some cases his medical adviser, to declare off the funds. No doubt the administrative difficulties in the way of granting partial sick benefit and allowing partial disablement under the Insurance Act are very great, but here also the appointment of medical referees with discretionary powers, subject to revision on appeal in certain cases, might possibly provide a partial solution of the difficulty.

5. Finally, much depends on the attitude of medical men themselves, and the extent to which they realize that the interests of the doctors on the panel in any area are corporate interests, and that if one practitioner is over-lenient and careless in the matter of prescribing and signing certificates, all his colleagues will be affected, not only by the extra drain on the funds available for medical benefit, but also by the false standard which is thereby set up in regard to demands by insured persons on the time and attention of other medical men.

REFERENCE.

¹ Traumatic Neuroses and the Accident Law. ² Malingering.

A PLEA FOR MEDICAL REFEREES VERSUS INSPECTORS.

By SIR JOHN COLLIE, M.D.,

MEDICAL EXAMINER TO THE LONDON COUNTY COUNCIL.

THE following suggestions are based upon considerable experience of the practical working of the Workmen's Compensation Act, and are made with a view to minimizing abuse of the sickness and disablement benefit clauses of the National Health Act.

The attitude of the profession with regard to suggested "inspectors" under the Act is hostile, but judging from interviews I have had with medical friends who are working the Insurance Act I believe the profession would welcome the appointment of medical referees under the Act, whose duty it would be to assist the medical men on the panel to put down malingering, and thus to safeguard the funds available for sickness benefit.

I believe that in a short time from their appointment the assistance of such officials, whose functions I am about to suggest, would be largely in requisition in doubtful and difficult cases, provided it is made abundantly evident from the beginning that they are appointed not to report on the conduct of the medical men, but on the conduct of the assured, and that their *raison d'être* is solely to assist the medical men who are working the Act in dealing with cases of suspected malingering.

The approved societies might fairly be expected to pay towards the remuneration of these officers either an annual sum, or so much per consultation, and would find—as has already been found in Germany—the saving much greater than the cost.

The difficulty of deciding whether a patient is incapable of work is a very real one. It arises in two classes of cases:

1. Those who consider themselves incapable of work, but are in fact able to do it.
2. Those who are capable of work, know it, and yet are determined to remain on the sick list as long as they dare.

In practice it will be found that the funds of the approved societies will be depleted from both these sources, and probably to a much greater extent by the former.

The first class is the more difficult to deal with. Its size is scarcely yet appreciated by the friendly societies or by those who are responsible for the administration of the Act. It embraces many who are often erroneously called "malingerers"; it includes a large proportion of those who are known in the law courts as "traumatic neurasthenics," and not a few of those known in the out-patient departments of hospitals as suffering from "functional nerve disease." It embraces a great number of complaining people who have no special temptation to remain in idleness, and who, until the passing of the Act, were in receipt of no special sick benefits. It is certain that there will be a considerable increase of unnecessary medical attendance if these people are allowed indefinitely to take advantage of the sick benefits under the Act.

Experience of a small selected group of employees in the public service showed that strict supervision reduced the total number of those whose illnesses lasted more than twenty-eight days by 50 per cent.

In men the condition is usually associated with an obscure want of mental balance and an apparent loss of courage and feeling of manliness. I fear it will be found in even greater proportion amongst the female operatives who come under the benefits of the Act.

Generally speaking, medical practitioners treat these complaining folk sympathetically, and assume their genuineness, and, even when doubts arise, accept and treat them as cases of chronic illness. Yet the majority are curable. If they are not treated energetically at an early stage they tend to become chronic, and a proportion lapse into true malingerers. This class is peculiarly responsive to its environment and are very reflective of the mental attitude and personality of their medical attendant. I feel assured that medical referees, if appointed, would have a vast influence for good in a multitude of these cases which are bound to be exceedingly troublesome to doctors on the panel and very costly to the committees unless properly dealt with. The medical referee's influence, however, will entirely depend upon whether he works in co-operation with the doctor on the panel.

A single consultation will be found, as a rule, not sufficient. Patients of this type do not give up the fetish of ill health at the single bidding of any one. Two, three, or even more visits with the doctor in attendance may have to be made before the assured is successfully led out of his morbid mentality.

Subjective sensations in those predisposed to introspection have a peculiarly demoralizing effect on many of the working classes. Unless at an early stage in their history these unfortunate people are led out of themselves long periods of time are wasted in supposed helplessness, which, apart from the economic aspect of the loss of their labour, must have a debilitating effect upon the character not only of those concerned but of their associates.

