

turbidity. I have never found tubercle bacilli in films of urine which did not contain a very few pus cells or a few red blood corpuscles. If a very dilute and watery urine is sent for examination and no pus or blood or bacteria are found in the films the best plan is to arrange to examine a more concentrated specimen or the deposit from a twenty-four-hour sample.

4. In urinary tuberculosis the excretion of tubercle bacilli will continue as long as the tuberculous lesion can discharge freely into the urinary tract. Whenever tubercle bacilli are found easily in films from the centrifuged deposit of the urine one can be sure that there is an open tuberculous lesion of the urinary tract, and if acid-fast bacteria are found in urine collected from one kidney it is certain that there is a tuberculous lesion of the kidney discharging into the renal pelvis. I reached this conclusion as the result of dissection of sixty tuberculous kidneys removed by nephrectomy before I knew of the work of Medlar (1932), Lieberthal and von Huth (1932), and Kjaer (1937). In each of these sixty cases I had examined the urine before operation, and in some had found tubercle bacilli in films, whereas in others the diagnosis had been based on guinea-pig tests, on cultures, or by other means. Whenever tubercle bacilli had been found in films the subsequent dissection of the kidney revealed an open tuberculous lesion. The smallest focus was a small tuberculous ulcer situated on the apex of a renal papilla. Next in size were small caseating lesions communicating with one of the calices. Tubercle bacilli were present in largest numbers in the ulcerating type of tuberculous lesion with extensive cavities. The films were generally negative in closed tuberculous lesions associated with calcification. In one case with double renal pelvis and double ureter I found pus and tubercle bacilli in the urine from the upper ureter, but the urine from the lower ureter contained no pus, and no tubercle bacilli were seen in films. On examining the kidney after it had been removed by nephrectomy I found an open tuberculous cavity communicating with the upper renal pelvis, whereas the tuberculous lesion of the lower pole was "closed" and had no direct communication with the lower renal pelvis.

### Summary

Tuberculous bacilluria is the result of an occult or subclinical tuberculous infection of the kidney, and may occur in many different forms of extrarenal tuberculosis, especially in disease of bones and joints. Tubercle bacilli are present in the urine in small numbers only and are rarely found by microscopical examination. Guinea-pig tests are necessary to demonstrate tuberculous bacilluria. The excretion of tubercle bacilli is intermittent. The urine is generally clear in appearance, though containing an excess of leucocytes. The excretion of tubercle bacilli may cease when the patient's general health improves.

In clinical urinary tuberculosis the urine contains large numbers of pus cells, and these can generally be found in stained films. Guinea-pig tests and cultures are rarely necessary. The excretion of tubercle bacilli is constant, and will continue as long as an open tuberculous lesion can discharge freely into the urinary tract. In clinical urinary tuberculosis the urine always contains a few pus cells, and often the pyuria is sufficient to cause a definite turbidity. These points enable a distinction to be made between results of laboratory tests in tuberculous bacilluria and in clinical urinary tuberculosis.

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## A PSYCHOLOGICAL ASPECT OF THE REARMAMENT PROGRAMME

BY

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It is forty-six years since Sir William Mather, at the Salford Engineering Works, found that reduction of weekly working hours from fifty-three to forty-eight resulted in an actual increase in total output. During the present century, and before the war of 1914-18, there gradually accumulated evidence which further illustrated the positive relation which modification of working week bore to increase of output. These findings were confirmed by the Health of Munition Workers Committee (1917 and 1918). Knight, writing in 1928, summarized his comments as follows:

(i) Every reduction in the working day leads to a decrease in accidents, spoiled work, sickness, and absence. (ii) The reduction of working hours from twelve to ten leads to an increase in hourly and daily output. (iii) The reduction of working hours from ten to eight leads to a further increase in hourly and daily output, except in operations whose speed depends mainly on the speed of machinery. (iv) The reduction of working hours below eight, though increasing hourly output, does not usually lead to an increase in daily output.

