peptone and peptone "siccum." The latter is of inferior value for the purpose in hand, although it is to be feared that not a few practitioners have been supplied with it. The clinical results indicated that about two and a half parts of Armour's "ordinary" peptone are the equivalent of one part of Witte's peptone. Discussing the matter with Professor Halliburton, he very kindly undertook the examination of several varieties of peptone, and his analysis, weighed to the second place of decimals, is subjoined:—

	No. 1, Witte's Peptone.	No. 2, Armour's "Ordinary" Peptone.	No. 3, Armour's "Siccum" Peptone.	No. 4, Fairchild's Peptone.
Primary proteoses ...	0.92	0.4	0.02	0.07
Secondary proteoses..	1.6	2.2	1.2	1.68
Peptone	0.3	0.2	1.55	0.9
Total	2.82	2.8	2.77	2.65

Professor Halliburton's figures are of great interest, particularly as showing the primary proteoses to constitute the deciding factor. For instance, although there are more secondary or deuto proteoses in peptone No. 2 than in No. 1, the latter contains considerably more than twice the amount of primary proteoses, and this corresponds with the clinical effects. No. 3, on the other hand, contains but a comparatively minute quantity of primary proteose, which explains its inefficiency. The purely peptone ingredient may be discarded, except that note may be made of the fact that it appears to act deleteriously when injected in large amount with the view of making up the deficiency in primary proteose.* That the primary proteoses are the ingredients almost entirely responsible for the specific physiological effects has also been proved experimentally in the careful work of W. H. Thompson.⁶

Technique and Dosage.

A 2 per cent. solution of Witte's (No. 1), or a 5 per cent. of Armour's (No. 2), are convenient for use. Witte's peptone is not entirely soluble, but it is more effective when partly in a fine suspension than it is after filtration. Dissolve the peptone as far as possible in normal saline (made up to three-quarters volume) by slightly agitating and warming at 37° C. Then add 1 mil. of a 2 per cent. solution of sodium carbonate for each gram (5 grains) peptone. This ensures the requisite degree of fineness of the suspended portion. Make up to volume with normal saline, adding 0.25 per cent. phenol as a preservative. Care is to be taken in adding the alkali, as any excess may cause racemization of the peptone, rendering it inactive. Peptone No. 2 is similarly prepared, the alkali being employed in this case to neutralize its acidity.

As regards the dosage, it is only possible to make a general statement, as variations may be necessary. When the main attacks, whether occurring singly or more or less broken up, occur at fairly pronounced intervals, a limited number of measured doses is usually sufficient. Should slight attacks persist, the dose may require to be increased. A feeling of chilliness and discomfort indicates that the limits have been overstepped. On the other hand, the dosage must be reduced when the attacks present great frequency and irregularity. In such the anti-anaphylactic mechanism is weak, or, in other words, the immunity reserve is small and will only tolerate gentle stimulation. Experience alone can enable one to decide the dosage, according to the symptoms and progress of the case; also, patients differ very considerably in their response to peptone. Generally speaking, the initial dose in all cases may be fixed at 5 decimils (5 m). This contains ½ grain of Witte's peptone (No. 1) or ¼ grain of No. 2. Increase by 2 decimils (roughly 5 m) every fifth day, until six injections have been given. Three or four more injections are to be given, employing in each the same dose as that given in the sixth injection. To this rule, however, there are exceptions. No reaction approached by the patient occurs. At any time during the course modifications in the dosage may be called for, as already indicated. In the case of children but a very slight reduction in the dose is necessary. No injection is to be given during attacks, and, when the latter occur at long intervals, begin the treatment about three weeks before one is expected. In all cases the diet should be low, and easily digested.

To administer the injection, cleanse the bend of the elbow with spirit (some hypersensitive patients may require local anaesthesia). Charge the syringe, and place the needle (a small one) apart. With the left hand grasp the patient's upper arm,

the thumb passing across the biceps, and make gentle pressure. Pass the needle into the vein, and as soon as blood issues freely from it, but not before, withdraw the left hand, and maintain the needle immobile by it; affix the syringe, and make the injection slowly. No after-dressing is necessary.

I should like to take this opportunity of thanking those medical men who have sent me their observations. Up to the present, the reports received have been favourable.

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A NOTE ON EPIDEMICS.

BY

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EPIDEMICS in war time assume a special significance, for though the symptoms, at least at the outset, may be mild, so that, as far as the individual is concerned, it may have but a brief or transitory effect, in the aggregate the loss of man power, reckoned in days, may be enormous. As all classes are concerned the importance of this is obvious.

