

The Health of the Worker

Dangers to Health in the Factory and
Shop and How to Avoid Them

By

C. E. A. WINSLOW

Associate Professor of Biology, College of the City of New York, and
Curator of Public Health, American Museum of
Natural History, New York



Printed and Distributed by the
METROPOLITAN LIFE INSURANCE COMPANY
for the use of its Policy-holders

1913

The Health of the Worker

What This Booklet is For.—Do you know that a great many men and women die every year on account of the conditions under which they work? Do you know that if a man goes into certain trades it means he will have five, ten or fifteen years less of life than if he earned his living in some other way?

It is true. The death rate among cutlery grinders in Sheffield, England, for instance, is just about twice as high as it is for other men of the same age. Half the men who die in this trade die of industrial disease (chiefly tuberculosis), due, largely, to breathing in sharp particles of dust.

Most industrial diseases are preventable. The bad conditions that exist in factories and other industrial establishments are due mainly to ignorance. They keep the worker uncomfortable, they hinder his work, and they make him an easy prey to any sicknesses that come along. They are likewise harmful to the employer's interests, for he is a constant loser from poor and careless work, spoiled stock, absences and the breaking in of green hands. Dangerous conditions continue to exist because neither employer nor employee knows what is going on. They do not understand that dust and fumes, bad air, poor lighting and dirt make sick men and a poor product. This book is written to help its readers to think of these things; for conditions will be made better as soon as people begin to think about them. You cannot keep your shop healthy unless your employer does his part. Neither can he unless you do yours.

Tuberculosis— the Great Industrial Disease.—When a mine gets on fire or a boiler bursts, there are big headlines in the

Copyright, 1913

BY THE MANUFACTURERS LIFE INSURANCE COMPANY

papers and everybody reads about it all over the country. When here and there a workman begins to feel poorly and cough and then drops out of the shop and goes to the hospital or the churchyard, no one knows or cares about it but his family and friends. *A great many more men die of industrial tuberculosis than are killed in mine fires and boiler explosions, with railroad collisions thrown in.*



DUST AND FUMES IN THE WORKROOM.

losis than are killed in mine fires and boiler explosions, with railroad collisions thrown in.

"Tuberculosis is caused by a germ which spreads from one person to another by spitting, direct contact, or common drinking cups, and in many other ways. But the strong, healthy man does not have tuberculosis even when he gets the germ. The sound human body can take care of tuberculosis germs and can destroy them. It is generally the man whose lungs have been injured by sharp bits of flying dust or whose general

health has been injured by living or working in hot stale air who falls a victim. That is why tuberculosis is so often an industrial disease.

Factory Dust and Its Dangers.—The largest amount of industrial tuberculosis is in the dusty trades. If the air is full of fine



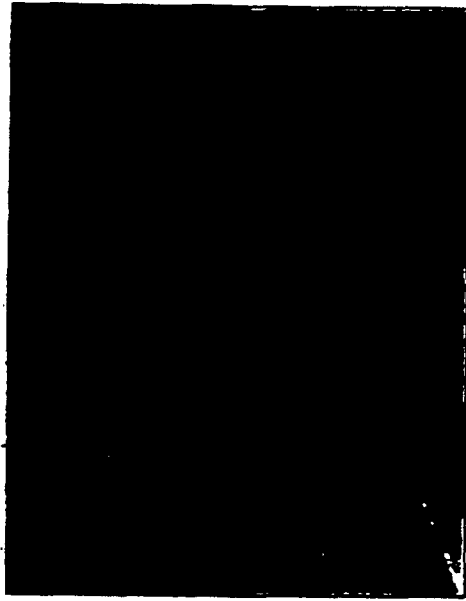
UNPROTECTED DUST-PRODUCING WHEELS—A MENACE TO THE WORKER.

sharp dust particles of steel or granite the delicate lining of the lungs will be torn and injured, and nothing gives the tuberculosis germ a better chance to do its work than just such a condition.