To some engaged in medical, and particularly in psychiatric, practice it is becoming apparent that these lessons, even if they have been learnt, are not being adequately applied at the present time, and the aim of this communication is to enlist the help of the profession in drawing attention to the problem before its effects begin to make themselves felt not only upon the health of individuals concerned but upon the vigour with which the nation can continue to prosecute its cause.

### Statement of the Problem

Among cases of psychoneurosis investigated at a psychiatric out-patient clinic, and in which occupational factors are prominent, there has lately come to be included a type of breakdown that can be ascribed to a situation having fairly well-defined features. The clinical characteristics, though of less striking interest than the features of the situation from which they derive, have exhaustion in some form as their common basis, and they may be grouped as follows:

(a) Relative failure referred to cognitive function in its finer aspects, such as attention and its associated processes of application, concentration, recent memory, maintenance of train of thought, and ability for expression. (b) Diminution of instinctive "drives" as displayed by some failure of emotional life, volitional and conative trends such as ability for interest, affection, capacity for "looking forward," general resilience and spontaneity—the "personality" of the patient in the sense used by Mayer-Gross (1938).

The features of the underlying situation found to be common to all cases were: (i) Skilled nature of occupation. (ii) High degree of individual, or collective (foreman), responsibility. (iii) Atmosphere of "rush" and pressure reinforced by knowledge that work was connected directly or indirectly with the nation's emergency and rearmament programme. (iv) Continuous "overtime" work, with resulting extension of working week consider-

ably beyond normal working conditions. (v) Relatively high wages, and increased opportunity for wage-earning partly contributed to by Item iv.

### Illustrative Case Material

A. B., aged 29, worked as a fitter in an arms factory. From the age of 14 to 28 he had worked in a similar capacity making machinery used in biscuit manufacture ("that suited me fine—moving about on all different types of work"). Before his breakdown he was working seven days to the week, his hours being distributed in the following way: Monday to Friday inclusive, 8 a.m. to 10 p.m. (with breaks totalling one and a half hours); Saturday and Sunday, 8 a.m. to 5 p.m. (break one hour). On alternate Sundays he was allowed off. His total working week was seventy and a half to seventy-eight and a half hours. From time to time he had the opportunity of working occasional "bursts" from 9 a.m. Monday to 5.30 p.m. Tuesday, continuously save for the usual breaks (one hour dinner, half an hour tea), together with a rest period of three hours for sleep. His weekly earnings averaged £7 15s. It was during one of the "thirty-two-hour bursts" that the patient "felt something snap" inside his head—the start of his breakdown. He complained of inability to shift his mind from one thing to another, mental depression, and pains in the limbs. He stated that "crowds overface me." He spontaneously observed that "chronic monotony set in with me; I'd never been used to being tied in the one place." He volunteered the view that his breakdown was attributable to overwork.

C. D., aged 57, was a foreman electrician to a large shipbuilding yard, where he had worked as improver, journeyman, charge-hand, and foreman for forty years. During the long years of slump and depression in trade, in which the shipbuilding industry was seriously involved, the patient had no difficulty in shouldering the responsibility, that of chief in his own department, for the whole yard. With the advent of rearmament, however, and the securing of large Government contracts the position changed very materially, and the firm were constrained to reopen a yard that had lain idle. Five weeks before being referred for psychiatric investigation the patient had had what he described as "an improvement" at work—he had been made foreman over the two yards—"and they're mad busy." He was delighted at first, had welcomed his promotion with enthusiasm: then, ten days before being seen, "something seemed to strike me in the back of the head." He complained of inability to concentrate, weakness in the legs, worry about his work, pain at the back of the head, and the feeling that he was "worn out." He expressed the view that if he had his old job back (that is, responsibility for one yard only) his difficulties would disappear.

E. F., aged 27, was a tool-setter in an aircraft factory, where he first began work in April, 1938. For three to four months before being referred for psychiatric investigation he had been working seven days a week and on continuous overtime, his hours being distributed as follows: Monday to Thursday inclusive, 8 a.m. to 8 p.m. (breaks totalling one and a half hours); Friday, 8 a.m. to 6 p.m. (break, one hour); Saturday and Sunday, 8 a.m. to 5 p.m. (break, one hour). His weekly earnings amounted to over £8. He complained of mental exhaustion, mental depression, physical feelings of tiredness, and lack of natural inclinations and appetites.

