

tal workers, who receive only a paltry wage, and are unable to afford decent dwelling-houses and sufficient food, are in a bad state of health when compared with American workmen, who receive higher pay.

THE PROCESSES EMPLOYED IN DIFFERENT OCCUPATIONS.—The chief element of danger in most trades lies in the processes which they employ, these often evolving substances or fumes which are more or less dangerous to health. Hirt bases his classification of the different trades upon the three principal harmful elements—viz., dusts, poisons, and gases. This classification, while not without its objections, is still the best for our purposes.

Trades Dangerous to Health on Account of the Dust Produced.—There are a number of industries in which large quantities of dust are produced. This dust being inhaled by the operatives becomes a source of danger to their health, the respiratory organs being the greatest sufferers, although dust may also produce gastro-intestinal disturbances and certain eye affections as well as dermatoses. The various kinds of dusts act alike, in a general way, differing very slightly, according to the form and quality of each. The first effects of dust inhalation are irritation and inflammation in the respiratory passages, the nose, throat, and bronchi, and if the inhalation is allowed to go on for a certain length of time the inflammation is likely to become chronic (chronic bronchitis and emphysema). The deposit of dust in the small bronchioles, and frequently in the parenchyma of the lung, superinduces inflammatory reaction in the lung tissue, followed by connective-tissue formation and sometimes by consolidation in nodules and distinct areas. The later stages of the pneumonokioses are characterized by degenerative changes in the nodules, and in the other areas where the dust is deposited. Indeed, modern pathologists are of the opinion that "coal-miner's phthisis," "grinder's asthma," "potter's rot," and the other pneumonokioses are, in their last stages, but tuberculous infections.

Coal Industry.—Coal miners who commonly inhale large quantities of dust are subject to respiratory diseases—bronchitis, emphysema, and anthracosis. Coal dust has been found in the lungs of miners, and the quantities are sometimes very great. The initial symptoms are those of a catarrhal inflammation of the respiratory passages, accompanied by cough, black sputum, dyspnoea, and in a large percentage of cases by symptoms of emphysema. A time comes, however, though not in all cases, when the symptoms become aggravated, and general constitutional disturbances are seen which are due to degenerative changes and processes in the lung tissue. Merkel, Arlidge, Rindfleisch, Olge, Oliver, and others are of the opinion that the later stages of anthracosis are not necessarily tuberculous, although the analogy seems characteristic. Indeed, it is claimed by them that coal miners are particularly free from tuberculosis. Coal miners are subject, during their work, to many insanitary conditions besides dust inhalations. To mention only a few of the dangers of coal mining would be to repeat all the conditions of work, the dangers of which have already been described in a previous section of this article. Burnt coal or soot seems to possess specially irritative qualities. At least, it is a fact that charcoal burners and chimney-sweeps are great sufferers from pulmonary tuberculosis. Chimney-sweeps also suffer from cancer of the scrotum, "chimney-men's cancer," an affection quite frequent in chimney-sweeps in England, although rarer in the same workers in other countries.

Iron and Steel Industry.—The effects of inhaling iron dust are not quite the same as those which result from the inhalation of coal dust. In the first place, iron dust undergoes absorption and oxidation to a greater or less degree in the lung tissues. Thus Zenker and Merkel both found in the lungs of iron workers large deposits of iron oxide; in Merkel's case 7.1 per cent.⁷ Then, in the next place, the particles of iron dust often wound, with their sharp corners, the delicate bronchial mucous membrane, and thus open the way for infection with pathogenic bacteria. The branches of the iron and steel industry, espe-

cially harmful on account of dust, are those in which polishing and grinding are done. Thus cutlery workers, needle makers, and grinders of steel articles are inhaling large quantities of metallic dust, and are very much subject to respiratory diseases, and particularly pulmonary tuberculosis. Dry grinding is the most injurious process in cutlery work. Lloyd⁸ quotes Holland, who says "that the average age of grinders is only twenty-five and three-quarter years; and young men of seventeen to twenty years of age, strong and rough from the plough, who engaged in the work died from its effects, as a rule, before reaching the age of thirty." The general mortality ratio of grinders from respiratory diseases is, according to Tatham, five hundred and fifteen to one hundred and fifteen among agriculturists. The mortality figure from phthisis is very high.

