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Industrial Hygiene.

By Sir Thomas OLIVER.

DURING the war, when the fortunes of Europe were in the balance, and the future of the world's peace hung upon the decision of the resort to arms, there was a widely spread feeling among Western peoples that they should constitute themselves with a Council and collectively prevent war, or make it difficult in the future for one nation to go to war with another without incurring the enmity and the opposition of the combined peoples. War-wearied, the world looked forward with hopeful anticipation to this taking place, but with this, as with all things human, realization has not been, so far, equal to anticipation. Political, military, and territorial problems of an international character cannot be solved within a few months, but while there has been delay in arriving at an amicable conclusion in regard to such after-war problems, no time has been lost in dealing with the hygiene of labour as an international question. In order that men and women shall find pleasure in their work, be able to render their best service for adequate wages received, factories and workshops must be run on healthy lines, and occupation be rendered free from risks to health and life. While much of the present industrial unrest may be one of the unavoidable reactions which follow in the wake of war, the enfeebled health of the men returned from the Front, and the conditions under which work had in some instances been previously carried on, may be contributing factors. State consideration for the health and welfare of workers, as established by legislation, is in Great Britain, which was the pioneer of the movement, just over a century old. It dates back to the first decade of the last century, when a Bill was introduced into the House of Commons, dealing with the preservation of the health and morals of prentices in cotton mills. Since then great advances have been made. All industrial countries have vied with each other in their endeavour to promote the health and security of workers. There is much in the early days of factory life in Great Britain, which we would like to see expunged from the pages of history, but, by its failures,

other countries have profited. These have avoided our mistakes, and thus, unfettered, have been able to proceed with industrial legislation in rapid strides.

There are problems connected with industry and conditions of work generally, which, since they belong to no one country in particular, but concern all, will have to be considered by the International Labour Office; one of the first of these will be the smelting of lead ore, also the manufacture and use of lead compounds. For these occupations much has already been achieved by legislation, but much yet remains to be accomplished. Hitherto, for example, with the exception of lead ore in the form of cerussite or carbonate, found in early operations in the Broken Hill mines of Australia, lead mining has not been a cause of plumbism among the miners, owing to the fact that lead in the form of galena or sulphide is extremely insoluble. While the lead miner working in galena ran no risk from plumbism, he was liable to pneumokoniosis and pulmonary phthisis as the result of the inhalation of the hard metallic dust. Recently at Broken Hill, as Dr. Birks, the Medical Officer to the mines, has shown, an important question has arisen as to whether, since the carbonate ore has been, practically speaking, worked out and lead poisoning is still occurring among the miners, there may not be taking place, through the action of the air and other as yet unknown agencies, a conversion of the underlying veins of galena into the soluble carbonate. The subject is being carefully considered by the owners, but the decision arrived at transcends locality. Under all circumstances, so far as plumbism is concerned, it is the manufacture and use of soluble lead compounds, which is the subject to which the International Labour Office will be obliged to direct its attention. Already steps have been taken in Great Britain by the introduction into the House of Commons of a Bill to carry out certain conventions of the Washington Conference relating to the employment of women in lead processes. Three decades have passed since I drew the attention of the British Government to the large number of deaths of young women at that time employed in white lead factories, and pleaded for their emancipation from the industry. It was a tough fight, for on economic grounds employers opposed the recommendation, as also did some of the societies then recently formed for the promotion of female labour. Experience had convinced me that, if women were removed from the dangerous processes in the factories, if the emptying of the "white beds" and the filling and emptying of stoves could be accomplished by automatic means, or, better still, the abolition of stoving altogether, (and this in many lead works is now an accomplished fact), the lead industry could be made, comparatively speaking, safe. Events have justified this statement. My reason for insisting upon the abolition of female labour in the dangerous processes was that the lead dust, which was inhaled or

swallowed, acted prejudicially upon the reproductive organs of woman, and that, if a female lead worker was pregnant, it was all but impossible for her to go to the end of term and bring a living child to birth. In France M. Paul was preaching the same doctrine. There was thus not only a reckless waste of infant life, but, as females appeared to be more susceptible to the harmful influences of lead than males, they suffered more severely, and blindness was more frequently met with amongst them. It was absolutely necessary, therefore, that the wastage of infant life and female suffering should cease. The restriction of female labour has not only removed from the lead industry much of the bad reputation the trade had created for itself, but it has saved innumerable lives to the nation. As an illustration of the good effects of the abolition of female labour in the dangerous processes of white lead manufacture, I may be pardoned if I repeat the following story. Shortly before the war I was visiting a large white lead works in Germany, and, after the round, I was discussing matters with the manager, the son of the owner. Having asked the question whether he had recently had any sickness amongst the employed, he replied, "None since we abolished female labour", and, when I further inquired why he had sent the women away from the factory, he replied, "You told us to do so". On reminding him that no such recommendation had been personally conveyed to him, he produced, from the drawer of his writing desk, the British Blue Book containing the recommendations of the Lead Committee, and said that in Germany they were working under the recommendations, and that since abolishing female labour his works had been free from sickness.

In Great Britain industrial lead poisoning has been placed upon the same footing as accidents, so far as Workmen's Compensation is concerned. France, in 1909, introduced a law prohibiting the use of lead paints in certain buildings, but it has not been given effect to in the manner expected, and the advent of war has not improved the prospect of immediate action. It is most desirable that the use of lead should be restricted, as far as possible, under circumstances where there is the risk of its doing harm not only to employees, but to society generally; hence the introduction of leadless glazed ware recommended for domestic use and the replacement of lead by zinc compounds in painting the interiors of dwelling houses.

