INDUSTRIAL HEALTH IN WARTIME

BY

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An article under the above heading was published in this *Journal* on April 13, when it reviewed the contents of the Emergency Report No. 1 issued by the Industrial Health Research Board. The article commented with approval on the statement of the Board that excessive hours of work do not ultimately pay, owing to the induction of over-fatigue in the workers, and that rest pauses are necessary for their health, contentment, and efficiency. Since the issue of the report grave events have forced us to realize more clearly than before the paramount need for the maximum production of munitions and other war requirements. In order to attain such a result Lord Beaverbrook, the Minister of Aircraft Production, asked all employees in aircraft factories to work full overtime for seven days a week. Mr. Herbert Morrison, the Minister of Supply, instructed all Royal Ordnance Factories engaged on urgent contracts to put in two twelve-hour shifts daily for seven days a week until further notice, while Mr. Bevin, the Minister of Labour and National Service, likewise appealed for a seven-day working week. Mr. Bevin was given complete authority in the regulation of factory conditions, as the powers of the Home Secretary under the Factory Acts were transferred to him for the period of the war. He quickly realized that if the workers were to maintain health and efficiency they must have rest periods from work, and in order to assist him in stimulating and developing to the fullest extent the safety, health, and welfare of the workers he established a Factory and Welfare Advisory Board. Most of the members of this Board represent trade unions or Mr. Bevin's own Ministry, and only one of them, Air Vice-Marshal Sir David Munro, is a medical man with an expert knowledge of industrial health. The composition of the Board therefore compares unfavourably with that of the Health of Munition Workers Committee appointed by Mr. Lloyd George in 1915, the membership of which included six medical men and three Inspectors of the Home Office Factory Department.

Hours of Work, Output, and Invalidity

Mr. Bevin states that, with the assistance of his Board, he soon hopes to publish suggestions to industry for so arranging the hours of work that industrial fatigue can be reduced to a minimum, and that he is particularly concerned about women and young persons. Such suggestions ought to take the form of compulsory orders. They are urgently necessary, for the fairly reasonable hours of work for women which were sanctioned by the Home Office during the first eight months of the war have since been greatly exceeded. These previously sanctioned hours ranged from fifty-four to fifty-seven a week, and work on Sunday was hardly ever permitted. There can be no doubt that such hours represent the longest for which women can work if they are to maintain their production at a steady maximum. It is true that when longer hours are suddenly imposed, as they were during the recent drive, the women achieve a bigger output for a very few weeks, but, as the Health of Munition Workers Committee pointed out, "misguided efforts to stimulate workers to feverish activity in the supposed interests of output are as useless as would be the cheers of partisans encouraging a long-distance runner to a futile sprint early in the race."

The statistical evidence on output at the disposal of the Health of Munition Workers Committee was collected over a period of nearly two years in factories where various lengths of working week were tried, and it conclusively showed that the maximum hours for which the women could work effectively were fifty-five or less a week, while it was found to be most important that they should have at least one day of complete rest per week. In

the earlier stages of the war the women were in some cases asked to work for seventy-five hours a week, while sixty to sixty-nine hours were common. In consequence they suffered much from sickness. In successive three-month periods about a third of the women dropped out altogether, largely from ill-health, and had to be replaced by others. A medical examination of 2,500 women remaining at work in various factories showed that more than a third were suffering some fatigue or ill-health, while 7 per cent. of them showed marked fatigue or ill-health. Moreover, these women could only struggle along by absenting themselves from the factory for something between one day a week and one day a fortnight in order to recuperate.

Of the women who dropped out of the factories entirely we have no specific knowledge, but there can be no doubt that a number of them died, especially from phthisis. Between 1913 and 1916 the proportion of women dying from this disease increased from under 35 per cent. of the total deaths to over 42 per cent. of them in industrial towns such as Birmingham, Manchester, and Sheffield, while in non-industrial towns it did not increase at all, or even fell. The records of the Registrar-General show that in the country as a whole young women, aged 15 to 24, had a special susceptibility. Their mortality rate from phthisis between 1911-14 and 1918 rose 50 per cent., and though this rise may have been partly due to malnutrition and overcrowding, it is a significant fact that the older women, aged 45 and upwards, showed practically no rise. These women, in contradistinction to the young women, seldom worked in munition factories, as they had to stay at home and look after their families.