Mineral Industries.—Workers who inhale mineral dust, as stonecutters, masons, plasterers, brickmakers, diamond grinders and polishers, porcelain makers, pottery and china workers, etc., are subject to chalicosis pulmonum, a term applied to the pathological condition which is produced by a deposit of mineral dust in the lung. The deposit of these dusts has been demonstrated by chemical analysis. Meinel and Malpert found that such lungs contained immense amounts of silica, silicic acid, phosphate of lime, and sand.¹⁰ The quantity of dust in the above-named trades is very large. Thus Oliver³ quotes Lamaister, who analyzed the air in the Limoges potteries, and found "that the dust is composed of earthy particles and fragments of granite, flint, glaze, soot, and charcoal. The atmosphere which the brushers-off, the finishers, and the porcelain makers generally work in contained 640,000,000 of dust particles to the cubic metre, while in some of the rooms the number reached 680,000,000 per cubic metre." That the breathing of air laden with such quantities of dust is injurious is self-evident, and the mortality rate of these workers from respiratory diseases is very great. Hirt found the average life of stone grinders to be forty-two and a half years. The mortality rate of potters is the highest; but this is due to the fact that potters are also subject to plumbism. The number of trades in which mineral dust abounds is very large.

Textile Industries.—Workers in textile industries are subject to inhalation of organic dust, animal and vegetable. Among the textile trades which are unhealthy on account of dust are those which deal in flax, linen, cotton, jute, silk, wool, and hair-working. The dust in each of these branches of the textile industry differs from that of any other industry in some of its features, but retains its irritating qualities in common with all dusts. Besides the effect on the respiratory system, these dusts seem to be very irritating to the skin, producing various dermatoses. Those who clean and work at the crude materials are compelled to inhale more dust than the spinners and those who work at the later stages of manufacture. Greenhow found that out of one hundred and seven flax spinners seventy were affected with respiratory diseases.

Cotton workers are said to suffer from "pneumonie cottonneuse," a form of pulmonary tuberculosis due to the irritating dust habitually breathed by the operatives. As in other textile industries, those who work at the crude material suffer the most from dust. Cotton dust is also said to be very irritating to the skin, producing dermatoses.

Silk workers are prone to tuberculous affections, and to all respiratory diseases. Thus, in one silk spinners in Sagrado the percentage of respiratory disease was twenty. Netolitzky¹³ quotes Combaresses, who on examination found 760,000,000 of particles of dust per cubic metre in the work-rooms of the silk mills. He says that silk workers suffer from respiratory and digestive diseases, and from anæmia, and that they present a very high death rate.

Wool workers are exposed to animal dust, and also to the danger of infection by any pathogenic organisms which may cling to the animal substances, such as hair, wool, hides, etc. Anthrax is the principal infectious dis-

ease afflicting woolworkers. The effect of dust inhalation is seen in the large number of cases of sickness from bronchitis and other respiratory diseases. Furriers very frequently suffer from what is called "furriers' asthma," the symptoms of which, however, are due not so much to the effects of dust inhalation as to the various poisonous dyes used in coloring fur.

The inhalation of *wood dust* is claimed to be without any effect, although Merkel states that workers in pencil factories, who inhale large quantities of dust formed in the processes of sawing the wood for the pencils, suffer very much from phthisis. Carpenters, sawmill workers, etc., are exposed to wood dust.

