15, 16, 20, 51, 53, 54.
Shellac makers, J 7, 8, 16, 24, 20, 51, 53, 80.
Shell fillers, J 62, 72.
Shepherds, F 1.
Shoddy workers, H 2, F 2, J 13, 26, 47, 80.
Shoe dyers, J 51.
Shoe-factory operatives, H 2, J 2, 25, 10, 51. *See also* particular occupation.
Shoe finishers, A 2, J 7, 8, 9, 16, 24, 26.
Shoe makers. *See* Cobblers.
Shot makers, J 12, 13, 51.
Shovels boys (glass), A 1.
Sifters, H 1, 2.
Silicate extractors, J 60.
Silk workers, H 2, F 2.
Silo workers, J 52.
Silverers (mirrors). *See* Mirror silverers.
Silver-foil makers, J 76.
Silver melters and refiners, A 2, J 24, 55, 64, 76.
Silver-nitrate makers, J 76.
Silver platers, J 76.
Silversmiths, J 76.
Singers (cloth), J 24.
Sintering-plant workers, H 1.
Sizers (felt hats), A 2, J 54.
Skimmers (glass), A 1, C 2.
Slag-machine tenders (iron and steel), A 1, H 1.
Slate workers, H 1.
Slip makers (pottery), C, H 1, J 51.
Smelters (porcelain enameling), J 51.
Smelters. *See* particular metal.
Smokeless-powder makers, J 8, 6, 9, 16, 22, 61, 64, 66, 72.
Smoothers (glass), C, H 1.
Soap (abrasive) workers, H 1.
Soap makers, A 2, C, F 2, J 5, 16, 44, 45, 47, 52, 55, 61, 74, 77, 78, 80.
Soda makers, C, J 7, 12, 22, 24, 26, 64, 76, 80.
Sodium-hydroxide makers, C, J 77.
Sodium-sulphide makers, J 76.
Softeners (tannery), H 2.
Solderers, J 23, 51, 54, 55, 67, 81.
Solder makers, J 21, 51.
Sole stitchers (Blake machine), J 64.
Spat packers, J 12.
Spinners (asbestos), H 1.
Spinners (textile), H 2, H.
Sponges, A 2, C.
Sprayers (paint), J 12, 55, 61.
Spreaders (rubber), A 2, J 15, 16.
Stablemen, F 1, J 7.
Stainers (shoes), J 51.
Stamp mill, workers, A 2, C, H 1.
Starch makers, H 2, J 22, 76.
Starchers (felt hats), A 2, J 54.
Stationary workers, H 1.
Steam fitters. *See* Pipe fitters.
Stearic-acid makers, A 2, J 8.
Steel (chrome), workers, J 51.
Steel engravers, D, J, 51, 54. *See also* Engravers.
Steeple jacks, J 24.
Stereotypers, A 2, J 11, 51.
Stiffeners (felt hats), J 54, 55.
Still (coal tar) cleaners, A 1, J 13, 60.
Stillmen (carbonic acid), A 2, J 60.
Stillmen, A 2. *See also particular chemical.*
Stitchers (shoes), J 25.
Stokers, A 1, H 1, G 2, J 24.
Stonecutters (dry), H 1, H.
Stonecutters (wet process), C, H 1, H.
Stonemasons, H 1.
Storage-battery chargers, J 76, 80.
Storage-battery makers, J 11, 13, 21, 51, 54, 76, 80.
Straw-hat makers, A 2, H 2, J 54.
Street repairers, A 1.
Submarine workers, J 23, 29, 30.
Sugar refiners, A 2, 3, C, H 1, 2, J 7, 22, 47, 76, 79, 80.
Sulphates makers, J 80.
Sulphides makers, J 76.
Sulphite cooks (pulp mills), A 2, 3, J 76.
Sulphur burners, A 1, H 1, J 12, 76.
Sulphur-chloride makers, J 36, 47, 79.
Sulphurers (malt and hops), J 76.
Sulphur extractors, J 22.
Sulphuric-acid workers, J 12, 13, 51, 64, 76, 79, 80.
Sulphur miners, J 79.
Sulphur-monochloride workers, J 51.
Sumachers (tannery), C, F 1.
Surgical-dressing makers, J 62.

Table hands (tannery), G, F 1.
Table operators (iron and steel), A 1.
Table turners (enameling), A 2, B 1, J 31.
Talters, H.
Takers-down (glass), A 1.
Tale workers, B 1.
Tallow refiners, F 2, J 3, 22, 69.
Tankmen, A 2, G.
Tannery workers, G, F 1, 2, J 7, 8, 10, 12, 15, 22, 27, 31, 36, 44, 46, 47, 51, 54, 65, 77, 78, 79, 80.
Tapers (airplanes), J 94.
Tappers (smelting), A 1. *See* also particular metal.
Tar-distillery workers, J 24, 62.
Taxidermists, B 2, F 1, J 12, 64.
Tear-gas makers, J 15, 20, 78.
Tenters (glass), A 1, J 24.
Telegraphers, H.
Telephone linemen (trunck work), G, J 24.
Temperers, A 1, 2, J 24, 26, 31, 67, 86.
Tetraethyl-lead makers, J 16, 31, 69.
Textile-comb makers, B 1.
Textile printers. *See* Calico printers.
Textile workers, A 2, 3, G, B 2. *See* also particular occupation.
Thallium workers, J 26.
Thermometer makers, J 24, 26.
Thread glazers, A 2, 3.
Tile makers, A 2, 3, G, B 1, J 31.
Tin-foil makers, A 1, J 31.
Tinners, A 1, G, J 6, 7, 12, 13, 47, 61.
Tin-plate-mill workers. *See* Iron and steel workers.
Tire builders. *See* Rubber-tire builders.
Tobacco moistemers, G, J 22.
Tobacco rollers, B 2.
Tobacco workers, B 2.
Toolgrocers (iron and steel), A 1.
Toolmakers, B 1.
Topmillers (foundry), A 1, B 1, J 24.
Towermen (sulphuric acid), J 15, 24, 78, 80.
Toy makers, J 3, 12, 61.
Train dispatchers, D.
Transfer workers (pottery), J 31, 69.
Transparent-wrapping-material workers, A 3, J 3, 22, 47, 77, 78, 80.
Transporters of hides and wool, F 1.
Tree sprayers. *See* Sprayers (trees).
Trench diggers, F 2.
Trinitrotoluol makers, J 16, 61.
Tube makers (glass), A 1.
Tubulators (incandescent lamps), J 24.
Tumbling-barrel workers, B 1.
Tunnel workers, B, D, F 2, J 22, 78.
Turners-out (glass), A, 1.
Turpentine extractors, A 2, J 69.
Type cleaners, J 15, 58.
Type founders, J 11, 61.
Type melters, J 5, 61.
Typesetters, J 61.
Ultramarine-blue makers, J 78.
Upholsterers, B 2, J 65.
Vanadium-steel workers, J 22.
Vapor cures. *See* Vulcanizers.
Varnishers, J 1, 3, 8, 9, 10, 15, 16, 20, 45, 51, 52, 56, 64, 69.
Varnish makers, A 3, J 1, 3, 8, 9, 10, 15, 16, 20, 45, 51, 52, 56, 64, 69.
Vatmen, A 2, G, J 22.
Vault workers, J 22.
Velvet makers, A 2, J 12.
Veterinarians, F 1, 3.
Vignetters, J 67.
Vinegar workers, J 1, 22.
Vintners, J 22.
Vinyl chloride makers, J 62.
Vulcanizers, A 3, J 10, 11, 15, 16, 22, 23, 26, 51, 56, 76, 78, 81.
Vulcanizers (steam), A 2, G.
Wall-paper printers, A 2, 3, J 12, 31, 61.
Warming-house employees (gunnetton), A 3.
Washers, G.
Washwomen, G, H.
Watch-dial (luminous) painters, G 1.
Watchmakers, D, H.
Water gilders, J 24.
Waterproofers (paper and textile), J 15, 16, 31, 44.
Wax-ornament makers, J 12, 31.
Wax refiners, J 69.
Weavers, B 2, H.
Weighers, B 1, 2.
Welders, A 1, G 2, J 10, 17, 21, 24, 61, 64.
Well workers, J 22.
White-lead workers, J 22, 31.
Window-shade makers, J 15, 16.
Wire drawers, J 12, 47, 69.
Wirers (incandescent lamps), J 3.
Wood-alcohol distillers, J 3, 24, 31.
Wood-last measurers (shoes), B 2.
Wood preservers, J 12, 24, 69, 82.
Wood polishers. *See* Furniture polishers.
Wood stainers, J 31, 61.
Woodworkers, B 2, J 15, 61.
Wool carders, B 2, F 1.
Wool scourers, A 3, G, F 1.
Wool spinners, B 2, F 1.
Wool workers, B 2, F 1. *See* also particular occupation.
Wringers (gunnetton), J 24.
X-ray photographers, G 1.
X-ray technicians, G 1.
Yeast makers, J 1, 22, 69.
Zincers, J 26.
Zinc-chloride makers, J 12, 22, 47.
Zinc-electrode makers, J 24.
Zinc miners, J 12, 61, 62. *See* also Miners.
Zinc smelters and refiners, A 1, B 1, J 11, 12, 17, 21, 24, 61, 78.

Section II.—List of Hazards, Symptoms, Occupations Exposed, and Methods of Prevention

A. Abnormalities of Temperature and Humidity

Exposure to environmental temperature beyond the action of the body's thermostatic control primarily results in disturbances of the circulatory system. The cutaneous circulation responds to heat stimulation in the skin by increasing the blood flow through the capillaries. The capillaries, responding to a reflex action of the nerves in the skin, dilate and induce the flow of a greater volume of blood through the cutaneous circulation. Cold, on the other hand, constricts the blood vessels of the skin, causing a diminished blood supply through the cutaneous circulation and not infrequently a serious congestion of the internal organs. Abrupt changes of temperatures, particularly from extreme heat to cooler temperatures and often to cold currents of air or drafts, are of more frequent occurrence, resulting in much bodily discomfort, and are contributory causes of neuralgia and respiratory diseases. Extremes of temperature may produce acute symptoms in the body directly attributable to the temperature. Thus, exposure to excessively high temperatures results in heat exhaustion or heat stroke; to excessively low temperatures in frostbite or gangrene and death.

The relative humidity is an important factor to consider in connection with temperature. It is contended that a low relative humidity tends to dry up the mucous membranes of the nose, throat, and lungs, thus lowering the resistance of these organs to infection. An excessively high relative humidity, on the other hand, is undesirable because of its interference with the normal evaporation of moisture from the skin. Under extreme conditions of high temperatures and high relative humidities there occurs a marked increase in the pulse rate, systolic blood pressure, and in the body temperature. Low temperatures and high relative humidities have the effect of undermining the general vitality of the organism, weakening its resistance to disease of the respiratory passages, and to neuralgia and rheumatic affections. With the above data in mind, abnormalities of temperature have been classified under three headings, namely, "sudden variations of temperature", "extreme dry heat", and "heat and humidity." "Extreme cold" has not been listed as a distinct hazard, because temperature so low as to cause the direct effects mentioned above is rarely met in industry. It is evident that the occupations listed in the divisions "extreme dry heat", and "heat and humidity," are exposed not only to the danger of the direct action of the high temperatures but also to the hazard, "sudden variations of temperature."

The prevention of diseases due to exposure to extremes of temperature consists, obviously, in the avoidance of sudden variations of

temperature. Workers in cold processes should keep active and avoid chill. The hot-process worker should allow his body to cool off gradually after completion of the day's work. He should carefully regulate his diet, drinking plenty of water. As direct preventive measures for the effects of extreme heat, it is advisable to make use of shields, helmets, goggles, water-cooled furnace doors, exhaust systems, cold air, fans, etc.

Our knowledge of the responses of the body to atmospheric conditions has been greatly enhanced recently by studies of American and foreign investigators. Men undergoing exposure to varying degrees of temperature, humidity, and movement of air have been medically examined. It has been amply demonstrated that these variable factors must be jointly considered in determining whether working conditions are inimical to health. Zones of comfort and discomfort and of effective working conditions have been charted. Means to mitigate the hazards of high temperature and humidity in certain industries have been devised. Those who have need for technical data on these subjects will find much of value in the paper by Dr. R. R. Sayers and Sara Davenport, entitled "Review of Literature on the Physiological Effects of Abnormal Temperatures and Humidity", in the United States Public Health Service Reports, April 8, 1927, page 923, and in reports of cooperative studies conducted by the United States Public Health Service, United States Bureau of Mines, and the Research Laboratory of the American Society of Heating and Ventilating Engineers.

A. Abnormalities of Temperature and Humidity

1. Extreme Dry Heat

Symptom, condition, or disease to look for

Heat stroke preceded by a rise in body temperature, increase in pulse rate, flushing of skin, profuse sweating, fall of diastolic pressure with rise in systolic blood pressure.

Anemia, general debility, catarrh, stiff joints, cramps, lumbago, Bright's disease.

Skin eruptions.

Cataracts, retinitis, conjunctivitis.

Occupations which offer such exposure

Ammonium salts makers
Annealers
Antimony extractors (reducers)
Arsenic roasters
Asbestos roofing makers
Asphalt workers
Bar-mill workers (iron and steel)
Benzol-still men
Bessemer converter workers (iron and steel)
Beta-still operators (beta naphthol)
Billet-mill workers (iron and steel)
Bisque-kiln workers
Blacksmiths
Blast-furnace workers
Blooming-mill workers (iron and steel)
Blowers-out (zinc smelting)
Blowers (revolvers)
Boiler-room workers
Brass founders
Brasiers
Brick burners
Brick makers
Burners (enameling)
Cappers (window glass)
Carbide makers
Carbon-black workers
Carborundum makers
Case hardeners
Casters (iron and steel)
Catchers (iron and steel)
Cement workers
Chargers (smelting)
Chargers (zinc smelting)
Coke-oven workers
Color makers
Copper smelters
Core makers
Core-products workers
Crassmen (glass industry)
Crassmen (iron and steel)
Crucible-steel-department employees
Cupola men (foundries)
Cyanamid makers
Dressers (glass)
Drop forgers
Enamelers
Engineers (stationary)
Firemen (city)
Firemen (stationary)
Flatteners (glass)
Floor molders (foundry)
Forgemen
Foundry workers
Furnace workers
Gatherers (glass)
Glass blowers
Glass-furnace workers
Graphite workers
Hardeners (metals)
Hot-rod rollers (iron and steel)
Iron and steel workers (all departments)
Junk (metal) refiners
Kiln tenders
Lead-mill makers
Lead smelters
Leer tenders (glass)
Levermen (iron and steel)
Lifters-over (glass)
Lime burners
Lutemen (zinc smelting)
Marblers (glass)
Molders (foundry; glass)
Mercury smelters
Mullie tenders
Open-hearth-department workers (iron and steel)
Pair heaters (tin plate)
Pavers
Petroleum refiners:
Pit molders (foundry)
Pot fillers (glass)
Pot fillers (iron and steel)
Pot pullers (foundry)
Pot-room workers (aluminum foundry; cryolite plant)
Pot setters
Pottery workers
Pressers (foundry)
Puddlers (iron and steel)
Pyrites burners
Refiners (metals)
Road repairers
Rollers (metals)
Roll cutters (iron and steel)
Roll wrenchers (iron and steel)
Roofing-material workers
Roughers (iron and steel)
Shove-in boys (glass)
Skimmers (glass)
Slag-machine tenders (iron and steel)
Still (coal tar) cleaners
Still men (carbolic acid)
Still men, operating
Stokers
Street repairers
Sulphur burners
Table operators (iron and steel)
Tobacco-dryers (glass)
Trappers (smelting)
Trimmers (glass)
Tunnelers
Tin-foil makers
Tinners
Tongmen (iron and steel)
Top fillers (foundry)
Tube makers (glass)
Turners-out (glass)
Welders
Zinc smelters

2. Heat and Humidity

Symptom, condition, or disease to look for

Heat stroke preceded by a rise in body temperature, increase in pulse rate, flushing of skin, profuse sweating, fall of diastolic pressure with rise in systolic blood pressure.

Anemia, general debility, catarrh, stiff joints, cramps, lumbago, Bright's disease.

Skin eruptions.

Occupations which offer such exposure

Artificial-leather workers
Artificial-silk workers
Bleachers
Bleachery driers
Blechers (felt hats)
Brewers
Calico printers
Candy makers
Canners
Charcoal workers (sugar refinery)
Cloth preparers
Coke-products workers
Cotton-mill workers
Cottonseed-oil workers
Digester house workers (paper and pulp)
Dollers (textile)
Drawer tenders (textile)
Dye makers
Felt extractors
Felt-hat makers
Felt makers
Flax spinners
Galvanizers
Laundry workers
Linoleum makers
Miners
Packing-house employees
Paper makers
Picklers
Pottery workers
Pullers-out (felt hats)
Pulp-mill workers
Roller coverers (cotton mill)
Roofing-material workers
Salt preparers
Sizers (felt hats)
Spongers
Steam-mill workers
Stretchers (felt hats)
Sugar refiners
Sulphite cooks (pulp mill)
Tank men
Tanners
Textile workers
Thread glazers
Tile makers
Turpentine extractors
Vatmen
Velvet makers
Vulcanizers (steam)
Wall-paper printers

3. Sudden Variations of Temperature

Symptom, condition, or disease to look for

Congestion of internal organs, catarrh, neuralgia, and rheumatic affections, gastro-intestinal and vesical catarrh, neuralgia, Bright's disease.

