MEDICAL SCIENCE AND PHYSICAL EDUCATION IN INDUSTRY *

NUTRITION AND DIET

Since nutrition is basic to welfare, the subject is of first importance for industrial workers. Provision of regular meals must therefore be considered. There are arguments in favour of workers returning home or taking meals out as a respite from the works atmosphere and for the sake of a change of companionship. These naturally vary with the individual, his home conditions, his earnings, the distance between his home and his work and other factors. Industrial canteens and adequate food services must, however, be provided for workers in the mass. The more attractive the environment, the better the food, and the more efficient the service the more will the beneficial effect on general health be evident.

Various bodies which do valuable work should be given assistance in tackling problems and instituting further research into matters such as the suitability of the food provided for different classes of workers, whose diet should be consonant with the energy output demanded by the particular type of work; the provision of special diets for workers with digestive disorders, such as chronic gastritis, colitis, peptic or duodenal ulcer, etc.; the adequacy of the time allotted for the luncheon hour; more often than not it is half an hour; the advisability of taking a heavy meal at midday or in the evening. These and a host of other questions equally pertinent to welfare arise in studying the industrial worker's life.

The Canteen Service

Number of Industrial Canteens. In June 1944, the Ministry of Food gave the figure as 17,178; of these 5,844 canteens were for heavy workers and 11,334 for other industrial workers.

The Chief Inspector of Factories' Report for 1943 contains comprehensive information on canteens. This report gives a total of 11,535, including docks and building sites. Of this total 5,704 were in factories employing under 250 workers, which shows the interest in establishing canteens apart from statutory obligation, as firms employing under 250 workers are not covered by the Canteen Order 573, April 1943, although canteens voluntarily established are subject to inspection by the Factory Department.

Extension of Services Provided. Besides the growth in numbers the extension of services provided for day workers is notable. Many official morning and/or afternoon breaks have been introduced and beverages and sandwiches and cakes made available either from trolleys, kiosks or in the canteen. Unofficial breaks are also more widely accepted. This factor has made a definite contribution to physical well-being as it supplements an inadequate breakfast. The Ministry of Food recognizes that owing to the bulky nature of war-time food it is better to have a number of small meals rather than fewer large ones. The available proteins are used more economically by the body if distributed in this way.

Shift Workers. Provision made for workers on eight-hour shifts has improved. Sometimes a typical dinner is asked for by shift workers, but in other factories a substantial snack is preferred.

Meals for Juveniles. There has been a marked increase in the number of special schemes for workers under 16 or 18. There is some tendency to stop special privileges on the 16th birthday. The importance of food on physical development between the 17th and 19th years should be more widely stressed. A National Milk Cocoa scheme was introduced in November 1943, for industrial workers under 18. In September 1944, the age limit was extended to 21, and supplies were also made available for youth clubs and similar organizations.

Special Diets. Adequate provision of special diets in canteens has received some attention, but this is a field in which much will be done in the near future. The established schemes have proved their value. Closer co-operation between doctors, hospital dietitians and canteen managers is essential to the successful development of this service. The difficulty of making a patient stick to a diet is constantly noted.

Food Tastes. Local tastes and customs persist strongly, and should never be ignored by anyone seeking to influence food habits. Customers tend to expect a standard of food that cannot be achieved with available food supplies. Surveys of various sorts (nutrition, food consumption or values) have been made by several bodies, including the Ministry of Food, Institute of Statistics, National Council of Social Service, and individual firms. Patronage of the small canteen is far better than large ones. The percentage taking a main meal tends to be higher when the proportion of office employees is high.

During war time values were maintained by substituting available foods for those which became scarce. In certain large firms raw vegetable salads have played quite a large part on the menus, and items like bovril have been added to the soups provided for the junior workers. Much educational work has been necessary to popularize the less common dishes, and good results have been obtained.

Improvement in Standards of Accommodation. The importance of rest and relaxation during meal breaks is becoming more widely recognized. Some attempt to brighten canteens by pictures or murals has been made. Entertainments during dinner-time have been extended. Restrictions on purchases have set a limit to what many firms are anxious to do.

Administration. Most canteens have carried on in the face of really grave staff shortages, and often without suitably trained or skilled cooks or canteen managers. Training courses to attempt to remedy this have lacked recruits, but as the pressure of war work is reduced, it is hoped this position will improve. It is desirable to have some registrable qualification for dietitians employed in canteens. Lecture courses on nutrition have had a remarkable success, showing the desire of canteen managers to understand this aspect of their job. The need for further instruction in kitchen hygiene and staff control is often apparent, and it is hoped these matters will receive further attention shortly.

Direct assessment of the value to health and general welfare is not possible. Isolated examples could be given of firms attributing low absentee figures in part to the canteen service being available during blitz periods. Also, some employers attribute more effective resistance to infection to the good meals taken in the canteen. It would be a disservice to research to quote these exceptional cases in a general report. The trend towards improving facilities and establishing canteens in the post-war factories is, however, pronounced, and this is an encouraging feature to all interested in nutrition and national health.
For the establishment and maintenance of health and general well-being of the worker, as well as for the attainment of optimum production through the display of maximum efficiency on his part, there is nothing of greater importance than that there shall be harmony between the individual concerned and the task to be performed. Much disability and much inefficiency derive from the strain that results when an individual is employed in a job that demands attributes that he does not possess and from the frustration that is created when he is so occupied that his abilities are not fully or appropriately employed.

For the establishment of this harmony it is necessary that there shall be teamwork between employer, employee, doctor, psychologist, welfare supervisor and physical educator. Such teamwork, based on scientific job analysis and personnel selection, on human understanding and sympathy, can help in no uncertain way in the provision of congenial employment suitable to the mental and physical attributes of the worker, and is essential to health, happiness and efficiency.

The scientific procedures of job analysis and personnel selection are the fruits of studies that have been undertaken in recent years by industrial psychologists both at home and abroad. In this country the Industrial Health Research Board and the National Institute of Industrial Psychology have been particularly active and have played a notable part in the designing and elaboration of systems of job analysis and specification, of personnel selection and vocational guidance.

Developments in the Services

These systems, adopted in this country before the war by a few progressive industrial and commercial organizations, have been further elaborated and refined and intensely and extensively used by the fighting Services, to which problems of man-power conservation and utilization quickly became paramount when the total resources of the country were mobilized for war. These Services, being faced with the overwhelming task of transforming, with the utmost speed, raw civilian human material into highly skilled warriors able to use a wide variety of most complicated weapons and instruments, were forced to pay great attention to such matters as the description of employment in terms of their demands in respect of certain human qualities: e.g. intelligence, educability, literary facility, constructional aptitude, sociability, forcefulness, leadership, carefulness, perseverance, general stability and physique; and to the selection from among Service personnel of the types better fitted to the exercise of their qualities, for the various kinds of employment that are to be encountered within the Services. Teamwork between representatives of the various arms and branches of the Services, doctors, industrial psychologists, psychiatrists, and physical training instructors, has been the means of placing many hundreds of thousands of men and women in their war-time employments in the Services by methods which have shown themselves to be thorough-going and humanly possible, and have demonstrably raised the efficiency of every group that has been exposed to them. Moreover these methods were regarded initially with a certain suspicion, became increasingly popular as it came to be recognized that they led to a more comprehensive and fairer appraisal than did those they replaced.

It is also possible to publish the results that have been obtained by the Services during the war there will become available for general application in industry and elsewhere, knowledge that will undoubtedly prove to be the greatest possible value both for war and labour and to organizations which are concerned with the selection of trainees for the professions and trades. Moreover, the selection procedures of the kind that have been devised by the War Office Selection Boards for the screening of potential officers will then become available for the systematic recognition of appropriate candidates for various high-grade types of occupation.

It is to be expected that in the immediate post-war years there will be a great increase in the application of this personnel selection of attitude surveys (the reactions of the employees to work) and of such procedures as time and motion studies of job performance, discomfort and wasted energy, and that for these purposes there will be required a considerable increase in the number of industrial medical officers and psychologists, welfare officers and physical educators in the industrial field.

Job analysis and job specification deal with the definition of the nature and the description of the various kinds of employment, and with respect to human attributes. In addition to the obviously necessary information about the job itself, the kind and availability of opportunities for learning and following it, the qualifications obtainable in it and the prospects it offers, the analyst and selector must also know what specific human physical capacities it demands, what preliminary educational qualifications or previous occupational experience, for what range of intelligence it is suitable, for what special types of studies it calls, and what kind of individual, in respect of disposition, it best suits.