Tobacco dust, in tobacco, cigar, cigarette, and snuff manufactories, acts on the worker mechanically, also chemically, by reason of the nicotine contained in it. There is a tendency among writers on the subject to deny the evil effects of tobacco dust on the operatives. This is hardly true. There is abundant evidence that cigar, cigarette, and snuff workers suffer greatly from respiratory diseases, as well as from anæmia and digestive disturbances.

Flour dust has always been regarded as peculiarly injurious to those who are compelled to inhale it. Millers, bakers, and confectioners, but the first especially, have been stated as having the highest death rate among workers in non-poisonous dusts. Of 108 cases of sickness among millers, Shuler³ found 34 cases of respiratory disease, 12 cases of tuberculosis, 19 diseases of the skin, 17 of the digestive organs, 4 eye diseases, and 3 of circulatory system. In the modern forms of flour milling the greatest part of dust production is done away with, and the effect of flour milling is not very harmful to the workers. Those who are exposed to the inhalation of *mixed dust*—for instance, street cleaners, carpet sweepers, carpet beaters, etc.—are liable to bronchial affections. In Hirt's tables mixed dusts show a larger percentage of all respiratory diseases than do most of the other dusts.

Trades Dangerous to Health on Account of Poisonous Substances.—There are a large number of trades, the chief element of danger in which consists in the poisonous nature of the materials and substances made in the processes of manufacture, etc. As the toxicology of most of these substances is dealt with in other parts of this HANDBOOK, only a very brief description of their effects upon the health of the workmen will be given here.

Arsenic.—Arsenic in its various forms is used in medicine and the arts for many purposes. It is employed for preparing dyes for textile fabrics and for coloring artificial flowers; it is an ingredient in many forms of wall paper, and is used in carpet manufacturing; it is sold as an animal and parasitic poison, and is used in many other ways and in combination with various substances. All persons manufacturing articles in which arsenic is employed are subject to arsenical poisoning. Arsenic affects the skin, gastro-intestinal tract, respiration, and especially the nervous system. On the skin the effects of arsenic are seen in the eczematous eruptions and various vesicular and pustular sores. On the respiratory passages arsenic acts as an irritant, and causes a catarrhal condition of the nose, throat, and bronchi. In the gastro-intestinal tract arsenic causes severe irritation, anorexia, diarrhoea, colic, gastritis; and among the nervous disorders which it produces may be mentioned a general diffuse multiple neuritis, progressive muscular atrophy, loss of tendon reflexes, local anæsthesia, trophic sores, and ataxia. Not all who are exposed to arsenic suffer equally from its effects. A large number of workers in arsenic seem to enjoy a peculiar immunity from its toxic effects. As an example of such immunity I can cite a patient of mine who for the last eight years has worked in a paint manufacturing establishment, packing Paris green in boxes, for from ten to sixteen hours a day, and seemingly he has good health all the time; while new men, who were engaged to assist him in his work, usually showed signs of toxic effects of arsenic within a very short period after exposure to the atmosphere full of arsenical dust.

Lead.—Lead is the most widely and largely used metal.

The number of its uses can hardly be stated; indeed, the trades and arts in which lead is not employed, in one or another form, are not very many. Hence a very large contingent of workers are exposed to plumbism. The mode of introduction of lead into the system is through the lungs, digestive tract, and skin. Lead dust is prevalent in most places where it is used. Lead is ingested in the form of dust or through the medium of the particles which cling to the hands, fingers, and person of the worker. Its absorption through the skin is slight. Among the trades in which the workers are exposed to the danger of plumbism are the following: Lead miners, white-lead workers, lead-paint manufacturers, painters, potters, calico printers, compositors, pressmen, stereotypers, linotypers, printers, plumbers, filemakers, platers of iron and makers of hollow ware, solderers, makers of lead toys, vessels, etc., glazers of cards, paper, etc., and a very large number of other trades into which lead goes in some of its forms. The effect of exposure to lead is not the same on all workers. Women and children are especially prone to plumbism. The effects of lead poisoning are seen in the anæmia, cachexia, metallic taste in the mouth, vomiting, constipation, lead colic, bluish line along the margin of the gums, retraction and ulceration of the gums; but the most marked effects are those on the nervous system. There are a loss of motor power in the hands and feet, wrist drop, progressive muscular paralysis, multiple neuritis, temporary and sometimes permanent blindness, convulsions, insanity. The mortality of lead workers is very great. Tatham³ says it is ninety per cent. above that of other workers, and three times greater than that of agriculturists. Of the total deaths which occurred among lead-workers, one-fourth were due to pulmonary tuberculosis, one-eighth to lead poisoning. Plumbism is especially frequent among those engaged in manufacturing white lead, printers, filemakers, and painters.

