management. Employers take medical men and women into their concerns, and in some an administrative and advisory function is combined. The Trade Unions have their own medical advisers, and the great hope is that all these different officers will continue to pull together in mutual confidence and consideration as they now so happily do. The universities are awakening to the need of supplying trained graduates (vide Birmingham and London), and the stage is set for a large-scale advance. This is likely to be rapid once we have overcome the difficulties of co-ordinating the sociological (labour management and health) functions of the small firms. These employ about two-thirds of the insured population, and the new Factories Bill/Act will be a great stimulus to co-operation on labour questions.

Social Implications

To an extent which those outside industry often fail to grasp, the industrial system of to-day is rapidly becoming the social centre of gravity. Many of its problems are primarily in the field of social medicine, not only in regard to the health and welfare of the workers, but indirectly in its effect on the whole social structure and the issues that arise therefrom in the lives and destinies of the bulk of our population. As a profession we cannot ignore the wider issues of industrial health; but we cannot understand them or play our part adequately unless we are prepared to study the industrial structure, from the worker at his bench and in his home to the administrative and technical functions which control his work, and to realize that in the widest sense his health is dependent on many factors, and that any attempt to deal with parts of the problem in isolation must prove a failure. Every preventive and therapeutic measure must be related to some central idea, because the worker himself is not isolated but is a functional part of an intricate system, and his health, happiness, and social efficiency depend on a high degree of technical and cultural co-ordination. Doctors, employers, trade unionists, economists, and teachers must understand each other and work together if we are to evolve progressive ideas which, after due trial, can be turned into the currency of practice, and without which no legislation can be of the slightest avail.

A specification for haemocytometer counting chambers and haemocytometer dilution pipettes has recently been prepared, with the co-operation of the medical profession, by the British Standards Institution. In framing the specification particular attention has been paid to the various tolerances specified. The accuracy of a blood count depends on the skill of the operator in obtaining a representative sample, in carrying out the dilution, and in the use of the counting chamber; it is also limited by the errors of the apparatus employed. The accuracy of the final count depends, *inter alia*, on the accuracy of a number of elements of the counting chamber—for example, accuracy of ruling, accuracy of depth, departure of under surface of cover glass from a plane, etc. In view of the number of possible sources of error the tolerances on individual elements had to be kept small in order to avoid the possibility of a comparatively large error in the final count due to an accumulation of small errors. On the basis of measurements carried out at the National Physical Laboratory on samples submitted by manufacturers as representative of current production, the tolerances were also related to the degree of accuracy attainable in manufacture without unduly increasing the cost of production. Copies of the specification may be obtained from the British Standards Institution, 28, Victoria Street, S.W.1, price 2s. 2d. post free.

THE WIDER ISSUES OF HEALTH LEGISLATION IN INDUSTRY*

BY

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My contribution to the discussion is an account of what has taken place in the electric accumulator industry during the last twenty years. It will furnish, I hope, a concrete example of what can be done, and what is now being done, to safeguard health in a dangerous industry, and will give some idea of the importance of individual effort as a complement to legislation.

In the first place I must point out that the particular risk in the battery industry is lead poisoning. In the years immediately following the war the industry began to expand. Batteries were needed for numerous purposes, and new fields opened up for their use. This demand had to be satisfied, and manufacture was undertaken by people with no previous experience of the industry and with little knowledge of the dangers it involved. They found that they were subject to certain Home Office rules and regulations, which they observed, or tried to observe—at any rate in the letter.

Soon it became evident that all was not well. A few workers were taken seriously ill, many looked and felt unwell, and the general standard of health in the industry deteriorated. Men became apprehensive when they heard of their friends suffering from lead poisoning; they became more worried when they saw that some of them were paralysed, could not dress or feed themselves for months on end, and did not return to work for a year or eighteen months. Some sought other jobs, but most carried on. They did what men usually do in these circumstances—they made feeble jokes about the danger, and a certain department became known as "The Dead House." The evil reputation spread to the districts round about, and it became, for instance, a stock joke for the wag visiting the works to misinterpret the notice "Drive Dead Slow." I mention these facts merely to give you some idea of the state of mind that existed among employees—a state of mind that can have produced nothing but harm, and probably caused as much suffering and inefficiency as the actual lead itself.

The larger firms did much to improve conditions, and during 1924 the Home Office authorities, viewing with alarm the rise in the number of cases of lead poisoning, decided that further and concerted efforts must be made. Employers and others were consulted, and the regulations governing the industry were completely revised. These rules, which came into force in 1925, made the best practice of the more progressive firms compulsory on all manufacturers, and regulations were drawn up by the Medical Department of the Home Office based on the vast experience of lead poisoning which they had accumulated in past years from other industries.

These regulations may be said to have brought the practice of the backward up to the level of the progressive firms, or, in Dr. Lockhart's words, "They pegged the advance." There was at any rate to be no slipping back from this level. This was a reasonable standard, and it was to be a minimum standard. Excellent results followed the introduction of this code of regulations; the number of cases began to fall, and has continued to fall ever since. This decline, however, has been assisted by another factor, which I will now describe.