I have a letter from an old doctor in a Massachusetts town about this disease which reads as follows:

"I have seen quite a number of cases of so-called grinder's consumption. The symptoms are excessive shortness of breath on slight exertion, dry cough and great prostration. The

grinders are from the Polanders and Finns for the past dozen years. The disease takes hold of them more frequently, and is more rapidly fatal than among the grinders of former years and of other nationalities. When I came here 40 years ago I found the victims among the Yankees who had ground some 20 years before. Those would grind 18 or 20 years before having to give it up. The French-Canadians were then grind-



GRANITE WORKER USING A SAND BLAST. ONE OF THE CONDITIONS LIKELY TO CAUSE TUBERCULOSIS.

ing. They could work 12 to 16 years. They became frightened off, and the Swedes took up the work. They would get the disease in 8 or 10 years. Now the Finns and Polanders are at it, and they last only 3 to 5 years, and the disease is more common among them."

The most dangerous dusts are those from metal and mineral grinding, polishing, sifting and handling. Some of the animal dusts, like those of bone, mother-of-pearl and the hair dust in

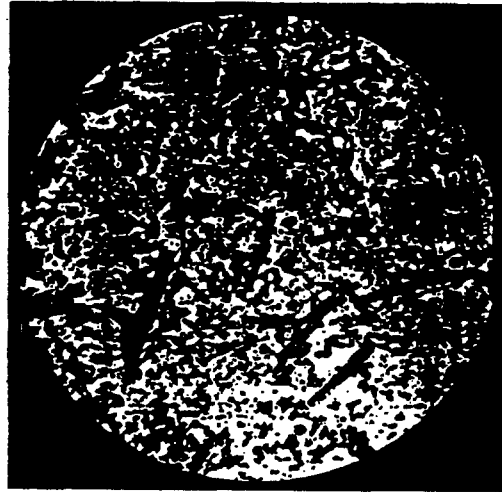
the felt-hat industry, are almost as bad as the stone and metal dusts. Others, like the dust in boot and shoe making, are less serious, and most of the vegetable dusts are softer and do less damage than the bits of steel to which the grinders are exposed. All of them, however, do more or less harm.

SOME OF THE DUSTY TRADES

Baking and confectionery making	Jewelry making
Boot and shoe making	Lace making
Brass working	Leather industry
Brush making	Lithographing
Cabinet making	Marble working
Carpet and rug making	Mining
Celluloid making	Molding
Cement working	Paper making
Core making	Pearl-button making
Cotton-ginning	Plastering and paper hanging
Cotton textile manufacture	Polishing
Crushing (various metals and minerals)	Pottery and earthenware making
Diamond cutting	Printing (including work of compositors and pressmen)
Engraving	Rag industry
File cutting	Sand blasting
Flax and linen manufacture	Shoddy manufacture
Flour industry	Sifting (metals and minerals)
Fur handling and taxidermy	Silk industry
Glass working	Spinning
Gold-leaf manufacture	Starch refining
Grain handling	Stone working
Grinding (emery wheels, etc.)	Tobacco working
Hatting	Tool making
Hemp and cordage manufacture	Upholstery and hair-matress making
Horn and bone working	Weaving
Hosiery and knitting industry	Wood turning and carving
Jute and jute goods manufacture	Woolen and worsted manufacture

Are You Exposed to Dust in the Air of Your Factory?—There are three ways in which the employer can protect his

workers against dangerous dusts. First, he can use wet processes instead of dry ones so as to keep down dust; second, he can carry out the work in closed vessels so that the dust does not get into the air of the workroom; and third, he can draw out the dust as soon as it is formed, by the use of hoods and

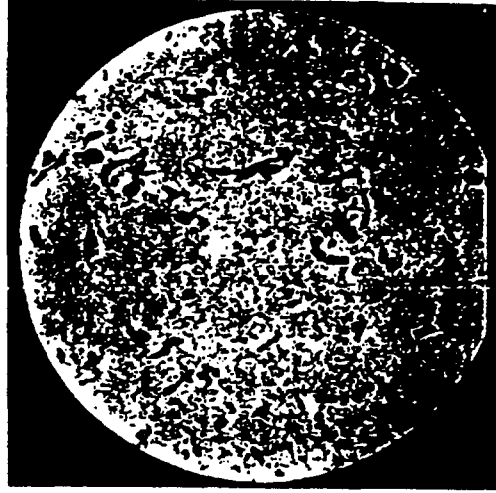


AMOUNT OF DUST BREATHED PER HALF-MINUTE BY
WOMAN WORKING AT A SPREAD-BOARD
IN A FLAX FACTORY.