The subjoined table is extracted from the 62 cases of functional disease which I recently sent to the Maida Vale Hospital for Nervous Diseases. All were settling down to chronic invalidism, and had they not been isolated from their sympathetic friends and environment, would have been pensioners for life. The cases represent a class which, unless it is recognized and grappled with, will entail an enormous amount of unnecessary medical attention, and will be a fruitful source of annoyance and irritation to hard-worked practitioners.

With regard to the second class—those who are capable of work, know it, and yet are determined to remain on the sick list as long as they dare: Out of 14 million insured persons, the aggregate number of malingerers is likely to be considerable.

The question is one of diagnosis. The natural antipathy that every practitioner has to accuse of fraud those who have trusted him will, at first at any rate, tend to influence the number of those who complain unnecessarily. Medical men as a rule are not on the outlook for simulation of disease. They are accustomed day by day to treat people who are genuinely ill, most of whom they have for years had good reason to trust, and often it is not until the case becomes wearisome and the fraud is irresistible that the idea of malingering is forced on the busy practitioner. When diagnosed, the question resolves itself not so much into a matter of treatment as a battle of wits. Under these circumstances most medical men will dislike the position in which they will find themselves. If, therefore, friendly societies, local committees, or the Government require this sort of work done, then special assistance should be put at the disposal of the practitioner, and medical referees, whose primary duty it is to look after the business part of the contract, should be appointed.

Experience teaches that a considerable proportion of insured persons who, after receiving compensation for accidents under the Workmen's Compensation Act, have been forced back to work either by the arbitration courts or threats of arbitration proceedings, will, after a few days' half-hearted work, again put themselves on the sick list. It is to be feared that in these cases, where

Occupation.	Nature of Illness.	Days of Disablement prior to Entering Hospital.	Days in Hospital.	Result of Hospital Treatment.
A. A., clerk ...	Neurasthenia; obsession of diabetes	163	58	Returned to work after fortnight in country.
A. B., seaman ...	Alleged injury to back	302	51	Resumed work.
A. C., surveyor ...	Neurasthenia complicated with alcohol	56	26	Returned to work.
A. D., carman ...	Typical traumatic neurasthenia; gave himself up to introspection	434	45	Resumed work.
A. E., stevedore ...	Alleged traumatic neurasthenia	6 years 8 months	42	Satisfied nothing the matter; discharged from hospital; weekly payments stopped; county court proceedings; judge and medical assessor decided fit for work.
A. F., seaman ...	Functional neurosis; back kept at almost right angle	612	45	Resumed work as a seaman.
A. G., tram driver ...	Treated for myelitis for 13 weeks, full pay most of time; ordered to hospital, where he had fits, blackening his face to give them realistic effect	426	70	Interview in hospital; plain speaking; walked to my house, distant 1 mile, the next day; resumed work within a week.
A. H., engine driver...	7 years previously off work whole year with strained back; now having been off work 9 months with back again said to be strained, was sent to me for examination with a view to superannuation; sent to hospital for observation	9 months	11	Told he would be reported as a malingerer and lose pension if he did not immediately resume work; left hospital next day, resumed light work, six weeks later resumed full work, and has been at it the last five and a half years.

compensation has been stopped, further attempts will freely be made to claim sick benefit under the National Health Act, by the simple process of attempting to give the alleged disability a medical instead of a surgical nomenclature. For instance, a workman who has had a not very serious injury, but who has suffered from concussion at the time of the accident and has been much shaken, eventually recovers; his wounds heal, and he has all the physical appearance of health; but he is still somewhat nervous, has lost the work habit, is introspective, and refuses even to attempt work of any kind. By threats of, or it may be by actual legal process, the employer shakes off his liability, and the workman, at last aroused to his responsibilities, obtains temporary light work for a few days. This under the circumstances is naturally distasteful. He is full of complaints, but has none of the usual stigmata of disease; he insists he is weak, declares he simply cannot work; his illness is now called "neurasthenia," "general debility," or, what is much more likely, he exalts some *symptom* such as neuralgia, indigestion, etc., is successful in getting a medical certificate of unfitness, and becomes a more or less chronic patient, and wastes the time of many a hard-worked practitioner for months, it may be for years.

Those accustomed to dealing with illegitimate prolongation of disabilities following accident will appreciate how, under certain circumstances, much ingenuity is likely to be spent in trying to persuade medical men to transfer an alleged illness from the category of *accident* to *disease*, and thus become a pensioner on the National Insurance Fund.

If such a scheme as I indicate were to work successfully, the advice of such experts as I advocate will not require to be forced on, but will be actually welcomed and applied for by the doctor in attendance.

