

FILE NAME: Metropolitan Life (ML)

DATE: 1941

DOC#: ML080

DOCUMENT DESCRIPTION: Excerpt - US Dept of Labor Publication -
Occupation Hazards and Diagnostic Signs



UNITED STATES DEPARTMENT OF LABOR
FRANCES PERKINS, *Secretary*
DIVISION OF LABOR STANDARDS
VERNE A. ZIMMER, *Director*

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OCCUPATION HAZARDS AND DIAGNOSTIC SIGNS

A Guide to Impairments To Be Looked for in
Hazardous Occupations

(Revision of Bureau of Labor Statistics Bulletin No. 582)

By

LOUIS I. DUBLIN

Third Vice President and Statistician

and

ROBERT J. VANE

Supervisor of Occupational Ratings
Metropolitan Life Insurance Company



Bulletin No. 41

United States
Government Printing Office
Washington : 1941



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. 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. Subsequent editions have been equally well received. It has been reproduced either in whole or in part in a number of works by authorities on the subject of industrial hygiene. The present publication is a complete revision of Bulletin No. 582 of the United States Bureau of Labor Statistics, issued in 1933 under the same title.

The authors are convinced by their experience with these earlier editions that this bulletin has served a useful purpose, and that there is a vital need for a compilation 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. Those who may wish to look further into the causes and effects of specific hazards will find detailed information in the sources referred to in the last section.

The two decades which have passed since the first edition of this bulletin was prepared have been years of tremendous expansion in the field of industrial hygiene. It has come to be recognized as an important branch of industrial management in which industrialists, physicians, engineers, chemists, laboratory technicians, statisticians, labor law administrators, workmen's compensation officials, and factory inspectors cooperate in the discovery of hazards, the nature of the injuries they cause, and in working out measures for their prevention. They have been years noteworthy for the large number of scientific investigations undertaken here and abroad to determine the causes of ill health among workmen and the effects of exposure to specific hazards. As a result of newer findings, we have had to revise many of our views on the effects of specific industrial exposures. Our idea that dusts, for example, were injurious in proportion to the hardness and sharpness of their particles, has been shown to be erroneous. It is now held that dusts are injurious in proportion to the amount of free silica or the amount of asbestos they contain. Our knowledge of the effects of many other hazards, long recognized as injurious, has been enhanced, and in addition a wealth of infor-

tion has been supplied on the effects of important new hazards, notably the volatile solvents and chemicals employed in the manufacture of synthetic resins, to mention only two.

In preparing this, the fourth 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 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 in which the hazard may be present, and not necessarily those in which specific cases of injury have occurred. It should be recognized that even where poisons or other hazards are present the chances of injury may be slight. Some industries today, due to the excellence of the preventive measures they have instituted, are manufacturing or handling extremely toxic materials with virtually no danger to the workmen. There is every reason to believe that most, if not all, plants could eliminate the hazard of poisoning if management and employees worked together toward that end and this may be said of many other hazards.

A word of caution should be given to the layman against the use of the material presented here for self-diagnosis or for diagnosing the illness of others. That is a practice fraught with the gravest danger. The only people competent to make a diagnosis are physicians. They should be consulted without delay whenever there are signs or symptoms of ill health. The hazards covered now include "abnormalities of air pressure;" "abnormalities of temperature;" "dampness;" "defective illumination;" "dust;" "infections;" "radiant energy;" "repeated motion, pressure, shock, etc.;" the "poisons;" and "dermatoses." The number of poisonous substances considered has been increased from 94 to 128. The number of hazardous occupations listed has been increased to approximately 1,100.

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. R. Sayers, W. F. Von Oettingen, L. Schwartz, L. Tulipan, W. D. McNally, H. F. Smyth, R. Prosser White, Carey P. McCord, Henry H. Kessler, Ethel Browning, and also the International Labor Office of the League of Nations, Harvard School of Public Health, United States Department

of Labor, United States Public Health Service, United States Bureau of Mines, and the Division 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, and to Miss Eleanor Rantoul, all 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 Sol Ungar, Jules V. Quint, and Robert S. Levin of the Statistical Bureau of the Metropolitan Life Insurance Co.