fans. There is one way in which the worker can protect himself against dangerous dusts—by wearing a good respirator. The best way to deal with dust is not to have any. Where wet grinding or grinding in oil can be used instead of dry grinding, where paint can be rubbed with pumice and oil instead of sandpaper and the like, there is no danger from dust in the air. Cleaning of the benches and floors in the workroom

should be done with a wet cloth, and not a dry one, for the same reason.

Many processes which do produce dry dust, such as sifting, sorting, etc., can just as well be carried out in closed cylinders or drums by machinery, so that the dust is kept where it can

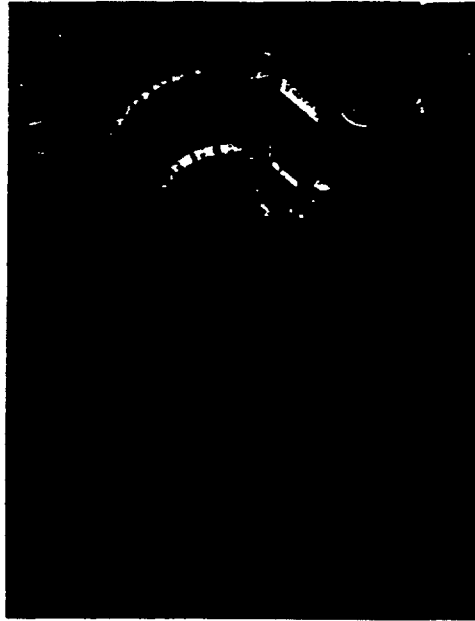


AMOUNT OF DUST BREATHED PER HALF-MINUTE BY
A PICKER IN A FLAX FACTORY. EFFECTIVE
VENTILATION BY SUCTION FAN.

do no harm. It is a good plan to use a machine instead of a man wherever the man would be in danger of his life and health.

In many other cases the work must be done by hand, as in some of the worst processes, like grinding and polishing by the use of emery and buffing wheels. Here the dust should be removed by a hood placed over the wheel or other dust-

producing part and the dust should be drawn off by a strong suction fan. There are hoods and fans that work, and hoods and fans that do not. In a study of shoe shops by the State Board of Health of Massachusetts, it was found that out of 4,399 dusty machines, 1,630 had good equipment for dust



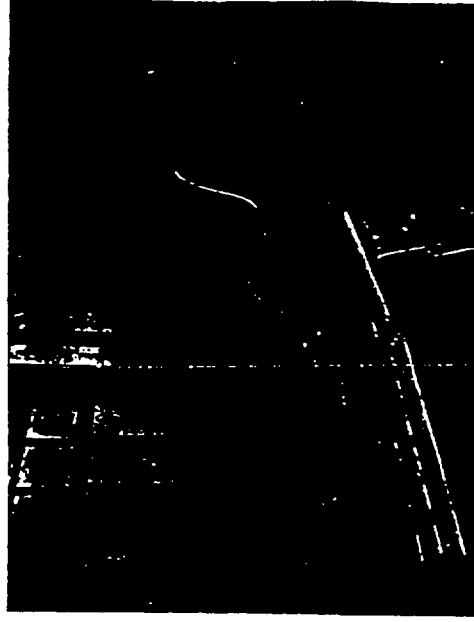
GRINDING ON EMERY WHEELS WITH HOODS AND SUCTION TO REMOVE DANGEROUS DUST.

removal, while 2,769 either had no hoods and fans or imperfect ones. *If the hood, nozzle or grating is the right shape and fits over or under the place where the dust is formed and there is a strong current of air drawing away from the worker, the danger from industrial tuberculosis will be greatly reduced.*

In trades like granite cutting, some sorting and packing processes, the opening of white-lead beds and the like, there is no good way of keeping dust out of the workplace, because the dust is everywhere. In such trades the only way for the worker

to be safe is to wear a good respirator or a wad of cotton wool tied over the mouth and nose. It is hot and uncomfortable, but it is not half so uncomfortable as the cough and the weakness of consumption.