In six consecutive cases of the material under review the weekly working hours were: 76, 65, 74½ (average), 71½, 73½, 76½. The figure in the second case (65) is admittedly lower than the others, but this apparent advantage was offset by the fact that the patient, a charge-hand electro-plater in an aircraft factory, was a night worker, and had been so continuously for four years. Throughout the series studied relatively high wages were found to be the rule, remuneration for skilled tradesmen being commonly £7 to £8—and even up to £10—a week.

### Discussion

To avoid confusion and unnecessary multiplication of terms it would perhaps be simplest to apply to the condition under review a term previously used by Tredgold (1933)—namely, that of "acute neurasthenia." It may be recalled that Tredgold did not use this term in a general sense, but restricted its application to a condition in which there occurs "marked failure of mental capacity" and to which "physical fatigue becomes superadded, and the individual suffers from a general nervous exhaustion. In addition to the incapacity for sustained efforts, either mental or physical, there is inability to make decisions, faulty attention and memory, loss of emotional control, and increased irritability."

To persons versed in applied psychology, whether in its social, industrial, or medical aspects, it will be apparent that the common factors enumerated above represent a combination of inducements, moral and material, that may be calculated to stimulate every department of the ego. The appeals of patriotism, self-esteem, the team spirit, and the position of personal responsibility (with associated unconscious concomitant of superiority), though indispensable to the successful prosecution of armed conflict, may, if pressed too far, reach a point when ultimate efficiency and output are threatened. Aside from all idealistic consideration, however, material urges may be no less dangerous. We shall not be surprised if we find that, after several years of unemployment, the skilled artisan welcomes the prospect of work, to say nothing of the opportunity of earning £7 or £8 weekly, even if in turn there is demanded of him continuous overtime and a 70-hour week.

From a study of the case material it is obvious that failures of patients in the series may have been contributed to by factors—personal, individual, constitutional—other than the circumstances of excessive working hours; but such factors—and they are to be found in a proportion of individuals composing any community—may not lead to breakdown unless additional and extreme external stress be applied. It may be that the perfectly adjusted personality would not break down under the conditions described; that in the absence of some constitutional predisposition, or mental conflict such as may derive from underlying discontent or unhappy personal relations, failure is impossible. It is realized that under the sustained and powerful emotional stimulus of a great national cause and effort individuals may achieve levels of performance substantially higher than may be gained in the course of their routine peace-time occupation; in the light of past experience, however, it would seem questionable whether demands so excessive as those described above can be satisfied by workers without jeopardizing, ultimately if not immediately, their total productive capacity, and it is contended that, in the type of case referred to, actual working conditions have been the exciting cause.

It may be argued that these conditions of employment are not obligatory, that the worker who is aware of strain is at liberty to take time off—as, for example, on Saturday afternoon or Sunday. The quality of insight is, however, by no means universal in its distribution, and in practice the inducements, already noted, to working all available hours prove too strong. It may further be objected that a small number of isolated cases referred to a psychiatrist afford an inadequate basis upon which to introduce the problem. There is no disputing, however, the previous scientific findings as to working conditions on the one

hand, and on the other the prevalence of the 70-hour week applied to the armament industry in its various aspects throughout the country.

### Conclusion

No attempt has been made in these observations to investigate or discuss the subject from the standpoint of industrial psychology in any scientific way. Nor has reference been made to methods of treatment found effective in the cases concerned. While it is true that in the majority prognosis is favourable, the conditions responding satisfactorily to psychological treatment and general measures, the object has been to call attention to the discrepancy between previous scientific findings as to working hours and conditions of work such as are current industrial practice under the exigencies of our present rearmament programme, and thereby to lay emphasis upon prevention as distinct from amelioration. If the nation is to "stay the course" in the most efficient way possible this problem will require to be looked into, and it is felt that a definite case has been made out as to the urgent necessity for detailed scientific investigation in collaboration with those whose duties bring them in touch with working conditions as they affect large groups of workers. The very demand for supreme national effort is also the argument for the closest study concerning productive capacity in its fullest and most lasting sense. The spontaneous, haphazard, and irrelevant remark of a psychoneurotic patient (a fitter), under treatment for a complaint other than anything connected with his work, may summarize and illumine the importance of this question: "Next week we'll be going on seven days—a 70-hour week. The thought comes to me, 'How long shall I stand up to that? How much shall I damage my resources for the future?'"

