Serum arthritis has been common, most often of the wrists and knees, once of the temporo-maxillary joints. It has never needed any active surgical treatment. Urticarial and erythematous rashes have been frequently noted. Two had orchitis during convalescence. One had cyclitis beginning some time before admission on the fifth day of disease.

Only one symptom has been at all constant—headache, generally acute and of sudden onset. Only one sign has been of real help to us in diagnosis—stiffness of the neck. In testing for this sign it has been found of little use to raise

headache, coarse tremors of the head and hands, and increasing turbidity of the fluid. It has not been a rule to continue the punctures until the fluid is clear.

The greatest number of punctures in any one of the recoveries was 26, of those who died 25. The greatest total amount of fluid drawn off among the recoveries was 1909 c.cm., among those who died 2127 c.cm. The average amount of fluid per puncture in a recovery was 61 c.cm., in those who died 54 c.cm. The average total quantity of serum given each man who recovered was 180 c.cm.

Conclusions.

1. The disease can be only slightly infectious; at any rate, in the field.

2. Early diagnosis would be more common if it were made a routine to test for neck stiffness in all acute illnesses with headache.

3. Early treatment seems to be of the utmost importance. This series of cases, in which treatment was begun on the average on the fourth day of the disease, compares very unfavourably with other series in which treatment was begun, in the majority of cases, during the first 48 hours.

4. Serum does seem to have some effect. The differences in the mortality in this series cannot be explained altogether by the possibility of there having been more

mild cases in the Pasteur series than in the Lister. Since the above notes were written 5 more cases have been treated with Pasteur with 4 recoveries and 1 death.

I am indebted to Captain R. H. Urwick, R.A.M.C., for the bacteriological work, and for his willing assistance at all times in connexion with these patients.

TRENCH FEVER: OBSERVATIONS ON THE CONDITION OF THE SPLEEN AND LEUCOCYTES.

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It would be quite a fair summary of the British writing which has appeared till now on the subjects referred to in the title of this paper to say that "trench fever" is a disease which is not associated with splenic enlargement, but which is characterised by a moderate mononuclear leucocytosis. It is the object of this paper to challenge both of those statements.

Splenic Enlargement in Trench Fever.

In the first clinical description of the disease which was published—that of Hunt and Rankin¹—it is definitely stated that splenic enlargement does not occur, and in the most extensive record of work on the subject which has yet been published—that of McNee, Renshaw, and Brunt²—there is no mention of the spleen.

Most of the other writers who have published on this subject have come into line with the foregoing. Hurst,³ however, is an exception. He described a definite splenic enlargement which occurred in the cases of this disease which he had observed in the Eastern Mediterranean, but he concludes that these findings might be peculiar to that theatre of war.

It has, however, been our experience while working over an area of 20 to 30 miles on the Western front, between the autumn of 1915 and that of 1916, that enlargement of the spleen in "trench fever" is sufficiently common to warrant its mention amongst the clinical features of the disease.

Amongst 214 cases of short pyrexia carefully observed during this period and considered, on clinical grounds, to be examples of trench fever, 37 had a palpable spleen at some stage of their illness—i.e., 17 per cent. had palpable spleens; hence some degree of splenic enlargement was probably a feature of most, if not of all, the cases.

It has been urged in criticism of some of these findings that the cases were paratyphoid infections modified because of T.A.B.

¹ Hunt and Rankin: THE LANCET, 1915, ii., 1133.

² McNee, Renshaw, and Brunt: R.A.M.C. Journal, 1916, xxvi., 490.

³ Hurst: Ibid., 1917, xxviii., 207. THE LANCET, 1916 ii., 673.

the man's head with the hand or to ask him to bend his head forward when lying on the back. A man who is feverish and feeling ill will often not make the effort. It has been found more reliable to put him on his side or to sit him up, and then to make him attempt to put his chin on his chest. If in this position the neck can be fully flexed without difficulty or pain, we have thought we could exclude cerebro-spinal meningitis for all practical purposes. The test is almost as quick and as easy as looking at a tongue, and if it were made a routine practice in every case of headache of unknown origin we believe there would be less delay in the diagnosis of many cases.

Kernig's sign has been of help, though not to the same extent. There is so much room for a difference of opinion when the sign is neither markedly positive nor markedly negative.

Temperature and pulse seem to vary from hour to hour and have been found valueless as signs, rashes have been infrequent, and alterations in knee-jerks, abdominal and plantar reflexes have not helped us at all.

Pharyngeal swabbing has not been used as a diagnostic measure. As a practical working rule we have come to the conclusion that a man who is ill, complaining of acute headache of sudden origin, without any definite physical signs other than some neck stiffness, should be suspected of having cerebro-spinal fever, and should be punctured without delay.

Technique of Lumbar Puncture.