Occupations which offer such exposure

Artificial-ice makers
Bakers
Bleachers
Brewers
Butchers
Caisson workers
Calenderers (rubber)
Calico printers
Candy makers
Canners
Cartridge shot shell paraffin dippers
Charcoal workers (sugar refining)
Clay and bisque makers (pottery)
Cooks
Corn-products workers
Digester-house workers (paper and pulp)
Dresser tenders (textile)
Driers (felt hats)
Drivers
Dry cleaners
Drying-room workers (miscellaneous)
Dye makers
Dyers
Electrotypers
Engineers (stationary)
Extractor operators (soap)
Fat renderers
Felt-hat makers
Firemen (city)
Firemen (stationary)
Fishermen
Flangers (felt hats)
Gas (illuminating) workers
Glast-kiln workers
Glue workers
Gypsum workers
Hothouse workers
Ice-cream makers
Ironers
Japan makers
Lasters (shoes)
Laundry workers
Linoleum makers
Lumbermen
Miners
Mirror silverers
Mixers (rubber)
Motormen
Packing-house employees
Paper makers
Patent-leather makers
Phosphate-mill workers
Phosphorus evaporating machine operators
Pressroom workers (rubber)
Refrigerating-plant workers
Roofers
Rubber workers
Sailors
Salt preparers
Shoe finishers
Silver melters
Soap makers
Spreaders (rubber works)
Stearic-acid makers
Stereotypers
Straw-hat makers
Sugar refiners
Sulphite cooks (pulp mill)
Table turners (enameling)
Textile workers
Thread glazers
Tile makers
Transparent-wrapping-material coaters and driers
Varnish makers
Vulcanizers
Wall-paper printers
Warming-house employees (guncotton)
Wool scourers
See also Occupations exposed to extreme dry heat.

B. Compressed Air

In building tunnels, laying deep foundations for large buildings, etc., it is necessary for the work to be carried on under increased air pressure in order to prevent the entrance of water into the excavations. The laborer is lowered gradually and, at short intervals, the pressure of the air in the compartment is increased. The first sensation of compression is felt on the eardrums, which may be relieved by the act of swallowing. If the air is too quickly compressed hemorrhage may occur. The greater part of the danger of working in compressed air lies in hasty decompression. While under compression the blood and tissue juices dissolve an increased amount of air, the gases of which are released when the pressure is suddenly decreased. The bubbles of nitrogen thus formed cut off the blood supply from various parts of the body by blocking up the capillaries. The symptoms of compressed-air illness, the so-called "bends", are the result.

Workers in compressed air must follow strictly the rules governing gradual compression and decompression. State regulations regarding work in compressed air cover limits of pressure, hours of labor under varying pressures, time of compression and of decompression, physical requirements, and other safety measures; see, for example, Industrial Code: Rules Relating to Work in Compressed Air, Bulletin No. 22, of the New York State Department of Labor, 1922, and the amendment to these rules reported in Special Bulletin No. 135 of the New York State Department of Labor, 1925, page 24.

B. Compressed Air

Symptom, condition, or disease to look for

Weakness, vertigo, pains in the back and legs, paralysis of legs and arms, painful constriction of the chest, cerebral hemorrhage and aphasia, coma, subcutaneous hemorrhages, impairment of hearing.

Occupations which offer such exposure

Caisson workers
Divers
Tunnel workers

C. Dampness

Most processes in which dampness is a hazard are associated with high or low temperature and high relative humidity, and have been dealt with under "abnormalities of temperature." There remains, however, to be considered, exposure to wet conditions where temperature and humidity are apparently not abnormal. Such conditions are brought together under the heading "dampness." Tank and vat men, washers and flushers, for example, are required to carry on their duties constantly in wet clothes. Drivers and other outdoor workers are also subject to frequent wetting from exposure to the weather.

Exposure to dampness generally has been considered to be a contributing factor in diseases of the respiratory system, neuralgic and rheumatic affections. Possibly dampness, like sudden variations in temperature, taxes the heat-regulating mechanism of the body.

When dampness is a feature of any industrial process, work places should be supplied with drain channels to prevent the accumulation of water, or use should be made of duck boarding. Adequate waterproof clothes should be supplied, such as rubber boots, rubberized aprons, etc.

C. Dampness

Symptom, condition, or disease to look for

Diseases of the respiratory passages, neuralgic and rheumatic affections.

Occupations which offer such exposure

Acid dippers
Alkali-salt makers
Artificial-ice makers
Artificial-silk makers
Auto painters
Bakers (tannery)
Beamhouse workers (tannery)
Beaterman (paper and pulp)
Boiler washers
Brewers
Brickmakers
Cable splicers
Caisson workers
Canners
Cartridge-cup washers
Cartridge felt and wad makers
Cartridge shot shell paraffin dippers
Clay and bisque makers (pottery)
Clay-plug makers (pottery)
Cloth preparers
Concentrating-mill workers (lead and zinc)
Cotton-mill workers
Creosoting-plant workers
Doffers (textile)
Dresser tenders (textile)
Drivers
Electroplaters
Enamelers
Explosives workers
Extractor operators (soap)
Fertilizer makers
Filter-press workers
Firemen (city)
Fishermen
Flush tenders (aluminum)
Galvanizers
Glass cutters
Glass finishers
Glaze dippers (pottery)
Glove makers (leather preparers)
Glue workers
Grinders (metals)
Guncotton washers
Hair workers
Ice-cream makers
Lasters (shoes)
Laundry workers
Lime pullers (tannery)
Linoleum makers
Masons
Match-factory workers
Miners
Mirror silverers
Nickel platers
Packing-house employees
Paint makers
Paper makers
Petroleum refiners
Phosphate-mill workers

Phosphorus evaporating machine operators
Picklers
Plasterers
Pottery workers
Preparers (tannery)
Pressmen (oil refining)
Pulp-mill employees
Refrigerating-plant workers
Sagger makers
Screen tenders (pulp mill)
Sewer workers
Shavers (felt hats; fur; tannery)
Slip makers (pottery)
Smoothers (glass)
Soap makers
Soda makers
Sodium hydroxide makers
Spongers
Stamp-mill workers
Stonecutters (wet process)
Sugar refiners
Sumachers (tannery)
Tablehands (tannery)
Tank men
Tannery workers
Telephone linemen (trench work)
Textile workers
Tile makers
Tinners
Tobacco moistiners
Varnish
Vulcanizers (steam)
Washers
Wool scourers

D. Defective Illumination

Defective illumination, characterized by insufficient quantity of light, glare, unsuitability of color, and improper diffusion and distribution of light, is the cause of eye fatigue, headache, dizziness, and errors of refraction. Miners' nystagmus, a condition in which the eyeball acquires a peculiar oscillatory movement, is an outstanding example of the effects of insufficient illumination. This disease is very common among British miners, but apparently is not found to any extent among American miners. The explanation for the favorable situation of the American miner probably lies in the better illumination of the American mines. Not only is defective illumination the cause of these serious impairments of vision but it is an important factor in reduced working efficiency in industry generally, and it is a very frequent cause of industrial accidents.

The hazard of defective illumination is not limited to any single industry or group of industries. It may be present in any plant. Men engaged in occupations requiring close, fine work, such as jewelers, engravers, clerks, and mail sorters, are especially liable to suffer from exposure to this hazard.

It is a comparatively simple matter to provide for all the requirements for properly illuminating workplaces in some industries, while in others the advice of illuminating engineers is required. The American Standard Code of Lighting for Factories, Mills, and Other Work Places, prepared by the Illuminating Engineering Society of New York City, is an excellent reference work for those who have need of a knowledge of the technical requirements of the work.

D. Defective Illumination

Symptom, condition, or disease to look for

Nystagmus, eyestrain, deficient vision due to astigmatism or hyperopia, headache, giddiness. Eyestrain contributes to neurasthenia.

Occupations which offer such exposure

Virtually all occupations. The following and similar occupations are especially subject to this hazard:

Buffers
Burnishers (lead and steel)
Caisson workers
Clerks
Compositors
Embroidery workers
Jewelers
Mail sorters
Metal polishers
Miners
Photographers
Steel engravers
Train dispatchers
Tunnel workers
Watchmakers

E. Dust

Dusts have been divided into two kinds—organic and inorganic. Organic dusts do not cause pulmonary lesions, while inorganic dusts produce fibrosis of the lung tissue, the extent of which depends upon the kind of dust, the size of the dust particles, the concentration of dust, and the length of exposure to the particular dust inhaled. Dr. H. R. M. Landis found that, when fibrosis was present in the lungs of men exposed to organic dust, the latter was always mixed with some form of inorganic dust. Workers exposed to organic dust for years showed no pulmonary changes other than those found in people living in the city. Dust, whether organic or inorganic, by acting as a carrier of bacilli, may increase their number in the lungs. In this way men exposed to dust may be in greater danger of contracting tuberculosis than others.

Whether or not all inorganic dusts, per se, are capable of producing lung fibrosis, given a sufficient length of exposure and a high enough concentration of dust, is still an open question. Many inorganic dusts, found in industry, have been inhaled for long periods without noticeable injury. Dusts containing free silica, however, are definitely known to be extremely harmful, producing serious pulmonary damage in a comparatively short time. The pathological condition resulting from exposure to silica dust is properly referred to as silicosis. X-ray pictures of the silicotic lung show a characteristic mottling due to the formation of fibrotic nodules where silica has lodged in the lymphatic system. Symptoms of the disease may not show until it is well advanced, when there is decreased lung expansion, marked shortness of breath, and cough. The silicotic lung is a fertile field for the tubercle bacillus; a very large percentage of cases of silicosis terminate in a fatal tuberculosis. The action of silica on the lungs is to promote the growth of connective tissue.

Asbestos dust is another dust which, it has recently been definitely determined, produces a lung fibrosis under existing industrial conditions, although its action is apparently milder than that of free silica. The relation of tuberculosis and asbestos dust is not entirely clear.

Complete protection for workmen exposed to silica dust has been found difficult in many processes. X-ray pictures, therefore, should be taken at regular intervals of all workmen exposed. It is of the utmost importance that these pictures be interpreted by a physician familiar with the appearance of the lungs at various stages in the development of silicosis. Workmen who are found to be affected should be transferred to other jobs, where they will not be exposed to dust.

There are four methods that may be used to keep down the amount of dust generated through industrial processes. No one of these can apply to all conditions, but the particular method to be used must be adapted to the peculiarities of the process.

1. The use of water or oil to wet the dust, thus preventing it from rising and filling the atmosphere. This method is now believed to be of doubtful value in some processes, and in these should not be relied upon when other methods are practicable.

2. The use of exhaust systems which remove the dust at the point of origin.

3. The use of enclosed chambers in which the dust-producing processes are confined, the processes being regulated by the operator from the outside.

4. The use of helmets covering the head and neck, preferably those which permit supplying air through a pipe from a nondusty area.

E. Dust

1. Inorganic Dust

Symptom, condition, or disease to look for

Cough, dyspnea, pleuritic pains, hemoptysis, deficient expansion, dullness, diminished resonance, mucous râles, fibrosis, inflammatory condition of eyes, ears, nose, and throat; colds, chronic catarrh of respiratory tract, chronic catarrh of digestive tract, pleurisy, tuberculosis.

Occupations which offer such exposure

Abrasives workers
Acetylene makers
Asbestos workers
Basic slag (artificial manure) workers
Battery (dry) makers
Bed rubbers (marble and stone)
Bench molders (foundry)
Bevelers
Biscuit-kiln workers
Blasters
Bone workers
Bricklayers
Brickmakers
Bronzers
Buffers
Burrers (needles)
Burr dicers
Button makers
Calenderers (rubber)
Carbide makers
Carbon-black workers
Carbon-brush makers
Carborundum workers
Card grinders (textiles)
Casting cleaners (foundry)
Cement workers
Charcoal workers (sugar refining)
Chargers (smelting)
Chargers (zinc smelting)
Chasers (steel)
Chimney sweepers
Chippers
Clay and biscuit makers (pottery)
Clay-plug makers (pottery)
Coal passers
Color makers
Compositors
Compounders (rubber)
Concentrating-mill workers (lead and zinc)
Construction laborers
Core makers
Cotton-mill openers
Crucible miners
Crushermen (clay and stone)
Cut-glass workers
Cutlery makers
Cyanamid makers
Diamond cutters
Diatomaceous-earth workers
Drillers (rock)
Electrolyzers
Emery-wheel makers
Engineers (stationary)
Engravers
Fertilizer makers
File cutters
Filers
Firemen (stationary)
Flint workers
Floor molders (foundry)
Flue cleaners
Foundry workers
Glass blowers
Glass cutters
Glass finishers
Glass mixers
Glass mixers (pottery)
Gold beaters
Gold refiners
Graphite workers
Grinders (metals)
Gypsum workers
Horn workers
House wreckers
Iron and steel mill workers
Jewelers
Junk (metal) refiners
Jute workers
Lapidaries
Lead smelters
Lime burners
Lime-kiln chargers
Lime workers
Linoleum makers
Lithographers
Marble cutters
Masons
Match-factory workers
Metal turners
Mica strippers or splitters
Mica workers
Miners
Mixers (rubber)
Mixing-room workers (miscellaneous)
Mold brushers (foundry)
Paint removers
Paper hangers
Phosphate-mill workers
Pit molders (foundry)
Planer men (stone; metal)
Plasterers
Plaster of paris workers
Pneumatic-tool workers
Polishers
Polish makers
Pottery workers
Pressers (felt hats)
Pressmen (printers)
Printers
Putty makers
Putty polishers (glass)
Pyrites burners
Quarrymen
Rubber workers
Sagger makers
Salt preparers
Sand blasters
Sand cutters
Sanders
Sanding-machine operators
Sandpaperers (enameling and painting auto bodies, etc.)
Sandpaper makers
Sand pulverizers
Saw filers
Scissors sharpeners
Scouring-powder makers
Scrapers (foundry)
Screen workers (lead and zinc smelting)
Sifters
Sintering-plant workers
Slag workers
Slate workers
Slip makers (pottery)
Smelters (metal)
Smoothers (glass)
Soap (abrasive) workers
Spinners (asbestos)
Stamp-mill workers
Statuary workers
Strikers
Stonecutters (dry)
Stonecutters (wet process)
Stonemasons
Sugar refiners
Sulphur burners
Table turners (enameling)
Talc workers
Textile comb makers
Tile makers
Toolmakers
Top filers (foundry)
Tumbling-barrel workers
Weighers

2. Organic Dust

Symptom, condition, or disease to look for

Dryness of nose, throat and mouth, cough, emphysema, asthma, bronchitis, emphysema, tuberculosis.

Occupations which offer such exposure

Bakers
Beamers (textiles)
Blowers (felt hats)
Broom makers
Brushers (felt hats)
Brush makers
Buffers
Button makers
Carbonizers (shoddy)
Carders (textiles)
Coal grinders (textiles)
Carpet makers
Cigar makers
Cobblers
Comb makers
Cowers (felt hats)
Cork workers
Cotton-mill workers
Cotton twisters
Curriers (tannery)
Devil operators (felt hats)
Doffers (textiles)
Feather curers
Feather workers
Felt-hat makers
Fiber workers
Finishers (leather)
Flax spinners
Flour workers
Formers (felt hats)
Fur carders
Fur clippers
Fur cutters
Fur handlers
Fur preparers
Fur pullers
Furniture polishers
Glove makers (leather preparers)
Glue workers
Grain-elevator workers
Grinders (rubber)
Gunstock pickers
Hair workers
Harness makers
Heel makers (shoe)
Hemp workers
Jute workers
Knitting-mill workers
Lace makers
Lasters (shoes)
Leather workers
Linen workers
Match-factory workers
Mattress makers
Mixers (felt hats)
Mixing-room workers (miscellaneous)
Polishers
Pressers (felt hats)
Pyroxylin-plastics workers
Rag workers
Roller coverers (cotton mills)
Rope makers
Rubber workers
Sawmill workers
Scourers, wool lots (shoes)
Shakers (felt hats; furniture)
Shaving-brush makers
Shoddy workers
Shoe-factory operatives
Siftters
Silk workers
Softeners (tannery)
Spinners (textiles)
Starch makers
Straw-hat makers
Straw pullers
Taxidermists
Textile workers
Tobacco rollers
Tobacco workers
Upholsterers
Weavers
Weighers
Wool-lot scourers (shoes)
Wool workers
Wool carders
Wool spinners
Wool workers

F. Infections

Infectious diseases are frequently of occupational origin. Among the more common of these are anthrax, hookworm, tetanus, trachoma, glanders, tularemia, actinomycosis, ringworm, athlete's foot, undulant fever, and septic infections. Anthrax, hookworm, and septic infections are of especial interest because of the frequency of their occurrence in industry. A brief summary, therefore, of the symptoms of these diseases and the principal occupations in which infection is likely to occur have been included.