I believe the appointment of medical referees cannot be long delayed. Assuming that the notice of a suspected case reaches a medical referee not from the doctor in attendance, but from either the Insurance Commissioners, the Insurance Committee, or an approved society, his first and invariable duty would be to put himself in communication with the doctor in attendance. If this is not done antagonism would at once be aroused, and very rightly a spirit of opposition fostered which would be fatal to the success of the scheme.

One difficulty likely to arise will be where large approved societies employ their own medical referee, who sees assured persons not at their own houses, but either at the society offices or at his own consulting room, and where a considerable number of cases are daily submitted to the medical officer, under some such rule as that adopted by the London County Council and the Metropolitan Water Board, whereby every such case is certified by the chief medical officer every twenty-eighth day. Under these circumstances it would be impracticable to

ask or expect the practitioner in attendance to meet the medical referee. Yet this difficulty can be got over; the doctor in attendance in every instance would be communicated with prior to the medical referee seeing the case, and a clear statement made in writing that his patient is being interviewed solely for the purpose of the medical referee reporting progress to the Commissioners, the Insurance Committee, or the approved society, that no opinion will be expressed to the patient, and no suggestion of treatment will be made to the patient.

In the event of difficult points arising it should be the duty of the medical referee to call upon the doctor in attendance and discuss the matter.

With regard to the question of the selection of the medical referees. The personal qualities of sound judgement, absolute integrity, and fearless independence are of infinitely more value than academic distinction. Nor do I think that mature age is necessarily a qualification which should have undue influence in the selection of men to fill these posts—given the qualities above referred to, many comparatively young men are often well suited for work of this sort.

The difficulties are: That approved societies would probably be unwilling to pay sufficient remuneration to command the best men; that they might be found to be lacking in sufficient judgement to make a proper selection; and that local influences and prejudices might lead to the selection of members of the profession known to members of the elective body, but who are not the best candidates. The professional status of the medical referee is a matter of much moment, and he should, in my opinion, have the status and emoluments of a Government servant.

If it were decided to appoint whole-time officers, and these were made responsible to the Insurance Commissioners, some arrangement might be made whereby they were assigned wide areas, which would in many ways tend to maintain their independence. Small boards of referees would, with little difficulty, be constituted for difficult cases in large centres.

A difficulty which the Government is sure to have, and one with which a staff of trained medical referees could best grapple, is the question of "incapacity for work" as opposed to the suggestion—so often made—that because a man cannot work *at his work* therefore he is unfit for any work.

Further, the medical referee would be particularly useful in cases of disablement benefit. I think probably there is much reason to fear that a large number of frauds and semi-frauds will be perpetrated in this connexion. I speak from experience, for of the first 80 cases presented to me for examination when I acted as chief medical officer to a society, 40 returned to duty forthwith at my instigation, many of whom had been drawing sick pay for long periods.

Many pensioners could be saved entering upon chronic

invalidism if treated firmly at an early stage, but when weekly payments have been made for periods extending over months it will be considered an "injustice" to withdraw it; it will, therefore, be necessary at a very early stage to have these cases visited and reported upon, preferably by independent medical men. For this purpose a medical referee visiting staff would be particularly useful.

The practical experience of the working of the Asylum Officers' Superannuation Act, 1909, is of assistance in this connexion. It will be remembered that Clause 3 (subsection 1) of this Act provides for the re-examination of pensioners at intervals of a year. As medical officer appointed under the Act for the County of London, I can well appreciate the difficulty a medical man is in when asked to revise at intervals the advisability or otherwise of continuing a pension in which the pensioner considers he has a vested interest, merely because so many antecedent weekly or monthly payments have been made.

For these and other reasons which the exigencies of time and space prevent my setting out in further detail I have formed the opinion that medical referees should be appointed. Their coming is inevitable. Their advent will be welcomed. The sooner they are arranged for the better for those members of the profession who are about to wrestle with difficulties which I know well, for the special nature of my work compels me to encounter them daily.

STUDIES ON BERI-BERI.

FURTHER FACTS CONCERNING THE CHEMISTRY OF THE VITAMINE-FRACTION FROM YEAST.

By CASIMIR FUNK,

BEIT MEMORIAL RESEARCH FELLOW.

(From the Biochemical Department, Lister Institute.)

[WITH SPECIAL PLATE.]