The techniques used most of course differ to some extent according to whether they are being employed to improve methods and purposes, as a basis for the training or transference of employees, or for the purpose of protecting the health and safety of employees. Nevertheless the basis is essentially the same for all analyses.

Selection by 'Pulhems' Assessment

Personnel selection is the sorting out from amongst a general population of those individuals and types suitable in virtue of their possession of certain kinds of talents, temperaments and acquired skills, for employment in various kinds of jobs. In the Services the individual is considered in respect of the following qualities: physique or general constitution; upper limb efficiency; lower limb efficiency; hearing; eye efficiency; mental capacity; stability (emotional). It will be noted that the initial letter of these headings form the synthetic word 'Pulhems.'

Each of these seven qualities is assessed in one of five degrees, No. 1 being the highest assessment. The figures Nos. 1 to 5 are entered on the Pulhems card of any given individual and form a profile and this profile is matched with that of the demands, in terms of these qualifications, of each and every employment in the Services. It thus becomes possible through job analysis and specification, through vocational selection, i.e. choosing the man for the job, and through vocational guidance, choosing the job for the man, to ensure as far as is humanly possible that each and every individual is recommended for posting to an employment which is in harmony with his or her personality, previous history and potentialities.

This system has played a very important part in the replacement and readjustment of disabled individuals in the Services. In compiling the Pulhems profile of any individual serious consideration is given to the question as to whether or not any quality which is assessed at a low rate can be certain of being remanufactured. It is here that the specialists in physical medicine and the Army Physical Training Corps make their special contributions.

It is probable that in the near future analyses of all industrial employments will resemble those of Army employment will be made possible under the auspices of the Ministry of Labour, through further expansion of the activities of such bodies as the National Institute of Industrial Psychology, and through the further development of schemes of vocational guidance for boys and girls leaving school under the auspices either of re-organized local education authorities or of the Ministry of Labour.
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In this way it can be expected that the misfit who results from the placing of too heavy a strain on modest ability or from the non-recognition of latent talent and its employment in unsuitable ways will become rarer.

RECREATION

There are no figures on which to estimate the exact percentage of companies which provide recreational facilities for their workers. Experience, indeed, would suggest that a small number of factories is such provision normally made. It is true that certain firms have comprehensive educational schemes which provide for the recreative as well as for the intellectual needs of employees; some have a wide range of indoor and outdoor recreative facilities, while certain large firms allow satellite factories in their area to use their grounds. In addition to the facilities arranged by these factories, the Ministry of Labour make some provision for transferred workers, and local clubs, hostels and other institutions offer opportunities to a considerable percentage of workers. For example, the Ministry of Labour Welfare Department have set up 130 clubs for transferred workers, e.g. as established at Swindon for 1000 to 1500 members; and in October 1944, had 16 others in preparation. Other types of workers' recreational clubs flourish throughout the country and are given special facilities by the Board of Trade and the Ministry of Labour to publish equipment. The report on the provision of special clubs for young workers by an investigator, commissioned by King George's Jubilee Trust to survey the whole field of adolescent activity, shows that a few firms have undertaken this, but that such provisions, which was *.* This deficiency is partially counterbalanced by efforts on the Ministry's part or by the long-established work of the voluntary organizations on behalf of industrial workers. At the same time neither the provision of the Government nor of voluntary bodies relieve firms of their particular responsibility for the welfare of their employees, nor excuse the fact that, considering the wide field of industry and the millions of human beings involved, the total sum of facilities provided from purely altruistic reasons for those millions in need of recreation from arduous tasks is lamentably inadequate to the need.

What really emerges from a survey of the position is that there is no general arrangement for recreation in industry as a whole. Certain large and small firms have through their own enterprise initiated schemes, there are certain sporadic—and sometimes spasmodic—Government schemes, and there are more permanent facilities of the voluntary organizations, in the shape of clubs, recreation centres, evening institutes, etc. (to whose value the Government provisions for youth service should materially add); but there is no compulsion on employers to see that their employees have opportunities for recreation; nor hitherto has there been any genuine coordinated effort between Government departments to meet this need. Yet experience shows that the contented worker is the best worker and that adequate arrangements for welfare result in better health and better output (though the latter should not be a primary consideration). Indeed, for the sake of common humanity, if there is to be a differentiation between man and machine, the industrial worker should be given full opportunity to indulge in rest or recreation, mental or physical, of a type entirely different from the often monotonous and automatic labour of the workshop or factory.

Interesting experiments in ascertaining the effects of regular physical education among selected groups of juvenile workers, during the health and capacity for output have been statistically compared with those of corresponding groups of controls, have been carried out by the Ministry of Education in co-operation with firms, such as Messrs. Montague Burton, Leeds, L.M.S. Railway, Derby, and Messrs. Albert Gill, Ltd., Teme Valley Trading Estate. A clear distinction, however, should be made between the use of physical education in its recreational and occupational aspects. The latter has its value in that it enables the worker to produce the greatest effect with real economy of effort; whilst the former is directed towards the all-round development of workers, which should be the foremost consideration.

The educational and welfare schemes of many industrial firms have been affected by war-time conditions. Some have been partially or wholly suspended. Others have been kept in existence. Some have maintained their welfare services as far as possible, although 50 per cent. of their premises have been requisitioned by Government departments and 50 per cent. of their employees withdrawn for service in the Forces or in more essential industries.

The Ministry of Education issued in 1944 a pamphlet on community centres which contains recommendations concerning canteens, social, educational, outdoor and general activities. The pamphlet stresses the need for variety according to the type of neighbourhood served, the centre being made for the community and not vice versa. It is stated that the justification for spending public money on a community centre must be that it performs a public service in which the social, recreative and educational aspects merge. Suggestions are made for organization in different kinds of ways.

Miners. Recreational facilities are provided largely by the Miners' Welfare Fund, instituted by Act of Parliament in 1920. This fund derives its income from a statutory levy of 1d. per ton on saleable coal and a royalties levy of 1s. in the pound on royalties. This is administered by the Miners' Welfare Commission and is used for various purposes, including the provision of parks, recreation grounds, buildings for reading, billiards and gymnasiums.

A point which here emerges is that where voluntary organizations flourish locally the task of industry in its welfare schemes should be not to compete with those organizations, but rather to support and to co-operate with them.

The Central Council of Physical Recreation. As an example of grant-aided provision for recreation in industry, the work of the Central Council of Physical Recreation serves to show the potentials of an organized service which could profitably be extended. This work is still in its infancy but it covers a wide curriculum of purposeful physical training, recreation proper, and fitness camps and holiday centres.

If progress is to be made, the Council consider—

(a) That more research is needed. There is a wide field for experiment in the whole subject of movement; this is one of the important factors in the promotion of positive health. In industry, the special subjects for research are perhaps relaxation, remedial exercises, physical compensation, and training in correct and economical movement.

(b) That firms must be safeguarded from the insufficiently trained amateur. It is essential that firms' physical recreation officers should be supervised and have the benefit of suitable refresher courses. There is yet very little application of physical education principles in the industrial world. The Central Council have done, however, considerable pioneer work in this field, and would seem, therefore, particularly if they continue to receive grant-aid from the Ministry of Labour and National Service, the appropriate body to guide and set a standard for physical training and recreation in industry. It is impossible at this juncture to foresee with any certainty the best way of finding a balance between the Council and firms, but a contributory scheme can be envisaged whereby interested firms could gain, for a sliding scale of fees to the Council, service in varying forms and degree, e.g. literature, advice, supervisory visits, part-time or full-time staff.

(c) That suitable leaders must be trained. First, physical education specialists should keep themselves up to date on measures directed towards the health of physical recreation in industry and special training in welfare. Second, young welfare officers should be given

an insight into and some training in the leadership of
recreational activities. In this way, firms unable to employ
full-time leaders of physical recreation could have either
a welfare officer able to help with physical recreation or
a physical educationist competent to assist with welfare.
If suitable Service physical training instructors either
before or after demobilization could be given training
based on the application of their physical training know-
ledge to industrial work and some special branch of
welfare, they would be valuable members of any factory
staff. Their qualifications would be assured and main-
tained by their link with the Central Council.
(d) That it should be made possible for the Central
Council of Physical Recreation to arrange experimental
schemes, perhaps of three months’ duration, in factories
whose managements, although interested, are not yet
wholly convinced as to the need for providing physical
training and recreation for their workers.
Holiday Provision
Trials have been made during the war years to stagger
holidays internally in large organizations, among them
the Ministry of Supply, but this practice has virtually
been abandoned. The majority of firms prefer to close
their works for a week, the main reasons given being the
need for cleaning and maintenance and the fact that a shortage of workers over a long period often
breaks up a team and production is affected much more
adversely than by closing the entire factory for a week.
Certain industries with continuous processes, however,
prefer the longer break, and they often have to make
their arrangements by rota. Clerical staffs of offices also
come under this heading.

