BRITISH MEDICAL JOURNAL

LONDON SATURDAY MAY 13 1939

INDUSTRIAL INCAPACITY AND MODERN MEDICINE*

BY

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"There is a vast amount of protracted malaise and suffering, disablement, or lessened capacity for industrial work . . . in almost every region of the world."—GAVIN MILROY, M.D. (1877).

The effect of industrial occupation on the health of the worker has been the subject of medical investigation in this country since the seventeenth century, but such investigations have mainly had regard to the effects of specific hazards which give rise to occupational disease. During the past hundred years many commissions and committees have investigated the problem from various points of view, but the cumulative effects of the great war brought the question most vividly into the limelight. The massing together of large numbers of munition workers, very many of them women, their abnormal hours of work, the intensive speeding up of production, and labour unrest generally, tended to produce at that time an unparalleled state of affairs. Realizing that a completely new health problem had arisen which was actually affecting the progress of the war, the Government decided that some action must be taken.

Industrial Health Research

So it came about that the Health of Munition Workers Committee was set up in 1915, under the chairmanship of Sir George Newman, "to consider and advise on questions of industrial fatigue, hours of labour, and other matters affecting the health and physical efficiency of workers in munition factories and workshops." The work of this committee was a landmark in the history of medicine in relation to industry. To-day its reports still make interesting reading, but yet reading that is in no way out of date, as is common in scientific literature, because their appeal holds good over twenty years later.

With the end of the war came an urgent need for the reorientation of industry. But although the spirit of commercial competition was revived once more, the work of this Health Committee was not completely relegated to the background. There were those who realized full well that the problems which had been brought to light had existed, in a smaller degree no doubt, in pre-war days, and could not automatically be settled by the ending of a war. It was realized, too, that the revival of industry, one of the main ways by which the country could come to life again, would produce once more the same health problems, and it was felt that side by side with scientific

research and commercial development should go a more intensive study of the effects of occupation on health. And so, as a direct result of the work of this committee, came the formation of the Industrial Fatigue Research Board at the end of 1918. It is interesting to note that its name was altered in 1928 to the Industrial Health Research Board. This change in name, I believe, was a sign of the time, and indicated the transference of constructive thought from disease to health in this as in other branches of medicine.

The board is of its kind outstanding in the world to-day. The work that it has carried out is comprehensive, and has included studies on hours of labour; environmental conditions in the factory, such as lighting, heating, and ventilation; dusts and toxic vapours; the physiology and psychology of work; vocational suitability; and industrial sickness. Each annual report in itself is a comprehensive document, and the individual reports on these various subjects are unique in their respective fields. Nevertheless, there has been the greatest difficulty in having the results of the board's investigations put into actual practice in British industry. And the board itself has made mention of this difficulty in a recent report. It may be that terms of reference preclude it from propaganda and advertisement, but in my opinion the time has now come, not by any means to call a halt in research, but, in addition, to form some policy which will enable that research work to become part and parcel of industrial management of to-day. This statement is made in no spirit of destructive criticism, but with the firm conviction that at the present time much of the research work on industrial health carried out in this country, which because of its high standard and great practical value can be so important to industry, is completely unknown to or ignored by the great majority of British employers.

Post-war Developments

With trade revival after the war came the setting up of industrial medical services. Although industrial concerns connected with the State, such as the General Post Office and Woolwich Arsenal, and the public utility companies—for example, gas companies and railway companies—have had attached to them whole-time medical officers for many years, the industrial medical service as we know it to-day was non-existent. One firm after another, however—most of them large firms—started to make appointments of medical officers to supervise the health of their staff and workers, and it is surely signi-

* The first of two Milroy Lectures, delivered to the Royal College of Physicians of London, February 23 and 28, 1939.

ficant to note that in these firms, so far as I have been able to ascertain, such a forward health policy has remained unaltered.