Prevention of these diseases lies in the observance of the well-established rules of general sanitation. The following special meas-

1. *Anthrax.*—All hides and animal hair must be thoroughly sterilized. Foreign skins or hair should not be carried on the unprotected shoulder. The hands should be frequently washed with bichloride of mercury. Hair sorters should wear respirators.

2. *Hookworm.*—Workers in mines and others who are exposed to infected soil should make special effort to keep the skin clean. Shoes must always be worn and gloves are also of value in preventing the entrance of the hookworm through the skin. Infected soil should be disinfected and kept dry. The utmost attention should be given to the prevention of soil pollution.

3. *Septic infections.*—Cuts, scratches, or abrasions should be treated at once to avoid infection. Men having open wounds should not be allowed to work with putrid material.

F. Infections

1. Anthrax

Symptoms, condition, or disease to look for

Anthrax (external):

(a) *Malignant pustula.*—Begins as inflamed pimple or boil. Papule becomes hard, with a purple center and deep red zone of infiltration surrounding, appearance of minute vesicular areola. Central papule becomes vesicular, discharges thick, bloody serum, later forming a brown gangrene. A painful lymphangitis with hard edema extending over neck and arm. Local phlebitis in the edematous area, chilliness, anorexia, vomiting, prostration, high temperature, feeble pulse.

(b) *Malignant edema.*—A spreading inflammation of loose connective tissue accompanied by sloughing and gangrene. Constitutional symptoms those of pyemia.

Anthrax (intestinal):

High fever, pains in head and back, vomiting, constipation, pain and tenderness in the abdomen, rapid, feeble pulse, palpable spleen, dyspnea, cyanosis. May be hemorrhage from bowels. When lungs are involved, there are additional symptoms—cough, pain in the chest, suffocation.

Occupations which offer such exposure

Animal handlers	Fur clippers	Shaving-brush makers
Butchers (tannery)	Fur cutters	Shepherds
Bristlehouse workers (tannery)	Fur handlers	Stablemen
Brush makers	Fur preparers	Stomachers (tannery)
Butchers	Fur pullers	Table hands (tannery)
Forget makers	Hair workers	Tannery workers
Cattle salesmen	Leather workers	Taxidermists
Cobblers	Lime pullers (tannery)	Transporters of hides and wool
Curriers	Longshoremen	Veterinarians
Farmers	Meat inspectors	Wool carders
Fertilizer makers	Preparers (tannery)	Wool spinners
Fur carders	Shavers (felt hats; fur; tannery)	Wool workers

2. Hookworm (ankylostomiasis)

Symptoms, condition, or disease to look for

Anemia, pallor of the face, even when the blood count is not very low; a dull, heavy, listless expression, manner, speech, and gait; itching sores; perversion of taste; increasing muscular weakness; occurrence of parasites in stool. Victims often complain of gastrointestinal pains and cramps; in exaggerated cases there are edema, ascites, progressive emaciation, protuberant abdomen, and increasing stupor.

Occupations which offer such exposure

Brick makers	Lumbermen	Sawmill workers
Construction-camp workers	Miners	Trench diggers
Farmers	Quarrymen	Tunnel workers

Note.—This disease occurs in the Southeastern States, and is prevalent also among the gold miners of California.

3. Septic Infections

Symptoms, condition, or disease to look for

Skin infections, such as boils, carbuncles, blood poisoning, localized lymphangitis or cellulitis.

Occupations which offer such exposure

Animal handlers	Handlers of putrid or decomposing animal products	Silk workers
Butchers	Preparers (tannery)	Soap makers
Cleaners	Rag workers	Tallow refiners
Feather workers	Shavers (felt hats; fur; tannery)	Tannery workers
Fertilizer makers	Shoddy makers	Veterinarians
Garbage workers		
Glue makers		
Hair workers		

G. Radiant Energy

1. X-rays, Radium, and Other Radioactive Substances (radiothorium, mesothorium, etc.)

The increasing use of X-rays and of radium for the detection and treatment of disease and the more extended use of X-rays in industry, as an aid in detecting hidden defects in metals, have greatly added to their importance as potential sources of occupational disease. Recently, radioactive substances (radium, radiothorium, mesothorium) have been added to the list of occupational hazards found in manufacturing industries following upon the discovery that these substances were responsible for the serious impairment and death of several young women who had been employed in the painting of luminous watch dials with radioactive paint. The hazard is now known to be present also in several other industries.

Exposure to X-rays and emanations from radium and other radioactive substances may produce serious burns and cancer, while the blood and blood-forming organs are profoundly affected. Anemia and leukopenia are frequently associated with exposure to radiations.

Much has been learned concerning adequate measures for the protection of workers exposed to X-rays and radioactive substances since the early days of their discovery, when many pioneers in medical treatment with these new agencies, suffered severe mutilating disabilities because of their unmitigated exposure. Protective measures today have been worked out in considerable detail for the variety of conditions met with. See for example, The Journal of the American Medical Association, April 27, 1929, pages 1428–1430, and the Monthly Labor Review for June 1929, pages 22–24. Also, the brochure entitled "Protective Measures Against Dangers Resulting from the Use of Radium, Roentgen, and Ultra-Violet Rays", published by the League of Nations Health Organization, August 1931.

G. Radiant Energy

1. X-rays, Radium, and Other Radioactive Substances (radiothorium, mesothorium, etc.)

Symptom, condition, or disease to look for

Anemia, leukemia, leukopenia, necrosis of bones, burns, dermatitis, cancer, sterility.

Occupations which offer such exposure

Chemists and laboratory workers (radium research)	Radioactive-paint makers	
Painters of luminous watch dials and painters of instrument dials, and other workers in plants manufacturing luminous dials	Radioactive-water makers	
	Radiologists	
	Radium ore reduction workers	
	Radium specialists	
Physicians, nurses, and hospital attendants	Roentgenologists	
	X-ray technicians and photographers	

2. Ultraviolet and Infrared Rays

Ultraviolet and infrared rays are an industrial hazard in a number of occupations, chiefly welding and cutting. Although we cannot see ultraviolet and infrared rays, they are very active and powerful and are usually coexistent with excessive radiance.

Ultraviolet rays are chemical in their action, and cause intense irritation of the eyes and burns of the skin, similar to sunburn. Snow blindness, desert blindness, and the "eye flashes" of welders are one and the same condition, all due to the action of ultraviolet rays upon the eye; their effects can be very painful and cause disability for several days, though usually they do not cause permanent damage.

Infrared rays act upon the eyes simply as heat, but may cause permanent damage. There is little definite evidence that welding may cause cataract, similar to glassblower's cataract, but it is probable that prolonged exposure to infrared rays may cause haziness of the cornea (part of eyeball).

The injurious effects resulting from excessive light due to defective illumination are not considered here, but treated as a separate hazard. *See* Hazard D.

Goggles, helmets, shields, and masks equipped with colored lenses especially designed to exclude the kinds and intensities of rays met with, afford protection to the eye. Booths should be provided for welders working indoors to protect others working nearby. Clothing which covers the body completely protects the skin from irritation caused by the rays.

2. Ultraviolet and Infrared Rays

Symptom, condition, or disease to look for

Burns, cataract, conjunctivitis, dermatitis, electrical ophthalmia, photophobia, retinitis.

Occupations which offer such exposure

Bakers	Cooks	Electricians
Blacksmiths	Cutters (oxyacetylene and other gases)	Electric linemen
Brazers		Furnace workers

Glass blowers	Iron and steel mill workers	Motion-picture machine operators
Glass-furnace workers	Motion-picture-studio workers and actors	Photographers
Incandescent-mantle hardeners		Stokers
		Welders

H. Repeated Motion, Pressure, Shock, etc.

Under this heading are included the occupational neuroses, those muscle-strain conditions which are caused by continuous repetition of movements, pressure, or blows peculiar to many occupations. This section is not concerned with the neurasthenic phenomena following accidental injuries, commonly referred to as traumatic neurosis. Everyone is familiar with the muscular strain experienced in performing for the first time some exercise, such as rowing, horseback riding, etc. Men newly introduced into a process requiring some repeated action are affected similarly but often much more severely, so as to disable them temporarily for the particular job. After long-continued exposure the muscles involved do not function when called upon to perform the accustomed task, although their function is unimpaired for other activities. The injury does not stop with muscular strain but may even cause inflammation of the surrounding sheaths or paralysis of the parts concerned.

Where continuous pressure or shock is the cause, pads or cushions are often beneficial. Workers who have to grasp tools tightly would do well frequently to change their method of holding the instrument, if this is possible. Occasional rest periods will do much toward the prevention of muscular pains and cramps.

H. Repeated Motion, Pressure, Shock, etc.

Symptom, condition, or disease to look for

Pain of muscle used, set up by a myositis, bursitis, synovitis, or other local changes of a chronic inflammatory nature; trembling, gradual emaciation and partial paralysis of parts, anesthesia.

Occupations which offer such exposure

Artificial-flower makers	Jewelers	Porters
Barbers	Knitters	Pressers
Bicyclists	Lathe turners	Riveters
Blacksmiths	Leather workers	Sailors
Carpenters	Lithographers	Sawyers
Chauffeurs	Locksmiths	Scissors sharpeners
Clerks	Machinists	Seamstresses
Cobblers	Mail carriers	Sewing-machine operators
Compositors	Masons	Spinners (textile)
Cotton twisters	Microscopists	Stenographers
Dancers	Millers	Tailors
Diamond cutters	Miners	Telegraphers
Elevator runners	Musicians	Typists
Enamelers	Painters	Washwomen
Engravers	Paper-box makers	Watchmakers
Furniture polishers	Pavers	Weavers
Gold beaters	Pneumatic-tool workers	
Hammermen	Polishers	

J. Poisons

The continued introduction of new processes making use of new poisonous substances and the increasing use in industry of other substances well known to be injurious to health make this section of more and more importance. During comparatively recent years the highly poisonous chemicals, tetraethyl lead and radio-active paints, have been introduced into manufacturing processes and have been productive of serious poisoning. A group of refrigerants (methyl bromide, methyl chloride, etc.) have found widespread use in the manufacture of refrigerators and have proved injurious to the health of workmen. Phosphorus, tetrachlorethane, and certain other chemicals, on the other hand, have decreased in importance. Industrial poisoning caused by these substances is comparatively rare today. Since we cannot foretell, however, when a new use will be found in industry for a poisonous substance, the inclusion of these chemicals in our list has been thought desirable.

The revised List of Industrial Poisons, compiled by Sommerfeld and Fischer for the International Association for Labor Legislation, has formed the basis for the data presented in this section.[1] The material in that list has been revised and brought up to date. A number of poisons have been added, and the occupations exposed are given for each poison. The symptoms cited are those which are reported in the best works available. In order to avoid swelling the list of poisons to unwarranted proportions, substances, the effects of which are similar, have been grouped. Thus all nitro compounds of benzol and its homologues have been included under one heading, and the same procedure has been followed with amino compounds. The next section (p. 60) is devoted to the substances occurring in industry which produce typical occupational dermatoses. Because of the very large number of substances in the latter class it has not been possible to treat them as fully as the other poisons.

To prevent industrial poisoning the following precautions should be taken:

Workers must be instructed as to the toxicity of the substance handled. Frequent medical examinations of workers must be made to detect early symptoms of disease. Before new substances are employed in industrial processes their toxicity should be determined.

Personal cleanliness must be maintained, and proper washroom facilities, therefore, should be provided. Men should not be allowed to eat in workrooms where poisonous substances are handled. Work clothes should receive special attention and should be removed at the end of the day's work. The use of gloves and boots is often necessary.

Mechanical devices for confining the poisons are of prime importance. Reference should be made in this connection to the preventive measures discussed under "Dust." Fumes and gases should be taken care of by proper ventilation, the use of exhaust systems, fans, and blowers. Men who work in an atmosphere polluted by poisonous fumes and gases should always wear gas masks properly suited for the obtaining conditions.

[1] See U.S. Bureau of Labor Statistics Bul. No. 100. Washington, 1912.

J. Poisons

1. Acetaldehyde

Symptom, condition, or disease to look for

Irritation of mucous membranes of eyes and respiratory tract, dyspnea a cough, acceleration of heart, profuse night sweats.

Occupations which offer such exposure

Acetaldehyde workers	Photographic workers	Varnishers
Aldehyde pumpmen	Pyroxylin-plastics workers	Varnish makers
Disinfectant makers	Resin (synthetic) makers	Vinegar workers
Dye makers	Rubber (synthetic) makers	Yeast makers
Explosives workers		
Mirror silverers		

2. Acetanilide. See Aniline

3. Acetone

Symptom, condition, or disease to look for

Irritation of skin and mucous membranes of eyes and respiratory tract.

Occupations which offer such exposure

Acetone workers	Lacquer makers	Pyroxylin-plastics workers
Acetylene workers	Methyl-alcohol makers	Rubber workers
Airplane-dope makers	Nitrocellulose workers	Smokeless-powder makers
Artificial-leather makers	Oil extractors	Transparent-wrapping-material workers
Cellulose acetate makers	Painters	Varnishers
Chloroform makers	Paint makers	Varnish makers
Dye makers	Paint removers	Wood-alcohol distillers
Dyers	Paraffin workers	
Explosives workers	Perfume makers	
Lacquerers	Photographic workers	

4. Acridine

Symptom, condition, or disease to look for

Irritation of skin and mucous membranes of eyes and respiratory tract, violent sneezing.

Occupations which offer such exposure

Acridine workers	Dye makers

5. Acrolein

Symptom, condition, or disease to look for

Irritation of skin and mucous membranes of eyes and respiratory tract, bronchial catarrh.

Occupations which offer such exposure

Acrolein workers	Linoleum makers	Stearic-acid makers
Bone renderers	Linseed-oil boilers	Tallow refiners
Candle makers	Pyroxylin-plastics workers	Tinners
Fat renderers	Refrigerator makers and repair men	Type melters
Galvanizers	Soap makers	Varnish makers
Glue makers		
Lard makers		

6. Aluminum

Not generally regarded as an industrial poison.

7. Ammonia

Symptom, condition, or disease to look for

Irritation of respiratory passages, cough and dyspnea, pulmonary edema, bronchitis, severe irritation of eyes, conjunctivitis, caustic action on skin.

Occupations which offer such exposure

- Acetylene workers
- Ammonia workers
- Ammonium-salts makers
- Artificial-ice makers
- Artificial-silk makers
- Bonechar makers
- Bronzers
- Calcium carbide makers
- Coke-oven workers
- Color makers
- Cyanide makers
- Dye makers
- Dyers
- Explosives workers
- Fertilizer makers
- Galvanizers
- Gas (illuminating) workers
- Gas purifiers
- Glue makers
- Lacquer makers
- Mirror silverers
- Nitric-acid makers
- Petroleum refiners
- Refrigerating-plant workers
- Salt extractors (coke-oven byproducts)
- Sewer workers
- Shellac makers
- Shoe finishers
- Soda (Solvay) makers
- Stablemen
- Sugar refiners
- Tannery workers
- Tinners
- Varnish makers

8. Amyl Acetate

Symptom, condition, or disease to look for

Irritation of mucous membranes of eyes, nose, throat, and bronchial tubes, headache and vertigo, fullness of the head, drowsiness, oppression in chest, cough, nausea.

Occupations which offer such exposure

- Airplane-dope makers
- Alcohol-distillery workers
- Amyl acetate workers
- Art-glass workers
- Artificial-leather workers
- Artificial-pearl makers
- Artificial-silk makers
- Battery (dry) makers
- Bookbinders
- Bronzers
- Buffers (rubber)
- Calico printers
- Camphor makers
- Cutlery makers
- Dyers
- Enamelers
- Enamel makers
- Explosives workers
- Fruit-essence makers
- Furniture polishers
- Gilders
- Jewelers
- Lacquerers
- Lacquer makers
- Leather workers
- Linoleum makers
- Mottlers (leather)
- Nitrocellulose workers
- Painters
- Paint makers
- Paint removers
- Patent-leather makers
- Perfume makers
- Photographic-film makers
- Polishers (wood)
- Polish makers
- Pyroxylin-plastics workers
- Shellackers
- Shellac makers
- Shoe-factory workers
- Shoe finishers
- Smokeless-powder makers
- Tannery workers
- Toy makers
- Varnishers
- Varnish makers
- Wirers (incandescent lamps)

9. Amyl Alcohol

Symptom, condition, or disease to look for

Irritation of eyes and respiratory tract, headache and vertigo, dyspnea and cough.

Occupations which offer such exposure

- Alcohol-distillery workers
- Amyl-acetate makers
- Amyl-nitrite makers
- Explosives workers
- Fruit-essence makers
- Fusel-oil workers
- Lacquerers
- Lacquer makers
- Mordanters
- Nitrocellulose workers
- Painters
- Paint makers
- Rubber (synthetic) makers
- Shoe finishers
- Smokeless-powder makers
- Varnishers
- Varnish makers

10. Aniline and Other Amino Compounds of Benzol and Its Homologues

Symptom, condition, or disease to look for

Pallor followed by cyanosis, especially of lips and finger tips, weakness, drowsiness, irritability, mental confusion, headache and vertigo, unsteady gait, muscular tremor and convulsions, erysipelatous eruptions, anemia, weak pulse, brownish discoloration of the blood and urine, disorders (tumors, etc.) of the bladder.