OCCUPATIONAL HEALTH SERVICES
Industrial medicine is no new form of medical practice
in Great Britain. In the early days of the industrial
revolution a few factory occupiers with a high sense of
duty appointed medical officers to attend to the needs of
their workpeople. But they were isolated examples and the
only comprehensive provisions made to eliminate
some of the worst evils of industrial life were the Factory
Acts, designed in the first place to safeguard women and
young persons from unbridled exploitation by textile
manufacturers. These Acts were gradually extended to
cover other types of industry and all classes of labour.
To-day the Factories Act, 1937, and special regulations
to protect workers in certain trades provide comprehen-
sive legislation laying down minimum standards to
guard the health, safety and welfare of those who come
under that Act.
British industry is made up of a variety of trades and
occupational groups such as factories, docks, railways,
shipping, road and air transport, mines, quarries, con-
structional work, building, agriculture, forestry, Govern-
ment service and commerce. Factories are by far the
biggest group, employing in peace time over 6,000,000
workers. It is no surprise, therefore, that both through
the public services and voluntary effort more has been
done to promote health in factories than in any of the
smaller industrial groups.

Health Workers in Industry
At the end of 1943 there were 174 medical officers
exercising full-time supervision in 265 factories, and
774 attending in 1,150 factories. By October 1944, the
full-time officers had increased to 179 and the part-
time to 880.
In August 1943 there were approximately 8385 nurses
employed in industrial nursing. About half were state
registered, the remainder having ‘lesser qualifications.’

Personnel and Safety Officers
In January 1944 the number of factories in which more
than 250 persons were employed carrying on work
which might bring the factory under the Order of 1940,
amounted to 4774. * Special officers, who might be called per-
sonnel managers or welfare supervisors are employed
in 3395 of them, and the total number so employed in this
is 5478. * There are safety officers engaged in factories.

Deficiencies in Existing Services
While much progress has been made since the war,
there are, nevertheless, certain outstanding deficiencies
in these arrangements. It is estimated that not more
than 25 per cent. of industrial workers are provided
for adequately as regards health services at work. In Great
Britain, and incidentally in other countries, it must be
stressed that the majority of workers are employed in
the smaller industrial organizations, and that factories,
although employing the major proportion of workpeople,
do not include all industries which need health services
at work. Because of the recent development in indus-
trial medicine, Government departments, private bodies
and privately owned industries have experimented with
their own arrangements for a service. The lack of co-
ordination is obvious, but it is also found in Government
administration. The Ministry of Labour administer
the Factory Department, the Ministry of Fuel and Power
their own mines medical service, the Ministry of Transport make arrangements for dock workers, and the
Ministry of Supply provide a separate medical service
for Royal Ordnance factories. This has led not only to technical and administrative overlapping, but also to
inadequate co-ordination of function.

Future Development. The existing industrial medical
doctors have recently been examined and reported on
by the Social and Preventive Committee of the Royal
College of Physicians. The recommendations of this
committee stand out as the only authoritative and con-
structive suggestions for the future of industrial medicine
which have so far been made. They conclude that an
industrial health service should be national in its scope
and apply to every variety of employment, and that it
should be planned as an integral part of the National
Health Service with arrangements for close association
at all levels, central, regional and local, with other
branches of the National Health Service. Quoting from
this report the reasons which led the committee to adopt
these views on this organization are briefly as follows:

(i) The health of the individual at home and at
work cannot be rationally separated;
(ii) It would be impossible to secure efficient re-
habilitation, unless there were the closest link
between the two services;
(iii) The development of the National Health Service
on sound lines requires direct access to the
wealth of knowledge accruing from observa-
tions in health industry;
(iv) The new industrial health service must spread
its influence far and wide into work which
is more closely associated with home and
family than the factory.

Objectives of Occupational Health Services
These suggestions can go a long way to meet the
difficulties in the existing organization of the service, by
co-ordinating existing arrangements, and by providing
for the small factories which at present have no service
at all. But the rapid development of occupational
medicine has allowed many different conceptions of its
function to arise; partly because many industrial medical
officers have received little or no training for this type of
practice. There are those who think that its sole func-
tion is to prevent industrial disease, while it is well
recognized that industrial disease causes only a fraction
of the total medical problems of the factory. Certain
are even others, including doctors, employers and work-
men, who regard the industrial medical officer as the
guardian of the employer’s interests—a censuring panel

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* All the above figures relate to factories and other places of work
coming under the Act. They do not take into account the medical
officers engaged in railways, shipping, Post Office and telegraphy;
these engaged whole-time on research which, according to a report
by the Education sub-Committee of the Association of Industrial
Medical Officers, employ altogether a further 349 medical officers,
300 of whom are in the Merchant Service. No figures are known
for forensic health workers employed in these industries and occupa-
tional groups.
doctors' certificates. Thus an understanding of the objectives of occupational medicine is no less important than plans for its future administration.

The aims of an occupational health service should be as follows:

To recommend suitable work for every worker

The suitability of a man, woman or young person for a particular type of work depends both on his or her physical and mental ability. Many firms have long used medical examination of workers before employment. In Great Britain there is no statutory requirement for the examination of new employees except for young persons under the age of 16 employed in factories and certain requirements for the examination of workers in dangerous trades. Before the war the pre-employment examination was accepted by many, but others, particularly the trade unions, regarded it with suspicion, and some opposed it in no uncertain manner. This attitude is understandable because medical examination could quite easily be used by those firms with their own medical service to pick the best workers and leave the unfit out of work or to find jobs in the smaller factories. However, during the war, many of the large industrial organizations, notably the Royal Ordnance factories, who employ many thousands of workers in engineering processes, have emphasized the need for placement of workers rather than rejection because of the shortage of labour and the need in war to make the best use of every available worker. If the examination of workers before employment is to be widely used, it is felt that this emphasis must be maintained. If used mainly for rejecting the less physically fit, it will naturally and rightly be viewed with suspicion by all workers and will be opposed by their trade unions.

Industrial medical services after the war will have a major responsibility in seeing that the disabled who return to work are absorbed satisfactorily into suitable jobs. Employment medical examinations can help to meet this responsibility if their purpose is clearly defined as being to place the worker in the most suitable job from the point of view of his own health and his physical abilities.

Mental capacity, also, affects a man's suitability for work. Tests for intelligence and special abilities, such as mechanical aptitude, have been used with effect in the Services, and there is no doubt that used with discretion by industrial psychologists they have a value in industry, particularly for guiding boys and girls towards suitable careers and selecting workers for skilled trades. The same principles apply to the use of vocational selection tests and the efficiency of pre-employment examinations. If they are not used not too rigidly for allocating rather than for rejecting the less intelligent their scope will be enormous.

Special reference should here be made to the excellent work done in the directorates of personnel selection and army psychiatry, in which important research into fitting men into employment suitable to their mental as well as their physical capacity has been successfully carried out.

To provide every worker with a good working environment

Much of the preventable sickness which affects workers is associated with poor housing, economic stress and lack of education. Nevertheless, the working environment can greatly influence the health of the worker, and apart from those special diseases peculiarly attributable to industry, such as lead poisoning and pneumokoniosis. A good working environment can only be attained by careful and prolonged study of groups of employees at work. This study can be undertaken by special investigators and by medical officers and others in their own factories. The latter have the advantage of being in constant contact with their workers day to day. If highly trained research workers can deal with national health problems and others with which factory personnel are unable to cope. In this way those factors associated with increased morbidity and lessened efficiency can be determined, and these harmful influences eliminated by the combined efforts of doctors, engineers, chemists, managers, workers and other technicians. Thus can minimum standards of health be raised.

To prevent occupational disease

At work a man may contract disease as a direct result of the hazards inherent in his occupation. Lead poisoning, from which, among many others, the house painter or those working at electric accumulator factories may suffer, can be quoted from many examples of industrial disease. But industrial disease is preventable and should therefore be prevented by industry and its health services who must accept responsibility for its incidence. Nevertheless it should be emphasized that industrial disease and accident cause only a fraction of morbidity among industrial workers. Undoubtedly the main contribution which industrial health services can make to better personal health and less disease is by paying attention to general conditions of work and the vocational suitability of the individual worker.

