tests within ten days—namely, during that period of the disease when such a result is not to be anticipated.

2. In view of the protein equivalent of the number of gonococci (1,800 million per c.cm.) contained in this vaccine, it may well be described as a detoxicated vaccine. Furthermore, it can easily be prepared and standardized.

3. No fixed method of dosage of the vaccine is possible. The maximum dose which a patient will tolerate can only be found by the individual response of the patient to gradually increasing doses.

4. In those patients who responded serologically to the vaccine a definite clinical improvement almost invariably followed within a short time, but the percentage of cases which subsequently presented symptoms of chronic infection was not lessened.

5. Where serological response to the vaccine was not forthcoming the results were disappointing in all but two cases.

6. Two cases which showed no serological response made a rapid recovery. The explanation of this is not apparent.

7. No acute complications occurred as a result of the vaccine, although it was administered during the acute stage of the disease. The number of acute complications—six (13.1 per cent.)—occurring later in the course of the disease in patients treated by this method is definitely lower when compared with patients treated by ordinary routine methods alone (24 per cent.).

8. The time taken to effect a cure is somewhat shortened in some cases when the routine methods of treatment are supplemented by the administration of this vaccine, but on the whole *the results are disappointing*.

9. It would appear that the type of gonococcal infection most likely to be benefited by treatment with this vaccine is that in which the patient is suffering from a *chronic* gonococcal complication such as arthritis, and the blood, when tested by the complement-fixation reaction, reveals a low ($\pm$) specific gonococcal antibody content. This point is at present under investigation (A. J. K.). Of the forty-six cases treated with vaccine, thirty-eight showed an increase in the antibody content of the blood (as evidenced by the complement-fixation test), and a definite decrease in the severity of the clinical symptoms within ten days of the first vaccine injection. It would be natural to anticipate that the time taken to cure these patients would be definitely shorter than when the ordinary routine methods of treatment are employed. This, however, was not the case, and, whilst admitting the danger of drawing conclusions from such a small number of cases, it would appear that specific gonococcal antibodies tend to prevent the occurrence of severe *acute* complications and to shorten the acute stage of the disease, but seem to have *little effect in eradicating the infection from its localized sites in the genital system*. This would account for the disappointing results from the use of gonococcal vaccines, prepared in all manner of ways, in the routine treatment of gonorrhoea.

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NOTES ON A SMALL OUTBREAK OF GLANDULAR FEVER

BY

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Glandular fever in epidemic form is not an uncommon disease. The literature¹ on the subject has grown during the last few years; but some of the cases occurring in the outbreak now to be described showed certain unusual symptoms, which are the main reason for these notes.

The cases arose in a preparatory school in October, 1933. Out of eighty-four boys eleven developed the disease; two cases were of alarming severity, three others were severe in type, the remainder were moderate or mild in character. All boys in the school occupy separate bedrooms or cubicles, but it is of interest that a direct relationship could be traced among the infected boys in friendship, or proximity in work and play. Further, a case of chicken-pox arose early in October, and although there were over sixty vulnerable boys, no other contracted this disease, so that the methods of isolation and prophylaxis, valid in the latter disease, were of no avail in glandular fever. The cases occurred within the space of twelve days. The school was disbanded on the fifteenth day after the onset of the epidemic and reassembled on the thirty-second day. Of the boys sent home two only developed the disease, and those in mild and attenuated form. Six of the adults in attendance on the boys fell ill, five with frank follicular tonsillitis and one with a doubtful attack of glandular fever. Nine out of eleven boys had had their tonsils removed; the illness of the two who retained them was mild in type.

As the cause of the disease is unknown, search was made among the domestic staff for a possible carrier of throat infection, but without any definite result. Analysis of the milk and water supply proved negative, and the drainage system of the school, tested regularly, was beyond reproach. Sporadic cases of glandular fever had arisen in the district during the previous two months, which had been prolific in producing other throat infections, and notably scarlet fever.

SYMPTOMS AND SIGNS

Before describing any case in detail the following general statement of symptoms and physical signs is given.

Onset.—The first complaint, in the majority of cases, was of the collar being too tight. This was followed by pain or stiffness of the neck. Slight fever occurred in the beginning, and the groups of glands under the sternomastoid muscles or in the submaxillary triangles were found to be tender and enlarged. There was vomiting at onset in five cases; headache was not noted.

Development.—Fever increased quickly and the glands became more swollen. Usually both sides of the neck were affected, but not equally. Glands in the posterior triangles of the neck were quickly and commonly affected; the axillary and inguinal groups of glands enlarged definitely in only four cases. Peradenitis developed in the severe cases, the cervical swellings becoming diffuse and very tender. Dysphagia occurred as a sequel of this, produced in two cases by oedema of the palate and fauces. An enlarged spleen was noted twice, enlargement of the liver once. Epistaxis gave some relief to the congestive symptoms early in the disease. A rash was observed in two cases only, once urticarial and once macular in type. All severe cases showed a typical feature, which came to be regarded as almost diagnostic. When asked to sit up in bed a hand was placed behind

the back of the head and the head and trunk raised in one piece till supported on the other elbow. In mild cases the temperature settled on the third or fourth day. In others it proved very erratic, settling, then rising again. Spasms of pain in the throat occurred even in cases where the fauces were but little affected. Even in mild cases the boys became more ill than seemed warranted by their physical signs: and the severe cases were rapidly debilitated by the fever, pain, and anorexia. There was a definite tendency to relapse, and it was found wise to keep the boys in bed until ten days after the cessation of fever.

