his letter that whatever be his mastery of the practical aspect of the subject, he is not well informed on the scientific aspect as set out in the report of the Royal Society Food Committee. He is particularly scornful of the view that it is more economical to feed cereals direct to human beings than to use them first for the production of pork. By a travesty of the facts as to the common practice of pig-feeding, and an obvious inaccuracy in the numerical example given, he has no difficulty in evolving his reductio ad absurdum. The whole matter would have been scarcely worthy of notice but for the public attack upon the position of the scientific investigator in relation to food problems, and a special meed of thanks is due to Prof. Starling for the swiftness and effectiveness of his defence.

For the farmer the position is perfectly plain and must be faced. The supply of feeding-stuffs is very short, and live-stock of some kind must be sacrificed. Above all, there must be no competition between animals and human beings for food which the latter can directly utilise. It is under this latter head that the hand of restriction falls most heavily on the pig. It is undeniable that by pig-feeding much could be done to remove the evil of the butter-queue; but the bread-queue would be infinitely more dangerous, and can only be avoided by a rigid economy in the use of cereals.

THE INVESTIGATION OF INDUSTRIAL FATIGUE.

PROF. STANLEY KENT gives, in the papers mentioned below,¹ a general summary of the results at which he has arrived in his studies of the physiological signs of industrial fatigue and some practical conclusions to be drawn from them. It is pointed out that the state to be tested is more complex than that of simple muscular exhaustion, inasmuch as it is dependent on a state of the nervous system, brought about, not by muscular fatigue alone, but even more by nervous fatigue, combined with worry, bad hygienic conditions in the factory, ill-health, and insufficient food, as well as unsatisfactory home-life.

The tests used were four in number—reaction time, visual acuity, acuity of hearing, and height of blood-pressure. They were selected as being made quickly and easily, while being incapable of control by the examinee. Curves constructed from the results of these tests show a gradual development of fatigue during the day, which recovers to some extent during the night, so that there is a steady increase through the week. The increase due to overtime work is also indicated, and the greater effect of a given amount of overtime towards the end of the week comes out distinctly. Overtime work always causes a greater

 "Fatigue Induced by Labour." Bristol Medico-Chirurgical Journal, July, 1917, vol. xxxv., No. 133.
An Address on "Fatigue and Alcohol." Delivered before the Society for the Study of Inebriety. Lancet, July 28, 1917.

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fatigue than the same amount of work at an early part of the day.

A factor which upsets the regular accumulation of fatigue is that called by Prof. Kent the "Monday effect." This is due to the lassitude and disinclination to work present on Monday morning. The cause of this appears to be the partial forgetting of skill during the period of rest, and is the more obvious the greater the skill acquired. The decrease of output on the Monday morning is not, in fact, a case of fatigue, but of loss of co-ordination.

As a rule, the Sunday rest puts an end to the accumulated fatigue of the week; if not taken, fatigue continues to increase until breakdown occurs; unless, as usually happens, an automatic slackening of work takes place, accompanied with late arrival in the morning and so on. In any case, there is loss of efficiency.

The measurement of fatigue by tests of the kind described leads thus to the same conclusion as that arrived at by Dr. Vernon from investigations of output, namely, that the maximum output is to be obtained in most cases by reducing the hours of labour. An equally important aspect of the matter is that the worker is also given time for culture and relaxation and for becoming a "reasonable being instead of a mere machine."

It will be seen that the fatigue investigated in this research may be described as the feeling of being tired, as distinguished from the exhaustion of the muscles themselves. Now, it is just here that the mischievous effect of alcohol shows itself so clearly. Alcohol abolishes for a time the feeling of fatigue, and thus enables the worker to go on until the fatigue becomes worse than before. He naturally takes more alcohol and so on. The net result is no increase of output--rather the reverse-while the state of the worker himself goes from bad to worse. The effect of alcohol on muscular work was strikingly shown in the march to the relief of Ladysmith, where the "drinkers" fell out as if labelled. Some interesting results with the four tests mentioned are given on p. 16 of the address on "Fatigue and Alcohol." The reaction-time of abstainers was uniformly less than that of those who took alcohol. Moreover, the depressing effect of a day's work was five times as great in the "alcoholics" as in the abstainers. Similar results were obtained with the other tests.

The conclusion is that the only effect to be put to the credit of alcohol is a psychical one, and that this is transitory, leading to repeated doses. The worker knows by experience that the discomfort called fatigue can be diminished by taking alcohol, and he naturally turns to it. The remedy is obvious. The fatigue is determined by the conditions in which men work. Improve the conditions and fatigue and drinking disappear. Let us, therefore, do our best to provide "the elements of a healthy, full, and interesting life in place of a mere existence without interest, without pleasure, and without hope." W. M. BAYLISS.