Chloroform has invariably been given for serum administration, though often no local or general anaesthetic has been given for a diagnostic puncture. The patient has been put on his side and propped up, usually to an angle of 45°, and as much fluid as possible drawn off. A dry tap has meant without exception that the lumen has not been reached. During the period dealt with no case of cerebro-spinal fever has been met with in which the fluid was quite clear at the first puncture. Some turbidity was always visible to the naked eye.

It has been the rule to give serum by the gravity method every 24 hours for the first few days, though in a few bad cases it has been given every 12 hours. We have found much difficulty in deciding when to omit the daily puncture. Sometimes the first omission has been regretted, a recrudescence having followed. Sometimes, on the other hand, a patient punctured daily makes little headway until the treatment is stopped, and then at once begins to improve. We have taken as indications for less frequent puncture diminution of neck stiffness, improvement of the mental condition, absence of headache, a cleaning tongue, cessation of fever, and a clearing fluid, and as calling for more serum increasing head retraction, mental stupor or delirium,

inoculation. Against such an explanation, however, there are the following facts:—

(1) That the cases were clinically distinct from cases of paratyphoid fever seen at the same time, and from which paratyphoid bacilli were recovered.

(2) That these short, irregular pyrexias with splenic enlargement were noted as frequently when proved paratyphoid infections had become rare as when they were fairly numerous.

(3) That 25 of the 37 cases cited with splenic enlargement were examined for bacilli of the typhoid group, and that the results were invariably negative.

Condition of the Leucocytes in Trench Fever.

The earliest descriptions of "trench" fever make it a disease characterised by a rather variable leucocytosis, with a maximum of about 25,000 and a moderate relative increase of the mononuclear cells. The only opposite conclusion expressed by a British worker which we have noticed is that of Coombs,⁴ who speaks of a slight polymorphonuclear leucocytosis, but as he only describes one case the observation has not much weight.

Our own observations with regard to the degree of leucocytosis, its variations, and the relative proportions of the different cells do not differ to any appreciable extent from those recorded previously, but we believe that an error has been made in interpreting the findings obtained as evidence of the existence of a slight relative lymphocytosis in "trench fever."

In two respects the observations published are insufficiently controlled: first, they do not record a comparison between the differential counts of a patient's blood in his pyrexial and convalescent periods; secondly, they do not record any observations of the average differential leucocyte count of healthy men living under the conditions to which their patients had been accustomed. Our observations with regard to these points are the following:—

Total and differential leucocyte counts were made in 27 cases of "trench fever": some were observed during the pyrexial periods, some in the intervals between periods of fever, and some on both occasions. The average* (1) of 24 counts during pyrexia and (2) of 11 counts during apyrexial periods was:—

	Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
(1) Pyrexia ...	10,766	65.14	21.96	4.32	4.76	2.3	0.43	0.68
(2) Apyrexia ...	10,283	54.37	35.0	3.15	4.44	2.0	0.56	0.47

The increase of polymorphonuclear leucocytes during pyrexia is rather more marked when the observations relate to the same cases. In the three cases for which counts were made, both in periods of fever and afterwards, the figures are:—

	Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
Pyrexia ...	10,125	66.6	24.1	4.2	3.0	1.0	0.4	0.5
Apyrexia ...	12,700	51.5	37.6	2.7	4.9	1.8	0.58	0.66

* Variations from the mean figure given were not very marked.

Normal Proportions of Polymorphonuclear Leucocytes and Lymphocytes in the Blood of Soldiers in France.

In order to strike a normal for comparisons with the above figures, groups of healthy men with no record of illness while in France were picked from various units.

In all, 33 were examined, and differential counts were done in 26. The average figures for these were:—

Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
8,595	44.8	41.4	4.7	3.7	4.0	0.7	0.4

To institute a further comparison, 10 cases of nephritis were examined. It was considered that, as most of these men had distinct bronchitis, they were likely to show a moderate polymorphonuclear leucocytosis. The figures obtained were:—

Total L.	P.	S.L.	L.L.	L.Hy.	E.	M.	T.
11,640	63.87	28.15	2.0	3.32	1.85	0.47	0.25

From these observations we are inclined to believe: (1) that the usual relative proportions of leucocytes amongst soldiers in France is not the "normal" of the text-books; (2) that errors are likely to be made when differential counts made on soldiers, in case of illness, are compared with that standard; and (3) that a moderate polymorphonuclear leucocytosis is a feature of trench fever. It may be pointed out that a marked relative lymphocytosis has already been described as a feature of two quite distinct pathological conditions to which our soldiers are subject; these are convalescence from gas poisoning (Miller⁵) and irritable heart (Briscoe⁶). In neither instance does the writer mention an extensive series of control observations on normal soldiers recently returned from France, and we are probably justified in quoting their findings in support of the conclusion that a relative lymphocytosis is the rule amongst the troops in France.