Occupations which offer such exposure

- Acetanilide workers
- Aniline makers
- Artificial-leather makers
- Calico printers
- Camphor makers
- Coal-tar workers
- Compositors
- Compounders (rubber)
- Dye makers
- Dyers
- Explosives workers
- Feather workers
- Germicide makers
- Lithographers
- Millinery workers
- Mixers (rubber)
- Nitraniline workers
- Painters
- Paint makers
- Pencil (colored) makers
- Perfume makers
- Photographic workers
- Proofroom workers
- Printers
- Reclaimers (rubber)
- Rubber workers
- Tannery workers
- Varnishers
- Varnish makers
- Vulcanizers

11. Antimony and Its Compounds

Symptom, condition, or disease to look for

Irritation and pruriginous eruptions of the skin, inflammation of mucous membranes of nose, mouth, and throat, gastro-intestinal disorders with vomiting, diarrhea, intestinal colic.

Occupations which offer such exposure

- Antimony extractors (refiners)
- Battery (storage) makers
- Brass founders
- Burnishers (iron and steel)
- Burnishers (rifle barrels)
- Calico printers
- Chargers (zinc smelting)
- Color makers
- Compositors
- Compounders (rubber)
- Copper refiners
- Dye makers
- Electroplaters
- Electrotypers
- Enamel makers
- Filers
- Fireworks makers
- Glass miners
- Glass dippers (pottery)
- Glass miners (pottery)
- Grinders (metals)
- Grinders (rubber)
- Lead smelters
- Linotypers
- Miners (rubber)
- Monotypers
- Mordanters
- Proofroom workers (rubber)
- Printers
- Rubber (red) workers
- Shot makers
- Stereotypers
- Type founders
- Vulcanizers
- Zinc refiners

12. Arsenic and Its Compounds

Symptom, condition, or disease to look for

Headache, eruptions and bronzing of skin, loss of nails and hair, keratosis, inflammation of mucous membranes, gastro-intestinal disturbances with nausea, vomiting, and severe diarrhea and abdominal pains, peripheral polyneuritis, muscular weakness and paralysis, perforation of nasal septum.

Occupations which offer such exposure

- Arsenic roasters
- Artificial-flower makers
- Artificial-leather makers
- Bookbinders
- Brass founders
- Briquet makers
- Bronzers
- Calico printers
- Candle (colored) makers
- Carpet makers
- Carroters (felt hats)
- Chargers (zinc smelting)
- Chimney sweepers
- Colored-paper workers
- Color makers
- Compounders (rubber)
- Copper founders
- Copper smelters
- Curriers (tannery)
- Cut-glass workers
- Decorators (pottery)
- Dye makers
- Electroplaters
- Enamelers
- Enamel makers
- Furriers
- Feather curers
- Feather workers
- Felt-hat makers
- Ferrosilicon workers

Fireworks makers
Fur handlers
Fur preparers
Galvanizers
Gardeners
Glass miners
Glass dippers (pottery)
Glass mixers (pottery)
Gold refiners
Insecticide makers
Japan makers
Japanners
Lacquerers
Lacquer makers
Lead smelters
Linoleum colorers
Lithographers
Mixers (rubber)
Mordanters
Painters
Paint makers
Paper glazers
Paper hangers
Paris-green workers
Pencil (colored) makers
Pitch workers
Pottery workers
Pressroom workers (rubber)
Printers
Pyrites burners
Refiners (metals)
Rubber workers
Sealing-wax makers
Sheep-dip makers
Shot makers
Soot packers
Sprayers (trees)
Sulphur burners
Sulphuric-acid workers
Tannery workers
Taxidermists
Tinners
Toy makers
Velvet makers
Wallpaper printers
Wax ornament makers
Wire drawers
Wood preservers
Zinc miners
Zinc refiners

13. Arseniuretted Hydrogen (arsine)

Symptom, condition, or disease to look for

Feeling of faintness and weakness, intense headache, nausea and vomiting, jaundice, abdominal pains, hemoglobinuria, shivering and chills, gastric disorders.

Occupations which offer such exposure

Acetylene workers
Acid dippers
Aniline workers
Arseniuretted hydrogen makers
Artificial-silk makers
Balloon (hydrogen) workers
Battery workers
Bleaching-powder makers
Bronzers
Carbonizers (sheddy)
Chemical workers
Dimethyl-sulphate makers
Dye makers
Electrolytic-process (copper) workers
Electroplaters
Etchers
Ferrosilicon workers
Fertilizer makers
Galvanizers
Gas workers
Gold extractors
Jewelers
Lead burners
Lime burners
Nitrocellulose makers
Nitroglycerine makers
Paper makers
Picklers
Plumbers
Refiners (metals)
Sheddy workers
Soda makers
Solderers
Submarine workers
Sulphuric-acid workers
Tinners
Towermen (sulphuric acid)
Zinc-chloride makers

14. Barium

Most of the salts of barium are poisonous when ingested. Few cases of industrial poisoning, however, have been reported. The symptoms reported in industrial poisoning include whitening and loss of hair, paralysis, acceleration of the heart, cyanosis of the skin, gastric pain, and vomiting.

15. Benzine (naphtha-gasoline)

Symptom, condition, or disease to look for

Headache and vertigo, nausea and vomiting, irregular respiration, drowsiness, irritation of skin and mucous membranes, "naphtha jag" (a condition resembling mild alcoholic intoxication), visual disturbances, twitching of the muscles.

Occupations which offer such exposure

Art-glass workers
Bronzers
Buffers (rubber)
Cast scrubbers (electroplaters)
Cementers (rubber shoes)
Cement mixers (rubber)
Chauffeurs
Compositors
Compounders (rubber)
Curriers (tannery)
Decorators (pottery)
Degreasers (fertilizer; leather)
Dippers (rubber)
Driers (rubber)
Dry cleaners
Dyers
Electroplaters
Enamelers
Enamel makers
Feather workers
Furniture polishers

Garage workers
Gasoline-engine workers
Gilders
Glue workers
Japan makers
Japanners
Lacquerers
Lacquer makers
Linoleum makers
Lithographers
Metal-polish makers
Millinery workers
Mixers (rubber)
Mordanters
Painters
Paint makers
Petroleum refiners
Polishers
Polish makers
Pressroom workers (rubber)
Printers
Putty makers
Pyroxylin-plastics workers
Rubber-glove makers
Rubber-tire builders
Rubber workers
Shade-cloth makers
Shellackers
Shellac makers
Shoe-factory workers
Shoe finishers
Tannery workers
Type cleaners
Varnishers
Varnish makers
Vulcanizers
Waterproof-cloth makers
Window-shade makers
Woodworkers

16. Benzol (benzene) and Its Homologues (toluol and xylol)

Symptom, condition, or disease to look for

Headache and vertigo, hemorrhages, spots of extravasated blood on the skin, anemia, injury to blood-forming organs, kidneys, liver and nervous system, marked susceptibility to infection, local irritation (bronchitis, conjunctivitis, stomatitis, etc.), narcosis (acute poisoning).

Occupations which offer such exposure

Airplane-dope workers
Alcohol (denatured) workers
Aniline makers
Artificial-leather makers
Battery (dry) makers
Benzol-still men
Blenders (motor fuel)
Brake-lining makers
Bronzers
Gas (sanitary) makers
Carbolic-acid makers
Coal scrubbers
Cementers (rubber)
Cement mixers (rubber)
Coal-tar workers
Coke-oven workers
Color makers
Compounders (rubber)
Decorators (pottery)
Degreasers (fertilizer; leather)
Dippers (rubber)
Driers (rubber)
Dry cleaners
Dye makers
Electroplaters
Enamelers
Enamel makers
Explosives workers
Engravers
Extractors (oils and fats)
Feather workers
Gas (illuminating) workers
Gilders
Glue workers
Lacquerers
Lacquer makers
Linoleum workers
Lithographers
Millinery workers
Mixers (rubber)
Mordanters
Nitrobenzene makers
Nitrocellulose workers
Oilcloth makers
Painters
Paint makers
Paint-remover makers
Paint removers
Paraffin makers
Phenol makers
Photo-engravers
Photographic workers
Picric-acid makers
Pressroom workers (rubber)
Pyroxylin-plastics workers
Reclaimers (rubber)
Rubber-tire builders
Rubber workers
Shade-cloth makers
Shellackers
Shellac makers
Shoe-factory workers
Shoe finishers
Silverers
Smokeless-powder makers
Soap makers
Still (coal tar) cleaners
Treaders (rubber)
Trinitrotoluol makers
Varnishers
Varnish makers
Vulcanizers
Waterproof-fabric makers
Welders
Window-shade makers

17. Brass (zinc)

Symptom, condition, or disease to look for

Headache, general malaise, irritation of throat, cough, slight nausea, severe chills with fever, profuse perspiration, trembling, muscular pains, exhaustion.

Occupations which offer such exposure

Bench molders (foundry)
Blowers-out (zinc smelting)
Brass founders
Bronzers
Brassers
Chargers (zinc smelting)
Core makers
Floor molders (foundry)
Galvanizers
Junk-metal refiners
Lasters (zinc smelting)
Pourers (brass foundry)
Welders
Zinc smelters

18. Bromine

Symptom, condition, or disease to look for

Violent irritation of air passages, bronchitis, and conjunctivitis, sensation of suffocation, skin eruptions, brownish discoloration of skin and mucous membranes.

Occupations which offer such exposure

- Bromine cells makers
- Color makers
- Disinfectant workers
- Dye makers
- Ethylene dibromide makers
- Gold extractors
- Ink makers
- Platinum extractors
- Tear-gas makers
- Tetraethyl-lead makers
- Photographic-film makers

19. Butyl Acetate. *See* Amyl Acetate

20. Butyl Alcohol

Animal experimentation showed marked dermatitis, early liver degeneration, a definite increase in red blood cells, with an absolute and relative lymphocytosis.

Occupations which offer such exposure

- Artificial-leather workers
- Artificial-silk workers
- Butyl-alcohol makers
- Motion-picture-film workers
- Perfume makers
- Photographic-film makers
- Pyroxylin plastics workers
- Shellackers
- Shellac makers
- Varnishers
- Varnish makers

21. Cadmium

Symptom, condition, or disease to look for

Weakness, loss of appetite, nausea, vomiting, headache, shivering, dryness of throat, rapid pulse, fatty degeneration of liver, inflammation of kidneys, brown urine. Animal experimentation shows generalized pneumonia.

Occupations which offer such exposure

- Cadmium-alloy makers
- Cadmium and cadmium-compound makers
- Cadmium platers
- Cadmium-vapor-lamp makers
- Calico printers
- Chargers (zinc smelting)
- Color makers
- Electroplaters
- Glass colorers
- Lithopone makers
- Solderers
- Solder makers
- Storage-battery makers
- Welders
- Zinc smelters and refiners

22. Carbon Dioxide

Carbon dioxide is now generally regarded as a simple asphyxiant. The symptoms preceding asphyxia are: Headache and vertigo, dyspnea, drowsiness, muscular weakness, flushing of face, tinnitus aurium.

Occupations which offer such exposure

- Alkali-salt makers
- Bakers
- Blacksmiths
- Blast-furnace workers
- Boiler-room workers
- Brass founders
- Brewers
- Brick burners
- Caisson workers
- Carbonated-water makers
- Carbon-dioxide-ice workers
- Carbonic-acid makers
- Charcoal burners
- Cupola men (foundries)
- Divers
- Drying-room workers
- Fertilizer workers
- Foundry workers
- Furnace workers
- Glass workers
- Lime makers
- Lime burners
- Lime-kiln workers
- Miners
- Pottery workers
- Sewer workers
- Slag workers
- Soda makers
- Starch makers
- Submarine workers
- Sugar refiners
- Tannery pit men
- Tobacco moisteners (storehouse)
- Tunnel workers
- Vatmen
- Vault workers
- Vinegar makers
- Vintners
- Vulcanizers
- Well workers
- White-lead makers
- Yeast makers

23. Carbon Disulphide

Symptom, condition, or disease to look for

Headache, vertigo, weakness, psychical effects (hilarity, agitation, irritability, hallucinations, mania), disturbances of sensation, particularly of sight, peripheral neuritis, digestive disturbances.

Occupations which offer such exposure

- Acetylene workers
- Ammonium-salts makers
- Artificial-silk makers
- Asphalt testers
- Carbonfilide makers
- Carbon-disulphide makers
- Celluloid workers
- Cementers (rubber shoes)
- Cement mixers (rubber)
- Driers (rubber)
- Dry cleaners
- Electroplaters
- Enamelers
- Enamel makers
- Explosives workers
- Glue workers
- Insecticide makers
- Match-factory workers
- Oil extractors
- Painters
- Paint makers
- Paraffin workers
- Putty makers
- Reclaimers (rubber)
- Sternutatory-powder makers
- Sulphur extractors
- Tallow refiners
- Transparent-wrapping-material workers
- Vulcanizers

24. Carbon Monoxide

Symptom, condition, or disease to look for

Tightness across forehead, pulsations of the eyeball, dilatation of cutaneous vessels, headache (frontal and basal), throbbing in temples, weariness, weakness, dizziness, nausea and vomiting, loss of strength and muscular control, increased respiration and pulse, collapse, anemia, polycythemia, presence of carbon monoxide hemoglobin.

Note.—Poisoning may proceed in some paramoxic the stage of collapse without causing any subjective symptoms.

Exposure to high concentrations of carbon monoxide for short periods may, through the effect of oxygen deprivation, cause degenerative changes in various tissues of the body. Chronic exposure to low concentrations for long periods of time according to some investigators, may produce permanent injury.

Occupations which offer such exposure

- Acetylene workers
- Ammonia makers (Haber-Bosch method)
- Bakers
- Balloon inflators
- Blaugas-kiln workers
- Blacksmiths
- Blasters
- Blast-furnace workers
- Bleachers (felt hats)
- Boiler cleaners
- Boiler-room workers
- Brass founders
- Brick burners
- Cable splicers
- Calico printers
- Carbide makers
- Charcoal burners
- Chargers (foundries)
- Chargers (zinc smelting)
- Chauffeurs
- Chimney masons
- Chimney sweepers
- Cleaners (foundries)
- Cloth singers
- Coal-tar workers
- Coke-oven workers
- Cooks
- Copper smelters
- Core makers
- Cupola men (foundries)
- Driers (wood)
- Drying-room workers (miscellaneous)
- Enameling
- Enamel makers
- Engineers (stationary)
- Filament makers and flashers (incandescent lamps)
- Firemen (city)
- Firemen (stationary)
- Flangers (felt hats)
- Flue cleaners
- Foundry workers
- Fumigators
- Furnace workers
- Garage workers
- Gas (illuminating) workers
- Glassers (textiles)
- Glost-kiln workers
- Incandescent-lamp makers
- Ink (printer's) makers
- Ironers
- Kiln tenders
- Laboratory workers
- Laundry workers
- Lead smelters
- Lime burners
- Lime-kiln chargers
- Linotypers
- Mechanics (gas engines)
- Mercury smelters
- Methane (synthetic) makers
- Methyl alcohol (synthetic) makers
- Miners
- Mold breakers (pottery)
- Monotypers
- Motion-picture-film workers
- Neon lights letter makers
- Patent-leather makers
- Phosgene makers
- Plumbers
- Pottery (kiln) workers
- Pressers
- Puddlers (foundries)
- Pyroxylin-plastics workers
- Refiners (metals)
- Repairers (foundries)
- Sealers (incandescent lamps)
- Sewer workers
- Silver melters
- Singers (cloth)
- Soda makers (Leblanc)
- Solderers

Steeple jacks
Stokers
Teasers (glass)
Telephone linemen (trench work)
Tempterers
Top Sliers (foundry)
Tubulators (incandescent lamps)
Welders
Wood-alcohol distillers
Wood-charcoal workers
Zinc smelters

25. Carbon Tetrachloride

Symptom, condition, or disease to look for

Irritation of nose, eyes, and throat, headache, nausea and vomiting, loss of appetite, mental dullness, confusion and excitement, dermatitis.

Occupations which offer such exposure

Airplane-dope workers
Carbon-tetrachloride workers
Cementers (rubber)
Cement mixers (rubber)
Degreasers (textiles)
Dry cleaners
Electroplaters
Fire-extinguisher makers
Firemen (city)
Lacquerers
Lacquer makers
Metal-polish makers
Paraffin workers
Perfume makers
Rubber workers
Vulcanizers

26. Cellosolve (mono-ethyl ether of ethylene glycol)

This compound is used as a solvent for nitrocellulose and resins in the manufacture of lacquers.

According to the United States Bureau of Mines, animal experimentation shows inactivity, weakness, dyspnea, and death following exposure for 18 to 24 hours to air saturated with cellosolve vapor (0.6 percent by volume).

27. Chloride of Lime

Symptom, condition, or disease to look for

Irritating cough, inflammation of upper air passage, difficulty in breathing, asthma, bronchitis, conjunctivitis, lachrymation, hyperhidrosis, burning eruptions on the skin.

Occupations which offer such exposure

Acetylene workers
Bleachers
Bleaching-powder makers
Chloride of lime makers
Chloroform makers
Disinfectant makers
Dye makers
Laundry workers
Mordanters
Tannery workers

28. Chlorine

Symptom, condition, or disease to look for

Irritation of mucous membranes of eyes and respiratory tract, bronchitis, cough, pulmonary edema, dyspnea, pallid countenance and emaciation, gastric disturbances, decayed teeth, irritation of skin, and chloracne.