Stuhler, of Berlin, taking his statistics from the reports of the sick-benefit societies, states that of 3,000 printers in Berlin, 313 were annually sick with lead colic.¹⁴ The analysis of the dust in some printing shops gave nearly 15 per cent. of lead.³ File-makers also suffer very largely from plumbism. Ogle gives the following statistics of the comparative mortality from lead poisoning, based on the death register for 1879-82, in males over fifteen years of age: File-makers, 466 per million living; painters, plumbers, glaziers, 224; earthenware-makers, 152; gasfitters, 62; printers, 27, and all other males, 4. According to Tatham, the comparative mortality from lead poisoning in the several trades is the following: Males occupied in one manner or another, 1, wool manufacturers 3, cutters 3, printers 3, leadmakers 5, gasfitters, locksmiths 6, coachmakers 7, copper workers 8, glassmakers 12, potters 17, painters and glaziers 18, plumbers 24, filemakers 75, and lead workers, 211.³

Mercury.—The effects of mercury upon workmen who labored in cinnabar mines had been noted as far back as in 1665, when reference to the tremor caused by it was made by Dr. Walter Pope in the Philosophical Transactions.⁹ Detailed accounts of the mercurial poisoning of operatives is also found in Ramazzini's work. The industries in which mercury is used, and in which the workers are exposed to the danger of mercurialism, are the following: Cinnabar mining, gold and silver mining, where mercury is employed to form amalgams; the manufacture of scientific instruments, such as thermometers, barometers, etc.; the manufacture of electric meters and lamps, where mercurial pumps are used to create a vacuum; the gilding and silvering of mirrors, etc.; the manufacture of certain paints; the making of pharmaceutical preparations; also the making of felt where the felts are brushed with a solution of the nitrate of mercury. The mode of introduction of mercury into the system is by inhalation of the fumes, or by ingestion of the salts of mercury through deposits on the hands, fingers, clothing, etc. Stomatitis, salivation, gastric disturbances, emaciation, cachexia, are symptoms of chronic mercurialism. The effects on the nervous system are

marked tremors, paralysis, and psychical changes. The tremors and paralyses are noticeable especially in the muscles of the face, hands, and arms. Melancholy, depression, loss of memory, and hallucinations are some of the psychic forms. Kussmaul has shown that mercurialism acts very unfavorably upon women, predisposing to abortions and to diseased conditions of the infants.

Phosphorus.—The danger of phosphorus poisoning is almost entirely restricted to the manufacture of matches from yellow phosphorus. The making of matches from red phosphorus (safety matches) is not accompanied by any dangers. The principal effect of phosphorus is its action on periosteum and bones, the maxillary bones being the most easily affected. A prolonged exposure to the action of phosphorus is necessary before the specific effects of it are noticeable. Some writers claim that phosphorus has no effect on healthy periosteum and bone and that only those who suffer from caries of the teeth and other affections exposing the periosteum of bones to the phosphorus fumes are affected. The disease manifests itself in necrosis and sequestration of the affected bone or of that portion of it which is diseased. The number of cases of phosphorus poisoning in the United States is not large. Sweden is the country where most of the match factories are located, and where phosphorus poisoning is most frequently met.