* Read in opening a discussion in the Section of Medical Sociology at the Annual Meeting of the British Medical Association, Belfast, 1937.

Despite the introduction of the 1925 regulations the incidence of cases in the largest and most progressive of the firms continued to rise. This apparent anomaly is easy of explanation. I have already pointed out that the 1925 revision of regulations was largely based on the current practice of the progressive firms, where these regulations had been voluntarily applied for a considerable time. In making the code compulsory, therefore, little change was necessary in the methods of this factory. Their business, however, was growing fast, with a corresponding increase in the number of employees, and since the proportion of cases to employees remained fairly steady it is obvious that the number of cases would continue to rise.

Investigation in the Factory

Here was a difficult problem. The Home Office could not immediately introduce more stringent regulations; it was already working hard to administer the previous code. The employers also were extremely worried at the turn of events. They had spent a great deal of money in their attempt to put things right, and still they were unsuccessful. It was here that the Medical Department of the Home Office went outside the rules and regulations and functioned in its other most important capacity—that of adviser. The Chief Medical Inspector pointed out that the problem needed further investigation “on the spot,” and it was suggested that the firm should appoint a medical man who would study the problem in the factory. Fortunately, this company had a board of directors which needed no persuasion that money so spent might reasonably be expected to result in a solution of the problem. At any rate they were prepared to make the experiment, and a medical officer was appointed for three years. He was to study the industry and its particular dangers, and was to make recommendations as to how improvements could be effected.

For his work it was necessary to have facilities for determining the effects of various doses of poison, how this entered the body, and the limits of contamination of the atmosphere which might safely be allowed. This knowledge was used when collaborating with chemists and engineers to produce safe working conditions. In addition it was necessary to elaborate methods for the routine medical supervision of the workers. But more than this was needed; it was essential that hours of work, and in some cases rates of pay, should be adjusted. These matters not only required the co-operation of a management which was fully alive to its responsibilities to the workers, but one which had the will and determination to see that every necessary step was taken. The figures show that the results of the experiment were satisfactory; in fact, they were so satisfactory that these methods were in 1929 extended to other factories in this industry, and with the same happy results. Here, then, we have an example of the wider activities of the Home Office in dealing with problems of this type. Rules and regulations embodying the best-known practice are laid down to ensure a reasonable minimum. Firms are then encouraged to undertake further pioneer work in which advice and expert assistance are forthcoming. This seems an eminently practical method of procedure, and one likely to give good results. To my mind the advisory function of this Government department is a most important one.

It might be argued that the method adopted in the case I have described is not the best method of procedure; that all investigations should be made by a Government body, and that rigid rules and regulations governing manufacture should immediately be based on these findings. The charge of paternalism might even be levelled at this

industry, and at the methods it has adopted. Such a charge, however, can be easily met. It should surely be required of any employer that he should provide safe conditions of employment for his workers. If the public demands an article the manufacture of which involves expensive plant and an expensive organization, it must expect to pay a correspondingly high price. Attempts to cut prices at the expense of the worker's health were the habit of industry in the past, and it would seem that one of the biggest advantages of any large combine is the power it possesses of keeping prices at a level which will enable the worker to be adequately provided for in the matter of healthy working conditions. In this connexion it is interesting to note that in a recent trade agreement of which I have knowledge general collaboration upon measures for health protection was specifically agreed upon.

Need for Concerted Effort

Dr. Lockhart contends that the long fight to obtain recognition of society's duty to its members is all but won. This is true. What is now needed is a concerted effort to implement that recognition. There are still far too many individuals who evade the responsibilities the community rightly expects them to carry. There is no doubt that some of the smaller firms provide the best possible working conditions—conditions and relations which are only possible in a small undertaking, but unfortunately the converse is also true; many of the very worst conditions so far as dangerous trades are concerned are found in small firms. In some cases this results from the necessity to cut prices, and where this is so an attempt is often made to reduce overhead expenses by curtailing necessary health services. In other cases personal selfishness influences policy. No education of the individual employer will entirely overcome this attitude where it exists. He must be strictly controlled by legislation, which must not lag far behind the most progressive practice. He will then be obliged to provide reasonable conditions for his employees, but the standard can never reach the level that is actually attainable unless the attitude and outlook of this type of employer is overcome. Public opinion can do much towards providing the necessary stimulus, and the trade unions must undoubtedly co-operate. Hitherto the unions have been largely concerned with obtaining an improved standard of money wages. As time goes on, however, they must also co-operate closely in an effort to procure the best working conditions for their members, which means the development of scientific advisory functions.

It is well-nigh impossible to introduce legislation which will provide for all contingencies. For instance, it will be remembered that recently in the House of Commons an amendment to the Factories Bill was introduced suggesting that “safety first” committees be made compulsory, and it was evident that the general feeling in all parties was that probably this was undesirable and that regulations making them compulsory would be likely to do more harm than good. Exactly the same argument applies to much that is done in the dangerous industries. Legislation is able to go a great deal of the way, but final success depends largely upon the employer and upon his outlook, and—what is often forgotten—upon the co-operation and support of the employees.