Occupations which offer such exposure

Alkali-salt makers
Beatermen (paper and pulp)
Bleachers
Bromine makers
Broom makers
Calico printers
Chloride of lime makers
Chlorine workers
Color makers
Detinning workers
Disinfectant makers
Dye makers
Extractors (gold and silver)
Ink makers
Iodine makers
Laundry workers
Paper makers
Phosgene makers
Photographic workers
Rubber-substitute makers
Shoddy makers
Soda makers
Submarine workers
Sulphur-chloride makers
Tear-gas makers
Zinc-chloride makers

29. Chlorodinitrobenzol. *See* Nitrobenzol

30. Chloronitrobenzol. *See* Nitrobenzol

31. Chromium Compounds

Symptom, condition, or disease to look for

Pitilike phagedenic ulcers, very difficult to heal and very painful, occurring on the skin, most frequently on the hands, and on the mucous membranes; inflammation and perforation of the nasal septum at the cartilaginous portion; ammoniacal eruptions, irritations of the conjunctiva and of the respiratory passages with rare inflammation of small areas in the lungs.

Occupations which offer such exposure

Acetylene workers
Aniline-compound workers
Artificial-flower makers
Battery (dry) makers
Bleachers
Blueprint makers
Calico printers
Candle (colored) makers
Carbon printers (photography)
Chrome workers
Chromium platers
Color makers
Compounders (rubber)
Crayon (colored) makers
Dye makers
Dyers
Electroplaters
Enamelers
Enamel makers
Explosives (ammonal and pyroxylin) workers
Freezers (glass and pottery)
Furniture polishers
Glass colorers
Glass workers (pottery)
Ink makers
Linoleum workers
Lithographers
Match-factory workers
Mixers (rubber)
Mordanters
Painters
Paint makers
Paper hangers
Pencil (colored) makers
Photo-engravers
Photographic workers
Photogravure workers
Rubber workers
Steel (chrome) makers
Tannery (chrome) workers
Vulcanizers
Wall-paper printers
Waterproofers (paper and textile)
Wax-ornament workers
Wood polishers
Wood stainers

32. Cobalt

There is little information available on the effects of cobalt. A case of poisoning with severe damage to the liver and kidneys was reported from a French tile factory. Cancer of the lungs is a recognized occupational injury among European cobalt miners, but the cause of the condition has not been definitely established. The presence of arsenic in the ore, and the fact that there are radioactive emanations in the mines, have been advanced as causes of the cancer.

33. Copper

Whether or not copper is toxic to human beings is still unestablished. The inhalation of copper dust is reported to produce "copper chills", headache, gastro-enteritis; the inhalation of fumes, to produce symptoms similar to those caused by zinc fumes. Impurities such as lead and arsenic have been advanced as possible causes of reported cases of copper poisoning.

Occupations which offer such exposure

Copper founders
Copper refiners and smelters
Coppersmiths

34. Cresol (cresylic acid)

Symptom, condition, or disease to look for

Toxic effects resemble those of phenol but are less severe. The chief symptoms are irritation and erosion of skin and mucous membranes, and nephritis.

Occupations which offer such exposure

Artificial-resin makers
Coal-tar workers
Cresol-soap makers
Cresylic-acid makers
Disinfectant makers
Dye makers
Explosives workers
Fumigators
Perfume (synthetic) makers
Resin (synthetic) makers
Rubber (artificial) workers
Tar-distillery workers

35. Cyanogen Compounds

Symptom, condition, or disease to look for

Headache and vertigo, nausea and vomiting, unsteady gait, bitter almond odor in breath, gastro-intestinal disorders, weakness, irregular pulse and respiration, irritation and inflammation of skin and mucous membranes, muscular pain and trembling, convulsions, paralysis of legs and arms, functional disturbances of nervous system.

Occupations which offer such exposure

Acid dippers	Dye makers	Mirror silverers
Ammonium-salts makers	Electroplaters	Mordanters
Artificial-silk makers	Extractors (gold and silver)	Oxalic acid makers
Art-printing workers	Fertilizer makers	Phosphoric acid makers
Blacksmiths	Fulminate makers	Photographic workers
Blast-furnace workers	Fumigators	Picklers
Brass distillers	Gas (illuminating) workers	Potishers (metals)
Bronzers	Gas purifiers	Pyroxylin-plastics workers
Bronzers (gun barrels)	Gilders	Silver refiners
Calico printers	Gold refiners	Soldierers
Case hardeners	Hydrocyanic-acid makers	Tannery workers
Coal-tar-distillery workers	Jewelers	Tempterers
Cyanide workers		Tree sprayers
Disinfectant workers		Zincers

36. Dimethyl Sulphate

Symptom, condition, or disease to look for

Strongly corrosive effect on the skin and mucous membranes, hoarseness, laryngitis, conjunctivitis, bronchitis, pulmonary edema with hemorrhages, photophobia.

Occupations which offer such exposure

Dimethyl-sulphate makers	Dye makers	Perfume makers

37. Dinitrobenzol. *See* Nitrobenzol

38. Dioxan (diethylene dioxide)

This compound may be used in the manufacture of a number of chemicals, and is a solvent for nitrocellulose, etc.

According to the United States Bureau of Mines, men exposed to air containing 0.16 percent of dioxan vapor by volume, immediately noted irritation of the eyes, nose, and throat. It is stated that "as in the case of practically all comparatively nontoxic volatile liquids, dioxan presents a hazard to life under conditions of exposure to air confined over the liquid in tanks, vats, and similar places where high concentrations would accumulate."

39. Ethyl Benzene

This compound is used as an "antiknock", as a lacquer diluent, general solvent, etc.

According to the United States Bureau of Mines, animal experimentation shows irritation of eyes and nose, apparent vertigo, static and motor ataxia, apparent unconsciousness, tremor of extremities, rapid jerky respiration, then shallow respiration, and finally slow, gasping respiration, followed by death. All these symptoms and death resulted from 1 percent exposure in from 2 to 8 hours.

40. Ethyl Bromide and Ethyl Chloride

Symptom, condition, or disease to look for

See note under Methyl Chloride

Occupations which offer such exposure

Anesthetic makers		Refrigerator (mechanical) makers as repair men
Ethyl-bromide makers		
Ethyl-chloride makers		

41. Ethylene Dibromide

Symptom, condition, or disease to look for

Irritation of eyes and respiratory tract, vomiting, pallor, weakness, vertigo.

Occupations which offer exposure

Ethylene dibromide makers.

42. Ethylene Dichloride

This compound is used as a solvent, particularly in the extraction of oil and fats.

According to the United States Bureau of Mines, animal experimentation shows irritation of eyes and nose, vertigo, static and motor ataxia, reckless movements, semiconsciousness and unconsciousness accompanied by uncoordinated movements of the extremities, and death if exposure is continued. Exposure to 8 percent vapors caused all these symptoms, excepting death, to occur in less than 10 minutes, and death in about 30 minutes.

43. Ethylene Oxide

This compound is principally used as an intermediate in the synthesis of other compounds as ethyl, methyl, and butyl cellosolve, and as a fumigant.

According to the United States Bureau of Mines, animal experimentation shows irritation of the eyes and nose; blood-tinged, frothy, serous exudate from nostrils; unsteadiness on feet and staggering; inability to stand; respiratory disturbances; dyspnea and gasping; and death. Most of these symptoms occurred with exposure to concentrations of 0.5 to 0.8 percent by volume.

44. Formaldehyde

Symptom, condition, or disease to look for

Irritation of mucous membranes, conjunctivitis, bronchitis, dyspnea, severe dermatitis, destruction of finger nails. Systemic effects, including degeneration of the liver, have been reported.

Occupations which offer such exposure

Artificial-amber makers	Formaldehyde workers	Recoverers (gold and silver)
Artificial-silk makers	Germicide makers	Rubber workers
Bakelite makers	Glass etchers	Soap makers
Brewery workers	Ink makers	Straw-hat makers
Broom makers	Insecticide makers	Tannery workers
Brush makers	Mirror silverers	Textile printers
Calico printers	Paper makers	Waterproofers (paper)
Disinfectant workers	Photographic workers	
Dye makers	Preservative makers and head ers	
Embalmers	Resin (synthetic) makers	
Explosives workers		

45. Formic Acid. *See also* Formaldehyde

Symptom, condition, or disease to look for

Dermatitis (blisters, ulcerations, necrosis), irritation of mucous membranes of eyes, nose, and throat.

Occupations which offer such exposure

- Alcohol fermenters
- Cellulose-ferments makers
- Dye makers
- Electroplaters
- Formic-acid workers
- Lacquerers
- Lacquer makers
- Mirror silverers
- Mordanters
- Perfume makers
- Rubber workers
- Soap makers
- Tannery workers
- Varnishers
- Varnish makers

46. Gasoline. *See* Benzine

47. Hydrochloric Acid

Symptom, condition, or disease to look for

Caustic and irritating action on skin and mucous membranes, conjunctivitis, coryza, pharyngeal and bronchial catarrh, dental caries, pulmonary hemorrhages.

Occupations which offer such exposure

- Acetic-acid makers
- Acid dippers
- Acid finishers (glass)
- Acid mixers
- Acid recoverers
- Acid transporters
- Alkali-salt makers
- Ammonium-salts makers
- Aniline makers
- Artificial-silk makers
- Battery (dry) makers
- Bleachers
- Bronzers
- Calico printers
- Camphor makers
- Carbonizers (sheddy)
- Cartridge dippers
- Cement makers
- Chlorine-compound makers
- Chlorine makers
- Dye makers
- Dyers
- Electroplaters
- Enamel makers
- Engravers
- Etchers
- Fertilizer makers
- Galvanizers
- Glass finishers
- Glass mixers
- Glass mixers (pottery)
- Glazers (pottery)
- Glue makers
- Hydrochloric-acid makers
- Ink makers
- Jewelers
- Leather workers
- Lithographers
- Metal cleaners
- Metal refiners
- Paint makers
- Paper-mill workers
- Petroleum refiners
- Phosphate extractors
- Photographic workers
- Picklers (metals)
- Pottery workers
- Reclaimers (rubber)
- Sheddy workers
- Soap makers
- Solderers
- Sugar refiners
- Sulphur-chloride makers
- Tannery workers
- Tinners
- Transparent-wrapping-material workers
- Vignetters
- Wire makers
- Zinc chloride makers

48. Hydrocyanic Acid. *See* Cyanogen Compounds

49. Hydrofluoric Acid

Symptom, condition, or disease to look for

Intense irritation of eyelids and conjunctiva, coryza, bronchial catarrh with spasmodic cough, ulceration of the nostrils, gums, and oral mucous membranes, painful ulcers of the cuticle, erosion and formation of vesicles, suppuration under the finger nails.

Occupations which offer such exposure

- Aluminum extractors
- Antimony-fluoride extractors
- Art-glass workers
- Bleachers
- Brewers
- Dyers
- Etchers
- Fertilizer makers
- Glass finishers
- Gold refiners
- Hydrofluoric-acid makers
- Phosphorus extractors
- Silicate extractors

50. Iron Carbonyl. *See* Nickel Carbonyl

51. Lead and Its Compounds

Symptom, condition, or disease to look for

Ashen pallor, metallic taste, gastrointestinal disturbances, constipation, abdominal pains, lead line on gums, asthenia, lassitude, headache, backache, pain about joints, weakness of grip, tremors of fingers and tongue, local paralysis, especially of muscles used most, stippling of red blood cells, ocular disturbances, mental symptoms (lead encephalopathy).

Occupations which offer such exposure

- Acid finishers (glass)
- Amber workers
- Art-glass workers
- Artificial-flower makers
- Bathtubbers
- Battery (dry) makers
- Beach molders (foundry)
- Blacksmiths
- Bleachers (tannery)
- Bookbinders
- Bottle-cap makers
- Brass founders
- Brass polishers
- Brazers
- Brick burners
- Brick makers
- Bronzers
- Brownsers (gun barrels)
- Brush makers
- Buffers (rubber)
- Burners (enameling)
- Cable makers
- Cable splicers
- Calico printers
- Canners
- Cartridge makers
- Chargers (zinc smelting)
- Chippers
- Colorers (white) of shoes
- Color makers
- Compositors
- Compounders (rubber)
- Concentrating-mill workers (lead and zinc)
- Copper refiners
- Cut-glass workers
- Gallery makers
- Cutters (oxyacetylene and other gases)
- Decorators (pottery)
- Dental workers
- Diamond polishers
- Dye makers
- Dyers
- Electroplaters
- Electrotypers
- Embroidery workers
- Emery-wheel makers
- Enamelers
- Enamel makers
- Farmers
- File cutters
- Fillers
- Filling-station workers
- Floor molders (foundry)
- Galvanizers
- Garage workers
- Gardeners
- Gasoline blenders
- Glass finishers
- Glass mixers
- Glass polishers
- Glass dippers (pottery)
- Glass mixers (pottery)
- Glost-kiln workers
- Gold refiners
- Grinders (metals)
- Grinders (rubber)
- Hunter boys (riveters)
- Imitation-pearl makers
- Incandescent-lamp makers
- Insecticide makers
- Japan makers
- Japanners
- Jewelers
- Jewel-metal refiners
- Laborers (paint mfg.)
- Lacquerers
- Lacquer makers
- Lead burners
- Lead-foil makers
- Lead miners
- Lead-pipe makers
- Lead-salts makers
- Lead smelters
- Linoleum makers
- Linotypers
- Linseed-oil boilers
- Lithographers
- Lithotransfer workers
- Match-factory workers
- Mirror silverers
- Mixers (rubber)
- Monotypers
- Musical-instrument makers
- Nitric-acid workers
- Nitroglycerin makers
- Painters
- Paint makers
- Paint removers
- Paper hangers
- Patent-leather makers
- Petroleum refiners
- Photograph retouchers
- Pipe fitters
- Plumbers
- Polishers
- Pottery workers
- Printers
- Putty makers
- Putty polishers (glass)
- Pyroxylin-plastics workers
- Reclaimers (rubber)
- Red-lead workers
- Reducers (metals)
- Riveters
- Roofers
- Rubber workers
- Sagger makers
- Sandpaperers (enameling and painting auto bodies, etc.)
- Screen workers (lead and zinc smelting)
- Sheet-metal workers
- Shellackers
- Shaling makers
- Shot makers
- Slip makers (pottery)
- Slushers (porcelain enameling)
- Smelters
- Solder makers
- Stainers (shoes)
- Steel engravers
- Stereotypers
- Storage-battery makers
- Sulphuric-acid workers
- Table turners (enameling)
- Tannery workers
- Tempterers
- Tetraethyl lead makers
- Tile makers
- Tin-foil makers
- Tinners
- Toy makers
- Transfer workers (pottery)
- Tree sprayers
- Type founders
- Typesetters
- Varnishers
- Varnish makers
- Wall-paper printers
- Welders
- White-lead workers
- Wood stainers
- Zinc miners
- Zinc smelters

82. Lead Arsenate. *See* Arsenic; Lead

83. Manganese

Symptom, condition, or disease to look for

Languor and sleepiness, stolid mask-like facial expression, low monotonous voice, muscular twitching, cramps and stiffness of muscles in legs, increase in tendon reflexes, ankle and patellar clonus, retropulsion and propulsion, slapping gait, uncontrollable laughter.

Occupations which offer such exposure

Battery (dry) makers
Bleaching-powder makers
Calico printers
Chlorine makers
Dye makers
Dyers
Enamelers
Enamel makers
Fertilizer makers
Fireworks makers
Glass miners
Glass dippers (pottery)
Glaze miners (pottery)
Linoleum makers
Manganese dioxide workers
Manganese grinders
Manganese-oresoperators
Manganese-steel makers
Match-factory workers
Painters
Paint makers
Pottery workers
Soap makers
Varnishers
Varnish makers
Zinc miners

84. Mercury and Its Compounds

Symptom, condition, or disease to look for

Stomatitis and gingivitis, salivation, blue line on gums, gastro-intestinal disorders, metallic or fetid breath, tremor, mercurial erethism, loss of memory, insomnia and depression, anxiety and irritability, mercurial eczema.