It would be unfair to claim that only with the introduction of a medical man or woman into industrial life has welfare, in the broad sense of the term, been a policy of British industry. A large number of employers have always had the welfare of their staff at heart. In many instances, however, this has been good in intention but badly misdirected in practice. And particularly so is this the case in connexion with the treatment of industrial injuries, the supervision of sick absenteeism, and the prevention and control of occupational disease. What I do claim, however, is this. The medical man and woman, by virtue of their training and professional experience and their specialized outlook on life, are eminently fitted to take their place to-day as an integral part of industrial management. There is work that they can do which is not only of value to their firm and its staff, but is also a contribution of importance in the fields both of curative and of preventive medicine.

The Present Service in Industry

It is estimated to-day that there are some 300 doctors attached to factories and business organizations in Great Britain, of whom about fifty are engaged in a whole-time capacity in the larger firms. And in addition there are some 1,750 factory examining surgeons, appointed by the Home Office, who carry out medical examinations on factory workers and who play a definite part in the prevention and control of occupational disease.

And then there is the all-important work of those doctors in Government Departments that have to do with industrial health—His Majesty's medical inspectors of factories, of mines, and members of the Silicosis Board; and a number of others who by teaching and research on industrial medical subjects are most certainly within the ranks of industrial medical officers. The work of both these groups is so essential to industry that one cannot do without it, and their guidance and experience have been of inestimable value to those of us who are working for the most part of our time inside the factory. More and more, too, is the general practitioner becoming interested in the working conditions of his patients; and the relationship of medicine to industry is being studied in many details by the British Medical Association.

In 1935 a growing need for some medium of contact and exchange of knowledge between the various medical officers was met by the formation of the Association of Industrial Medical Officers under the leadership of Howard Mummery, one of the pioneers of this service. For the time being it includes only those whose whole work lies within industry, and has become within a short space of time representative of all parts of what is perhaps one of the youngest branches of medical science. The association comprises medical men and women from a great variety of industries, such as nickel refining; coal-mining; the fishing industry; the potteries; motor-car manufacture; transport undertakings such as railways, shipping, and airways; the food industries; the non-ferrous metal industry; lead works; manufacture of chemicals; gas companies; telephone and cable manufacture; explosives; tobacco factories; large retail stores—a list of industries which is certainly comprehensive. It includes, too, those Government doctors employed in industrial work, and those whose whole time is given up to teaching and research work on industrial medicine both in Government and in University Departments.

What of the Future?

It is interesting to conjecture what is going to be the end of all the activity in this branch of medicine. There are those who look forward to a State medical service with a large Department of Industrial Health, and many of us would like to see the Home Office medical inspectorate still further increased, and the solitary Medical Inspector of Mines given additional medical assistance. My own view is that the number of whole-time industrial medical officers engaged on the present basis by the employer will always be limited under the existing system. Only the large organizations can afford their own special advisers. But it must be remembered that only about 10 per cent. of the workers in this country are in large concerns where whole-time doctors could be employed; the majority work in the small factory. And so the field for future development must be among the places where the great bulk of our men and women earn their living—in the small factories and workshops.

How is this to be done? Many suggestions can be put forward: a State service of whole-time doctors each with a district, the service linking up in some way with the Medical Department of the Home Office and the Ministry of Health; an extension of the work of the examining surgeon, who is incidentally always a general practitioner of standing, on a voluntary or State-aided basis, to be the medical adviser to the firms in his district; or, finally, each firm, no matter what the size, voluntarily appointing a medical adviser—the small factories combining together. as they could, for example, on some of the new trading estates, and the larger firms having their own doctor.

I make no apology for introducing at this stage some speculation regarding the future. Because of the importance of the work and the benefit to the health and well-being of the worker which can be effected, some extension of the present service must come in the not too distant future. These are some of the alternative methods which can be suggested; but, recognizing our national characteristics, some scheme based on the voluntary co-operation of employers and employed in industry is likely to be more readily accepted in the long run than any other—once the evidence for such a service is adequately presented and properly assimilated.

Industrial Injuries

If any of you were appointed to-morrow to be the medical officer of a large firm it is not unlikely that one of the first things you would have to tackle would be the treatment of a man injured at work. And because of the fact that injuries are an important cause of industrial dislocation and incapacity for work, and because the medical profession can do much to reduce this dislocation and incapacity, I feel that it is imperative to discuss the subject at some length, not from the detailed angle of surgical procedure, but rather from the point of view of the general underlying principles that are of interest to all of us as a profession.