Furthermore, judging from the history of epidemics in the distant past, even a type of disease apparently trivial may in time intensify itself with most serious results, and it might well be supposed that in war, with its herding together of armies of men and workers of all kinds, this time element might be considerably shortened and the process of exaltation correspondingly hastened. Consequently, it seems important to visualize with the greatest possible precision any unusual circumstances connected with the health of armies and populations at the present time.

Bearing these points in mind, it seems to me that certain features in the prevailing epidemic are worthy of consideration.

There can be no doubt that it is widespread and advancing. The clinical manifestations are reproduced in each fresh case with the striking regularity which I had already observed at the beginning of an analogous if not the same epidemic overseas earlier in the year. Unfortunately my notes on these are all filed in — General Hospital, and are beyond my reach. There is much doubt, however, as to its real nature. With the limitations of the present nomenclature we are driven to a diagnosis of influenza or pyrexia of unknown origin. The latter term, however, has become so closely associated with trench fever as to be almost synonymous with it, and, indeed, is unsatisfactory in any case; whilst the former is so loosely employed in various indefinite states of disease that it is equally unsatisfactory. And, indeed, there is some doubt as to the present epidemic being due to the influenza bacillus.

It is obvious that we are dealing with a specific infectious disease which, like all the zymotic fevers, has an incubation period, leading up to the onset and followed by stages of fastigium, acme, and defervescence by crisis. But what the specific infective agent is remains to be ascertained. We are faced with the possibility of its being as elusive as that of the other zymotic diseases. That it is infectious under certain conditions is evident, but it is undoubtedly dependent on environmental conditions, such as overcrowding, etc. For though cases have been admitted into general wards only a comparatively few sporadic cases have broken out amongst the patients in these wards. But in camps and billets and various outposts cases have occurred in preponderating numbers. Overseas, where the epidemic first came to my notice in the beginning of April, it was at first confined to one large convalescent camp and apparently to the huts forming one subdivision of this camp. It would appear that no cases occurred at home at the time, but in the beginning of June, whilst stationed at a general hospital, cases presenting identical symptoms were admitted in large numbers, and in a week or two the epidemic had reached large proportions. It was evident there had been no change in the type of the disease.

Briefly the history is as follows: The onset is sudden, often the exact hour is given by the patient—as on parade, at meals, or in bed. There are severe pains in the head,

* As Armour's peptone is not guaranteed of absolute uniformity in composition, it is advisable to use Witte's peptone, if obtainable. A peptone may be roughly tested before use by adding an equal volume of saturated aqueous solution of ammonium sulphate to a 10 per cent. solution of peptone and stirring with a glass rod. In a satisfactory sample a sticky precipitate comes down in considerable abundance, which adheres to the stirring rod.

eyes, and back, with giddiness, shivering, sweating, and marked loss of appetite; prostration may be extreme. The conjunctivae are reddened and the mucosa of the palate and throat injected, whilst the tongue is clean; but occasionally furred. There is no rash, and only very rarely have I seen a slight erythema on the chest.

There is a rapid rise of temperature to 100° or 101° and occasionally to 103° or 104°, but the pulse is not increased out of proportion to this.

The most striking feature, however, is a general lymphadenitis. From an early stage, and increasing rapidly, there is an enlargement of the glands of the cervical region, which can be felt especially in the posterior triangle and above the clavicle, but firm pressure reveals innumerable hard, discrete, fairly prominent chains of glands, even up to the angle of the jaw and evidently beneath the deep fascia. The salivary glands are not affected. In many the axillary or inguinal glands are implicated and even the femoral glands; in several I have noted the epicondylar gland enlarged in the arm. The glands do not suppurate.

In severe cases the splenic dullness appears to increase, but this is always a difficult matter to decide, though there has certainly occurred pain on deep pressure in the splenic region.

The severe symptoms last about two days, and on the third day there is a marked improvement and the disease is practically at an end, and in a day or two many can return to duty. So far, sequelae and complications have been absent, but recent cases give the impression that there is an increase in the severity of the symptoms. In my earlier series of cases the stay in hospital was extended to ten days, as they had been admitted to the infectious block with a diagnosis of rubella, but all were well on the fourth day. The adenitis subsides more slowly, and a few glands can still be felt several days afterwards.

Briefly, then, the condition is one of acute fever with prostration, accompanied by a general polyadenitis out of all proportion to the local lesions and ending by crisis.

The incubation period is uncertain, but cases which have broken out in the wards suggest that it may be as little as two days; it must be remembered that only isolated cases have thus occurred. Bacteriological investigations throw, so far, no light on the etiology. No specific germs have been isolated from the pharynx or the blood.