LOUIS I. DUBLIN.
ROBERT J. VANE.

Poisonous dusts are not considered in this section but under their appropriate headings relating to their composition. For practical purposes industrial dusts are divided into two classes, organic and inorganic.

ORGANIC DUST

Organic dusts contain carbon and are largely derived from substances of animal and plant origin. Examples of these are textile dusts, flour, sugar, wood, leather, and feathers. Organic dusts may irritate the skin, causing an occupational dermatitis or may irritate the conjunctiva. Many, if not most, organic dusts may cause an allergic reaction in some persons. When present in very large quantity, any organic dust may cause irritation of the upper air passages. Some woods may also cause skin irritation, notably Brazil wood, satinwood, teak, some mahoganies, cocobolo, California redwood.

Organic dusts do not cause pneumoconiosis or pulmonary fibrosis of a specific disabling nature. The particles of many types of organic dusts are not of the size or shape to permit them to penetrate to the lung tissue and those which do gain entrance into the body are absorbed. Coal is an organic dust, but on account of its origin is sometimes classed with the mineral dusts. Coal dust does get into the lungs, causes pigmentation, and may stimulate the production of fibrous tissue but will not produce a disabling pneumoconiosis. The "miners' asthma" of anthracite miners has been shown to be in fact a silicosis, modified by the presence of coal dust along with the silica, and is properly termed anthraco-silicosis.

INORGANIC DUST

Inorganic industrial dusts are mostly metallic and mineral. Of all the various types of such dusts, only those containing "free" or *uncombined silica* will produce the specific pneumoconiosis known as silicosis. Other inorganic dusts may cause some pulmonary fibrosis of a benign or nondisabling character. The action of silica dust upon the lungs is probably chemical, and the dust particles producing the reaction are mostly those from one-half to three microns in diameter. The reaction of silica is the production of nodules, distributed throughout both lungs, producing a characteristic appearance on the X-ray film. Another effect of silica is to stimulate tubercle infection and severe cases of silicosis frequently die with tuberculosis.

Dusts containing silica in *combined form* do not cause silicosis. However, one such dust, asbestos, a magnesium silicate, will produce a characteristic fibrosis. This is quite different in its pathology from silicosis, and has a characteristic "ground glass" appearance on X-ray film. Animal experimentation indicates that the action of asbestos is probably mechanical, since it cannot be produced in other than the pulmonary tissue. Asbestosis may cause disability, and a few fatal cases have been recorded, but in those cases showing marked disability, other organic disease is usually also present.

The control and prevention of silicosis and asbestosis depends on both medical and engineering supervision. Periodic X-ray examination of workmen exposed to these dusts is essential. Engineering methods for the control of dust comprise:

(1) The use of exhaust systems or suction devices which entrap the dust at its point of origin.

(2) The use of water, and occasionally oil, to lay the dust and keep it out of the atmosphere. Both these methods may be combined.

(3) The use of enclosed systems for dust-causing procedures, properly exhausted.

(4) Increased ventilation, thus diluting the amount of dust in the air and decreasing its concentration.

(5) The use of helmets or respirators, of a type approved by the United States Bureau of Mines, where intermittent exposures, not otherwise controllable, are involved.

1. Organic Dust

SYMPTOM, CONDITION, OR DISEASE TO LOOK FOR

Irritation of the skin and upper air passages, allergic effects, asthma.