Copper and Brass.—Copper is a metal which is found in a pure state, and which is also procured from various ores. Brass is an alloy of copper and zinc. The mining of copper and the manufacture of copper vessels, etc., are not considered as dangerous as the manufacture of brass and brass articles. It has been said that workers in copper have often found that their hair, urine, and skin turn green. The salts of copper are more poisonous than the metal. Arlidge thought that inhalation of copper dust produces the "copper colic," which is a form of digestive disturbance characterized by pain, purging, vomiting, and prostration. This is denied, however, by later investigators, who assert that the symptoms are due to a mixture of the carbonate of copper and lead.

Workers in brass-smelting and the manufacture of brass articles are subject to inhalation of brass dust and fumes. A general catarrhal condition of the respiratory passages and gastro-intestinal tract results from exposure to brass dust. What is known as "brassmen's ague," which is characterized by chills, fever, cephalalgia, nausea, depression, prostration, and collapse, is thought to be due more to the zinc in the brass than to the copper.

Noxious Gases and Fumes.—The occupations in which perceptible quantities of dust or definite poisonous substances are produced are few in comparison with the numerous industries in the processes of which noxious gases and fumes are evolved. The industrial processes in which chemical agents and gases are produced which, when absorbed or inhaled, may become dangerous to health, are so manifold and diverse that it is absolutely impossible to give even a brief description of them. Nor is it always possible to trace the harm done to health in these chemical industries to any one of the elements or gases prevalent in the process, for in most of these industries various and complicated processes are being simultaneously carried on, and the workers may be exposed to a number of agents and gases at the same time or successively. If we take, as an example the coal-tar color industry, there are several dozens of various agents produced, either together or as by-products, and each of them may be more or less injurious to health; and it is exceedingly difficult sometimes to determine which of them has produced the most harm in the case of any particular individual. So widely do chemical manufactures permeate the whole range of human industries that there is hardly an article or substance made in which chemical processes of some kind do not take place.

Some of the principal agents and gases evolved in chemical trades are the following: Sulphur and its compounds; carbon and its compounds; sodium, sodium chloride, chlorine gas; potassium and its salts; ammonia, ultramarine, carbon bisulphide, dynamite, nitroglycerin

and other explosives; chromium, alum, iron and its oxides; lead and its salts; arsenic, copper, zinc, illuminating gas, coal tar and its products, nitrobenzol, the various drugs, india-rubber, turpentine, cyanogen compounds, and many others too numerous to mention.

Most of these agents are used, in one or another form, singly or in combination, in most of the human industries and arts; and many of them are also toxic to a large degree, and injuriously affect the health of those engaged in their production and in handling them.

The effects of the work with noxious agents and gases are either acute or chronic, and the dangers are from (1) the toxicity of the substances; (2) the danger of explosions, burns, and corrosions; and (3) the excessive temperatures which are necessary in most of the chemical processes. The mode of introduction of these noxious agents into the system is somewhat different from that of the dusts produced in other trades; and the effects are also somewhat different. While the inhalation of dust acts chiefly upon the respiratory system, the gases and other noxious agents of the chemical industries have each their own effect, each having specific action, but mostly of a toxic character. Moreover, while dusts affect the human system only after long exposure and continuous and prolonged inhalation, the effects of gases and chemical agents are produced after comparatively short exposures. Again, while the effects of dust inhalations may always be seen on the respiratory system, and at times pathologically demonstrated by the presence of the dust in the lung tissue, the effects of toxic agents and gases cannot, in most cases, be demonstrated, and, if at all, only in the blood, by chemical and spectroscopic examinations.

Roth cites Austrian statistics of mortality and morbidity among chemical workers. He found the mortality to be 7 per 1,000. The diseases with which they were affected were distributed as follows: 25.7 per cent. for burns, contusions, and the like accidents; 17.9 per cent. for affections of the respiratory system; 14.7 per cent. for disorders of the digestive tract; 10.8 per cent. for diseases of the skin, and 10.5 per cent. for general constitutional diseases.