The blood shows merely a differential change, in that the monomorphonuclear elements (the lymphocytes) are increased (to 40 per cent. or 50 per cent.), a condition one might anticipate with so much activity of the lymphatic system. In a few cases examined no albuminuria has been noted.

The disease is popularly termed influenza, but it is open to discussion whether it be an acute specific infection, as distinct an entity as any of the zymotic diseases, or an anomalous or aberrant form of any one of these, or, indeed, true influenza.

Of the latter it is easiest to speak first, as its causal agent is known. The term influenza has been used in a very loose manner to describe various conditions, but in the absence of the specific bacillus such diagnosis should not be made. This we have not yet found in the present epidemic. Clinically also it differs from influenza, and most especially with regard to complications and sequelae. It is true it resembles it in its epidemicity, its rapidity of spread, and in the great prostration produced. In most works on influenza no mention is made of a glandular complication, but in a small footnote in Notlmagel's *Encyclopaedia* it is remarked that two or three observers have found swellings of the cervical or other glands. It might be supposed, however, that in true influenza epidemics polyadenitis could hardly have been overlooked, had it occurred. Again, with regard to the blood change in influenza, though little is mentioned on the subject, it would appear that no special change occurs. A leucocytosis, varying with the severity of the inflammatory complications, is known, but no actual increase of lymphocytes is found, such as appears in the cases described above. On the whole, therefore, there is no precise evidence that we are dealing with influenza.

With regard to the zymotic diseases, rubella and perhaps mumps are both to be considered. Indeed, as already mentioned, the first cases I saw overseas were sent in to hospital as rubella. It has been suggested that it is an abortive form of rubella, and it is difficult to comment

on this suggestion in the absence of any specific proof of an infective agent. The adenitis is perhaps more marked than rubella and the onset and general symptoms more sudden and severe, and there is no rash. However, it is of interest to note that I have at present in the isolation wards a case of German measles with marked eruption and furnishing all the symptoms, subjective and objective, of the present epidemic.

With mumps, mentioned by Parkes West³ in the article referred to below, there is hardly a superficial resemblance. The salivary glands are never affected, nor have any of the complications or sequelae of mumps been observed. In West's series the majority of the children had previously suffered from mumps.

On the whole, seeing that the cases have up to the present been characterized by such a constancy of manifestations, it might be better to regard it as a distinct clinical entity. And in this connexion I suggest that it bears a marked similarity to the disease known as glandular fever. This is an infrequent condition, described first by Pfeiffer² in 1889; it occurs epidemically in children in the first decade, and is characterized by sudden onset, fever, slight pharyngitis, and marked polyadenitis, lasting a few days and subsiding without complications and sequelae. Several epidemics have been described, and the subject was exhaustively treated in an article by Dawson Williams in the *Lancet*.¹ In reading this article one is struck by the idea that the present epidemic is of the same nature, but occurring at a different age period. This is no insurmountable objection when one recognizes how all the zymotic diseases under war conditions have produced similar marked changes in the age period, so that mumps, rubella, measles, and chicken-pox, not to ignore the meningococcal infections and poliomyelitis, have all been of epidemic frequency in the armies.

If the facts enumerated here, then, as occurring in a large number of cases are in accord with observations in other districts it is evident that the polyadenitis is the characteristic manifestation of the epidemic. In order to identify the well-defined picture of the disease it might be well to classify it as glandular fever until its true nature can be determined. An opportunity for investigation certainly presents itself at the moment.

The method of infection is still merely conjectural. The pharynx is certainly slightly inflamed in all cases, but the extent of glandular implication is apparently out of all proportion to this, and unlike the ordinary picture presented in tonsillitis and allied conditions. But in this light one is reminded that in recent outbreaks of pharyngitis with severe general symptoms overshadowing the local lesions, the pneumococcus has been the causal factor.

The intestinal path of infection likewise cannot be entirely neglected, and it might even be that the virus arises in certain foodstuffs, the purity of which at the present day may not be always what could be desired.

An investigation of an affected gland itself might be productive of information. So far we have not thought it justifiable to excise a gland for such a purpose.

For the present we can only say that prophylaxis is concerned with proper hygienic conditions and the avoidance of overcrowding and bad ventilation.

June 30th.

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NASOPHARYNGEAL CONDITIONS IN MENINGOCOCCUS CARRIERS.

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THE application of antiseptic sprays to the nasal cavities has been the method of treatment mainly used to clear up carrier cases infected with the meningococcus of cerebro-spinal meningitis. Their wide variation in resistance to such treatment suggested that there must be factors in the anatomical or pathological conditions of the