Occupations which offer such exposure

Acetaldehyde makers
Acetic-acid (synthetic) makers
Acetone (synthetic) makers
Alcohol (synthetic) makers
Amalgam makers
Artificial-flower makers
Barometer makers
Battery (dry) makers
Blowers (felt hats)
Bronzers
Browners (gun barrels)
Brushers (felt hats)
Calico printers
Cap leaders
Carroters (felt hats)
Cartridge makers
Chlorine makers (electrolytic)
Color makers
Cutters (felt hats)
Cyanotic workers
Cyanogen gas makers
Dentists
Detonator cleaners
Detonator fillers
Detonator packers
Devil operators (felt hats)
Disinfectant makers
Dye makers
Electric induction furnace workers
Electroplaters
Embalmers
Embossers
Explosives workers
Extractors (gold and silver)
Felt-hat makers
Fireworks makers
Fulminate miners
Fur handlers
Fur preparers
Gilders
Gold refiners
Hardeners (felt hats)
Incandescent-lamp makers
Jewelers
Laboratory workers
Lithographers
Manometer makers
Mercury-alloy makers
Mercury-boiler workers
Mercury bronzers
Mercury miners
Mercury-pump workers
Mercury-salt workers
Mercury smelters
Mercury-solder workers
Mercury-still cleaners
Mercury-switch makers
Mercury-vapor-lamp makers
Mirror silverers
Mixers (felt hats)
Painters
Paint makers
Photographic workers
Porcelain makers
Primers (explosives)
Refiners (metals)
Shears (felt hats)
Sole stitchers (Blake machine)
Stainers (felt hats)
Steel engravers
Stiffeners (felt hats)
Storage-battery makers
Tannery workers
Thallium salts
Thermometer makers
Water gilders
Welders
Wood preservers
Zinc-electrode makers

85. Methanol (methyl alcohol)

Symptom, condition, or disease to look for

Headache, nausea and vomiting, vertigo, irritation of mucous membranes, severe colic, convulsions, paralysis, chilliness and cold sweats, cyanosis, loss of reflexes and of sensation, irregular and intermittent heart action, rapid breathing followed by retardation, rapid and marked drop in temperature, alterations of sight including amblyopia, optic neuritis, conjunctivitis, mydriasis, nystagmus, visual hallucinations, blindness.

Occupations which offer such exposure

Aldehyde pungents
Aniline-dye makers
Antifreeze makers
Art-glass workers
Artificial-flower makers
Artificial-silk makers
Automobile painters
Bookbinders
Bronzers
Brush makers
Calico printers
Cementers (rubber shoes)
Dimethyl-sulphate makers
Driers (felt hats)
Dry cleaners
Dye makers
Explosives workers
Feather workers
Felt-hat makers
Filament makers (incandescent lamps)
Filters (shoes)
Furniture polishers
Gilders
Hardeners (felt hats)
Incandescent-lamp makers
Ink makers
Japan makers
Japanners
Lacquerers
Lacquer makers
Lasters (shoes)
Linoleum makers
Methyl-alcohol workers
Methyl-compound makers
Military workers
Mottlers (leather)
Painters
Paint makers
Patent-leather makers
Perfume makers
Photo-engravers
Photographers
Polishers (wood)
Polish makers
Pyroxylin-plastics workers
Rubber workers
Shellackers
Shellac makers
Shoe-factory operatives
Shoe finishers
Soap makers
Stiffeners (felt hats)
Stitchers (shoes)
Type cleaners
Upholsterers
Varnishers
Varnish makers
Vulcanizers
Wood-alcohol distillers
Woodworkers

86. Methyl Bromide

Symptom, condition, or disease to look for

See note under Methyl chloride.

Occupations which offer such exposure

Methyl bromide makers
Refrigerator (mechanical) makers and repair men

87. Methyl Chloride

Symptom, condition, or disease to look for

Progressive drowsiness, vertigo, nausea, staggering gait, mental confusion, weakness, visual disturbances, tremors, presence of formates and acetone in urine, insomnia.

Note.—Experiments conducted by the United States Bureau of Mines on guinea pigs showed that air containing methyl chloride, methyl bromide, ethyl bromide, and ethyl chloride produced similar symptoms, including excitement, loss of equilibrium, inability to walk, rapid pulse, convulsive rapid respiration with rales, frothy (often blood-tinged) exudate from nostrils. The signs of lung irritation were not as pronounced for exposure to ethyl chloride as for the other compounds.

Occupations which offer such exposure

Chloroform makers
Color makers
Dye makers
Methyl chloride makers
Refrigerator (mechanical) makers and repair men

58. Naphtha. *See* Benzine

59. Nickel Carbonyl

Symptom, condition, or disease to look for

Headache, giddiness, nausea, dyspnœa, cough, cyanosis, œdema, pain in the loins.

Occupations which offer such exposure

Nickel-purification workers (blood process)

60. Nitraniline. *See* Aniline

61. Nitrobenzol and Other Nitro Compounds of Benzol and Its Homologues

Symptom, condition, or disease to look for

Cyanotic face and lips, nausea and vomiting, odor of bitter almonds in breath, irritation of skin, icterical skin, visual disturbances, anæmia, dark-brown blood, methæmoglobin formation, presence of hæmatoporphyrin, albumin, and sometimes free poison in urine, tremors, muscular twitching, and other manifestations of nerve injury.

Occupations which offer such exposure

Aniline makers	Ink makers	Smokeless-powder makers
Dye makers	Nitrobenzol workers	Soap makers
Explosives workers	Perfume makers	Trinitrotoluol makers
Floor-polish makers	Shoe dyers	

62. Nitroglycerin

Symptom, condition, or disease to look for

Intense headache, nausea and vomiting, flushing of face, gastro-intestinal disturbances, tachycardia, skin eruptions (characterized by dryness and the formation of rhagades).

Occupations which offer such exposure

Explosives workers | Nitroglycerin workers | Shell filers

63. Nitronaphthalene. *See* Nitrobenzol

64. Nitrous Gases and Nitric Acid

Symptom, condition, or disease to look for

Irritation of air passages, spasmodic cough, dyspnœa, pulmonary œdema, bronchitis, feeling of suffocation, pain in chest, digestive disturbances, corrosion of teeth, severe burns on the skin.

Occupations which offer such exposure

Acid dippers	Electroplaters	Phosphoric-acid makers
Acid mixers	Enamel makers	Photo-engravers
Acid recoverers	Etchers	Picklers (metals)
Acid transporters	Explosives workers	Picric-acid makers
Aniline makers	Fertilizer makers	Pyroxylin-plastics workers
Artificial-leather makers	Fur preparers	Refiners (metals)
Artificial-pearl makers	Galvanizers	Scourers (metals)
Bleachers	Gilders	Smokeless-powder makers
Calico printers	Guncotton workers	Soda makers
Carroters (felt hats)	Jewelers	Sulphuric-acid makers
Cartridge dippers	Lithographers	Tawermen (sulphuric acid)
Collodion makers	Mordanters	Wringers (guncotton)
Denaturing workers	Nitrators	
Dimethyl-sulphate makers	Nitric-acid workers	
Dippers (guncotton)	Nitrocellulose makers	
Dye makers	Nitroglycerin makers	
	Nitrous-oxide workers	

65. Oxalic Acid

Symptom, condition, or disease to look for

Local caustic action on skin and mucous membranes, bluish discoloration and brittleness of nails, irritation of mucous membranes of œsophagus, stomach and intestines, peripheral circulatory trouble, cardiac weakness, convulsions.

Occupations which offer such exposure

Dry cleaners	Ink makers	Publishers (metal)
Dye makers	Lithographers	Straw bleachers
Engravers	Metal-polish makers	Tannery workers
Glycerin refiners	Oxalic-acid workers	

66. Ozone

Symptom, condition, or disease to look for

Irritation of eyes and respiratory tract.

Occupations which offer such exposure

Bleachers | Electrical workers | Laundry workers

67. Petroleum. *See also* Benzine

Symptom, condition, or disease to look for

Inflammation of the skin, acne, suppurating sores, papillomæ, neuroses and irritation of the Schneiderian membrane, headache and sensory disturbances, affections of the respiratory organs.

Occupations which offer such exposure

Borerers (gun barrels)	Millinery workers	Paraffin workers
Feather workers	Oil-flotation-plant workers	Petroleum refiners
Furniture polishers	Oil-well workers	Tempterers
Lampblack makers		

68. Phenol

Symptom, condition, or disease to look for

Erosion of the skin, eczema, irritation of respiratory organs, digestive disturbances, symptoms of degeneration of blood, anæsthesia, nephritis, gangrene, jaundice.

Occupations which offer such exposure

Bakelite makers	Explosives workers	Phenol workers
Bleachers	Gas (illuminating) workers	Picric-acid makers
Calico printers	Gas purifiers	Powder (smokeless) makers
Carbolic-acid makers	Lampblack makers	Rubberoore (rubber)
Coal-tar workers	Paint makers	Resin (synthetic) makers
Disinfectant workers	Paint-remover makers	Stillmen (carbolic acid)
Dye makers	Paint removers	Surgical-dressing makers
Dyers	Perfume makers	Wood preservers
Galalith		

69. Phenyl Hydrazine

Symptom, condition, or disease to look for

Vesicular eruptions of the skin with itching and burning, diarrhœa, anorexia, granular degeneration of blood corpuscles, formation of methæmoglobin, a cause of general malaise.

Occupations which offer such exposure

Antipyrin makers | Dye makers | Phenyl-hydrazine workers

70. Phosgene

Symptom, condition, or disease to look for

Violent lung inflammation with edema, necrosis of lung tissue, emphysema, bronchitis, bronchiectasis, dysfunction of the heart, dyspnea.

Occupations which offer such exposure

Carbon-tetrachloride workers	Dye makers	Phosgene makers

71. Phosphorus

Symptom, condition, or disease to look for

Increasingly severe toothache, inflammation and sclerosis of the bones and of the periosteum, swelling and ulceration of the gums and buccal membrane, loosening and falling out of the teeth, suppuration and destruction of jawbone with fistulous channels burrowing through the cheek, meningeal inflammation, brittleness of bones, digestive disturbances, emaciation.

Occupations which offer such exposure

Bone-black makers	Insecticide makers	Phosphorus-compound makers
Brass founders	Match-factory workers	Phosphorus extractors
Fertilizer makers	Phosphate-mill workers	
Fireworks makers	Phosphor-bronze workers	

72. Phosphuretted Hydrogen (phosphine)

Symptom, condition, or disease to look for

Oppression in chest, headache and vertigo, gastro-intestinal irritation, dyspnea, general debility, tinnitus aurium, tremors and convulsions.

Occupations which offer such exposure

Acetylene workers	Phosphorus extractors	Phosphuretted hydrogen workers
Ferrosilicon workers	Phosphorus (red) makers	
Phosphine workers		

73. Picric Acid

Symptom, condition, or disease to look for

Irritation and inflammation of the skin and mucous membranes, yellow coloring of skin, headache, vertigo, digestive disorders, gastric pain, nephritis.

Occupations which offer such exposure

Dye makers	Germicide makers	Smokeless-powder makers
Dyers	Photography workers	Tear-gas (chloropicrin) makers
Explosives workers	Picric-acid workers	
Fireworks makers	Shell filters	

74. Potassium Hydroxide

Symptom, condition, or disease to look for

Severe chemical burning of the skin and mucous membranes, formation of deep-seated and persistent ulcers, loss of nails.

Occupations which offer such exposure

Bleachers	Oxalic-acid makers	Soap makers
Match-factory workers		

75. Pyridine

Symptom, condition, or disease to look for

Irritation of respiratory tract and of eyes, cough, dermatitis. Symptoms following ingestion include headache, vertigo, trembling of extremities.

Occupations which offer such exposure

Denatured-alcohol workers	Lacquerers	Pyridine makers
Gilders	Lacquer makers	
	Pencil makers	

76. Silver

Symptom, condition, or disease to look for

Argyrosis, a grayish blue or black discoloration of the skin and mucous membranes, is the chief effect reported in industry.

Symptoms of intoxication are reported from ingestion of soluble silver salts.

Occupations which offer such exposure

Photographic-film makers	Silver melters and refiners	Silver platers
Silverers (mirrors)	Silver-nitrate makers	Silversmiths
Silver-foil makers		

77. Sodium Hydroxide

Symptom, condition, or disease to look for

Severe chemical burning of the skin and mucous membranes. Formation of deep-seated and persistent ulcers, loss of nails.

Occupations which offer such exposure

Artificial-silk workers	Paper makers	Tannery workers
Bleachers	Soap makers	Transparent-wrapping-material workers
Mercerizers	Sodium-hydroxide makers	
Oil refiners		

78. Sulphur Dioxide

Symptom, condition, or disease to look for

Irritation and inflammation of mucous membranes of eyes and respiratory tract, spasmodic cough, bronchial catarrh, digestive disturbances, blood-tinged mucous, inflammation of lungs.

Occupations which offer such exposure

Alkali salt makers	Disinfectant workers	Refiners (metals)
Artificial-ice makers	Dye makers	Refrigerator (mechanical) makers and repairmen
Blast-furnace workers	Feather workers	Smelters
Bleachers	Fertilizer makers	Storage-battery chargers
Bone extractors	Fine cleaners	Sugar refiners
Brass founders	Fruit preservers	Sulphite cooks
Brick makers	Fumigators	Sulphur burners
Broom makers	Galvanizers	Sulphurers (malt and hops)
Carbolic-acid makers	Gelatine makers	Sulphuric-acid workers
Cellulose workers	Glass makers	Tannery workers
Ceramic workers	Glue makers	Towermen (sulphuric acid)
Chambermen (sulphuric acid)	Lead smelters	Ultramarine blue makers
Chargers (zinc smelting)	Mercury smelters	Vulcanizers (rubber)
Coke-oven workers	Oil-flotation-plant workers	Zinc smelters
Copper smelters	Paper-mill workers	
Digester-house workers (paper and pulp)	Petroleum refiners	
	Pottery workers	
	Pyrites burners	

79. Sulphuretted Hydrogen

Symptom, condition, or disease to look for

Irritation of mucous membranes of eyes and respiratory tract, conjunctivitis, bronchitis, rhinitis pharyngitis and laryngitis, pulmonary edema, headache and vertigo, hyperpnea, gastro-intestinal disturbances, brachycardia.

Occupations which offer such exposure

- Alkali-salt makers
- Artificial-silk makers
- Barium-carbonate makers
- Blast-furnace workers
- Bottlers (mineral water)
- Bronzers
- Cable splicers
- Calcium workers
- Carbon-disulphide makers
- Cellulose extracters
- Coke-oven workers
- Cyanogen makers
- Digester-house workers (paper and pulp)
- Dye makers
- Fat renderers
- Fertilizer makers
- Flax-rettery workers
- Gas (illuminating) workers
- Gas purifiers
- Glue workers
- Gypsum workers
- Hydrochloric-acid makers
- Hydrogen-sulphide workers
- Match-factory workers
- Miners
- Oil-flotation-plant workers
- Oil-well workers
- Petroleum refiners
- Phosphorus-compound makers
- Pulp-mill workers
- Pyrites burners
- Pyroxylin-plastics workers
- Sewer workers
- Soap makers
- Soda (Leblanc) makers
- Sodium-sulphide makers
- Starch makers
- Sugar refiners
- Sulphides makers
- Sulphur-chloride makers
- Sulphuric-acid makers
- Sulphur miners
- Tannery workers
- Transparent-wrapping-material workers
- Tunnel workers
- Vulcanizers

80. Sulphuric Acid

Symptom, condition, or disease to look for

Corrosive action on the skin, severe inflammation of the mucous membranes of the eyes and respiratory tract, injury to the teeth through softening of the dentine, chronic catarrh.

Occupations which offer such exposure

- Acid dippers
- Acid finishers (glass)
- Acid mixers
- Acid recoverers
- Acid transporters
- Alum workers
- Ammonium salts makers
- Ammonium sulphate makers
- Artificial leather makers
- Artificial silk makers
- Benzene purifiers
- Beta still operators (beta naphthol)
- Bleachers (iron and steel)
- Calico printers
- Carbolic-acid makers
- Carbonizers (shoddy)
- Cartridge dippers
- Chambermen (sulphuric acid)
- Color makers
- Dimethyl sulphate makers
- Dye makers
- Electroplaters
- Engravers
- Etchers
- Ether makers
- Explosives workers
- Fat purifiers
- Felt-hat makers
- Fertilizer makers
- Galvanizers
- Glass finishers
- Glue makers
- Gunpowder dippers
- Hydrochloric-acid makers
- Hydrocyanic-acid makers
- Jewelers
- Linoleum makers
- Lithographers
- Mercerizers
- Nitrators
- Nitric-acid makers
- Nitrobenzene makers
- Nitrocellulose makers
- Nitroglycerine makers
- Oil purifiers
- Paper makers
- Patent-leather makers
- Perfume makers
- Petroleum refiners
- Phenol makers
- Phosphoric-acid makers
- Phosphorus evaporating machine workers
- Photographic workers
- Picklers (metals)
- Picric-acid makers
- Pyroxylin-plastics workers
- Rayon makers
- Reclaimers (rubber)
- Refiners (metals)
- Salt extracters (coke-oven byproducts)
- Scourers (metals)
- Shoddy workers
- Soap makers
- Soda (Leblanc) makers
- Storage-battery workers
- Sugar refiners
- Sulphates makers
- Sulphuric-acid makers
- Tallow refiners
- Tannery workers
- Tungsters
- Towermen (sulphuric acid)
- Transparent-wrapping-material workers
- Wax refiners
- Wire drawers
- Yeast makers

81. Sulphur Monochloride

Symptom, condition, or disease to look for

Compound of questionable toxicity. In contact with water it decomposes, forming hydrochloric acid, sulphurous, and sulphuric acid. Injury may result from the presence of these compounds.

Occupations which offer such exposure

- Carbon-tetrachloride makers
- Cement mixers (rubber)
- Dyers
- Gold extracters
- Insecticide makers
- Rubber-substitute makers
- Sulphur monochloride workers
- Vulcanizers

82. Tar

Symptom, condition, or disease to look for

Tar itch, acne, eczema or psoriasis, ulcers of the skin and cornea, epithelial cancer, loss of appetite, nausea, diarrhea, headache, vertigo, irritation of the respiratory tract, conjunctivitis, albuminuria, edema, leukemia.