Are There Gases and Fumes in the Air of Your Workroom?
—All gases and fumes should be kept out of the workroom,



SANDBLASTING CASTINGS, WITH HELMET FOR PROTECTION AGAINST DUST.

whether they are actively poisonous or not. The lungs are meant to breathe air, not chemicals. Acid fumes, bleach dust and the like do not cause any special disease, but they hurt the delicate lining of the nose and throat, and the men who breathe them have bad colds and are likely to have more serious disease.

All gases and fumes should be sucked out by hoods and strong suction fans.

Is Your Workroom Stuffy and Overheated?—It is not only dust that gives people tuberculosis. Bad air does the same thing more slowly, but almost as surely. Only a few workers are in dusty trades, but a great army suffer from bad air in factories and shops and offices of a hundred different kinds.

There is no mystery about the working of bad air. It is not any poison from the breath that it takes a chemist to detect. *The main things that make bad air bad are heat and dampness.* You know how you feel on a dog-day in August and how you feel on a bright cool morning in October. There is just the same difference between a well-ventilated and a badly ventilated room. The human body is all the time giving off heat and moisture, and in the factory there are all sorts of steam-pipes, stoves, furnaces, solder pots, mangles and other machines that heat up the air. When the temperature gets over 70 degrees we begin to feel it, and as it goes to 80 degrees and above we feel it more and more. The blood all comes to the skin and leaves the brain and the internal parts of the body where it is needed. If the air is hot and dry the body can cool off by evaporation of perspiration, but if the air is damp as well as hot we feel the heat much more. A hot, wet spinning-room is one of the worst places in the factory.

The man who works under such conditions is not much good to himself or to his employer. He feels tired and dull and headachy. He works slowly and badly and spoils a good deal of stock. He gradually gets weaker and less efficient, till at last he may drop out with tuberculosis—unless the shock of going out from the hot, damp shop into the chill night air of winter gives him an attack that carries him off more quickly.

A great many shops and factories are so hot and stuffy that the workers are uncomfortable, their work is badly done, and their health is being injured. In a study of factories in New York State, in cool weather when the outdoor temperature was not over 70 degrees, it was found that 63 out

of 215 workrooms had a temperature of 80 degrees or over. *Is your workroom one of this kind?*

How to Keep the Air of the Workroom Fresh and Whole-some.—Good ventilation means simply drawing out the hot, stale air and bringing in fresh cool air in its place. In a small



A WELL-VENTILATED LAUNDRY MACHINE HOOD WITH SUCTION TO CARRY OFF FUMES AND HEAT.

room with only a few people in it this can be accomplished by opening a window top and bottom so that the hot air will go out at the top and cool air will come in to take its place at the bottom. In a room in which there are many people it is not possible to get in enough fresh air in this way without creating drafts that the people near the windows will not stand, and it is necessary to have artificial ventilation supplying air by fans and ducts.

If there is to be good ventilation in the workroom it must not be too crowded. If people are too close together it is not possible to give them enough fresh air without making them uncomfortable by a gale of wind. Many State laws require at least 400 cubic feet for every worker (or a space 8 feet high and 7 feet square), and this should be the rule in all factories.

Crowding generally means bad ventilation, but plenty of space does not always mean good ventilation. There must not only be space, but the right amount of fresh air must be brought into the room and the hot, stale air drawn out. This means inlets and outlets placed in different parts of the room with pipes and ducts and fans to force in and draw out the air through them. Ovens, stoves, mangles, and all machines that give off a great deal of heat should have special hoods over them to carry their fumes away. It is just as well to remember too that ventilating fans do not do much good if they are not kept running.