Increased industrial activity has unfortunately been accompanied within recent years by a steady rise in the incidence of injuries. During 1937 there were over 460,000 cases of injury in which compensation was paid in the seven great groups of industries (mines, quarries, railways, factories, docks, construction, and shipping), employing in all some 7,500,000 persons. Of this number nearly 200,000 occurred in factories, with which I am here more directly concerned. The cost to industry and to the country as a whole runs into many millions of

pounds, and the degree of dislocation of production and the extent of incapacity for work are both correspondingly significant. And in addition to those accidents a vast number of minor injuries occur every day. Although they do not necessarily cause much lost time, they are nevertheless a most definite cause of lessened capacity for work.

TABLE I.—*Attendances for Treatment of Injuries Occurring During the Course of Employment in a Group of Workers Employed in the Metal Industry (1935-8)*

Year	Average No. of Workers	Dressings or Attendances		
		First	Subsequent	Total
1935	10,000	43,873	58,726	102,599
1936	10,500	45,417	70,036	115,453
1937	11,500	54,949	98,265	153,214
1938	12,200	48,848	90,847	139,695

The figures shown in Table I are a record of those employees who attended at the various ambulance rooms situated in the different factories that house a group of over 12,000 operatives, for treatment of injuries at work. They are some indication of the amount of work carried out by a factory medical service, catering in the main for a heavy industry where there is a considerable risk of accident, and are also some index of the fact that the workman to-day does make full use of the available facilities for treatment. These facilities depend largely on the size of the factory, on the numbers employed, and on the type of work done. In the small factory employing perhaps a dozen persons the medical arrangements need only be of the simplest, but in the larger factories ambulance rooms are provided, and where many thousands of workers are congregated together on one site the medical department may be on a scale which corresponds to the casualty or out-patient department of a general hospital.

Treatment in the Factory

The type of treatment provided is to all intents and purposes the same throughout this group of factories. There is a standard method of carrying out dressings. When possible and economically practicable a trained nurse is employed. If not, the person "trained in first aid," to quote the new Factories Act, gets special training annually at one of the larger centres. And every factory is under the special supervision, from the medical point of view, of a doctor who is responsible for the treatment given. He may visit the works every day or only on occasion. Nevertheless, he is available in times of emergency and becomes part of a co-ordinated service for the group. We provide specially for the first treatment of the major injury and the prevention of shock by rest, warmth, and the giving of morphine by the mouth at the earliest possible opportunity. We do not permit early removal to hospital from the factory, and in many cases the patient is kept in the ambulance room for hours on end. But when he does go to hospital he has no shock, and is fit to proceed straight to the operating theatre.

One word about first aid. I have made it a cardinal rule that the giving of unskilled first aid—and I mean by that first treatment by any other person than a doctor or trained nurse—must be cut down whenever possible to the barest minimum. The injured worker's whole future depends on his hands, his eyes, and his earning capacity; why therefore leave such things to the tender mercies of the unskilled? First aid, on the lines taught at present by the various organizations in this country, is not suited

for modern industry, and is not in accordance with the best interests of the injured man.

The commonest minor injury we meet with in the factory is, first, the cut finger, and then the eye injury. Both frequently need expert surgical attention, which should be given to the patient in hospital by a specialist in such matters. Except in rare circumstances, when perhaps a part-time industrial medical officer is also the local surgeon, only emergency treatment should be carried out within the factory.

Sepsis

One of the main results of an organized service for dealing with minor injuries is the rapid reduction of sepsis which can be effected. And in relation to the accompanying graph much of the credit of the present conditions in

Graph showing percentage of total employees losing one day or more through sepsis in a metal factory (8,000 workers) (1931-8). The arrow marks the introduction of medical services.

my own company must be given to my predecessor (Trumper, 1932), whose hand was the first to remedy an altogether shocking state of affairs.