PROPHYLAXIS.

Having briefly examined the various dangers of different trades, we now come to the most important phase of our subject, that of prophylaxis; the most important, for, after all, the aim and purpose of hygiene in general, and industrial hygiene in particular, is the prevention of disease and preservation of life. On a closer study of industrial conditions we find that many, if not most, of the dangerous elements in trades are preventable, and that there is no need for the terrible waste of health and vast destruction of life prevailing in modern industries, as shown in the mortality and morbidity statistics.

In the endeavor to improve industrial conditions, and prevent unnecessary suffering in the dangerous trades, medicine and legislation are allied: the one to study and expound the rules of health, the other to enforce the laws based on scientific hygiene. Unfortunately, the ignorance of the workmen and the cupidity and negligence of employers are the two stumbling-blocks to the general acceptance of the better laws of health.

In discussing the hygiene of occupations we propose to consider the subject under two heads—General Prophylaxis and Special Prophylaxis.

GENERAL PROPHYLAXIS.—The first personal requirement for preventing the evil influence of occupation on health is the proper selection of a trade; this is commonly done by natural selection, or more frequently by accident; yet it is very important that certain trades be followed only by the best physically endowed constitutions. Were there a medical supervision and control of the selection of trade by individuals, persons of a scrofulous diathesis, with a tuberculous family history, would not be permitted to embrace indoor, inactive, sedentary occupations, and

certainly not any in which large quantities of dust must be inhaled; nor would nervous, delicate, choleric persons be allowed to enter industries which subject the workmen to great nervous strain, mental worry, and responsibility, nor those in which they may be exposed to toxic agents which act specifically on the nervous system. Perhaps the proper medical supervision of the selection of a trade is as yet a dream of hygienists, but it is bound to be realized.

Already there are legislative enactments in all civilized countries restricting, limiting, and partly prohibiting *child labor*, and the highest aim of hygiene is that no child under eighteen should be allowed, under any circumstances, to engage in any occupation except that of developing its physical and mental faculties.

Female labor is also largely restricted, and even prohibited in some trades; and in many States legal provision is made to limit the industrial activity of women during pregnancy, after childbirth, and in specially dangerous trades.

The **personal cleanliness** of the workers is an important condition in the general prophylaxis of the effects of occupations. It is a fact that in specially dangerous trades, such as printing houses, lead works, etc., and in all industries where poisonous substances are manufactured and manipulated by the employees, those workers who have the least regard for personal cleanliness, who are careless in washing themselves, and who eat their food with hands and clothing full of the toxic materials, are the readiest victims of industrial poisoning; while the more careful often escape all harm. Workers in dusty and poisonous trades should have their hair on face and head cropped short and they should be compelled to observe rigid rules of personal cleanliness, the compulsion being necessary on account of the ignorance of the workmen and their contempt for the dangers lurking in their trade,—a contempt bred by familiarity.

The wearing of **proper clothing** is an important prophylactic measure in all trades. It must suit the kind of trade in which the individual is engaged. Those who are exposed to low temperatures should wear woollen sweaters or flannel underwear, while workers in high temperatures should wear light absorbing cloth. All who work in damp, moist, and wet places should have their footwear impermeable to dampness, and their clothing should be made of a material which will absorb moisture without letting it penetrate the underclothing. The wearing of rubber-impregnated cloths is inadvisable as it interferes with evaporation of perspiration; mackintosh capes, protecting from moisture and at the same time allowing evaporation, are recommended by some authorities. Persons working in dusty occupations should wear fabrics with smooth surfaces only, and, whenever possible, without any seams, folds, or pockets where dust may accumulate. But the most important prophylactic measure in this respect is that no clothes worn while at work should be taken out of the workplace, but must be exchanged for other clothes which are to be worn only outside the workshop. In some trades the employers are compelled to furnish the workers with two suits of overalls to be worn while at work. In those trades in which corrosive poisons and gases are likely to burn or injure clothing, the worker should wear leather cloth or other not easily destructible material; and wherever the hands come in contact with the same substances leather gloves should be worn. In dusty trades it is advisable to cover the head with closely fitting caps. There are some industries in which the cloth worn is the result of established custom and is usually consistent with hygienic principles. Thus the chimney-sweep's suit, so often seen on the Continent, is very appropriate to his calling, and protects him from contact with the irritating soot.