It is a good thing in any workroom to open the windows and air the place thoroughly by letting the wind blow through. It not only cools the room itself and freshens it, but even if the air outside be warm, its blowing past cools off the bodies of the people. There is a layer of hot air round our bodies, and a wind breaks up this blanket or layer and makes us more comfortable (just as an electric fan does). Every shop should be aired out at noon hour, and it might help the work to do it sometimes in working hours too.

Remember that the main thing is to avoid overheating. There should be a thermometer in every workroom, and both foreman and workman should understand that whenever the temperature gets over 70 degrees it means discomfort and sickness for the worker and poor efficiency for the shop. The workroom ought to be kept cool without drafts. If it isn't, choose the drafts. Drafts do not do a tenth part the harm that overheating does.

Remember, too, that moisture and heat together are worse than either one alone. Wet spinning rooms and weaving sheds

must be kept damp because the work demands it. For years manufacturers have known just how much dampness was needed for yarn, but we have only lately begun to think how much is good for people. In England the temperature and moisture for wet weaving are now limited by law, and every effort should be made to keep rooms that must be moist from getting overheated.

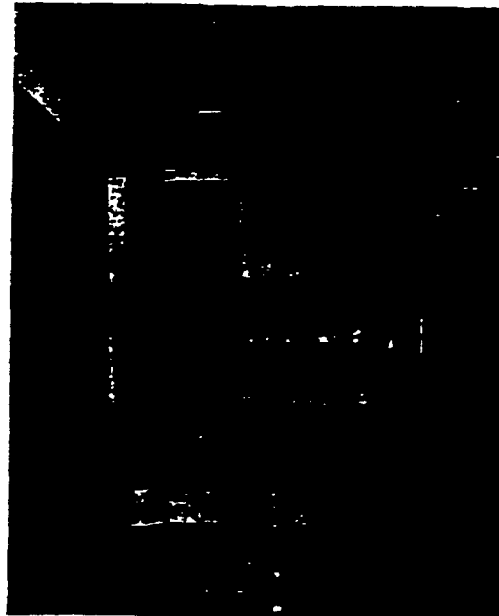


A GOOD WASH-ROOM.

Where men are working in foundries, furnace rooms, and other very hot places, special care should be taken to supply as much fresh cool air as possible, blown in where it will do the most good.

Is Your Workroom Badly Lighted or Lighted so That There is a Glare in Your Eyes?—Good light in the factory is almost as important as good air. You cannot work well if you cannot see. Headache and a general feeling of not being up to the mark are often due to eye strain. Yet many workrooms are dimly lighted, so that the workers have to strain to see what they are doing. Work accidents are often due to poor lighting, which makes a man take a misstep or go too near a dangerous machine.

For good lighting there should be enough window space or plenty of gas or electric lights. Windows of ribbed glass spread out the light and help to carry it to the darker parts of the room. Many factories are badly lighted just because the windows are not kept clean, and if the walls are whitened the



CLOTHES LOCKERS AND BATHS FOR PUNDRY EMPLOYEES.

light goes much further. Hallways and stairways should be well lighted for decency and for quick escape in case of fire.

Too much light is almost as bad as too little. Glassblowers suffer from a special kind of cataract, and workers who have to look at brightly polished surfaces often suffer from eye strain. Lights should never shine right into the eyes, and should not even be reflected directly into the eyes from the table or work bench. Artificial lights of all kinds should

therefore be shaded so that the worker is protected from the glare.

Is Your Workroom Clean and Tidy?—"Filth is the nurse of disease" is a true saying. If the workroom is dirty and cluttered up and the workers spit on the floor, the shop may



A WELL-LIGHTED WORKROOM.

become a center of tuberculosis. Accidents, too, are pretty sure to happen when floors are greasy and crowded with refuse that ought to have been cleared away. There are two sides to this question, as to all the other questions of factory sanitation. If the workroom is dark and dirty, the habits of the worker are likely to be dirty too. If the shop is clean and light and in good order, the men will respect it and do their part.

Floors should be hard and smooth, and floors and benches should be cleaned daily by wet sweeping and the use of damp cloths. In wet rooms there should be well-drained floors and gratings for the workers to stand on out of the water. Some one should be responsible for seeing that every room is kept clean and in order.