To prevent injuries at work

Industry in general deals with accidents largely from the point of view of providing first-aid treatment for major injuries and continuous treatment for minor ones. And lately few industries have even considered assisting injured workmen to regain full function after injury by providing rehabilitation shops and special centres. These are important aspects of the accident problem which cannot be ignored, but insufficient attention has been paid to the prevention of accidents. Although the law requires that dangerous machines in factories shall be guarded, the bulk of accidents are not due to unsafe machinery, so however satisfactorily the Factories Act is enforced, accidents will not be reduced substantially unless attention is given to the training, supervision and placing of workers in suitable jobs, and particularly to the enforcing of good working conditions. It has been shown by scientific investigation that the temperature and lighting of workshops are related to the incidence of accidents, and from prolonged and frequent study of accident records that certain workers are accident-prone and should be put on to safe work. There is great opportunity for health services in industry to assist in reducing the accident rate in factories and mines.

To treat injured and sick workers at work

In 1938, the last full year before the war, there were more than 511,879 accidents in factories and mines alone involving absence from work of more than three days. This represents a loss of £70,000,000 per annum. The total loss due to industrial accidents in Great Britain has been estimated at £70,000,000 per annum (Mr. Ernest Bevin, The Times, 25.4.45). Recovery where the injury is serious and the speed with which the worker recovers depend very much on the first treatment received. So it is in the interest of all industries with an accident hazard to provide good casualty services for the first treatment for medical emergencies and minor medical ailments not serious enough to prevent the worker from working.

To help workers to regain full function after injury and disease and to assist in the resettlement of the permanently disabled

The speed and degree of recovery of an injured or sick person depends primarily on the surgical or medical treatment given at home or in hospital. The publicity given lately to rehabilitation is a general appreciation of the need for a wider use than hitherto of improved methods of treatment practised for many years by a few enlightened physicians and surgeons. War makes heavy demands on man power and the exigencies of war are mainly responsible for the medical profession being obliged to adopt new criteria for measuring the success of their therapeutic efforts. These new methods are designed to restore full function to the injured or sick as
soon as possible so that they are fit to do their usual work and earn full wages.

In co-operation with physician, surgeon or general practitioner the industrial medical officer can play an important part in achieving this aim. He can help to find graded work for those who are not permanently disabled but who have reached a certain stage in recovery and is then in a position to resume their normal work. Under the joint supervision of the surgeon and the industrial medical officer machines can actually be adapted for remedial use in certain types of injury. This has been done very successfully by the Austin Motor Company, for instance, who have established a sheltered shop solely for this purpose. The industrial medical officer can also keep watch on those who have returned to work after a long period of disablement, and determine whether they are fit for their work and where necessary help to restore self-confidence.

The purpose of the new number (Johnson, 1944, 126, 1073) show what the industrial medical officer can do to help 'G. I. Joe' to resettle in industry. The author says a number of the men returning to civilian life would certainly have lost their jobs if they had been handled casually and without careful individual attention.

They are not permanently disabled for whom industry must find suitable work under the provisions of the Disabled Persons (Employment) Act. The Ministry of Labour have already adopted a scheme to implement this Act. The disablement rehabilitation officer can examine the area in which patients in hospital before their discharge. He discusses both with the patient and his doctors the job the former wishes and is able to do. He obtains a medical report on the patient's disablement and compiles it by reference to his disablement for the injured or disabled person. So far the industrial medical officer, who should have special knowledge of industrial processes and their functional requirements, has not been brought into the scheme. In fact he has been denied access to the reports prepared by the disablement rehabilitation officer. It is hoped that this policy will be changed, for he can give valuable assistance to the permanently disabled in two ways. Firstly, he can help the disablement rehabilitation officer to find suitable work for the disabled worker, for with medical knowledge he can understand the medical reports on the man's disablement and by his knowledge of his own industry he can assist the disablement rehabilitation officer in placing the disabled. As a medical practitioner with a knowledge of industrial processes he holds a unique position among sociologists. He can also assist in the rehabilitation of those who are unfit to take up any specially full-time course of training.

Under Section 3 of the Disabled Persons (Employment) Act, the Minister has power to provide special facilities for this class of worker. There will be many who will want to stay at home and not go away to the Egham experimental centre or a similar centre. They could quite easily be rehabilitated and retrained in some of the larger firms which have their own industrial health services.

Other obvious advantage would be that they would be in contact with normal workers and day to day work-life. The industrial medical officer can also assess whether an injured man is physically suited for the work for which it is proposed to retrain him. One of the main obstacles in the way to full recovery is financial worry, which can be avoided by putting a man on productive work in a factory which provides him with a reasonable wage and treatment. For all these reasons the medical officer has an important part to play in rehabilitating and resettling the injured and sick.

Ancillary Health Services

In the U.S.A. and U.S.S.R. some of the larger industrial organizations have polyclinics which provide facilities for medical advice and treatment usually given in this country by panel doctors and out-patient departments of hospitals and for mass-radiography. This is done in the interests of the worker. The advantages are many. It automatically links up the curative and preventive aspects of medical practice. It is convenient to the worker, who is therefore more likely to seek early advice. Medical clinics can be better equipped than the surgery of any panel doctor because of the large numbers they serve, and they can also become centres for clinical and sociological research. They are, in fact, health centres established in industry, and should be the subject of experiment after the war. This principle has to some extent been adopted by a few of the larger firms in this country, who because of the deficiencies in existing health services have found it necessary, for instance, to have set up under the guidance of their local medical officers ophthalmic, dental, foot, physiotherapeutic and ante-natal clinics in their own factories. Experience shows that they have received on the whole warm support from the workers who pay for their treatment, which they receive in the firm's time. In some instances, the employer has subsidized the service, but if in the future there is any scheme for polyclinics in factories, it is strongly recommended that the employer should not be expected to give any financial assistance, other than allowing employees to attend during working hours. The possible loss to production would no doubt be more than repaid by the absence and reduced sickness as a result of earlier and better medical attention. Industrial polyclinics should in no way interfere with the practice of preventive medicine. They should be adequately staffed by doctors working in collaboration with the industrial hygienists.

Health Education

Disease and ignorance have been described by Sir William Beveridge as two of the five giant enemies of human happiness. Disease cannot be successfully attacked by integrating and expanding our health services both within and outside industry unless something is done to eliminate its ally—ignorance.

It so happens that nurses and doctors in industry are in a position to provide workers with knowledge which will overcome the type of ignorance which encourages disease; and not only industrial disease. At pre-employment examinations workers can be told of any defects found and advised about treatment. For many this will be the first time that they have had a complete medical examination. They receive an introduction to the medical department, which they should be encouraged to use, as well as other facilities like washing accommodation and ambulance rooms. They can also be advised about making claims for sickness benefit and workmen's compensation. The reports can also be focused on showing films, giving talks, and health propaganda of all sorts. From experience it has been found that schemes for health education in industry are most successful where the workers themselves participate actively through factory health committees on which they are represented. The education of management and workpeople on health problems in industry is fundamental to any improvement in the health of our industrial population.

There is unlimited scope for publishing in attractive and readable reports the fund of knowledge gleaned by the various Government departments concerned with occupational health. Many reports have been published but so old by they are badly produced, written in official jargon, and overloaded with complicated tables and data which no layman can understand. Sometimes valuable information is kept hidden in files and never seen the light of day. There is certain need for scientific reporting for scientists, but there must be a form of popular publication for the industrial manager and the workman, whose interest is essential if scientific knowledge is to be used to their advantage.

The Central Council for Health Education

The Ministry of Health grant-aid a body which is doing useful work in the field of health education. The Central Council for Health Education attaches great importance to health education in industry and consider
the problem of being 'not quite fit' much more important than the more obvious problem of sickness causing absence from work. This problem is common to all sections of the community and offers an opportunity for reaching members of the public. The Central Council do not deal with industrial problems but aim at giving workers information which will be of help to them. Training courses, include talks, film shows, gramophone records, literature, posters and exhibitions which can include all the foregoing individual methods and be linked with education on the particular industrial risks to which the workers are exposed. More specialized education in preserving positive health can be arranged by means of courses for industrial welfare officers and nurses; and the Central Council also offer to deal with any problems submitted to their headquarters. It is desired that health education in the factory should be part of a campaign undertaken jointly with local authorities, municipalities, welfare officers and workers; and the Central Council have area representa-
tives in twelve centres in England and Wales who act as organizers and are able to co-ordinate this work.

Education and Research

After the 1914-1918 war a small number of factory occupiers began to appoint their own industrial medical officers, but is was not until the middle of the 1939–1945 war that this number became substantial. It is only recently that medical science has been applied on any large scale to factories and other industries for the promoting the health of workers. The principles to be adopted in its application are in many cases similar to those applied by medical men and women in the medical services of the armed forces, the public health services and hospitals.