Need of a Weekly Day Off

The Health of Munition Workers Committee specially deprecated Sunday labour, and considered that "the discontinuance of Sunday labour should be of universal application and should extend to all classes of workers, except that where the work must necessarily be continuous special arrangements will be necessary." The evidence at the disposal of the committee did not indicate the evil of Sunday labour as such, but merely the bad effects of a seven-day working week. Health could be fairly well maintained if each worker were guaranteed *one* free day per week. By a system of relays it would still be possible to keep the industrial plant running continuously, in accordance with our urgent needs for war supplies. For instance, the assignment of a group of seven women in each shift to a set of six machines would mean that every woman could get her weekly holiday.

The health of the men during the last war was far better maintained than that of the women, in spite of their excessive hours of work. This was partly owing to their better physique and powers of endurance, and partly the result of past experience of industrial work which most of the women lacked. The men had found out for themselves the futility of inducing a condition of over-fatigue, and they had learnt that in order to avoid it they must adopt a somewhat slower rate of working when they were on very long hours. Many of the men put in seventy to eighty hours of work per week for months on end without much ill-health, but this did not mean that they were working efficiently. They were simply being paid by their employers at a higher wage for an amount of work which they could have done equally well in about sixty hours a week, or less. The Health of Munition Workers Committee at first recommended that the average working hours for men should not exceed sixty-five to sixty-seven a week, but they subsequently concluded that such hours are too great except for quite short periods. Indeed, the statistical evidence collected for the committee showed that men engaged on fairly heavy work attained their best production on a fifty-five-hour week.

A medical examination of 1,540 men (aged 41 or more) drawn from a number of munition factories showed

that 17 per cent. were "slightly below normal," while 5 per cent. were "much below normal" and 0.4 per cent. were in "bad" condition. The 1,500 boys examined (at ages of 14 to 17) were healthier than the men, in spite of the fact that most of them were working for sixty to seventy hours a week. This was probably because of the shorter periods for which they had been engaged on munition work and the lighter character of their occupations.

Reports of Societies

PROTECTION OF THE SOLDIER IN WARFARE

A meeting of the Section of Surgery of the Royal Society of Medicine was held on June 26, under the chairmanship of Mr. ZACHARY COPE, for a discussion on the protection of the soldier in warfare, or what the chairman called "the physical prophylaxis of wounds."

Mr. KENNETH WALKER said that he had been interested in the protection of certain vital areas of the body ever since, in the last war, he noted how many men were killed in the front line by small missiles entering the chest and ripping up one of the great blood vessels or the heart. The principle that it was worth while protecting the head by means of a steel helmet had been recognized, but there was no reason why protection should stop there. The old objection to the use of armour—that it was impossible to add the necessary weight to the already overloaded soldier—no longer held good. The man to be protected did not march, but was carried by a lorry, a motor-bicycle, or an aeroplane. Moreover, steel of great tensile power was now available, as well as other suitable materials. In the last war the daily press mentioned many examples of men who had been saved from almost instantaneous death through carrying a cigarette case or a book in the breast-pocket; but for one lucky escape there were a hundred deaths. In the last war 60% of the wounded arriving at the casualty clearing stations were put out of action by missiles other than bullets, mostly by trench-mortar splinters. In all this equipment of armour it was necessary to bear in mind the mobility of the soldier. Armour to protect a man against armour-piercing bullets necessitated a weight of 20 lb.

Mr. Walker showed specimens of compressed fibre and other materials, including bakelite, which had the same tensile power as aluminium and was half its weight. It would protect against shrapnel; probably it was not suitable for body armour, but it might be utilized in the form of an inner skin for certain parts of aeroplanes and other machines. Even if the use of this material were confined to backing the box respirator it would prevent many fatalities. That the German staff had long been interested in body armour was evidenced by the picture of a German sentry in 1917 the front of whose body was protected by the best available armour of that period.