OCCUPATIONS WHICH OFFER SUCH EXPOSURE

Abrasives makers	Fertilizer makers	Pouncers (felt hats)
Ashmen	Fiber workers	Pyroxylin-plastics workers
Bakers	Finishers (leather)	Rag workers
Battery (dry) makers	Flax spinners	Resins (synthetic) makers
Beamers (textiles)	Flour-mill workers	Roller coverers (cotton mills)
Blowers (felt hats)	Formers (felt hats)	Rope makers
Boneworkers	Fur carders	Rubber workers
Broom makers	Fur clippers	Sawmill workers
Brushers (felt hats)	Fur cutters	Scourers, wood lasts (shoes)
Brush makers	Fur handlers	Shavers (felt hats; fur; tannery)
Buffers	Fur preparers	Shoddy workers
Button makers	Fur pullers	Shoe-factory operatives
Carbide makers	Furniture polishers	Sifters
Carbon-black workers	Glove makers (leather preparers)	Silk workers
Carbon-brush makers	Glue workers	Soap makers
Carbonizers (shoddy)	Grain-elevator workers	Softeners (tannery)
Carbon-paper makers	Graphite workers	Soot packers
Carders (textiles)	Grinders (rubber)	Spice makers
Card grinders (textiles)	Guncotton pickers	Spinners (textiles)
Carpet cleaners	Hair workers	Starch makers
Carpet makers	Harnessmakers	Straw-hat makers
Charcoal workers	Heel makers (shoe)	Street cleaners
Cigar makers	Hemp workers	Sugar refiners
Coal passers	Horn workers	Taxidermists
Cobblers	Jute workers	Textile workers
Comb makers	Knitting-mill workers	Tobacco workers
Coners (felt hats)	Lace makers	Upholsterers
Cork workers	Lampblack makers	Weavers
Cotton-mill workers	Lasters (shoes)	Weighters
Cotton twistors	Leather workers	Wood-last scourers (shoes)
Crucible mixers	Linen workers	Woodworkers
Curriers (tannery)	Linoleum makers	Wool carders
Devil operators (felt hats)	Match-factory workers	Wool spinners
Diamond cutters	Mattress makers	Wool workers
Doffers (textiles)	Mixers (felt hats)	
Electrode makers	Mixing-room workers (miscellaneous)	
Electrotypers	Pharmaceutical workers	
Feather curers	Polishers (metal)	
Feather workers		
Felt-hat makers		

OCCUPATION HAZARDS AND DIAGNOSTIC SIGNS

2. Inorganic Dust Containing Free Silica

SYMPTOM, CONDITION, OR DISEASE TO LOOK FOR

Cough, dyspnea, pleuritic pains, deficient chest expansion, dullness, diminished resonance, colds, pleurisy, tuberculosis, hemoptysis.

OCCUPATIONS WHICH OFFER SUCH EXPOSURE

Abrasives makers	Fertilizer makers	Sand cutters
Abrasives workers	Flint workers	Sanders
Bedrubbers (stone)	Foundry workers	Sanding-machine operators
Bisque-kiln workers	Fused-quartz workers	tors
Blasters	Glass furnace workers	Sandpaper makers
Brick makers (silica brick)	Glass mixers	Sand pulverizers
Buffers	Glaze mixers (pottery)	Sawyers (stone)
Burrers (needles)	Grinders (metals)	Scouring-powder makers
Burr filers	Grinding wheel makers	Scrapers (foundry)
Casting cleaners (foundries)	House wreckers	Silicon alloys makers
Cement (portland) workers	Insulation (sound, heat) workers	Slate workers
Chippers	Jute workers	Smelter workers
Clay and bisque makers (pottery)	Masons	Soap (abrasive) workers
Concentrating-mill workers	Miners	Sodium silicate makers
Construction workers	Molders (foundry)	Stamp mill workers
Core makers	Ore-concentrating mill workers	Statuary workers
Crushermen (clay and stone)	Planer men (stone)	Stone (artificial) makers
Cutlery makers	Polishers (metal)	Stonecutters
Diatomaceous-earth workers	Pottery workers	Stonemasons
Drillers (rock)	Pouncers (felt hats)	Stone workers
Enamelers (vitreous enamels)	Quarrymen	Street repairers
	Quartz workers	Subway construction workers
	Road repairers	Tile makers
	Rubber workers (filling)	Tumbling-barrel workers
	Sand blasters	Tunnel construction workers

3. Inorganic Dust (except Asbestos) Containing no Free Silica

SYMPTOM, CONDITION, OR DISEASE TO LOOK FOR

Exposure to inorganic dusts containing no free silica has been found in some instances to be associated with simple linear fibrosis (nonspecific benign fibrosis-Gardner) not associated with disability. The exact relationship of various dusts to this type of fibrotic reaction is not entirely clear.