Occupations which offer such exposure

- Artificial-stone makers
- Asphalt workers
- Battery (dry) makers
- Briquet makers
- Brush makers
- Chimney sweepers
- Coal-tar workers
- Coke-oven workers
- Coal makers
- Dressing-plant workers
- Electrode makers
- Flue cleaners
- Gas (illuminating) workers
- Insulators
- Painters (tar)
- Paint makers
- Paraffin workers
- Pavers
- Petroleum-refinery workers
- Pitch workers
- Roofers
- Roofing-paper workers
- Still (coal tar) cleaners
- Tar workers
- Wood preservers

83. Tellurium

Symptom, condition, or disease to look for

Garlic-like odor of breath and of secretions and excretions, suppression of sweat, dryness of the mouth.

Dry flaking skin, metallic taste, anorexia, nausea, vomiting, indigestion, constipation, and drowsiness.

Occupations which offer such exposure

- Copper refiners
- Glass colorers
- Lead refiners

84. Tetrachlorethane (acetylene tetrachloride)

Symptom, condition, or disease to look for

Abnormal fatigue, profuse perspiration, gradual discontent and nervousness, headache and vertigo, insomnia, anorexia, gastro-intestinal disorders, abdominal pains, jaundice, increase of immature large mononuclear cells in blood, elevation of white cell count, slight anemia, slight increase in number of platelets in blood, petechiae, polyneuritis.

Occupations which offer such exposure

- Airplane-dope makers
- Airplane-wing varnishers
- Artificial-pearl makers
- Artificial-silk makers
- Cellulose acetate workers
- Color makers
- "Dope" workers
- Enamelers
- Enamel makers
- Lacquerers
- Lacquer makers
- Lithographers
- Moving-picture-film makers
- Oil extracters
- Paint-remover makers
- Paint removers
- Rubber workers
- Tapers (airplanes)
- Varnishers
- Varnish makers

85. Tetraethyl Lead. *See also* Lead and Its Compounds

Symptom, condition, or disease to look for

Insomnia, nausea and vomiting, anorexia, vertigo and headache, muscular weakness, pallor, subnormal blood pressure, subnormal temperature, loss of weight, abdominal cramps, tremors, lead in feces and urine, lead encephalopathy.

Occupations which offer such exposure

- Filling-station workers
- Garage workers
- Gasoline blenders
- Tetraethyl lead makers

86. Thallium

Symptom, condition, or disease to look for

Reddish discoloration and falling out of the hair, pains in the limbs, severe eye affections, inflammation of the kidneys.

Occupations which offer such exposure

Artificial-gem makers
Color makers
Depilatory makers
Disinfectant makers
Dye makers
Filament makers (incandescent lamps)
Glass workers
Thallium workers.
Thermometer makers

87. Tin

Not generally regarded as an industrial poison.

88. Titanium Oxide

This compound is used as a substitute for white lead in the manufacture of paint. No ill effects have been reported as a result of its use in industry.

89. Trinitrotoluol. *See* Nitrobenzol

90. Turpentine

Symptom, condition, or disease to look for

Irritation of mucous membranes of eyes, nose, and upper air passages, cough, bronchial inflammation, salivation, headache and vertigo, irritation of kidneys and bladder, strangury, odor of violets in urine, severe irritation of skin, inclusion of the epidermis.

Occupations which offer such exposure

Art-glass workers
Cable splicers
Calico printers
Camphor makers
Cementers (rubber)
Decorators (pottery)
Dry cleaners
Dye makers
Enamelers
Enamel makers
Feather workers
Furniture polishers
Japan makers
Japanners
Lacquerers
Lacquer makers
Linoleum makers
Lithographers
Millinery workers
Painters
Paint makers
Patent-leather makers
Potthers
Polish makers
Printers
Rubber workers
Sealing-wax makers
Shellackers
Shellac makers
Transfer workers (pottery)
Turpentine extractors
Varnishers
Varnish makers

91. Uranium

Uranium is a source of radiant energy. It is reported to be the most toxic of metals. Symptoms following ingestion or injection of the soluble salts of uranium are reported to be nephritis, glycosuria, gastro-intestinal disorders, degeneration of the liver, affections of the nervous system, respiratory paralysis. No cases of industrial poisoning have been reported upon.

92. Vanadium

Symptom, condition, or disease to look for

Anemia, cachexia, irritation of respiratory tract, dry cough resulting in hemorrhages, diarrhea or constipation, emaciation, hysterical manifestations, melancholia.

Occupations which offer such exposure

Mordanters
Vanadium-steel workers

93. Vinyl Chloride

This compound is used in the synthesis of organic compounds, principally rubber.

According to the United States Bureau of Mines, animal experimentation shows unconsciousness and motor ataxia, incomplete and finally complete narcosis. Men exposed to 2.5 percent for approximately 5 minutes soon began to feel dizzy and disoriented as to space and size of surrounding objects and complained of a burning sensation in the soles of the feet. They immediately recovered on leaving the chamber, and complained only of a slight headache which lasted about 30 minutes.

94. Zinc. *See* Brass

Section III.—Dermatoses

Skin affections resulting from exposure to the hazards discussed in the foregoing section have been recorded with the symptoms, conditions, or diseases to be looked for in men employed in occupations where such hazards are present. Because the dermatoses form so large a proportion of all disabling occupational diseases, the more important occupations exposed to agencies producing skin affections have been listed separately. A complete enumeration of such occupations would be impracticable. Almost any foreign substance can become a skin irritant if it is in continuous contact with the skin. Thus, soap and water, which ordinarily do not irritate the skin, may cause severe dermatitis in housewives. Under the dermatoses are included the effects on the skin of such causative agencies as poisonous and irritating chemicals, heat and cold, dust, radiant energy, friction, plants and woods, proteins, and vegetable and animal parasites.

Occupational dermatoses are frequently distinguished by their grouping, situation, mode of appearance, spread, and evolution. They crop up in series, retaining their initial type throughout, unless they are secondarily infected. They are most often local, except when they are a differentiating sign of the toxemias. The onset and development are usually sudden. The inflammation is sharply outlined. Exudation is excessive, and there is a deep-seated edema. The eruption usually predominates on the right side. Skin affections caused by different external irritants often, however, may show the same clinical picture. A number of occupational skin eruptions have no specific lesions or special pathology, which makes their differential diagnosis very difficult. For these reasons, the symptoms for each irritating substance have not been listed as has been done for the other hazards.

The excellent work of Dr. R. Prosser White entitled "The Dermatergoses, or Occupational Affections of the Skin", admirably covers the entire subject of causative agencies and differential diagnosis. It should be consulted by anyone who has a need for an extensive treatment of the subject. The data presented in this section are based largely on Dr. White's compilation.

The following is a list of the more common occupations exposed to agencies causing dermatoses. It is a partial list only. Reference should also be made to the specific hazards listed for the occupation under consideration in section I.

Occupations Exposed to Specified Skin Irritants

Occupation exposed	Skin irritants
Acetylene workers	Calcium carbide.
Acid workers	Acids.
Alkali plant workers	Caustic alkali.
Aniline dyestuff workers	Caustic alkali, dyes.
Bakers	Flour, fatty matter, phenol.
Barbers	Benzol, potassium permanganate, lead.
Bleachers	Acids, lime, chlorine.
Blueing (Prussian) workers	Caustic alkali, ammonium salts, charcoal.
Boilermakers	Caustic alkali, dyes.
Bookbinders	Acids, alkalies, powder, caustic alkali, hydrogen peroxide, sodium silicate.
Brass workers	Dyes.
Bronze workers	Dyes, charcoal, chromium salts, formaldehyde, magnesium salts, sodium thiosulphate.
Bricklayers	Lime.
Brushmakers	Dyes.
Butchers	Dyes, vegetable dust.
Cable splicers	Dyes.
Candy makers	Flour.
Canners	Fruit acids, lacquers, copperware.
Car washers	Mercury compounds.
Chauffeurs	Oil, grease.
Chemical workers	Caustic alkali, phenol.
Chromium (yellow dyes) workers	Caustic alkalies.
Cleaners (dust hazard)	Acids, mercury compounds.
Cleaners (wet hazard)	Acids, soaps.
Cleaning engines	Dyes.
Cleaning machines	Petroleum, coal-tar products, naphtha, methyl alcohol.
Cleaning solutions (rubber shoes)	Lime.
Coal handlers	See specific chemical in section II.
Coal tar workers	Chromium compounds.
Concrete workers	Acids, caustic alkali, lime, soap, potassium salts, sodium salts, sodium silicate.
Confectioners	Sugar.
Cotton dyers	Acids, dyes, chlorine, caustic salts, phenol.
Creosote (tarring)	Petroleum, tarry matter.
Dairymen	Dyes.
Detergents (conditioning action)	Wax, charcoal, chromium salts, formaldehyde, magnesium salts, sodium thiosulphate.
Dockers	Tar products.
Dyestuff chemists	Chromium compounds.
Dyestuff dippers	Chromium compounds.
Dyestuff grinders	Chromium compounds.
Dyestuff makers	Chromium compounds.
Dyestuff packers	Chromium powder, soap, lubricants, sodium salts, copper.
Dye makers	Acids, bleaches, caustic alkali, coal-tar products, dye intermediates, dyes, turpentine, ordinary compounds, various salts, acetone, benzine, benzol, carbon bisulphide, chlorine, formaldehyde, hydrosulphites, lead salts, phenol, potassium chromate.
Dyers	Dyes.
Electroplaters	Acids, bleaches, caustic alkali, lime, potassium cyanide, soap, other compounds.
Embalmers	Formaldehyde.
Engravers	Acids, caustic alkali, ferric chloride, potassium cyanide.
Enamellers	Acids, caustic alkali.
Explosive workers	Dyes (nitrocellulose, explosives (TNT, etc.), ammonium salts, formalin, mercury compounds.
Farmers	Dog and other plants, fertilizers, insecticides.
Fat boilers	Acids, ammonia, phenol, dyes.
Fertilizer workers	Calcium cyanamide.
Fish curers	Dyes, lime.
Fish cutters	Lime, brine.
Fishermen	Tar.
Fish preservers	Benzine, caustic alkali, naphtha, turpentine, methyl alcohol, pyridine, resin.
Fish smokers	Dyes.
Fur workers	Ammonium chloride.
Gardeners	Ivy and other plants, fertilizers, insecticides.
Germicide preparations	Thiurium compounds.
Glass blowers	Charcoal, pitch, resin.
Glass makers	Caustic alkali.
Hairdressers	Dyes.
Hairdressing makers	Arsenic.

Occupations Exposed to Specified Skin Irritants—Continued

Occupation exposed	Skin irritants
Lampblack makers	Soot.
Laundry workers	Caustic alkali, soap.
Lime burners	Lime.
Lime pickers (tannery)	Lime.
Linoleum makers	Dyes.
Machinists	Cutting compounds, lubricants, oils.
Masons	Lime.
Match factory workers	Dyes, dextrine, gums.
Mattress workers	Acids, caustic alkali.
Mercury poisoning	Ammoniates (ammoniated mercury).
Metal workers	Acids, caustic alkali, chromates, zinc chloride, aluminum salts, ammoniacal compounds, turpentine, chromium salts, copper salts, iron salts, lead salts, phosphates, silicates, tin salts.
Mothers (textiles)	Dyes.
Nickel plating	Zinc chloride, nickel sulphate.
Nitroglycerin makers	Acids, explosives.
Nursing-home employees	Iodine.
Painters	Acids, caustic alkali, paints, zinc chloride.
Paint makers	Paints.
Paper-box makers	Dyes.
Pencils workers	Pencils.
Permanent waivers	Zinc chloride.
Pencil (colored) makers	Dyes.
Petroleum refiners	Caustic alkali, paraffin.
Photography	Acids, caustic alkali, chromates, metol, pyrogallic acid, ferrocyanides, oxalates, bromides, hydroquinone, reducers.
Photographic plate cleaners	Caustic alkali.
Pitch workers	Pitch.
Plasterers	Lime.
Polishers	Caustic alkali, naphtha.
Polishers silver and brass	Ammonium cyanide.
Printers	Ink, benzine.
Radium workers	Radiant energy.
Rock-salt workers	Brine.
Roofers	Oil, tar.
Rubber workers	Accelerators (benzenethyleneamine).
Salt processors	Brine.
Scratch brushes (electroplating)	Acids, benzine, lime, oils.
Shell fishers	Explosives (1917, etc.).
Shoe factories	Benzine, coal tar products, paraffin, mustard shellac.
Shore fronters	Zinc chloride, aluminum salts, calcium salts, magnesium salts.
Smelters	Arsenic.
Soap makers	Caustic alkali, soap, vegetable oils, sodium silicate.
Sodium hydroxide makers	Caustic alkali.
Soldiers	Acids, zinc chloride.
Sugar refiners	Sugar.
Tannery workers	Acids, lime, sodium sulphide, arsenic salts, lotus, sodium hydrosulphide, chromium salts.
Tar workers	Tar.
Tempterers	Oil, lotus.
Tinners	Zinc chloride.
Tobacco rollers	Vegetable dust, vegetable oils.
Tube in pure (rubber manufacturing)	Nitrobenzol, chromium salts, formaldehyde, magnesium salts, sodium fluosilicate.
Typists	Carbon paper.
Vulcanizers	Accelerators (benzenethyleneamine).
Washers	Caustic alkali.
Waterproofers	Caustic alkali, soap, sodium salts.
Weatherstrip	Petroleum spirits.
Waterproofers (paper)	Paraffin.
War department workers	Dye intermediates, petroleum spirits.
War-Lobbies workers	Lime, aluminum salts, formaldehyde, magnesium salts, sodium fluosilicate.
Wood preservers	Tar, zinc chloride.
X-ray workers	Radiant energy.
Zinc-chloride makers	Acids, zinc chloride.

LIST OF BULLETINS OF THE BUREAU OF LABOR STATISTICS

The following is a list of all bulletins of the Bureau of Labor Statistics published since July 1912, except that in the case of volumes giving the results of periodic surveys of the Bureau only the latest bulletin on any one subject is here listed.

A complete list of the reports and bulletins issued prior to July 1912, as well as the bulletins published since that date, will be furnished on application. Bulletins marked thus (*) are out of print.

Conciliation and arbitration (including strikes and lockouts).

No. 111. Conciliation and arbitration in the building trades of Greater New York. [1913.]
No. 158. Report of the industrial council of the British Board of Trade on its inquiry into industrial agreements. [1914.]
No. 159. Michigan copper district strike. [1915.]
No. 161. Industrial court of the cloak, suit, and skirt industry of New York City. [1915.]
No. 162. Organization, functions, and procedure of the joint board of sanitary control in the cloak, suit, and skirt industry of New York City. [1915.]
No. 165. Collective bargaining in the anthracite coal industry. [1916.]
No. 166. Conciliation and arbitration in the building trades of Greater New York. [1917.]
No. 167. Industrial relations and the war in the clothing trades. [1917.]
No. 168. Collective bargaining among railroad employees in the United States. [1917.]
No. 169. History of the Bridgeport (Conn.) Labor Adjustment Board, 1917 to 1919.
No. 170. Collective bargaining in the printing trades. [1915.]
No. 171. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the mining industry. [1916.]
No. 172. Report of the Industrial Commission on the relations and conditions of capital and labor employed in agriculture. [1916.]
No. 173. Report of the Industrial Commission on the relations and conditions of capital and labor employed in manufactures and general industries. [1916.]
No. 174. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the public service and on railroads. [1916.]
No. 175. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the education system of the United States. [1916.]
No. 176. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the labor movement. [1916.]
No. 177. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the industrial relations systems and experience in the United States. [1916.]
No. 178. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the United States. [1916.]
No. 179. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the United States. [1916.]
No. 180. Report of the Industrial Commission on the relations and conditions of capital and labor employed in the United States. [1916.]
No.

Industrial accidents and hygiene - Continued.

*No. 111. Law relating to the sanitary and safety of land. [1914.
*No. 117. [illegible]-ted accident statistics. [1914.]
*No. 126. Law relating to the examination of storage batteries. [1914.]
*No. 132. Industrial poisons used in the rubber industry. [1913.]
No. 136. Report of British departmental committee on the danger in the use of lead in the painting of buildings. [1913.]
*No. 141. Report of the committee on statistics and compensation insurance cost of the International Association of Industrial Accident Boards and Commissions. [1913.]
No. 142. Hygiene of the printing trades. [1914.]
*No. 143. Industrial poisons used or produced in the manufacture of explosives. [1913.]
No. 144. Hours, fatigue, and health in British munition factories. [1916.]
No. 145. Industrial efficiency and fatigue in British munition factories. [1917.]
No. 147. The safety factor in mechanical progress. [1913.]
No. 148. The safety movement in the iron and steel industry, 1907 to 1917.
No. 149. Effects of the air hammer on the hands of chippers. [1915.]
No. 150. Industrial health and efficiency. Final report of British Health of Munition Workers' Committee. [1918.]
*No. 151. Preventable death in the cotton manufacturing industry. [1916.]
No. 152. Accidents and accident prevention in machine building. [1914.]
No. 153. Lectures on an occupational disease. [1916.]
No. 154. Standardization of industrial accident statistics. [1913.]
*No. 155. Industrial poisoning in making coal-tar dyes and dye intermediates. [1913.]
*No. 156. Cerebro-spinal meningitis. [1917.]
No. 158. The problem of dust phthisis in the granite-stone industry. [1916.]
No. 159. Causes and prevention of accidents in the iron and steel industry, 1910-1916.
No. 160. Effects of hydrogen sulphide in the printing trades. [1915.]
No. 161. Thorium minerals in the manufacture of fireworks and in the preparation of phosphorus. [1918.]
No. 162. Health survey of the printing trades, 1913 to 1916.
No. 163. Proceedings of the Industrial Accident Prevention Conference, held at Washington, D.C., July 10-12, 1916.
*No. 164. A new test for industrial lead poisoning. [1916.]
No. 165. Employment by sex and age in American factories. [1917.]
No. 166. Deaths from lead poisoning, 1912-1917.
No. 167. Statistics of industrial accidents in the United States to the end of 1916.
No. 168. Causes of death, by occupation. [1917.]