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The annual report for 1938 of the National Association for Supplying Medical Aid by Women to the Women of India (Countess of Dufferin's Fund, including the Women's Medical Service) reveals a gratifying increase in the support of this organization while indicating the great amount of work that still needs even more financial and other kinds of help if the intense demand for its services is to be at all adequately met. A very strong case is presented for enlarging hospitals for women and for building new ones. A tour in the North-Western Province, for example, taken at the request of the Inspector-General of Civil Hospitals showed that the women in that Province, as is also the case in other parts of India, are becoming much more "hospital-minded"; the number of maternity patients has more than doubled there in the last few years. The present hospital accommodation is quite inadequate to meet the demand, and the existing hospitals for women are all overcrowded and understaffed. It is gratifying that the unhealthy "purdah" system has been broken down, but there are still very many Indian women who would rather risk death than enter a general hospital, and a still larger number of women who would much prefer to be treated by members of their own sex for their confinements and for special diseases of women. Hospital equipment needs modernizing, and medical and nursing staffs should be brought more nearly up to the standards existing in Great Britain and the United States. Many local authorities seem to be unable to give proper financial support to the hospitals under their administration.

## DOES POLIOMYELITIS AFFECT INTELLECTUAL CAPACITY?

### AN INVESTIGATION ON 98 CASES

BY

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The question as to how far infections of the central nervous system have any influence on basal intelligence is one which has not been widely explored. In this country Dawson (1931) has investigated a series of cases of chorea in which he found no variation from the normal, and another of encephalitis lethargica in which he demonstrated a progressive deterioration; but, as far as we can discover, no investigation on the effects of anterior poliomyelitis has been undertaken. It might be said that poliomyelitis, being a disease whose chief incidence falls on the anterior horn cells of the spinal cord, was hardly likely to affect intelligence, but it should be remembered that it is now reasonably certain that the path of invasion is by a droplet infection lodging the virus in the post-nasal mucous membrane, whence it travels by the perineural path through the cribriform plate, and so transcerebrally to its subsequent nidus in the anterior horn cells. Furthermore, many cases show at least transient initial cerebral symptoms, which are sometimes of considerable intensity.

Mollaret (1937) in his chronaxial studies of the nervous system sums up certain experimental results on anterior poliomyelitis, which included the introduction of the virus by non-cerebral routes (intraperitoneal, etc.). The interest of this study is that it suggests the existence of a cerebral disturbance occurring before the evident onset of symptoms. Moreover, this disturbance is found as constantly in abortive or asymptomatic cases as in those which develop typical paralysis. It bears witness without doubt to the constancy of a hitherto unsuspected early encephalitic dissemination of the virus. For these reasons it seemed worth while to attempt to determine whether poliomyelitis affects general intelligence, as measured by standard tests, especially as it is not unusual for parents or teachers to express anxiety as to how far this disease may affect the intellectual as well as the physical integrity of the unfortunate victim.

### Selection and Testing of the Group

All the cases were derived from those coming under the scheme of the Bath and Wessex Orthopaedic Hospital and clinics, to the surgical staff of which we wish to express our gratitude for allowing us access to them. All children between the ages of 4 and 16 who during the period of investigation were under treatment at the central hospital for the acute stage of poliomyelitis or its residual effects were tested on the Stanford-Binet scale. In order to increase the numbers, and to include cases the onset of whose disease had occurred several years before the tests were applied, a further group was examined at some of the clinics. The children tested were those who