OCCUPATIONS WHICH OFFER SUCH EXPOSURE

Abrasives makers	Calenderers (rubber)	Compounders (rubber)
Abrasives workers	Carbide makers	Concentrating-mill workers
Acetylene makers	Carbon-brush makers	ers
Ashmen	Card grinders (textiles)	Construction workers
Basic slag (artificial manure) workers	Casting cleaners (foundry)	Core makers
Battery (dry) makers	Cement (portland) workers	Cotton-mill openers
Bed rubbers (stone)	Chasers (steel)	Crucible mixers
Bevelers	Chimney sweepers	Crushermen (clay and stone)
Bisque-kiln workers	Chippers	Cut-glass workers
Blasters	Clay and bisque makers (pottery)	Cutlery makers
Bricklayers	Clay-plug makers (pottery)	Cyanamid makers
Brickmakers	Coal passers	Diamond cutters
Bronzers	Color makers	Drillers (rock)
Buffers (needles)	Compositors	Electrotypers
Burrers		Emery-wheel makers
Burr filers		Engineers (stationary)
Button makers		Engravers

Fertilizer makers	Mica strippers or splitters	Sandpaper makers
File cutters	Mica workers	Saw filers
Filters	Mineral-earth workers	Sawyers (stone)
Firemen (stationary)	Miners	Scissors sharpeners
Flint workers	Mixers (rubber)	Scouring-powder makers
Flue cleaners	Mixing-room workers (miscellaneous)	Scrapers (foundry)
Foundry workers	Mold breakers (foundry)	Screen workers (lead and zinc smelting)
Furnace workers	Molders (foundry)	Sifters
Glass blowers	Paint removers	Sintering-plant workers
Glass cutters	Paper hangers	Slag workers
Glass finishers	Phosphate-mill workers	Slate workers
Glass-furnace workers	Planer men (stone; metal)	Slip makers (pottery)
Glass mixers	Plasterers	Smelter workers
Glaze mixers (pottery)	Plaster of Paris workers	Smoothers (glass)
Gold beaters	Pneumatic-tool workers	Soap (abrasive) workers
Gold refiners	Polishers (metal)	Stamp-mill workers
Graphite workers	Polish makers	Statuary workers
Grinders (metals)	Pottery workers	Stokers
Grinding wheel makers	Pouncers (felt hats)	Stone (artificial) makers
Gypsum workers	Printers	Stonecutters
Horn workers	Putty makers	Stonemasons
Insulation (sound, heat) workers	Putty polishers (glass)	Stone workers
Iron and steel mill work- ers	Pyrites burners	Street cleaners
Jewelers	Quarrymen	Street repairers
Junk (metal) refiners	Road repairers	Sugar refiners
Jute workers	Roofing-material workers	Sulphur burners
Lapidaries	Rubber workers	Table turners (enamel- ing)
Lime burners	Sagger makers	Talc workers
Lime-kiln chargers	Salt preparers	Textile comb makers
Lime workers	Sand blasters	Tile makers
Lisoleum makers	Sanders	Toolmakers
Lithographers	Sanding-machine opera- tors	Top fillers (foundry)
Marble cutters	Sandpaperers (enameling and painting auto bod- ies, etc.)	Tumbling-barrel workers
Masons		Tunnel workers
Match-factory workers		Weighers
Metal turners		

4. Asbestos

SYMPTOM, CONDITION, OR DISEASE TO LOOK FOR

Cough, dyspnea, pallor, clubbing of fingers, diminished chest expansion.

OCCUPATIONS WHICH OFFER SUCH EXPOSURE

Asbestos miners	Crushers (asbestos)	Spinners (asbestos)
Asbestos-products work- ers	Fiberizers (asbestos)	Textile (asbestos) work- ers
Brake-lining makers	Miners (asbestos)	Weavers (asbestos)
Corders (asbestos)	Molders (asbestos)	
Cobbers (asbestos)	Roofing-material (asbes- tos) workers	

F. Infections

Infections, both localized and systemic, are frequently of occupa-
tional origin. Anthrax, fungus infections, undulant fever, and "septic
infections" are typical examples. A brief summary of the symptoms
of these diseases and the principal occupations in which infection is
likely to occur are given in this section. Other infectious diseases
especially worthy of mention are listed below:

Butcher's pemphigus	Butchers, dead-animal handlers.
Erysipeloid	Butchers, button makers, cooks, fish handlers, meat inspectors.