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## Scientific Aspects of Industrial Accidents

THE annual report of the Chief Inspector of Factories and Workshops for the year 1936 (Cmd. 5514. H.M. Stationery Office, 1937. 2s. net), raises several questions with which scientific workers are concerned, whether actually engaged in industries or as citizens interested in the protection of national health from conditions which would degrade it. Anyone reading the report would be disturbed at what is revealed in it as to the very long hours that are being worked in some of the newer industries. While in the nineteenth century, broadly speaking, Great Britain undoubtedly led the world in imposing limitations on hours of work and the observance of minimum standards of safety and health in factories and workshops, in the last few decades it is clear that the country has fallen sadly behind other important industrial countries in these matters.

The report shows that although the 47 or 48 hour week is considered normal, many cases are reported where the working week exceeds 48 hours, not only for busy periods but often also continuing for months at a time or even for most of the year. Work up to 50 and even 60 hours a week has been common in laundries, the metal trades in the Midlands, as well as in leather, bakelite and other industries and in the woollen and worsted trades, and some disconcerting examples of illegal employment of women and juveniles are cited in the report. Despite the improvement in the employment situation, unemployment is still far too severe and widespread for this situation to be regarded with equanimity. Obviously the inspectorate requires very much stronger and clearly expressed support from public opinion if even the minimum standards required by the law are to be enforced

and these abuses suppressed, nor can we feel confident that the advance represented by the provisions of the new Factories Act now passed will effect any improvement unless there is a very considerable increase in the inspectorate.

A significant share of that support may well be looked for from scientific workers, whether engaged in industrial work or not. Apart altogether from the posts of responsibility in the management of industry which many of them hold, they should not require this report to realize the connexion between long hours of work and industrial accidents and sickness, which is once again so clearly portrayed in its pages. On this subject parts of the report are painful reading. A substantial increase in accidents over the previous year is again recorded—about 15 per cent for accidents generally and 9 per cent for fatalities. Although the analysis and graphs submitted by the chief inspector afford some evidence that the risk of accident is tending to decrease, through such factors as the work of the inspectorate, the educational work of the National Safety Association, the Industrial Welfare Society and similar organizations, the closer supervision of the growing number of factory safety organizations, and especially through the growing recognition of their responsibility in this matter by employers, disturbing fluctuations in the risk of accident as well as in the numbers of accidents still occur from year to year.

Some of the causes of these fluctuations are obvious. The longer hours to which reference has already been made are a significant factor. The greater speed of production, the absorption of more inexperienced or unpractised workers, both old and young, and the installation of new plant

and machinery with unknown risks, are among other factors which are responsible for the rising toll of death and injury, and appear at present to be associated with increased production and prosperity.

That this position should be accepted as inevitable may well be challenged. Already there are many firms, both large and small, in which the safety of the worker is a first consideration, and where no new machinery or process is put into operation without every possible measure being taken to ensure that it is as safe as it is eventually intended to be. It should not be too difficult a task for professional associations and safety organizations to arouse public opinion in such matters to a point which would ensure not merely that the minimum requirements of the law were rigorously enforced, with adequate penalties if need be, but also that a high incidence of avoidable accidents, especially among the young workers, would be regarded as a definite slur on the reputation both of the firm and of its management.

The position of the juvenile worker requires special stress because of the exceptionally high accident rates among workers under eighteen years of age to which the report again directs attention, and also because of the possibilities of a much more rapid reduction in this accident rate among juvenile workers than among adults in the same occupation. While accidents to young workers are usually of the less serious kinds, the situation was regarded as sufficiently important to receive special attention from the inspectorate, and a separate chapter of the present report deals with accidents to young workers and methods of preventing them. In relation to young workers the question of industrial safety presents its own problems, and too often it appears beyond doubt that the special protection which should be accorded to young workers is wanting.

An attempt to apportion responsibility between the employer and the victim indicates that in only 23·8 per cent of the accidents to boys could no blame be attached. In 32·3 per cent of the accidents the firm was mainly responsible and in 44·3 per cent the boy. The figures for girls do not differ greatly, but in 51·1 per cent of the accidents the girl was mainly responsible. The inquiry also emphasized the greater liability to accident in the initial stages of employment; about 10·4 per cent of the boys and 24·4 per cent of the girls who were injured in the first six months being injured during the first week.

These figures alone emphasize the significant part which a sense of responsibility on the part of the management, combined with active oversight, can play in determining the standard of safety in a works, and they stress, too, the importance of educating the young worker in the risks attached to his work as well as the importance of selecting that work, and adequate supervision and training in the initial period of employment. In spite, however, of the attention directed to this matter as a result of a memorandum issued following a conference convened by the Home Office, in which the National Confederation of Employers' Organizations participated, the general progress has been unsatisfactory. The publicity given to the matter has as yet aroused little, if any, interest in many employers, and others have had no knowledge of it.