The Trained Medical Officer

An employer willing and anxious to provide the best working conditions for his employees will in many cases need expert medical advice. If he is prepared to accept this advice he will find he avoids many pitfalls. An

interesting example recently came to my notice. A small factory which had been carrying on quietly and safely for many years decided to introduce so-called efficiency engineers to improve its methods. This resulted in turning out rather more material per man-hour, but at one stage a very large proportion of the workers were down with lead poisoning. In this particular instance, had a trained medical officer with adequate industrial experience been asked to co-operate with the engineers it is certain the "speed-up" could have been carried through without such disastrous results to health.

How is the employer to obtain this advice? Much may be procured directly from the Home Office authorities. Where, however, experimental work is necessary this may now be carried out at either London or Birmingham University, where a department of industrial hygiene has been opened. In other instances the problem might be investigated by the Industrial Health Research Board, which, as you know, is administered under the Privy Council. The problems investigated by the Board are usually of fairly wide application, and the findings can be of value over a large range of occupations or industries. In many cases it is important to have a completely impartial body, and one of high scientific attainments. It is a good thing, for instance, that the investigation of the incidence of gastric sickness among busmen was started by the Industrial Health Research Board some four years ago and was completed before the question became controversial. Whether or not the pioneer work is best done by University bodies, by the Industrial Health Research Board, or by the industry particularly concerned may be a matter of opinion, but that it must be done by someone is obvious. Most people will be ready to agree with this contention in the case of the dangerous trades. The figures available are convincing evidence that a danger existed, and that certain steps were successful in overcoming the danger, while the most obstinate director is likely to be convinced of the value of this type of work when he finds that it is actually saving him money and that his medical department is costing rather less than he had previously spent on compensation. It is perhaps not so easy in ordinary industry to convince the sceptic that these methods are necessary, but those of us who are in close contact with the medical side of industry know that it is just as important for these industries as for the dangerous trades.

Commentary

I hope I have made it clear that in order to obtain real and final success the attitude of the employer must be the correct one, and the worker must be co-operative. The education of both employers and workers in these matters is of vital importance, and it is only by improvement in both and by the general education of public opinion that we can establish the best conditions in industry. This education is going on and conditions are improving steadily, but it behoves all who are interested in the public health to see that this education grows and flourishes. It appears to me that this means that the medical profession must take a much greater interest in these health problems, and must make an effort to acquire a real and accurate knowledge of industry's needs in this sphere.

A large cancer institute with an experimental department, hospital, and out-patient department has recently been founded in Buenos Aires, with a branch at Bahia Blanca. It has been found that only 3 per cent. of the patients seek advice in the first month, as compared with 86 per cent. after the end of six months.

THE WIDER ISSUES OF HEALTH LEGISLATION IN INDUSTRY*

BY

ERNEST BEVIN

It is a gratification to the great trade union movement that the industrial health problem is receiving much closer consideration than at any period in its history. The problem has given our movement much anxiety and has involved considerable expenditure of money and effort in bringing about investigations to secure the scheduling of industrial diseases.

Opportunity for a Co-ordinated Service

With the passing of the Factories Act, although in many respects it falls short of our desires, and the placing of the industrial health problem on a more organized basis, an opportunity is presented for a really co-ordinated service which, for the first time, can be made universal in its application. We agree that a large contribution has been made by voluntary effort. It is true that it may have been introduced from a variety of motives, possibly paternal, or from the point of view of economic efficiency; or schemes may even have been conceived with an idea of handicapping our own movement. But motives do not always govern achievements or determine the effect of a course of action which may be taken. The net result has been to produce sufficient evidence to enable the State, employers, and trade unions to approach this problem and place it on a more organized basis, co-ordinating all the contributing factors and linking it with a complete medical service which, if handled correctly, will become a great national asset.

The Health Problem and Capital Values

If the health problem could be viewed from the point of its capital value it would be possible to arrive at a better estimate of the result to the nation of its neglect, for it must be remembered that the only capital a worker has is his skill and ability to work. Therefore if the capital loss could be calculated in terms of depreciation, as is done in the case of machinery, the facts would be such that, applying the same result to the mechanism of a works, the industrial management would call in the best scientific and engineering ability at its command to remedy the loss. I suggest that the loss of value resulting from the lack of proper standards for the health of the worker, if it could be translated into capital, would represent a greater total than would appear under any other head. No attempt, however, has been made to calculate the actual capital value of an efficient worker, as represented in output and gain to the community. In addition, the loss is extremely far-reaching, for whilst a machine may depreciate, its effect is limited; but physical deterioration of the worker has a very grave repercussion upon his home, on the well-being of his family, and on his general environment.

We welcome the consideration of the industrial health problem from yet another angle. For a long time it was assumed that the main thing to be decided in the case of a worker who was ill was whether or not he was a malingeringer. Practically the whole of the Workmen's Compensation Laws and restrictions associated with certain health services have been based upon the assumption that protection had to be secured against exploita-

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