Industrial relations and labor conditions.

No. 127. Industrial unrest in Great Britain. [1917.]
*No. 133. Chinese immigration, with special reference to labor conditions. [1914.]
No. 137. Industrial relations in the west coast lumber industry. [1915.]
No. 138. Labor relations in the Philippines (P. I.) Government mail bill. [1914.]
No. 139. Japanese labor conditions in Germany. [1914.]
No. 140. Welfare museum movement in Germany. [1914.]
No. 146. Labor conditions in the shoe industry in Massachusetts, 1885-1915.
No. 152. Labor relations in the iron and hardware industries in the United States. [1916.]
No. 153. Conditions in the shoe industry in Haverhill, Mass., 1913.
No. 154. Labor conditions in the Territory of Hawaii, 1915-1916.

Labor laws of the United States (including decisions of courts relating to labor).

*No. 121. Labor laws and their administration in the Pacific States. [1913.]
*No. 122. Wage-payment legislation in the United States. [1913.]
No. 123. Minimum wage laws of the United States: Constitutionality and operation. [1913.]
No. 124. Labor laws that have been held unconstitutional. [1913.]
No. 125. Laws providing for inspection of labor conditions, etc. [1913.]
No. 126. Labor laws of the United States, with decisions of courts relating thereto. [1913.]
No. 129. Laws relating to payment of wages. [1913.]
No. 130. Decisions of courts and opinions affecting labor, 1912-1913.
No. 131. Labor legislation, 1913.
No. 134. Laws relating to employment agencies in the United States, as of January 1, 1915.

Proceedings of annual conventions of the Association of Governmental Officials in Industry of the United States and Canada. (Name changed in 1919 from Association of Commercial Labor Officials of the United States and Canada.)

*No. 119. Seventh, Seattle, Wash., July 22-24, 1913.
*No. 127. Eighth, New Orleans, La., May 1-3, 1914.
*No. 128. Ninth, Harrisburg, Pa., May 28-30, 1915.
*No. 129. Tenth, Kalamazoo, Mich., May 1-3, 1916.
*No. 130. Eleventh, Chicago, Ill., May 10-12, 1916.
*No. 131. Twelfth, Salt Lake City, Utah, August 13-15, 1916.
*No. 135. Thirteenth, Columbus, Ohio, May 7-9, 1917.
*No. 145. Fourteenth, Paterson, N. J., May 31 to June 2, 1917.
*No. 146. Fifteenth, New Orleans, La., May 22-24, 1918.
*No. 155. Sixteenth, Toronto, Canada, June 4-6, 1918.
*No. 156. Seventeenth, Louisville, Ky., May 20-22, 1919.
*No. 166. Eighteenth, Boston, Mass., May 24-26, 1920.

Proceedings of annual meetings of the International Association of Industrial Accident Boards and Commissions.

No. 142. Third, Columbus, Ohio, April 22-25, 1913.
No. 143. Fourth, Boston, Mass., August 21-23, 1913.
No. 144. Fifth, Madison, Wis., September 24-26, 1914.
No. 151. Sixth, Toronto, Canada, September 22-24, 1915.
No. 161. Seventh, San Francisco, Calif., September 20-22, 1916.
No. 162. Eighth, Chicago, Ill., November 22-24, 1917.
No. 163. Ninth, Baltimore, Md., October 8-10, 1918.
No. 169. Tenth, St. Paul, Minn., September 24-26, 1919.

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Proceedings of annual meetings of the International Association of Industrial Accident Boards and Commissions—Continued.

No. 170. Eleventh, Halifax, Nova Scotia, August 28-30, 1920.
No. 171. [illegible] to Exposition, 1915.
No. 172. Twelfth, Salt Lake City, Utah, August 31-Sept. 2, 1921.
No. 173. Thirteenth, Montreal, Canada, September 27-29, 1922.
No. 174. Fourteenth, Atlantic City, N. J., September 25-28, 1923.
No. 175. Fifteenth, Columbus, Ohio, September 23-25, 1924.
No. 176. Sixteenth, Indianapolis, Ind., September 22-24, 1925.
No. 177. Seventeenth, Richmond, Va., October 19-21, 1926.
No. 178. Eighteenth, Cincinnati, Ohio, September 20-22, 1927.

Proceedings of annual meetings of the International Association of Public Employment Services.

No. 168. First, Chicago, December 31 and 29, 30th annual, Indianapolis, September 30 and 31, 1919.
[illegible]

Productivity of labor and technological unemployment.

No. 155. Productivity costs in the common-brick industry. [1916.]
No. 156. Time and labor costs in manufacturing 30 gallons of coal oil. [1916.]
No. 157. Time and cost of production and wages and hours of labor in the paper box-board industry. [1916.]
[illegible]
No. 170. Wages, hours, and productivity in the printing industries, 1916.
No. 171. Productivity of labor in the glass industry. [1917.]
No. 172. Productivity of labor in sawmilling. [1917.]
No. 173. Productivity of labor in the petroleum industry. [1917.]
No. 174. Technological changes and employment in the Portland (Maine) Pipe Foundry. [1919.]

Public policy and work of bureau.

No. 132. Work of public employment offices in connection with the war. [1918.]
No. 133. Standardization of public employment offices and practice. [1918.]
No. 134. Public employment offices in the United States. [1918.]
No. 135. Work of employment offices in relation to demobilization. [1919.] [illegible]
No. 136. Unemployment in the United States. [1920.]

Safety codes.

No. 122. Safety code for the protection of industrial workers in foundries. [1917.]
No. 123. Safety code for the construction, care, and use of ladders. [illegible]
No. 124. Safety code for the operation, care, and use of cranes. [illegible]
No. 125. Safety code for mechanical power-transmission machinery and equipment. [illegible]
No. 126. Code of lights for mines. [illegible]
No. 127. Safety code for the use, care, and protection of abrasive wheels. [illegible]
No. 128. Safety code for the care and use of paper trimmers and guillotine shears. [illegible]
No. 129. Safety code for the construction, care, and use of power punches and shears. [illegible]
No. 131. Safety code for the construction, care, and use of derricks. [illegible]
No. 132. Safety code for the use, care, and protection of abrasive wheels, as revised 1923.
No. 133. Code of lights for illuminating gases, and other mine gases. (Bulletin of Bur.)
No. 134. Safety codes for the prevention of scaffold accidents. [illegible]

Vocational and workers' education.

No. 135. Vocational courses for wage earners, and a system of vocational supervision. [1918.]
No. 137. Vocational education survey of Minneapolis, Minn. [1919.]
No. 138. Vocational education survey of Minneapolis, Minn. [1919.]
No. 139. Adult working-class education in Great Britain and the United States. [1921.]
No. 140. Apprenticeship in building construction. [1919.]

Wages and hours of labor.

*No. 118. Wages and regularity of employment and standardization of piece rates in the dress and waist industry of New York City. [1913.]
No. 120. Wages and regularity of employment in the cloak, suit, and skirt industry. [1914.]
No. 121. Wages and hours of labor in the clothing and allied industries, 1911 to 1913.
No. 122. Wages and hours of labor in the building and repairing of steam railroad cars, 1907 to 1913.
No. 123. Wages and hours of labor in the cotton, woolen, and silk industries, 1907 to 1913.
No. 124. Street railway employment in the United States. [1917.]
No. 125. Wages and hours of labor in the iron and steel industry, 1907 to 1913. With a glossary of occupations.
No. 126. Wages and hours of labor in the hosiery, knitwear, and underwear industries, 1907 to 1913.
No. 127. Industrial survey in selected industries in the United States, 1919.
No. 128. Wages and hours of labor in the petroleum industry, 1918.
No. 129. Productivity costs in the common-brick industry. [1921.]
No. 130. Wages and hours of labor in the cotton-goods industry, 1913.
No. 131. Time and labor costs in manufacturing 100 gallons of coal oil, 1918.
No. 132. Wages and hours of labor in the paper and pulp industry, 1918.
No. 133. Time and cost of production and wages and hours of labor in the paper box-board industry. [1919.]

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Wages and hours of labor—Continued.

*No. 412. Wages, hours, and productivity in the pottery industry, 1925.
*No. 418. Hours and earnings in metalliferous coal mining, 1924 and 1925.
*No. 420. Wages and hours of labor in commercial street railways, 1924.
*No. 430. History of wages in the United States from colonial times to 1926.
*No. 431. Wages and hours of labor in the motor-vehicle industry, 1925.
*No. 434. Wages and hours of labor in the hosiery and underwear industries, 1907 to 1925.
No. 440. Power presses, foolproof and full automatic. Power Report of Joint Post Finding Committee in the wages and hours of labor.
*No. [illegible]. Hours and earnings in the anthracite coal mining industry, 1925.
*No. [illegible]. Wages and hours of labor in the canning and preserving industry, 1925.
*No. [illegible]. Wages and hours of labor in the Portland cement industry, 1925.
*No. [illegible]. Wages and hours of labor in the fertilizer manufacturing industry, 1925.
*No. [illegible]. Wages and hours of labor in the woolen and worsted goods manufacturing, 1907 to 1925.
*No. [illegible]. Labor conditions in the Territory of Hawaii, 1926–1927.
*No. [illegible]. Wages and hours of labor in the slaughtering and meat-packing industry, 1924.
*No. [illegible]. Wages and hours of labor in the clothing and building of hosiery, 1925.
*No. [illegible]. Wages and hours of labor in cotton goods manufacturing, 1907 to 1925.
*No. [illegible]. Wages and hours of labor in rayon and other synthetic yarn manufacturing, 1925.
*No. [illegible]. Wages and hours of labor in the cotton-knitting industry, 1925.
*No. [illegible]. Wages and hours of labor in the men's clothing industry, 1911 to 1926.
*No. [illegible]. Wages and hours of labor in the lumber industry in the United States, 1923.
Uniform system of wages and hours of labor. (Bul. 36, 1924.
*No. [illegible]. Wages and hours of labor in the iron and steel industry, 1923.
*No. [illegible]. Wages and hours of labor in the manufacture of silk and silk goods, 1923.
*No. [illegible]. Wages and hours of labor in the building and construction industry, 1923.
*No. [illegible]. Wages and hours of labor in the hardware industry, 1923 to 1924.
*No. [illegible]. Wages and hours of labor in establishments using gas, 1923 to 1924.
*No. [illegible]. Wages and hours of labor in the petroleum industry, 1924.
*No. [illegible]. Wages and hours of labor in the pharmaceutical and allied chemical industry, 1923.
*No. [illegible]. Wages and hours of labor in the manufacture of electrical machinery, apparatus, and supplies, 1923.
*No. [illegible]. Wages and hours of labor in the coal and coke industry, 1923 to 1925.
*No. [illegible]. Wages and hours of labor in the railway industry—local and cable departments, 1923.

Welfare work.

*No. [illegible]. Employers' welfare work. [1919.]
*No. [illegible]. Welfare work in British munition factories. [1917.]
*No. [illegible]. Welfare work for employees in industrial establishments in the United States. [1919.]
No. [illegible]. Health and recreation activities in industrial establishments, 1920.

Wholesale prices.

*No. [illegible]. Index numbers of wholesale prices in the United States and foreign countries. [1919.]
*No. [illegible]. Revised index numbers of wholesale prices, 1913 to July, 1920.
No. [illegible]. Wholesale prices, 1923.

Women and children in industry.

*No. [illegible]. Report, earnings, and duration of employment of wage-earning women in selected industries in the District of Columbia. [1914.]
*No. [illegible]. Prohibition of night work of young persons. [1919.]
*No. [illegible]. Ten-hour maximum working day for women and young persons. [1919.]
*No. [illegible]. Working hours of women in the iron industry of Wisconsin. [1919.]
*No. [illegible]. Employment of women in power laundries in Milwaukee. [1918.]
*No. [illegible]. Hours, wages, and conditions of labor of women in Indiana canneries, establishments and personal hygiene. [1919.]
*No. [illegible]. Minimum-wage legislation in the United States and foreign countries. [1919.]
*No. [illegible]. Summary of the report on conditions of women and child wage earners in the United States. [1919.]
*No. [illegible]. Effect of minimum-wage determinations in Oregon. [1919.]
*No. [illegible]. The hours and other handicaps of the overtime and the evening worker in specified trades. [1919.]
*No. [illegible]. Dressmaking as a trade for women in Massachusetts. [1919.]
*No. [illegible]. Industrial experience of trade-school girls in Massachusetts. [1919.]
*No. [illegible]. Effect of employment certificates issued in Philadelphia. [1919.]
*No. [illegible]. Effect of workmen's compensation laws in diminishing the necessity of industrial employment of women and children. [1919.]
*No. [illegible]. Employment of women and juveniles in Great Britain during the war. [1919.]
*No. [illegible]. Women in the lead industries. [1919.]
*No. [illegible]. Minimum-wage legislation in various countries. [1919.]
*No. [illegible]. Labor conditions of women and children in Japan. [1919.]

Workmen's insurance and compensation (including laws relating thereto).

*No. [illegible]. Care of tuberculous wage earners in Germany. [1913.]
*No. [illegible]. British national insurance act, 1918.
*No. [illegible]. Sickness and accident insurance law in Switzerland. [1913.]
*No. [illegible]. Law relating to insurance of salaried employees in Germany. [1913.]
*No. [illegible]. Compensation for accidents to employees of the United States. [1919.]
*No. [illegible]. Proceedings of the conference on social insurance called by the International Association of Industrial Accident Boards and Commissions, Washington, D.C., December 4-6, 1913.
*No. [illegible]. Workmen's compensation legislation in the United States and foreign countries, 1917 and 1918.
No. [illegible]. Comparison of workmen's compensation insurance and administration. [1919.]
No. [illegible]. National health insurance in Great Britain, 1911 to 1921.
No. [illegible]. Comparison of workmen's compensation laws of the United States up to January 1, 1919.
No. [illegible]. Public service retirement systems, United States and Europe. [1919.]
No. [illegible]. Workmen's compensation legislation of the United States and Canada up to January 1, 1919. (With text of legislation enacted in 1917 and 1918.)
No. [illegible]. Workmen's compensation legislation of the Latin American countries. [1919.]

Miscellaneous series.

*No. [illegible]. Subject index of the publications of the United States Bureau of Labor Statistics up to May 1, 1918.
No. [illegible]. Trade training in the United States. [1918.]
No. [illegible]. Food situation in central European land.
No. [illegible]. Government labor legislation during the century of optimism. [1919.]
No. [illegible]. Industrial survey of Pennsylvania during reconstruction period.
No. [illegible]. Annual outlay of the various governmental departments in Washington, D.C. [1919.]
No. [illegible]. The Bureau of Labor Statistics: its history, activities, and organization. [1921.]
No. [illegible]. Handbook of mailing and compiling statistical information of the Bureau of Labor Statistics. [1919.]
No. [illegible]. International Seamen's Union of America: A study of its history and problems. [1919.]
No. [illegible]. Housing by employers. [1920.]
No. [illegible]. Convict labor in 1923.
No. [illegible]. Cost of living in the United States. [1924.]
No. [illegible]. Directory of conventions. [1924.]
No. [illegible]. Health problems in workers' education. [1924.]
No. [illegible]. Proceedings of the Fifth National Conference of Labor Legislation. [1919.]
No. [illegible]. Official list of publications of the Bureau of Labor Statistics. [1919.]
No. [illegible]. Profit sharing in the United States. [1920.]
No. [illegible]. Directory of workers' education agencies. [1924.]
No. [illegible]. Conference on unemployment, 1921. [1921.]
No. [illegible]. Unemployment in New York City, 1916–17. [1917.]
No. [illegible]. Business cycles and unemployment. [1923.]
No. [illegible]. Employment and earnings in the United States, 1922–23. [1924.]
No. [illegible]. Proceedings of the Employment Standards Conference, 1923. [1924.]
No. [illegible]. Unemployment in the United States. [1930.]
No. [illegible]. Industrial unemployment: A statistical study of its extent during the period 1923 to 1927 inclusive. [1928.]
No. [illegible]. Unemployment in Philadelphia: Report of the Philadelphia Unemployment Survey. [1929.]
No. [illegible]. Unemployment in the United States. [1930.]