Duration of Work should be adjusted to the nature of the work and the standard of health of the operatives. Economists agree that there has been no loss of productive capacity since the work day was reduced from sixteen to eighteen hours to the ten-hour-day standard; and owners who frantically struggled against every attempt

to reduce the working day, and prophesied the decadence of industry if it was done, have at last come to see that a shorter workday means actually a greater productive capacity and a better state of health in the workers. No universal workday can be established or is applicable to all trades and persons; the length of work should be carefully adjusted to the age, sex, and health of the worker, to the place of work, to the conditions under which it is carried on, and to the character and nature of the processes of each industry. The more unfavorable the conditions under which the work must be carried on, the shorter should be the workday. This is the rule followed in specially dangerous trades; thus, caisson workers are allowed to work for only from two to four hours at a time; furnace workers, or those who are exposed to fumes and gases in lead and other trades, work, as a rule, only in three- to four-hour shifts. The same rule should be applicable to all other trades.

The number and length of the **work pauses** bear an important relation to the health of the employees in each trade, for every physical or mental activity requires periodical relaxation. It has been proven that more work can be done in two hours at the beginning of the workday than in twice that time at the end of the day. In England forenoon and afternoon pauses are required for child workers, besides the usual midday lunch hour. This rule should be adopted for adults also, especially in the dangerous trades. The length of the midday lunch pause should not be less than one hour in any trade, as a shorter pause leads to carelessness and haste in cleaning up, to high speed of food consumption, and to failure of the worker to go outside of the shop for a short breath of fresh air.

Night work is more unfavorable to health than work during the day, and, whenever this is practicable, such work should be restricted; at any rate, the working hours should be comparatively shorter and the pauses longer and more frequent than in day work, and there should also be periodical changes between the day and night shifts, so that those who for one period are engaged during nights should at other times be working by day.

Overwork leads to ill health and to fatigue neuroses, and should be restricted if not entirely abolished. The prophylaxis of the fatigue neuroses can be accomplished only by due regard to the working capacity of the muscles and organs employed. The burden of work, whenever this can be avoided, should not be put on one group of muscles or on one organ. Thus writers, copyists, clerks, and others who have much handwriting to do should train themselves to employ both hands, and besides they should use them in such easy positions as not to overfatigue the muscles. The same principles may be applied to overstrain of other organs.

The proper **education** of the worker in general hygiene, and especially in the dangers of his specific trade, is an important factor in the prophylaxis of many of the occupational diseases.

The problem presented by the unhealthy condition of **sweatshop** work is a difficult one for legislators, but very simple to hygienists, who are unanimously of the opinion that all home work should be entirely prohibited; and that there should be a complete separation of the factory from the home. It is therefore merely a question of time when the economic obstacles to the abolition of the sweatshop method will be surmounted.

The **construction** of workshops, factories, mills, etc., cannot be gone into here, but there is one requirement which should not be overlooked in this respect, and that requirement is that industrial establishments should be constructed for the specific processes to be carried on therein, and that the plan of adapting any ramshackle, out-of-date building, unfit for any other purpose, to the uses of factory or workshop, as is frequently the case, must be absolutely prohibited. The size of the workplace should, of course, correspond to the number of employees, and to the needs of each establishment. The minimum of four hundred cubic feet of space for each worker, which is established by legislation in many places, is entirely in-