The team-work required therefore involves various members of the medical profession—surgeons, physi-
cians, psychiatrists—nurses, physiotherapists, physical educationists, education officers, almoners, welfare supervisors, ministry officials, training-centre authorities and instructors, trade union officials, employers and the patients themselves. Only real and direct co-operation between these will bring about full rehabilitation of the individual.

In this report the question must primarily be considered from the angle of co-operation between the medical and physical education professions (and physical education must be interpreted here in its widest terms). It must also, however, be viewed in its general aspect, embracing not only the relation of the doctor and physical educationist—or re-educationist—to the rest of the team concerned, but also the fundamental aim of their cooperation, i.e. the happiness and health of the individual, which can only be achieved by social and industrial reinstatement corollary to mental and physical restoration.

To dissociate any part of the problem from its medical and sociological background would be unintelli-
gent and unsound.

Types of Cases

Rehabilitation is not confined to cases of fracture or serious injury but is also applicable to all conditions in which there is loss of function or risk of residual dis-
ability resulting from illness or accident. The child with a congenital deformity—the boy with a burnt or lacerated hand—the young adult recovering from pneumonia or other serious respiratory disorder—the mother attempting to regain her strength after childbirth—the deaf and dumb and blind—the amputated—the chronic ortho-
pedic or chronic heart case—the tuberculous and the neurotic—all such cases and many which are similar can benefit enormously from special physical and psychological rehabilitation, followed where necessary by special vocational training. Such treatment not only improves the patient’s physical condition and expedites his recovery; it also affects his whole morale, and holds out before him a new hope of recovery and usefulness whilst at the same time stimulating his own powers of co-operation and self-help. That this is true can be proved by a visit to any hospital or centre concerned with different branches of rehabilitation, where first-hand knowledge is readily available.

Psychological Readjustment

The experience which has been gained during these past five years of war has drawn attention to the large part which mental anxiety and psychological disturbance can play in retarding physical recovery, and what is true of war-time conditions is also true in large measure during the days of peace. Anxiety about home affairs, anxiety regarding money, fear of losing his job or of becoming a permanent invalid or cripple—these factors all play a very large part in a man’s or woman’s recovery after serious illness or accident, and must be done to restore confidence, to give reassurance and encour-
agement, and to call forth the patient’s hope and co-operation form a most valuable part of rehabilitation. In the Army these functions have been carried out by
Army psychiatrists, welfare officers and educational officers, each of whom in his own way has been concerned with the process of psychological rehabilitation by scientific investigation of the cause of the mental disturbance, by the removal of sources of domestic and financial anxiety, and by providing new and healthy sources of mental entertainment and stimulus. In addition, neurosis centres have been set up to deal with the treatment and rehabilitation of patients suffering from psychosomatic disorders, such as effort syndrome, functional vertigo, atomic dyspepsia and similar conditions; and after a combination of careful clinical and psychiatric investigation and treatment, physical reconditioning, and suitable occupation, excellent results have been obtained.

Similar principles ought to be observed in our ordinary hospital practice in dealing with psychological aspects of rehabilitation. A certain number of cases—not, it is hoped, many in number, but cases which are easily overlooked—require the skilled help of a psychiatrist, but all cases of serious illness or injury should have the expert assistance of the social workers attached to the hospital, with a view to helping where necessary to alleviate anxiety and distress and smooth out any difficulties in connection with the patient’s domestic or industrial affairs. For this kind of work the hospital almoner, with her special training in social science, and her long experience in dealing with individuals, is eminently fitted, but it is plain that it is that so many important hospitals and are still without the services of an almoner, and that where almoners have been engaged their time is far too often taken up with purely financial matters which could easily be dealt with by a clerk attached to the officer or the hospital secretary. Once it is appreciated that an essential part of rehabilitation consists in the psychological readjustment of disturbance created by illness or injury it will be obvious that almoners or similar social workers should be set aside for this task and given sufficient time to deal with each patient’s case in whatever way seems desirable. The almoner must also be the effective link between the hospital staff and those representatives of industry and labour who will be responsible for the resettlement in industry of patients who are incapacitated from resuming their former occupation as a result of their disabilities. For that reason it is of the utmost importance that the almoner’s department should have full knowledge of local industries and should in close touch with the disablement rehabilitation officer of the Ministry of Labour and National Service, who is responsible for interviewing patients likely to need vocational training and resettlement and who is now expected to make regular visits to the hospital for this purpose.

Industrial Resettlement

The setting-up, some three years ago, of the Interim Scheme, to deal with disablement problems as far as war-time circumstances allowed, led to the formation of the Disabled Persons (Employment) Act, 1944. Industrial rehabilitation is a term introduced by the Act. It signifies the provision of special facilities for those disabled persons unable immediately to enter full-time training or employment. An experimental centre for the purpose is established at Egham, Surrey, where the object is to combine the functions of reconditioning, physical development, restoration, vocational guidance and industrial training. Industrial rehabilitation can also be carried out in co-operation with employers; the Ministry is empowered to provide financial assistance.

Vocational Training

This may be provided in Government training centres, of which there are 32, including coal-mining training centres, or in centres administered by voluntary organizations, grant-aided for the purpose. The Ministry has power also to grant-aid employers where the latter can provide the training direct. Both in schemes of industrial and vocational training trainees receive allowances with supplementary allowances for their dependants. A further feature of the Act is that it obliges employers with 20 or more employees to employ a quota of disabled persons.

Co-operation between Medicine and Industry

Liaison between authorities responsible for medical rehabilitation and industrial resettlement is still far from assured. Industries have been further awakened to the need of the disabled to obtain suitable employment and educated as to the possible employment which can and are being undertaken by them.

Service and Civil Centres

Further liaison should equally be established between those responsible for the rehabilitation of Service and civilian men and women. Plans for the adaptation of the excellent Service centres for civilian purposes should be drawn up and put into operation as soon as possible. The findings of the research which has been practised in those Service departments administering them should be made available, first and foremost to bodies such as the Medical Research Council and its constituent Industrial Health Research Board, and also to civilian centres which have not necessarily had the facilities nor the personnel available for such work.

The Substandard Worker

Rehabilitation of the substandard worker is as important as that of the more evidently disabled. The findings of the Research Board’s Youth Service Panel and of the Services Committee with regard to the substandard condition of boys and girls of 14 plus and of Service recruits, and to the variety of major and minor defects needing remedial and sometimes surgical treatment, and the Research Board’s recommendations for research into these matters and the establishment of juvenile and industrial physical development centres, modelled on the highly successful Service centres, need earnest consideration.

It is desirable that the idea of centres for the improvement of substandard workers should be correlated with general planning for rehabilitation. The problems can be dealt with simultaneously. The same health centre, the same medical organizer and supervisor, the same accommodation and equipment and the same ancillary technical staff could treat both types of cases and provide preventive and restorative measures. There is a certain danger that rehabilitation centres may be set up through the medium of a new centre under the combined supervision of hospital and health centres, wholly concerned with the post-hospital aspect of rehabilitation, regardless of the equal importance of preventing ill-health and breakdown by the employment of the very same means as are devoted to the restoration of physical function. In this report the Research Board have a unique opportunity of drawing attention to this point and emphasize most strongly the need for direction in the planning of health and rehabilitation centres towards the dual function that such centres should discharge.

A further problem in the treatment of the substandard as well as the injured worker is psychological breakdown. The section on psychological readjustment which occurs earlier in this chapter deals more specifically with the psychological factor in cases which have already met with illness or injury resulting in hospitalization; it does not, however, deal with the even larger problem of the psychological misfits who continually report sick but never come to hospital and never consult a psychiatrist. The causes of their truancy as through personal and domestic problems, faulty job selection, congenital companionship, frustrated ambition and industrial fatigue, play a vital part as predisposing to absenteeism, accident-promotion and breakdown. There is a strong case therefore of equal importance with physical disabilities as requiring preventive or curative treatment. Developments of such ideas as the Roffey Park Rehabilitation Centre and the Rest Break Houses scheme should all find their place in planning for rehabilitation.
A further type of case to be considered either as sub-
standard or regrettably often as completely disabled is the
patient who suffers from long-term occupational dis-
ability and pain commissions. Often a return to the former occupation is so far impracticable as to be well-nigh impossible. Steps should therefore be taken to explore the possibility of making provision by village settlement or other appropriate means, when local surroundings do not lend themselves to rehabilita-
tion.

**Young Persons in Industry**

The term 'young person' is now accepted to mean boys and girls of the 14-18 age-group, of whom there are approximately 21 millions in industry. To consider their welfare and the best methods of improving this it is well to recapitulate briefly the original historical facts of their employment and the steady improvement of conditions in the last 150 years.