At the end of 1911¹ I described a method for the isolation of the vitamine-fraction from rice polishings. At this time only a single substance was detected, which was studied to some extent in its chemical properties and curative power. Early in 1912² I was able to show that the same method might be successfully used for the isolation of the vitamine-fraction from other foodstuffs, namely, milk, yeast, brain, and lime juice. Even at this time it was noticed that the isolated pure substance of the melting point 233° had a slightly diminished curative power as compared with the crude product. As a second substance at that time could not be isolated, there was no explanation of this fact available. Since then I have been able to show³ that a number of purin and pyrimidin derivatives possess a slight curative effect—a very interesting fact, which, however, did not simplify the problem.

It was therefore conceivable that besides the substance of the melting point 233°, small quantities of other substances might be present in this fraction, the physiological effect of which therefore would be the resultant of the individual actions of these constituents.

A fractionation of the yeast extract was therefore carried out on a large scale and the results of this are shortly summarized in this preliminary communication.

The alcoholic extract of 100 kg. dried yeast was prepared, following the method already described in my earlier papers. The fractionation itself was carried out without any change of methods and only the silver and baryta fraction which represents the vitamine-fraction was carefully investigated. The total amount of substances obtained in this fraction from 100 kg. of dried yeast was 2.5 grams. This initial product was crystalline and melted at 210° (uncorrected).

A number of pigeons were treated with this product. Polyneuritis was induced in them by artificial feeding with an exclusive diet of polished rice. After a time, varying from ten to twenty-one days, they developed the characteristic symptoms of avian polyneuritis, as they are represented in the figures 1, 3, and 5. By a series of controls it was found⁴ that the animals in this condition

live rarely longer than six to twelve hours, twenty-four hours being perhaps the utmost limit. The product mentioned above was injected into the pectoral muscle in quantities varying from 4 to 8 mg. and in each case a complete recovery was obtained (Figs. 2, 4, 6). Before and after treatment the animals were kept on an unchanged diet of polished rice. In spite of that they lived after the recovery for four to six days without any symptoms of neuritis. As the food did not secure a new supply of vitamine, the birds developed neuritis again after the injected substance was apparently used up for metabolic processes. In one of these cases after a new supply of substance a second cure was effected.

CASE I.—Severe symptoms of polyneuritis; 4 mg. of the above-mentioned product were injected into the pectoral muscle. Three hours later a great improvement; next day a complete recovery; four days later shows again symptoms, and dies.

CASE II.—Severe symptoms (Fig. 1);* 8 mg. injected. Two hours later a complete recovery (Fig. 2); was able to fly away, and had to be photographed, therefore, in a cage; relapsed after six days, and was again cured by a new injection of the product.

CASE III.—Severe symptoms (Fig. 3); injected 4 mg. Recovery after three hours (Fig. 4); lived for four days.

CASE IV.—Polyneuritis (Fig. 5); injected 8 mg. After three hours a complete recovery (Fig. 6), which lasted for four days.

We see from these experiments that the initial vitamine-fraction possesses the undiminished curative power of the original yeast extract. As in some cases the change of diet alone (an addition of maize, for instance) is capable of improving very markedly the condition of the sick birds, the fact that an unchanged diet of polished rice was kept throughout the experiment cannot be too much emphasized.

By a further fractionation I was able to separate the crude fraction into at least three substances, each of which has been carefully purified (recrystallization till constant melting point) and analysed. The original product (2.5 grams) yielded the following substances:

Substance I.—1.6 grams, melting at 229° (corrected); needles and prisms nearly insoluble in cold water. When mixed with the substance previously obtained from yeast² it does not show any depression of melting point; the substances might therefore be regarded as identical.

Substance II.—0.4 gram, very soluble in cold water, and gives a difficultly soluble picrate. The substance melts at 235° (uncorrected).

Substance III.—0.3 gram, more soluble in water than the first substance; melts at 222° (uncorrected).

These observations have an interesting parallel with the case of pituitary extract, as recently recorded by Fühner,⁴ where also in the first instance a crystalline fraction was isolated, which showed the whole physiological action of the gland, but on further fractionation was found to consist of not less than four different substances. Each of these had a specific action, but the effect of the original product could only be obtained by the collective action of all the four substances. It will be interesting to see whether the same is the case with the vitamine-fraction, or whether a single substance plays a preponderating part in the process of cure.

For therapeutic purposes, therefore, the best results may at present be expected by a paraenteral administration of the whole vitamine-fraction, especially in acute cases which have proceeded too far to be influenced by a change of diet—in such cases, for example, as have been described by Strong and Crowell⁵ and Schüffner.⁶ This fraction which is suggested to be employed contains the active constituents unimpaired of the original starting material, and is free from any harmful substances.

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* The photographs have been kindly made for me by Dr. A. B. Macallum, jun., to whom I would like here to express my thanks.