I have dealt with the question of lead compounds at considerable length, for the manufacture and manipulation of these is not yet quite free from danger, and lead poisoning is widely spread.

No words are required to accentuate what is already well known in regard to the harmful effects of the abuse of alcohol upon workers and how it disturbs the continuity of their work. A similar remark applies to tuberculosis. Each

of these morbid entities requires special consideration, especially in view of the fact that alcoholism prepares the way for tuberculosis. The tuberculous worker, and his place in the factory and the home, call for kindly consideration, as do also certain trades of a dusty nature, in which the fine particles of inorganic matter, when inhaled, are apt to induce pneumokoniosis or dust disease of the lungs, which may end in phthisis. Anthracosis or coal miners' phthisis is much less frequently met with today than half a century ago, largely owing to improvements in the ventilation of coal mines by the double shaft system, but steel grinders', file makers', ganister crushers', and gold miners' phthisis is still far too prevalent and must be combatted. The prevention of disease arising from the inhalation of dust when at work is something more than a question of the wearing of respirators.

The influence of venereal disease and its far-spread consequences upon society, also its interference with the continuity of work on the part of its victims, will be doubtless dealt with by the International Labour Office, especially as regards the dissemination of the disease through factories in consequence of the contamination of the implements employed. This is particularly the case as regards the glass bottle industry, where the blow tubes are indiscriminately used. Through the existence of a syphilitic sore on the lips of one workman several innocent persons in a factory may become infected. What applies to syphilis, applies equally to tuberculosis.

For many years the use of white phosphorus in the manufacture of lucifer matches was not only a source of serious disease and of a painful affection among match dippers, but a cause of death as well. It was after visiting lucifer match works on the European continent, and careful consideration of the materials employed, that Sir Edward Thorpe and myself recommended as a substitute for white phosphorus the sesquisulphide of the metalloid, which had suggested itself to French manufacturers and which in my experiments upon animals I had found to be harmless. The substitution of sesquisulphide for white phosphorus has cleared the lucifer match industry of necrosis of the jaw-bone and of the constitutional state known as *phosphorisme* incidental to the occupation. By the ratification, at the Berne Conference, of the attitude assumed by the principal match-making countries in regard to this question, the manufacture of lucifer matches is today a comparatively speaking healthy industry.

Previous to the war, ankylostomiasis had been not only a cause of death, but of ill-health among the coal miners in Hungary and Westphalia, also of sickness among the tin miners of Cornwall and the agricultural labourers in the southern parts of the United States, the West Indies, and elsewhere. At present it is difficult to say what is the actual condition of things in Mid-Europe as regards the prevalence

of the malady. A few years previous to the war it had spread rapidly from the near East of Europe into the Western mining areas. With our wider knowledge of the disease and improved methods of treatment, ankylostomiasis should in the future claim fewer victims.

Occupation in mines and factories is still attended by far too large a loss of life as the result of accident. Many accidents occurring in occupations are undoubtedly preventible, but there will always be a certain number, which, for want of a better name and of being better understood, will be classed as unavoidable. It is towards reducing these that all effort should be directed. Better education of the workmen, accompanied by practical illustrations of the source and causes of accidents in various occupations, has already done much to reduce the number of accidents. Many causative agencies still call for consideration, such as the faulty lighting of factories and iron works, too long hours and fatigue, impaired eyesight of workers and defective factory plant; also the unworked-off effects of alcoholic debauch, and contempt for danger on the part of the workers owing to their familiarity with danger. "*Safety First*", which has been preached and practised in America for the last decade, has considerably reduced the number of accidents in various industries.

A factory is more than a place of work. Within it, conditions of labour should be as hygienic as possible, work pleasurable and healthy, and between employers and employed there should exist more friendly and unselfish relationships. The large inrush of female labour into munitions during the war obliged employers to provide ampler dining — room accommodation, canteens, and improved lavatory space, also to appoint women to supervise the health and welfare of their own sex. Previous to the appointment of lady factory inspectors in Great Britain the toilet portion of many factories was anything but satisfactory. There must be no return to the insanitary conditions of two or three decades ago. The provision of a wholesome supply of drinking water, with proper fountains for its distribution, also the use of pure water for processes in textile factories wherein a humid atmosphere is necessary, are of prime importance. Cleanliness of workrooms and lavatories, removal of dust from floors and machinery during the absence of the workers, also the illumination of all dark corners, commend themselves.

The time has come when medical men should have greater opportunities of studying occupational diseases and of becoming more intimately acquainted with conditions incidental to employment, which indirectly may become prejudicial to health. Italy was the pioneer of this movement. For several years past there has been a hospital in Milan set aside specially for the treatment of occupational diseases. Here, set too, under the direction of Professor Devoto and his able

assistants, Dr. Carozzi and others, research work is carried on. The United States of America has taken up the matter, and already there have been founded University Chairs for the study of occupational diseases. Great Britain is following the lead and is moving in the matter. At present Professor Collis of Cardiff is the sole full-time representative of the subject in the Universities of Great Britain.

There is need for the appointment of works' doctors, so that medical men may be available to the operatives at all times and consulted when absolutely necessary, without deduction of wages for loss of working time; a hospital-trained nurse or nurses should be always in the factory, ready to deal with indispositions and with minor injuries at once, so as to prevent wounds from becoming septic. It cannot be too strongly affirmed that it pays employers to keep their workpeople healthy.