⁴ THE LANCET, 1917, i., 183.

⁵ Miller: THE LANCET, 1917, i., 793.

⁶ Briscoe: Ibid., i., 832.

INDIAN MEDICAL SERVICE.—It has been decided that officers serving in the field shall be given acting rank to the extent admissible to officers of the Royal Army Medical Corps with effect from the commencement of the war. Further orders will be issued in regard to the grant of acting rank to officers occupying field appointments.

A NOTE ON EYE-STRAIN.

BY A. S. COBBLEDICK, M.D., B.S. LOND.

Dr. Des Vœux's paper on Eye-strain in THE LANCET of March 2nd is certainly refreshing, inasmuch as it does not come from one who has a "bee in his bonnet," as the ophthalmic surgeon who carefully corrects astigmatism is frequently dubbed. I take it that all these cases were such as Dr. Des Vœux was unable to cure by other medical means at his disposal, and, if so, I think it is a point he should have laid stress upon.

It is common experience in these very diverse cases to find that tonic treatment—a rest in the country, a course of stomachics or purges will relieve the patient possibly for some months, but they do not cure, and recurrence is certain until an exact correction is made and the glasses are worn constantly.

I feel that the difficulty in explaining the meaning of eye-strain, the exact path of impulses to the sensori-motor cerebral cortex, the condition of the sensory cortical cells which makes them abnormally respond to a summation of stimuli and the paths by which they expend their energy in conducting impulses to the periphery, are the chief causes of so much scepticism by those who have not had ample clinical proofs. If a neurologist could make all these points clear much prejudice would be removed. It is remarkable that the correction of a quarter or even an eighth of a diopter of astigmatism should give so much relief; but if one considers that the ciliary muscle is straining to overcome the defect every minute of the waking hours, the summation of stimuli must be enormous. As Mr. Wilson points out,¹ many people with astigmatism do not suffer from headaches, but they may suffer from other troubles pointing to deficient nerve energy, such as lack of concentration, rapid fatigue, nervous irritability—the number of bad tempers that can be cured is amazing!—&c. Theorising, I suggest that the prime seat of the trouble is in some abnormal condition of the cortical sensory cells of the sensori-motor area, some change in their molecular composition making them react abnormally to unwelcome stimuli. If this is granted, it is not difficult to see that very diverse functional troubles may arise from their disorder. The paths of impulses, the question of the nature of the sensory stimuli in the ciliary muscle, whether due to stimulation of the sensory receptors in the muscle, &c., come rather more into the sphere of the physiologist or neurologist than of the ophthalmic surgeon.

In the *Practitioner* of May, 1912, writing on the subject of eye-strain, I anticipated relieving epilepsy by the relief of eye-strain, especially where the family history was good, but I was unsuccessful until some 12 months ago. I quote the following case as it is full of interest:—

Jan. 20th, 1917.—Female, aged 20 years. Family history good. Father and mother, four sisters, and one brother alive and healthy. The mother suffered from fits 29 years ago, previous to the birth of the second child—probably eclamptic. From the age of six months to seven years the child suffered from fits which were always diagnosed as epileptic. At seven years she developed otorrhœa; whilst the ears discharged she did not suffer from fits, but as soon as the discharge was cured the fits returned. At the age of 14 and 15 years she had three attacks per week regularly; she then improved, but at 18 years of age the fits were worse and she developed nocturnal attacks, during which she sometimes, but not always, unconsciously passed urine. The last attack, early in January, 1917, she described as a very bad one.

She has attended Queen's Square Hospital for Epilepsy for 12 months recently, but obtained no relief, and they were diagnosed as undoubtedly epileptic in nature. There is a transverse scar across the top of the nose through falling in the last fit. She has only suffered from headaches during the last two years. Her doctor advised her to have her eyes examined.

On Jan. 20th, 1917, her refractive error was investigated, and hypermetropic astigmatism against the rule in the right eye and oblique in the left was discovered—viz., + 0.50 D. cyl. ax. nor. right eye and + 0.37 D. cyl. ax. 45° left eye (down and in). These were ordered to be worn constantly. The muscular eye balance was normal. She reported on Oct. 19th, 1917, that she felt quite different and had not had a single fit since she obtained her glasses, and had not taken a dose of medicine. A request that she should not wear her glasses for a month in order to see if the fits returned met with a decided refusal, so that the case cannot be regarded as quite complete.

In some cases of neurasthenia where only partial relief is obtained there is no doubt some other causative factor or factors; nevertheless, all these cases should have the benefit of having their eye-strain relieved. The secret of success in all these cases in correcting their refractive error under a cycloplegic is infinite exactness and patience, a gift not accorded unto all men: hence the varying results.

¹ THE LANCET, March 9th, 1918, p. 385.