The industrial revolution of the eighteenth and nine-
teenth centuries affected children even more adversely
than their parents. Conditions, working-hours, the employment of young children, the exclusion of those suffering from lack of nutrition and lack of education were a crying scandal of which a record lives in the writings and speeches of reformers of political and literary fame, such as Shaftesbury, Pecksniff, Dickens, Kingsley, Elizabeth Barrett-Browning. Not until 1784, when the revolution was well under way, do we find concessions made in respect of the health of children, when a group of Man-
chester manufacturers, 'We, on the one hand, recommend a longer recess from labour at noon and a more early dismission from it in the evening to all those who work in the cotton mills; but we deem this indulgence essential to the present health and future capacity for labour for those who are under the age of 14' with the result that the Lancashire magistrates refused to apprentice pauper children to owners of cotton mills and other works in which children are obliged to work in the night or more than 10 hours in the day.'

The Health and Morals of Apprentices Act (1802) forbade the employment of apprentices at night and for more than 12 hours in the day; and made the provision of elementary education, decent clothing and housing and the whitewashing of factories twice a year compulsor-
y. It was followed by Robert Owen's Act, of 1819, which prohibited the employment of children under 9 in cotton factories and limited to 12 the working hours of children between 9 and 16 years old. In 1833 Lord Althorp's Act, involving the appointment of four per-
manent factory inspectors to enforce the law, affected nearly all the textile factories, forbade the employment of children under 9 except in silk mills, limited the working time of those under 18 to 12 hours a day and 69 a week, and of those under 13 to 9 hours a day and 48 a week, and forbade nightwork for all under 18. It enforced some education for all factory children, those between 9 and 13 attending schools for 2 hours on 6 days a week. It made illegal the employment by any mill-
owner of children who had not completed 11 years of age without a certificate by a surgeon or physician and further enacted that any such child should be 'of the ordinary strength and appearance of children of or exceeding the age of 9 years.'

Lord Shaftesbury's work for children is memorable. In 1840 he set up a committee to investigate working conditions and in 1842 a Mines Act prohibiting under-
ground work for women and for boys and girls under 10 was passed. In 1844 Factory Acts was a further advance. The age at which children could begin work was reduced to 8, but the hours were limited to 6½ and all factory children had to attend school for the rest of the day. It directed the fencing of dangerous machinery and forbade its cleaning, when in motion, by women and children. It also introduced the appointment of certi-
fying surgeons.

The culminating victory was the Act of 1850, intro-
ducing a 10-hour day for women and young persons; in the same year inspection of coal-mines was also intro-
duced. By 1861, print works, bleaching and dyeing works and lace factories had all been brought within the scope of the Act, while the Workshops Act of 1867 covered all places employing women, young persons and children, forbade the employment of children under 13, enforced the half-time system for them and insisted on attendance at school for at least 10 hours during the week. The Consolidating Act of 1878 improved working conditions and brought all factories into alignment. It prohibited the employment of children under 10 and placed those under 14 on the half-time system. A Coal Mines Act of 1887 forbade the employment in mines of children under 12, enforced care of their health from 12 to 16 and laid down standards of safety, cleanliness and sanitation.

Such, roughly, was progress in the nineteenth century, and from it may be deduced that modern factory legis-
lation really originated through reform of conditions for factory-children's welfare. To-day's Act affords pro-	ection for every type of worker and contains many sections for safeguarding young persons. The reforms had repercussions also on compulsory part-time edu-
cation for children and, equally, on the establishment of state medical supervision.

**Accidents**

In any report concerning the health and welfare of young persons the accident-rate is of prime importance. The following table shows that the rate is higher among boys than among girls and that the incidence of accidents among young persons is high and increasing.

<table>
<thead>
<tr>
<th>Year</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1936</td>
<td>24,299</td>
<td>8,191</td>
</tr>
<tr>
<td>1937</td>
<td>26,853</td>
<td>8,988</td>
</tr>
<tr>
<td>1938</td>
<td>22,922</td>
<td>7,803</td>
</tr>
<tr>
<td>1939</td>
<td>22,364</td>
<td>7,665</td>
</tr>
<tr>
<td>1940</td>
<td>26,492</td>
<td>8,493</td>
</tr>
<tr>
<td>1941</td>
<td>27,757</td>
<td>9,347</td>
</tr>
<tr>
<td>1942</td>
<td>29,028</td>
<td>10,493</td>
</tr>
<tr>
<td>1943</td>
<td>27,623</td>
<td>9,805</td>
</tr>
</tbody>
</table>

The drop in the incidence of accidents in 1938-39, shown in the same table, was probably due to:

(a) a decrease in working persons involved less fatigue as well as a decrease in the time of exposure to danger;

(b) the tightening-up of safety regulations;

(c) the decrease in the number of young persons employed in industry owing to the reduction in working hours.

Accidents should not be inevitable. They arise as a general rule because of regulations not sufficiently widely or strictly enforced. The Factories Act provides general provisions for the safety of all workers. It prohibits young persons from cleaning machinery in motion; it ordains the training of workers before they use dangerous machines, and supervision by a skilled worker with knowledge of the machine. Guarding machinery is not enough. However well machinery can be guarded more than a 10 per cent. reduction in the accident rate by the provision of safeguards alone cannot be antici-
pated.

**Training and Supervision**

One of the solutions of the problem lies in training and supervision. It would be a great advantage if new en-
trants to the factory could be trained on a non-pro-
ductive basis rather than allowed to pick up the techni-
que of a new occupation in the ordinary course of production. Training schemes for simple industrial processes may appear to be wasteful of time in the initial instance, but ultimately they save time by turning out workers who are more productive and less liable to accidents. It is a short-term and short-sighted policy which does not recognize non-productive time occasioned by
a growing accident rate. Various preventives are well worth consideration:

(1) Improved working conditions.
(2) Shorter hours and the enforcement of the law concerning these.
(3) Better selection of young persons for employment suited to their mental and physical capacity based on factors such as:
   (a) Vocational guidance;
   (b) Visual acuity;
   (c) Accident proneness.
(4) The provision of classes on causes and prevention of accidents.
(5) Film demonstrations at the factory and elsewhere.
(6) The formation of safety committees in the factories, through which boys and girls can learn a sense of responsibility and develop a cautionary sense and awareness similar to that developed in younger children by road-safety methods.

Medical officers can pay attention to all these matters and contribute with benefit to instruction in safety measures. The main improvements, however, are needed in factories where there are no medical officers—a further reason for recommending an increase in the low percentage of works medical officers employed. The introduction of instructors in physical education which involves development of agility and avoidance of accidents would seem more than desirable. Recent experiments in physical activity classes in which avoidance of accidents is taught have proved successful. Such instruction increases awareness and agility, and, while providing relaxation and entertainment is purposeful, in the extreme, to a very good end. An extension of such instruction is worthy of recommendation.

The employer cannot wash his hands of responsibility. In the past juvenile labour has been exploited for its convenience as a way of making money. It involves a heavy obligation on the employer to counteract the risks run by employing young persons; if he finds it convenient to use irresponsible labour he must assume an ultimate responsibility.

**Hours of Work**

There are certain legal requirements made by the Act which state that the weekly working hours shall be:

- **Under 16**: 44 hours, except for a few trades where 48 hours is permissible.
- **Over 16**: 48 hours, plus allowance for overtime.

For young persons a system of three shifts in certain trades is allowed.

Under emergency orders, however, these hours can be increased as follows:

- **Under 16**: Day work—weekly hours of work must not exceed 48.
- **Male young persons**: 3 shifts—hours of shifts (including meal-times) to average 8 per day between 6 a.m. and 11 p.m.
- **All young persons**: 2 day shifts over 16—hours of shifts, 8 per day between 6 a.m. and 11 p.m.
- **Male young persons**: 2 night shifts over 16—hours of work not to exceed 60 per week.

Moreover, in the early days of the war these emergency orders were in many cases woefully exceeded, to the detriment of the young workers' health, and possibly causing an increase in accident rate, as is shown in the table on p. 35. The hours worked by young persons have now returned to a more normal level, but it is essential in the interest of the health of young British workers and in order to prevent this respect factors set out in law should be enforced; and those sections of the 1944 Education Act enforcing part-time education up to 18 put into operation as soon as possible.