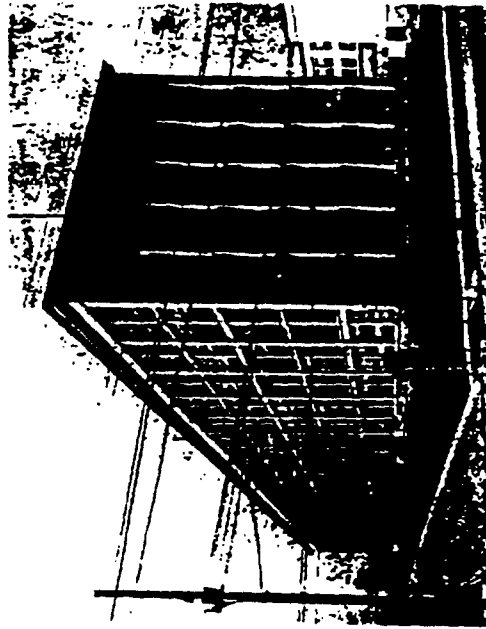
The worst kind of filth that can get about in a room is spit. Spit may contain the germs of consumption, diphtheria, tonsillitis, and many other diseases, and careless spitting is one of the best ways of spreading them from one person to another. The workers in a factory should no more think of spitting on the floor than they would of spitting on some other man's hand. If spit is put on the floor a man may drop something in it and in picking up the article get the spit on his hands five minutes later.

Is There Plenty of Good Water to Drink and to Wash with in Your Factory?—The first important thing about a water supply is purity and the second is quantity. Canal water is pretty sure to be polluted and may cause typhoid fever. If there are two supplies in the mill, one of canal water and the other of drinking water, *don't drink the canal water even if you have to go farther for the other.*

The worst time to have water polluted is just before you drink it. That is what the common drinking cup does. The germ diseases all spread from person to person, and the germs of diseases, like tuberculosis and diphtheria, are in the mouth and spread from one mouth to another. Nothing could be worse than the drinking cup for passing these germs from one person to another. *Remember before you use a common drinking cup that it is smeared with germs from the mouth of the last man who used it, and that he may have been coming down with tuberculosis or diphtheria.* There ought to be upward-spray jets to drink from, well distributed over the factory. If not, have your own glass or put your mouth under the tap.

It is very important that there should be plenty of water in

the factory for washing as well as for drinking. The law in many States requires one tap or basin for every thirty employees. There ought to be enough basins so that the men can wash up without waiting so long that they will get home late from their work. Where the work is dirty, and where poisons are used, there should be hot water and soap and nail brushes. For molders and firemen and other workers who get very hot and



A WELL-BUILT AND WELL-LIGHTED FACTORY.

dirty there should be shower baths. There should be paper towels in the washrooms, or the men should have towels of their own. The roller towel spreads all kinds of disease.

Are There Plenty of Toilets in Your Factory and Are They Kept in Good Condition?—In a study of shoe shops in Massachusetts it was found that "In more than one-third of the factories visited the conditions of water-closets were not com-

mendable; most of them were dark and dirty." A dark, dirty closet is an excellent place to spread typhoid fever, sexual and other diseases. In such closets the hands of one person may easily get soiled by the filth from another.

Closets should be ample in number, one for every twenty-five operatives, with separate rooms, doors and vestibules for men and women. There should be a good flush of water to keep the bowl clean, and the toilet room itself should be well lighted and kept clean by some one whose duty it is to do it.

If toilet rooms and wash rooms are dark and dirty, the people who use them will be dirty too. If they are light and clean, the users will respect them and keep them so.

Are There Dressing Rooms Provided in Your Factory?—Wherever the work calls for a change of clothing, and most work does, there should be clean and suitable dressing rooms for men and women, with lockers for street and working clothes.