A large proportion of the accidents to juveniles appear to occur in the smaller factories, where only individual approach is likely to be effective, and the chief difficulty lies here rather than in the larger and better organized factories. Whether the factory is large or small, however, the interest of the occupier, managers and foremen is indispensable before there can be much hope of a noticeable reduction in these accidents.

For this reason, the interest and co-operation of the scientific worker in this matter is of prime importance. Whether or no he occupies a position on the management side, an experienced chemist or engineer, for example, is usually able to initiate steps leading to improved working conditions and to secure the formulation and observance of strict safety rules. He has also an indispensable contribution to make on the technical side in improved design or safer operating methods and conditions in new or established processes. His personal interest may largely determine the success or failure of attempts at educating the young recruit or in securing that the training and supervision he receives is efficient and not perfunctory.

Nor is this the only contribution which scientific workers can make in the field of industrial safety and accident prevention. Besides the enthusiastic and skilled leadership and co-operation of the man of science, whether in a technical or an administrative capacity, there is needed an alert and informed public opinion which will not tolerate the continuance of the abuses revealed in this report. Ridiculously inadequate penalties are at present inflicted for such exploitations of health and safety as the employment of boys of fourteen to

seventeen years of age for as many as eighty hours a week, of girls of fourteen from fourteen to fifteen hours a day, and women for an unbroken twenty days work, which are in themselves an obvious cause of industrial ill-health and accidents. Clearly the strong pressure of public opinion is urgently needed to stir some magistrates to a sense of responsibility in this matter, and a Government which professes so great an enthusiasm for physical health and training might do well to convey a strong hint to the offending quarters to discourage leniency as ill-timed as it is reprehensible.

This problem of arousing a public opinion will secure the observance not so much of the minimum standards of the law but rather of the practice of the more progressive firms, whether large or small, and supply the support which such firms, no less than the factory inspectors, themselves require, is less a matter for an individual scientific worker than for his professional associations. They indeed can afford the individual worker the

moral support he may need in making his stand against specific negligence or abuses which he may encounter in his ordinary industrial life, as well as supplying the stimulus and vision which may induce him to initiate constructive measures whether in the technical or more general sphere. Equally they could, if they chose to speak with a united voice and authority, mould public opinion and bring to an end the neglect and indifference which are as detrimental to industrial efficiency as to the health and well-being of the whole nation, and not only that of the individual workers, young and old, of whose lives and happiness so distressing a toll is now taken. The present report may well stir such professional associations as the British Association of Chemists and the Institute of Chemistry to take a more active part in creating an informed public opinion and in strengthening the hands of their members, especially when employed in professional isolation in the small firms where improvement is most needed.

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## National Factors of Physical Fitness

### National Fitness:

The First Steps. (Issued by the National Advisory Council and the Grants Committee for Physical Training and Recreation.) Pp. 24. (London: H.M. Stationery Office, 1937.) 2d. net.

### Physical Education in Germany

(Board of Education: Educational Pamphlets, No. 109.) Pp. 80. (London: H.M. Stationery Office, 1937.) 1s. net.

ON Tuesday, July 20, a striking leader appeared in *The Times*, entitled "The Empty Chair". It referred to the fact that physical culture had no conspicuous place among the subjects to be discussed at the annual meeting of the British Medical Association at Belfast. "If the doctors will not fill the empty chair, others less well qualified than they will fill it". "Into this pageant of life in action the science of nourishment and the science of personal hygiene will fit easily and with propriety. . . . This is the larger physiology. . . ." The complaint is just and timely. Physical training is largely neglected by doctors and physiologists in Great Britain, and it is almost impossible to obtain expert scientific advice on it.

The Physical Training and Recreation Act passed through Parliament this year. The little

pamphlet "National Fitness" shows how the National Advisory Council and the Grants Committee are beginning to plan the organization by which the Act may achieve its ends. It is curious that Great Britain—the home of 'sport'—is so backward in matters relating to the physical education (in its widest sense) of the people. How many of its towns have running tracks, gymnasia, swimming baths? How many of its schools and universities have means and personnel for the physical examination and assessment of their students? How many of our young people, lacking advice and encouragement, know anything of the joys of bicycling, tramping, camping (and singing) about the countryside? How many more than at present, even without help and leadership, might find out for themselves, in their holidays and week-ends, were the Youth Hostels multiplied ten times in number and capacity? How much health, happiness and content might result were there reasonable means of physical recreation, with organization, leadership and advice, within the reach of all instead of a small fraction of our people?

The beginning of a national effort is being made. Its success will depend on various factors: first, on public opinion, which, as the pamphlet truly says, "in this country means the opinion of the