**Nutrition**

The need for good nutrition of boys and girls is obvious to all interested in their health. There is a measurable improvement in the physique of elementary school children during the last twenty years owing to improved feeding and the recent provision of milk and meat in schools. In some 10,000 factories there are canteens; but they are not all used by young persons. Sometimes the price is too high. Many firms, however, supply free or subsidized meals. From experience it has been found that the adoption of a sliding scale based on a payment of 10 per cent. of earnings for five meals is well within the means of most young persons. Again the habit of eating sandwiches is still prevalent. This could be obviated by educating the parents to recognize the value of the canteen for their children. It would be worth while to give free meals for a week to effect this. The quality and quantity of the food, the appearance of the canteen, organization and speed of service are other important factors to consider. The co-option of a young person to the canteen committee would be advisable and help to extend interest. The canteen meal, properly organized, can provide one-third first-class protein, one-third total calories, two-thirds vitamins of total daily requirements.

**Medical Supervision**

The 1833 Act required surgeons to pass children, i.e., those between 9-13 years of age, as reasonably fit with the ordinary strength and appearance of a child of at least 9 years old. The powers of examining surgeons were gradually extended and the 1937 Act now in operation requires a medical examination by the examining surgeon of all persons under 16 years old within fourteen days of employment. Conditional certificates of fitness may be given, subject to conditions respecting the nature of the work, including a re-examination at one-third the rate at an interval specified on the certificate. The value of this procedure lies in the fact that a young person is thereby allotted work within his physical capacity and that a follow-up scheme, limited though that is, is provided.

In certain circumstances a provisional certificate is given, lasting 21 days, during which time the medical officer can get more information about the fitness of the young person. In the case of boys between 16 and 18 years old employed on shifts in continuous processes, re-examination takes place every three months during the first year and every six months during the second year until the age of 18. This re-examination as well as the conditional certificate is not popular with some employers, but within certain limitations it is valuable from the point of view of the medical officer and the employer.

1939 showed that out of 400,000 young persons examined, 13,000 conditional certificates were issued and 251 provisional certificates, pending the receipt of the school medical officer's report, i.e., 0.06 per cent. of the whole number examined.

The main objects of such medical supervision are:

(i) To find work suitable for the young employee;
(ii) To follow up all cases if possible; at least to follow up all suffering from defects, who are engaged in heavy or dangerous work.

A voluntary follow-up scheme in a large non-ferrous metal factory employing approximately 7500 workers, which was conducted for 18 months during 1937 and 1938 showed that out of 600 three were rejected, two suffering from gross mitral stenosis, one from epilepsy. Twenty-two were passed fit for some light work; thirty, with a history of chorea behind her, and suffering from mitral and aortic lesions, discharged from hospital under no medical supervision, was found a light sitting-down job where she thrived. If she had left she would either have been out of work or at work without medical supervision. This follow-up scheme proved the practicability of a high placement percentage and a low rejection rate when, through co-operation between the
medical and labour departments, suitable employment could be found for employees with certain defects.

**Effect of Job on Physical Development**

There is insufficient research into this pressing question, but medical officers often come across obvious examples of the bad effects of certain types of employment on posture, on feet, on internal organs — through heavy lifting — and on general health. No statistics have been taken in this country, but a survey taken among 412 children in the U.S.S.R. showed that 169 of them had faulty posture, 85 per cent. of the cases aggregated by the type of work in which they were employed. (Occupation and Health, I.L.O., Geneva, 1930.)

Among the causes of such defects are extreme fatigue, prolonged standing, unsuitable height of machinery, incorrect or too heavy weight-lifting, bad seating and too prolonged sitting on bad seats, bad lighting, etc. Many of these causes are remediable and here the advice of doctor and physical educationist would be found invaluable. Bad lighting, bad seating and bad positioning of the machinery are comparatively easily rectified. Compensatory activities for prolonged standing or sitting, instruction in economic use of effort in operating certain machines, instruction in correct methods of weight-lifting are all within the purlieu of the physical educationist, who, more often than not, can show the cause of the trouble and can advise the doctor and employer himself or her subordinates. Decisions as to whether an employee is fit or not to undertake certain work are only too often made without sufficient knowledge of what the work really is, apart from its generic title, of what physical and mental labour it entails, and of what provisions or modifications can be made to bring it within the competence of the would-be employee.

If any doubt is felt about the possibilities of improving the well-being of young persons in industry the recorded facts should be studied. A few concrete examples quoted from Young Citizen by A. E. Morgan may serve to illustrate these points:

1. Boys of 17 years of age at Christ's Hospital School (1926-29) were on the average 3.8 inches taller than working boys (1929-32) of a similar age-group.
2. In York in 1936 the average weight of boys of 14-16 in secondary schools was 8 lb. more than boys of the same age in the poorest groups in the community; among girls the disparity was 15 lb.
3. The weights of school children of 5-14 years in the poorest groups, examined during the years 1899-1936, show an increase of 4.8 lb. for boys and 5.5 lb. for girls.

Our aim should be to narrow the gap between the boys and girls of these sections of the community and to make the higher level the common one. To this end team-work between administrators, industrialists, school authorities, works authorities, medical officers, physical educationists and all concerned with the welfare of young people can make the best and most effective contribution.

**WOMEN IN INDUSTRY**

There has been a recent trend towards fuller investigation into the work of women in industry, its effect on their health, their capacity for motherhood, their right to a more equitable scale of wages and to equal compensation. This is neither a political nor a feminist propaganda pamphlet. Facts speak for themselves, and with the growth of a better social conscience some of them at least will right themselves. Humanitarian as well as utilitarian principles should actuate the bettering of conditions for women workers as much as for men workers and young people.

Factory legislation which aimed at reform in industrial practices in the nineteenth century affected women as well as children and young people. The 10-hour day movement, for which the struggle continued from 1784 to 1850, became law by the passing of the 1850 Act and reduced working hours for women and children. From the outset of the industrial revolution women had played an active part in industry. They have played it ever since in the great war through which we have passed — and their aftermath through which we are now passing — have shown that the versatility of women can be turned to good account and that, where the strength of mind in certain ways be less physically strong than men, they have great
powers of endurance and great aptitude for adapting themselves to conditions and forms of work to which they have not necessarily been previously accustomed.

The Health of Women Workers

'The efficiency of industry and the well-being of the country depend very largely on the health of women workers."

So begins a quotation from a pamphlet published in 1945 by the Industrial Health Research Board. If so, better provision should be made for preserving it. The majority of women have a dual role in life, which involves heavy mental and physical strain. They have their jobs in industry; they are also housewives and often mothers, and comparatively few of them return after working hours to homes where complete domestic and material responsibility has been lifted from their shoulders. Taken as a whole, women are of slighter physique than men, psychologically have less capacity for throwing off cares and a greater capacity for 'worrying', and often find the cumulative anxieties of home and work an intolerable burden.

The Industrial Health Research Board pamphlet efficiently covers a number of causes for absence of women from work owing to health reasons, and should be studied closely. It would therefore not be hard to recapitulate all the facts disclosed by the Industrial Health Research Board investigations. Certain of them should, however, be stressed for their immediate importance. For example, the report shows that a visit to an investigation covering five factories during the last six months of 1942 revealed that illness accounted for 10 per cent. of loss of working time, i.e. one-half of the total time lost through absence; a survey in 1943 and 1943 of the general trend of sickness over a longer period, involving 33,500 women, showed that on an average, 54 out of every 100 days' absence was caused by sickness or accident. The cause appeared to have been cold, influenza and other respiratory complaints, nervous and digestive disorders and fatigue; two-thirds of the total amount of time lost through illness was caused by only 16 per cent. of the women—conclusions similar to those reached by other investigations into sickness-absence in pre-war industry and also in war-time industry in Britain and the U.S.A.; which seems to indicate that special care and treatment of a comparatively small number of illusory-prone women, in addition to adequate provision for the general health of women-workers, should lead to a considerable reduction of this percentage. Research into the various causes of absenteeism would be profitable. The report suggests, these for immediate research should include diet, predisposition to certain types of illness and their causes, the effect of long standing or sitting, hours of work, different shift systems, etc.

Chapter I (Maternity and Child Welfare) of the three-part report Medical Science and Physical Education, published in 1944 by the Research Board for the Correlation of Medical Science and Physical Education, also contains paragraphs on environment at home and at work: its effect on mother and child, which are not inapposite in considering the health of women in industry.