In other places I have discussed the why and the wherefore of this subject (Stewart, 1936a); it remains now to emphasize that the good results obtained in the beginning can be maintained only by the co-operation of both employer and employee. The employer has to educate, teach, and, if necessary, discipline his workers to report at once anything that occurs. The permanently stiff finger, or the amputation that may be required, is frequently the result of sepsis arising from lack of treatment of a simple injury. The employer is willing to provide treatment and pay for the time lost in having it, and the worker, by neglecting what is freely offered, often occasions a major catastrophe to himself and to his dependants that can be more damaging from the point of view of earning capacity than the fractured femur or the amputated leg.

Prevention of Accidents

This is a problem to which much attention has been given by laymen and curiously little by the medical profession. During the past few years there have been great improvements in safety devices and in the mechanical guarding of production plant. Legislation demands a higher standard than ever before. There has been an increasing use of educative propaganda in the factory, in the Press, and in contemporary literature. And research work on the human factor in accidents proceeds apace, although too slowly perhaps for some of us. From my own observations I believe that accident-proneness exists to-day. Abnormalities in human behaviour are undoubtedly causes of many accidents, and it may be that they can effectively be detected and put right by the doctor. The scope for this type of work is great, and

industry and medicine must collaborate further in the matter.

How far the industrial medical officer can advise or have jurisdiction in preventive work is largely a matter of circumstance; the greater part must be carried out by management and not shelved as the complete responsibility of any medical service. There is much, however, that can be done by the medical officer in industry to educate supervisory staff in the human problems of accident prevention. It is a matter of concern to have revealed to one the ignorance of a number of otherwise intelligent managers and foremen regarding the relation between accidents and such factors as persistent overtime, inefficient lighting and ventilation, low rates of pay, and faulty supervision.

Injuries to Juveniles

And, finally, there comes the problem of the latest arrival into industry—the juvenile. In many ways there is nothing more tragic than the boy or girl of 14 or 15 years of age who becomes permanently disabled because of an injury at work. During 1937 nearly 14 per cent. of all the reported non-fatal factory accidents in this country occurred to employees under the age of 18. The significance of this figure can be more fully realized when the ratio in industry of young persons to adults is considered. It is not difficult to see that the employer must bear the greater part of responsibility for such injuries. The Factories Act, 1937, is specially catering for this part of the problem, and rightly so, because legislation is often the only way by which some measures can be put across to the employer. It has been my privilege to help in this matter during recent years. My colleagues and I have been able in a small way perhaps, but yet I believe effectively, to educate the child who comes to our industry from school. A follow-up system which we have instituted, and which will be described later, enables us to keep a watch on the growth and development of the juvenile in the factory and on his reactions to industrial life, and has also given us an opportunity to teach some of the principles of safety and to educate him in preventive measures.

Some Problems of Workmen's Compensation

During 1937, as we have seen, the number of compensatable factory accidents reported to the Home Office was nearly 200,000, of which 900 occurred in my group of workers, consisting mainly of slight injuries such as strains, cuts, eye injuries, and finger injuries. Careful observation was made of these cases by the medical staff, and in all just under 4,000 separate examinations for compensation purposes were carried out. This work has a significant bearing on the rehabilitation of injured employees. By watching progress the industrial doctor is able to regulate the return to work. Because of his intimate knowledge of the man's job and of his financial affairs, and by continued contact with the man himself and his doctor, this part of industrial medicine becomes an important item in any rehabilitation scheme.

The question of monetary compensation for industrial injuries is one of complexity, not only on the administrative and legal side, but also from the medical point of view. The present laws have a definite bearing on the clinical course of many compensation cases, on their duration, on the degree of incapacity, and on their eventual recovery (Stewart, 1939). I believe that in many cases recovery and rehabilitation are definitely retarded as a result of the present laws. The amount of weekly payment, which at a maximum is 30s. per week, is frequently insuffi-

cient for workers who have been accustomed previously to wages of £4 or £5 a week or more. Feeding costs are not necessarily reduced by incapacity, and actually may be increased. Money difficulties and home troubles arise. Maintenance of the family becomes a problem. Rents still have to be paid. And because of the general inadequacy of income the man may be forced to return to work before he is completely fit, and in other cases it retards his return. There is also trouble when delay in compensation payments takes place, owing to the difficulty, it may be, in deciding the question of liability.