Pathology.—Examination of the blood in selected cases showed a mononuclear lymphocytosis, which developed after the third day, and was well marked at the end of the third week of illness. Throat swabs taken in certain of the cases were negative for haemolytic streptococci and Klebs-Loeffler bacilli. Where abscess formation occurred the organism cultured from the pus was a non-haemolytic streptococcus.

Complications.—The following arose in three separate instances: acute retropharyngeal abscess, suppuration of a cervical gland, and acute otitis media. No haematuria or nephritis occurred. The following sequelae were noted: tachycardia, anaemia, persistent glandular enlargement (six weeks or more), and slight, irregular temperature.

Differential Diagnosis.—During the first forty-eight hours there may be a resemblance to mumps of the submaxillary type. Follicular tonsillitis is distinguished by the throat appearance and the fact that the fauces are affected primarily and the glands next. The absence of a definite rash in glandular fever should be sufficient to distinguish it from scarlet fever. Tuberculous adenitis and lymphadenoma both have certain features in common with glandular fever, but time and a biopsy in persistent cases will prove deciding factors. A differential blood count in the acute stages, though not to be taken as diagnostic, may be regarded as confirmatory of glandular fever if a mononuclear lymphocytosis be present.

INDIVIDUAL CASE RECORDS

Case 1 (aged 11)

On October 6th this boy went to bed with an ordinary feverish cold, stayed in bed two days, then appeared well until October 13th, when he complained of stiff neck and pain just to the left of the larynx. His temperature was 99° F., and he was put to bed at once. Examination showed nothing in the throat and no enlarged glands. On October 15th the glands in the left substernomastoid region and in the posterior triangle on that side were enlarged and tender; there was some dysphagia, and the temperature was 100°. Next day the pain grew more severe, shooting up into the left ear, the glandular swelling was more diffuse, and the left side of the soft palate showed oedema. The glands on the right side of the neck began to swell, and the temperature rose to 102°.

On October 17th the fauces were more oedematous and very painful; there was constant clearing of the throat and hawking up of mucus. Nothing but fluid could be taken by the mouth, and the temperature in the evening rose to 104°. On October 18th there was expectoration of blood-stained mucus from the throat, the pain in the throat and neck was severe, the evening temperature was again 104°, and sleep was poor, with some delirium. Next day the oedema and swelling of the throat began to abate, epistaxis occurred, the temperature was falling, and there was some general improvement, though the day was disturbed by bouts of abdominal pain. By the evening of October 20th all the oedema had gone from the throat, the gland swellings were subsiding, and fluid nourishment was taken freely. On October 21st there was further subsidence of physical signs and symptoms, except for sudden and unaccountable spasms of pain in the throat.

On October 23rd the temperature began to rise again, and the left tonsillar region became swollen and angry. On October 24th the temperature rose to 104°, the left side of the pharynx was swollen, but not oedematous; the glands in the neck, however, remained less swollen and less painful. By October 26th the swelling of the fauces was receding and displayed another swelling on the posterior wall of the pharynx. Next day there was a definite localized retropharyngeal abscess, and this was incised "per os" and the pus evacuated. On October 28th the temperature, which

CHART I.—Case 1: (A) Oedema of palate and fauces; (B) Tonsillar swelling; (C) Retropharyngeal abscess incised; (D) Went home.

had dropped, rose again, reaching 104°, but the throat was comfortable, the glands less swollen, and the boy was beginning to eat and take interest again. From October 29th to November 1st the temperature was of the swinging, septic type, but subsequently subsided, except for occasional small irregularities. No further untoward symptoms arose, and convalescence, though slow, was uneventful.

Case 2 (aged 13)

On going to bed on October 15th he noticed that his collar felt too tight. Next morning the right side of his neck was stiff and painful; at 10 a.m. his temperature was 102°, and there was marked glandular swelling under the right sternomastoid muscle; the fauces then showed nothing abnormal. By noon the swelling had increased rapidly, spreading up under the jaw and to the ear. By 6 p.m. dysphagia was present and the right palate and fauces were oedematous; at 8 p.m. fluid swallowed was regurgitated through the nose, and there was slight laryngeal stridor. The temperature rose to 103°, and the glandular swelling was very tender and painful. At 3 a.m. on October 17th, after an attack of

CHART II.—Case 2: (A) Earache; (B) Paracentesis.

coughing, stridor became more severe, but spraying of the throat with adrenaline seemed to relieve this; swallowing became more comfortable, and by 6 a.m. the temperature fell to 99°. Swelling of the glands on the left side of the neck appeared, but that on the right was definitely subsiding. The glands in both axillae were found enlarged. On October 18th there were brisk repeated bouts of epistaxis, with considerable relief to the oedema and swelling, whilst the pain became easier. A differential white blood count showed no abnormality.