'An important consideration affecting both mother and child is the influence of the mother's environment on the child in the uterus. Her house, the conditions of her work, her whole social background may well have some repercussions upon her child. It might be helpful to ascertain to what extent, if any, such factors as noise, long standing at work, mechanical work or work involving imagination, constant attention, and so on, may affect parent and offspring. Whilst the Factories Act (1937) and the Public Health Act (1936) contain provisions against the employment of a mother within four weeks of the birth of her child, they make no reference to any period of restriction before confinement. Further research might usefully be made into such problems as (a) the number of hours a woman in an advanced state of pregnancy should continue different types of sedentary or heavy manual work; (b) how near to her confinement she should continue work other than her normal domestic duties (again in relation to different types of work); (c) how long a period should elapse before confinement and return to work, i.e. whether the period at present allowed by the Acts is adequate. There is evidence to show that some employers already prescribe a longer interval. One large local education authority now requires notification of the expected date not less than three months beforehand and, as well as the statutory absence of four weeks before that date, insists on a further period of at least nine weeks after confinement before resuming work (or four weeks should the child not live); extension of the compulsory period may be granted on medical grounds.'

The whole of this chapter is indeed worthy of study in this respect; and, considering the anxiety to which mothers are subjected over financial considerations and the care of the children, the Research Board do not apologize for re-inquiring a further paragraph from Chapter II, Part I, p. 18, dealing with nurseries, nursery schools and nursery classes:

'For financial reasons it may be necessary for some mothers to seek employment at a time when, were their physical health the sole consideration, they would be well advised not to do so. Even these circumstances may entail leaving their children overdue in nurseries. It is earnestly to be hoped that some means may be found, e.g. by family or other allowances, to relieve mothers of the burden of such a choice which affects the interests of family life and health.'

Physical Education for Women in Industry

As in the case of young employees, the effect of regular physical education for women during working hours is shown to be good in those firms which now employ regular physical education teachers. The activities include special training in correct methods of weight-lifting, posture-correction, correct methods of using machinery, and compensatory exercises after being in standing, sitting or cramped positions in factories, workshops and offices; they also include recreative physical training, dancing, games activities, etc., and employers state that in no case have they found that the work suffers on account of the break. Rather the contrary. Indeed, such breaks are essential to the woman worker possibly even more than to the man worker. She is more frequently put to do utterly monotonous tasks, so that her brain becomes dulled and her body weary. Psychologically she needs a change of occupation more often than a man. Comparative research into the effect of active breaks on health and output might well show more active improvement among women than among men and boys.

RECOMMENDATIONS

NUTRITION AND DIET

(1) Provision for regular meals in works canteens should be made general.
(2) Employers should organize attractive surroundings and as attractive service in canteens as is possible in the circumstances for their employees.
(3) Every support should be given to bodies investigating dietary values and the content of adequate meals for workers.
(4) More investigation into special diets for workers with digestive disorders should be conducted.
(5) Closer co-operation between doctors, hospital dietitians and canteen managers should be encouraged.
(6) Research into the effect of snack meals and heavy midday and evening meals should be encouraged.
(7) There should be some definite standard of registration for dietitians employed in factory canteens.
(8) The establishment of canteen committees should be encouraged.
(9) An extension of the national service hostels scheme should be carefully considered.
MEDICAL SCIENCE AND PHYSICAL EDUCATION IN INDUSTRY

JOB ANALYSIS, JOB SPECIFICATION, VOCATIONAL SELECTION, VOCATIONAL GUIDANCE

(1) The knowledge distilled from the experiences of the fighting services in connection with job analysis and personnel selection should be conserved and steps taken to incorporate it in the affairs of industry.

(2) More co-ordination should be effected between organ- isation, a special study should be undertaken, and advising on job analysis, job specification, vocational selection, vocational guidance; and the advice of these bodies should be made available to all types of firms.

(3) The number of works medical officers and welfare workers should be increased. The co-operation of physical medicine specialists should be sought. Firms should also employ experts in physical education.

RECREATION

(1) More research is needed into physical education in industry particularly with regard to relaxation, remedial exercises, physical compensation and training in correct and economic movement.

(2) The Central Council of Physical Recreation having already undertaken experimental work in this connection might deservedly be grant-aided to conduct further experiments.

(3) Suitable leaders of physical recreation should be trained. It is certain that with further training a number of experts in recreation would be suitable for this work. Although no guarantee of employment is expected, the appropriate Government departments should encourage suitable well-trained men and women. The training of suitable leaders can be undertaken by the local education authorities, and by the Central Council.

(4) Industrial firms must be safeguarded from the insufficiently trained amateur, and to ensure that the firm's leaders of physical recreation should be supervised.

(5) Young welfare officers should be given an insight into some training in physical recreation.

(6) Further investigation into the question of holiday provision for industrial workers should be made.

OCCUPATIONAL HEALTH SERVICES

(1) An industrial health service should be planned as an integral part of the National Health Service.

(2) An industrial health service should be a co-operative undertaking with full support from both management and workers.

(3) Pre-employment medical examinations should be undertaken wherever possible.

(4) Such examinations should be undertaken with a view to placing the worker in the task most suited to his physical capabilities and not to rejecting him/her as unfit.

(5) The practice of providing rehabilitation shops and sports clubs should be extended.

(6) The establishment of polyclinics within industry should be the subject of experiment.

(7) Employers should not be expected to subsidize such service other than by allowing employees to attend during working hours.

(8) The education of management and workpeople on health problems in industry should be regarded as fundamental to any improvement in the health of our industrial population.

(9) The fund of knowledge gleaned by the various Government departments concerned with occupational health should be published in an attractive and readable form.

(10) Medical officers and personnel officers should have facilities for undertaking research.

(11) University departments and other bodies should assist such men and women with their research problems.

(12) The recommendations made by the Education Committee of the Association of Industrial Medical Officers in their report 'Education in Industrial Health' should be studied and put into effect.

REHABILITATION

(1) In any scheme of rehabilitation, surgeons, physicians, psychiatrists, nurses, physiotherapists, physical educationists, education officers, almoners, welfare supervisors, ministry officials, training centre authorities and instructors, trade union officials, employers and the patients themselves should work together as a team.

(2) Rehabilitation should not be confined to cases of fracture and major injury, but should also be applicable to all conditions in which there is loss of function.

(3) The number of hospital almoners should be materially increased.

(4) Closer liaison should be established between authorities responsible for medical rehabilitation and industrial resettlement.

(5) Plans for the adaptation of Service rehabilitation centres for civilian purposes should be drawn up and put into operation as soon as possible.

(6) The cost of the establishment of juvenile and industrial physical development centres should receive immediate consideration.

(7) Further provision for preventive as well as restorative treatment of psychological breakdown among industrial workers should be made.

(8) Steps should be taken to explore the possibility of making provision by village settlement or other appropriate means for workers with silicosis and pneumokongiosis.

(9) Every effort should be made to retain the services of those men and women doctors and physical training experts who have been conducting rehabilitation work in the Services.

YOUNG PERSONS IN INDUSTRY

(1) (i) The introduction of county colleges should not be unduly delayed. Young employees should attend these colleges for the equivalent of one day a week and physical education should be a compulsory part of the curriculum. (ii) Whilst such training would make a valuable contribution to the maintenance of health, it cannot in itself be considered as sufficient and should be supplemented by the physical recreation which employers should provide for all young persons in industry.

(3) These colleges should form a focal point for recreational and other activities in the evenings and should, therefore, be liberally staffed as an attendance of 200 per day might well cause a demand for recreational facilities for 1000 young people.

(2) Specialists in physical recreation should be employed by industrial firms with a view to conducting training which will develop agility and help to decrease the number of accidents.

(3) In the interests of the health of young workers the factory law relating to the hours of employment should be strictly enforced.

(4) An increased number of medical officers should be employed by industrial firms.

(5) Research should be undertaken with regard to the type of employment and its effect on the general health of the employee.

(6) Remedial classes designed to check and correct minor defects should be developed in industry.

(7) Serious consideration should be given to the possibility of adapting the present Service physical development centres for civilian use.

(8) Conditions of entry to physical development centres should be such as to encourage young employees either to apply for entry to the centres or to reconcile to direction to them by industrial medical officers.

(9) Liaison should be established between school authori- ties (including school doctors and organizers and teachers of physical education), industrial medical officers, parents, employers and the boys and girls themselves, with the object of ensuring better vocational guidance for school leavers.

(10) There should be especial co-operation between the school medical officer, the medical and welfare officers of the works to which the young employee goes, and the physical educationist concerned to ensure that work within the young employee's capabilities may be chosen and provision made for any physical or other idiosyncrasy.

(11) There should be closer liaison between industry, youth service and the voluntary organizations.

WOMEN IN INDUSTRY

(1) Further investigation into the work of women in industry and its effect on their health should be investigated.

(2) Better facilities for rest, relaxation and physical recreation for women and girls should be introduced into factories; special training in corrective and compensatory exercises on the lines already initiated by the Central Council of Physical Recreation should be made more readily available.