And then there is the problem of lump-sum settlements. From a medical point of view such settlements are often the direct cause of major psychological disturbances. The patient frequently thinks in terms of large sums of money and relegates any necessity for getting fit to the background. Litigation, which so often accompanies the claim for lump sums, may also be a factor in delaying return to work. In my experience lump sums are in many cases mismanaged by those who receive them, more particularly when young people between the ages of 21 and 30 are affected. They purchase businesses and spend large sums on gambling, wireless sets, and even motor-cars. They forget that their weekly income may now be considerably reduced; and the end-result is often failure and desperate unhappiness all round.

Another point in connexion with the Acts is the fact that they do not allow for travelling expenses to and from treatment centres, nor do they allow for the purchase of artificial limbs and other remedial apparatus so necessary for complete rehabilitation. Under our present conditions, therefore, the laws relating to workmen's compensation are sometimes both a hardship to the man and a serious handicap to the doctor who is carrying out the treatment. To remedy this state of affairs there must be some change in the present legislation; but obviously this in itself will not be sufficient. There must also be an earnest attempt on the part of the employer to reduce the incidence of his accidents, and, from our point of view as doctors, improved and better co-ordinated methods of treatment.

The General Practitioner, Hospitals, and Industrial Injuries

It is doubtful to-day whether the general practitioner himself has full facilities for dealing with minor injuries sustained at work and with the follow-up treatment of hospital patients who have been sent home but are not yet ready for employment. There is no question of competence to treat these cases, but only of the lack of facilities and time for so doing which is inherent in the present system; and in connexion with this point a recent proposal (Lockhart, 1938b) advocates the setting up of clinics for the treatment of such cases in various areas.

Fractures account for only some 9 to 10 per cent. of all industrial injuries, yet many persons seem to think that the provision of fracture clinics is going to solve the whole problem. The less sensational treatment of the septic finger or the cut tendon, however, is just as important in relation to incapacity and future earning power. On the other hand, the facilities for the treatment of finger injuries have as yet not approached in any way the facilities for the treatment of fractures. It seems that in large industrial areas there is a case for the provision of special casualty hospitals to deal with all traumatic surgery, including fractures, or special casualty departments on the same lines attached to the large teaching hospitals, which should be staffed by competent and well-paid resident surgeons as well as by a visiting staff, and

where treatment would be carried out on a co-ordinated basis from the beginning to the end of the case, with the full co-operation of industry at all stages. At the present time we often find that the septic finger is treated by the newly qualified house-surgeon. His experience, however, is being obtained at the expense of the working man, who may, as a result of treatment, have a permanently stiff finger, with concurrent loss of earning power. The problem is essentially one of fingers and eyes, not of fractures.

The mainstay of our voluntary hospitals is the various workmen's contributory schemes, and, to a lesser degree, employers' contributions. And for that reason the whole future of the system is at stake if adequate return for contributions is not received by the men themselves and by industry. In my experience complaints have already been lodged, and reasonably so, by groups of workmen and by industrial managements on this very point, and the whole question of hospital policy therefore becomes one of vital and fundamental importance in connexion with the problem at issue.

The Return to Work

Then comes the time when, either in the natural course of events or as a result of special effort, the man feels that he is ready to start work again. Here comes a real difficulty. It may be that he is permanently unfitted for his original employment and no alternative or light work is available; his job may have been taken over by another, and he finds himself workless; or it may be that he has some fear of a recurrence because of a hitherto undiscovered weakness, or because of an acquired distaste for that particular type of work. And so at this stage it becomes a real necessity for the final return to be supervised in detail by the doctor in the factory. I believe that only thus can rehabilitation be carried out in very many cases. Not only does he know the man's job and other available jobs in the same industry with the intimacy of long acquaintance, but from his personal knowledge of the foreman and manager he is able to obtain for the man just that modicum of indulgence for a short period of time which can be utterly essential in completing his rehabilitation. It is difficult to define in any exact terms what I mean. But in many ways it denotes what can be described as a type of fellowship and a common bond between men, which not only can be the final stage of treatment in its broadest sense but is also an essential requirement of all industrial relations at the present time.