QUESTIONS FOR YOU TO ASK YOURSELF

1. If you work in a dusty trade, is the dust kept under cover or drawn off by effective hoods and suction fans?
2. Is your workroom overcrowded?
3. Has your workroom a good system of ventilation, and is the system kept working so that the air is fresh and cool? Is the room aired out by opening all the windows at the noon hour?
4. Is your workroom well lighted, and are the lights shaded so that there is no glare in your eyes?
5. Is your workroom kept clean and in good order?
6. Is there a good supply of pure drinking water, and are there plenty of taps for washing up after work?
7. Are there toilets, wash rooms and dressing rooms in your factory, and are they well lighted and kept clean?

8. If there is dust in your workroom, do you wear a good respirator over your mouth and nose to protect yourself from consumption?

9. Do you do what you can by opening windows and doors to keep your workroom cool and comfortable?

10. Do you help to keep the workroom clean and in good order?

11. Do you make it a rule never to spit on the floor of the workroom?

12. Do you take care not to use a common drinking cup or common towel and not to drink canal water?

13. Do you do your part to keep washrooms, toilet rooms and dressing rooms clean and in good order?

14. Is your union taking an active interest in sanitation? One of the best things a labor union can do is to take up these questions of public health and to educate its members.

**SANITARY STANDARDS ADOPTED BY THE JOINT
BOARD OF SANITARY CONTROL IN THE CLOAK,
SUIT AND SKIRT INDUSTRY OF GREATER
NEW YORK**

1. No shop is to be allowed in a cellar.
2. No shop is to be allowed in rear houses or attic floors without special permission of the Board.
3. Shops located in buildings two stories or more in height must have one or more fire-escapes.
4. All fire-escapes are to be provided with ladders to the roof of same house or to an adjoining house; also with full length drop ladders properly located and adjusted.
5. In all shops which are not provided with automatic sprinklers, there should be kept a sufficient number of chemical extinguishers, or a sufficient number of fire buckets, properly located and filled.
6. Special caretakers are to be appointed in each shop for the care of the fire buckets, and for their use in case of fire.
7. All openings and exits to fire-escapes are to be left unobstructed by tables, machines, boxes, partitions, and iron bars.
8. No doors are to be locked during working hours.
9. No smoking is to be permitted in the workshop.
10. Conspicuous signs are to be placed throughout the shop, marking location and direction of exits and fire-escapes.
11. Fire-proof receptacles, lined with tin, and having a tin cover, are to be provided, in sufficient numbers, for rubbish.
12. Halls and stairways leading from shops are to be adequately lighted by natural or artificial light.

13. Stairs are to be provided with secure handrails and safe treads.
14. Sufficient window space is to be provided for each shop, so that all parts of the shop be well lighted during the hours from 9 A. M. to 4 P. M.
15. Where gas illumination is used, arc-lights or incandescent mantles should be used.
16. All lights are to be well shaded, placed above operatives, and not too near them.
17. At least 400 cubic feet of space, exclusive of bulky furniture and materials, should be provided for every person within the shop.
18. The shop should be thoroughly aired before and after work hours, and during lunch hour, by opening windows and doors.
19. No coal should be used for direct heating of irons, and whenever stoves are used for heating shops, they should be surrounded by metal sheet at least five feet high.
20. Walls and ceilings of shops and water-closet apartments should be cleaned as often as necessary, and kept clean.
21. Floors of shops, and of water-closet apartments, are to be scrubbed weekly, swept daily, and kept free of refuse.
22. A separate water-closet apartment shall be provided for each sex, with solid partitions to extend from floor to ceiling, and with separate vestibules and doors.
23. Water-closets are to be adequately flushed and kept clean.
24. A special caretaker is to be designated by the employer to the care of the shop and water-closet apartments.
25. A sufficient number of water-supplied wash-basins is to be provided in convenient and light locations within the shop.

26. Suitable hangers should be provided for the street clothes of the employees, and separate dressing-rooms are to be provided wherever women are working.

27. Water-closet apartments, dressing-rooms, wash-rooms, and lunch-rooms are to be properly lighted, illuminated, ventilated, cleaned, and kept clean.

28. All seats are to have backs.

NOTE.—We are indebted to the National Civic Federation for the use of most of the illustrations contained in this booklet.