To summarize his conclusions, just as in factories and mines there was close co-operation between the medical profession and the managers with the object of protecting workers against illness and injury, so there should be a far closer co-operation than at present existed between the surgeon treating the wounds and the naval, military, and Air Force authorities. Only by a close study of the type of injury from which a particular branch of the Service suffered could the necessary methods of prevention be devised. Many pilots at present were coming down with superficial and strictly localized burns of the hands, forearms, face, and neck. That observation ought to be followed up immediately by seeing whether something could not be done to prevent this, perhaps by the provision of emergency gauntlets or even something that could be put in front of the face. If anything was to be achieved along these lines the initiative must come from the medical profession. One reason why this subject of better protection was being completely ignored in certain quarters was that there was no single authority to deal with it. He

had been inundated with letters from people who had failed to obtain any consideration for certain suggestions that had been brought forward. Some of the suggestions were no doubt ridiculous, but others ought to have been considered. He added that last week he received from America a letter stating that during the Hitler regime three unsuccessful attempts had been made to induce a certain American inventor of armour to equip the German armies.

Sir RICHARD CRUISE described his duralumin visor for attachment to the steel helmet, an account of which was given in the *British Medical Journal* of May 18 (p. 825). From figures which he worked out in 1917, from 50 to 70 per cent. of all war blindness was preventable. The new visor aimed at simplicity and effectiveness, and he hoped that no steel helmets would be issued in the future without this attachment.

Sir HAROLD GILLIES suggested that the War Office should consider the question of extra windscreens which would protect the lorry or ambulance driver and the motor-cyclist. A very frequent injury in war was burns of the hand due to the placing of the hand in front of the face when exposed to flame. The result was extensive burns of the back of the hand, with stiff joints, if nothing worse, so that the man was useless for the rest of the war. A gauntlet—a leather glove was not sufficient protection—would be of value without interfering with the use of the hand in driving.

Colonel MAX PAGE said that one thing which must not be done was to add to the weight carried by the soldier. He did not want to be destructive in any way, but he did not think there was any evidence that the Germans were using armour for infantry troops in this war. He added that the perforating type of wound had been very much more in evidence during the last few weeks than in the earlier fighting in the Maginot Line.

Surgeon Rear-Admiral G. GORDON-TAYLOR spoke sympathetically in favour of the protection advocated by Mr. Kenneth Walker and Sir Richard Cruise.

Sir THOMAS DUNHILL said that the question seemed to lie as between the protection which Mr. Walker had so ably set forth and the caution which Colonel Page had expressed, that nothing should be done to interfere with the mobility of the soldier. It was a case for getting all the evidence available from both points of view, and putting forward the conclusions in such a manner that they would at least be sure of consideration.

Mr. T. B. LAYTON was absolutely opposed to the addition of any weight to the British soldier's equipment. It made no difference whether he carried it himself or it was carried in the motor lorry. He referred to a comparatively small engagement in the last war, when 70,000 men were engaged in the capture of Beersheba. If the weight carried were increased by 14 lb., a figure mentioned by Mr. Walker as the weight of a special jerkin, it would mean for such a force an extra weight of 400 tons, requiring forty more ten-ton lorries, with all the petrol and other services. On the other hand, he had been impressed by the protection afforded by something in the pocket covering a vital area, and if Mr. Walker could produce something weighing 2 oz. which would cover that vulnerable area he believed he would get it through.

Colonel A. E. PORRITT remarked on the relative absence of chest and abdominal cases in the base hospitals. Mr. ASLETT BALDWIN urged that petrol tanks should be better protected if possible. Many men were burned by the petrol catching fire. Mr. JOHN BUNYAN suggested that the plane surface of the protective armour should be broken up; it would more efficiently deflect a missile and afford more protection.

Mr. OGIER WARD, in a communication given by Mr. Kenneth Walker, said that many casualties were from missiles directed from above. The natural reaction of the human being in such circumstances was to crouch down, and therefore there had been a great increase in wounds of the buttock and back and back of the neck. The British helmet, he thought, was inferior in design to the German. It afforded no protection of the temple region and no protection behind. He suggested that a curtain of chain mail might be attached to the back of the "tin hat," coming down as far as the seventh cervical