(The second lecture, with bibliography, will appear in next week's issue.)

At the meeting of the Board of Directors of the Finney-Howell Research Foundation, Baltimore, fellowships were renewed for the following: Paul Clarence Aebersold, Ph.D., Margaret Esther Boyland (Royal Cancer Hospital, London), Alma Howard, Ph.D., Lloyd Marvin Joshel, Ph.D., Lloyd William Law, Ph.D., Hermann Lisco, M.D., Charles Stuart McEuen, M.D., Walter C. Merkel, M.D. Fellowships were awarded for 1939 to G. M. Badger, M.S., of Melbourne, Australia, to work at the Royal Cancer Hospital, London; Arthur Kirschbaum, Ph.D., to work at Yale University; J. L. Melnick, Ph.D., to work at Yale University; John F. Menke, M.D., to work at Stanford University Hospital, San Francisco; John L. Wood, Ph.D., to work at Harvard University; Paul C. Zamecnik, M.D., to work at the University of Carlsberg, Copenhagen. Grants-in-aid were also awarded to: Drs. R. D. Fowler, R. Walter Graham, jun., and George O. Gey. Applications for 1940 awards must reach the office of the Foundation, 1211, Cathedral Street, Baltimore, Maryland, U.S.A., by January 1, 1940.

FOREIGN BODIES *

BY

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A paper on foreign bodies is really a story of the human body. It refreshes our knowledge of anatomy, physiology, psychology, and legal medicine. It is not, as many think, merely an account of the vagaries of the lost article before its recovery. The first stand in the museum of the Royal College of Surgeons is covered with articles which have strayed into the human body by intention, by accident, or by surgical assistance, and which, after a sojourn there, have been recovered at operation, post mortem, or spontaneously.

The first of these to catch the eye is the cranking-handle of a tramcar—a Z-shaped iron bar some two feet in length—which had entered the body in an unusual manner. The patient was descending the stairs of a moving tramcar. Having had a generous quantity of alcohol, he had lost his customary exactness of step, so that when the tram started somewhat suddenly he was projected backwards and sat down forcibly upon the control-box of the car. He felt acutely ill—not without reason—and was transferred at once to hospital. On admission he was a mixture of shock and alcohol, but as soon as advisable he was operated upon. It was found that the handle, after piercing the seat of his trousers, had entered the anus and mounted the rectum. It had then gone into the pelvic colon, and later had cut into the peritoneal cavity. At the operation the various rents and tears were sewn up, including a hole in the bladder, and the man made an uninterrupted recovery. The honours of the case are divided equally between the dexterity and skill of the surgeon—Mr. Brook—and the physical endurance of the patient.

Articles usually enter the alimentary canal by being either swallowed at the upper end or pushed into the bowel at the lower end. Of the swallowed articles there is usually little to say. They are seen weekly in our hospitals, especially the children's hospital, with possibly a peak rise at Christmas, Hallowe'en, and birthdays. Most of the smaller articles can pass through quite easily. It may be taken as a rough guide that anything which can go down the oesophagus and enter the stomach will be able to leave it, and then make the journey of thirty-five feet or so to the anus without difficulty. In fact the doctor's main duty will be to remember that "they also serve who only stand and wait." Coins, brooches, small toys, whistles, stones, false teeth, etc., are many of the examples often seen. Recently I had under my care a small boy of 10 years who had swallowed seventeen marbles. This boy said that he had been attacked by bigger boys and forced to swallow them; while they in turn said that the boy, having earned such applause for the first marble, kept repeating the trick. Although the police were called in, no satisfactory solution has ever been reached (Figs. 1 and 2). One still has to operate upon the odd case of the open safety-pin, which catches and cannot pass; the coin—a penny—which is too large; and that dangerous article of female attire the Kirby grip, which may fail to pass through the pylorus and negotiate what might almost be called the "hair-pin bends" of the duodenum.

A case which occurred in my own house is worth mentioning. It was when a 3-months-old cocker spaniel swallowed a small rubber toy duck. Aperiens proved

* The substance of the presidential address to the Belfast Medical Students Association.