On October 19th the temperature was settling, the faucial oedema had gone (petechiae showed on the mucosa), and there remained a diffuse, hard swelling under the upper third of the right sternomastoid muscle. On October 20th the spleen was felt. On October 21st the temperature rose to 101°, the glands on the left side of the neck became more swollen and tender, and a general macular erythema appeared. On the 23rd earache started, the temperature rose to 103°, and the membrana tympani was found to be thickened, red, and pulsating. Next day the temperature was still high; paracentesis of the membrane was performed, with liberation of pus and relief of pain. This was followed by a gradual settlement of the temperature, and convalescence proceeded uneventfully, but for a persistently high pulse rate and occasional rises of temperature to 99–100°.

Case 3 (aged 13)

On October 8th this patient went to bed with a feverish cold. On October 11th his temperature rose to 102° and the right submaxillary gland was found to be swollen and tender. On October 13th he vomited and complained of dysphagia, and the glands in the posterior triangles of the neck were enlarged and tender. On October 16th the fauces were swollen, but not septic, the glands large and tender on both sides of the neck. Two days later he complained of headache and pain low down in the throat. On October 20th

CHART III: CASE 3.

he was more comfortable, but the glands were still tender and the temperature irregular. On October 23rd there was pain in the upper part of the chest and a sense of constriction, which was thought to be due to enlargement of the glands in the mediastinum; this subsided in forty-eight hours. The temperature settled, but for minor irregularities, and no further symptoms of note developed, apart from anaemia. A differential white blood count on October 30th gave the following: polymorphs, 48 per cent.; small mononuclears, 47 per cent.; large mononuclears, 5 per cent.

A fourth boy, who ran a very mild course for a fortnight, relapsed on the fourteenth day, and had a much more severe bout, with high fever, dysphagia, and glandular swelling lasting a further ten days.

Treatment.—This was necessarily empirical. Phenazone and quinine were tried without any obvious effect. Antiphlogistine externally and throat sprays of hydrarg. perchlor. 1 in 1,000 and of adrenaline 1 in 1,000 seemed to give relief.

SUMMARY

Certain of the cases described showed a very acute onset, a marked degree of periadenitis, and oedema of the palate and fauces, leading in one instance to laryngeal stridor. Unusual complications arose in the shape of an acute retropharyngeal abscess, and a cervical abscess (in a case not described in detail).

I am deeply grateful to Dr. F. J. Poynton for his advice on the outbreak in general, and to Dr. G. F. Still for his help and interest in one particular case.

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ON THE DIAGNOSTIC SIGNIFICANCE OF A POSITIVE SPUTUM REPORT

(DIRECT EXAMINATION FOR TUBERCLE BACILLI)

BY

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A great deal of attention has lately been focused on the neglect of the early diagnosis of pulmonary tuberculosis. It may not, therefore, be untimely to stress a certain aspect of the *wrong* diagnosis of pulmonary tuberculosis, which has not received the notice it deserves in view of the important social and economic consequences to the individual concerned.

The student is rightly taught that one or even several negative sputum examinations do not justify the rejection of a diagnosis of pulmonary tuberculosis; but neither he, the general practitioner, nor the tuberculosis officer has his attention sufficiently well drawn, either in textbooks or post-graduate lectures, to the fact that a single positive sputum report by no means always establishes the diagnosis. As clinical assistant to the tuberculosis dispensary at the Hospital for Consumption, Brompton, I saw several patients sent by their medical attendant with the diagnosis of pulmonary tuberculosis based on a single report of "T.B. found in the sputum," in whom subsequent physical examination, x-ray of the chest, repeated sputum examinations, and prolonged observation (including a stay in hospital) showed no evidence of active disease. The reports of the sputum examinations emanated from a pathological laboratory of high repute, and the patients had been promptly notified by their private practitioners.

It is unnecessary here to emphasize the significance of such a label to the patient. But the position of the tuberculosis officer also is not an enviable one. He must continue to keep the patient under observation for several months at least. If at the end of this period he is still convinced that the patient has no active pulmonary tuberculosis, he can hardly remove him from the dispensary register as "cured"! Two alternatives lie before him.

(a) He can himself denotify the patient as "notified in error," or as "diagnosis not confirmed." Such action requires some courage, for occasionally a patient will develop pulmonary tuberculosis shortly afterwards, purely as a coincidence, and the tuberculosis officer will undoubtedly be blamed as having mishandled the case.

Thus Rist¹ found that of 192 patients, representing a consecutive series of hospital nurses (see below), referred to him at the Dispensaire Léon Bourgeois of the Laennec Hospital as diagnosed or suspected cases of pulmonary tuberculosis, and discharged by him as non-tuberculous, after sufficiently detailed investigation to ensure that no error had occurred, two developed active pulmonary tuberculosis within six months and one year respectively.

(b) The tuberculosis officer can communicate with the patient's private practitioner, giving his findings and suggesting that the latter denotify the patient. This procedure will, however, prove awkward for the doctor, who will probably be accused by the patient of bungling, and will certainly be blamed for the great inconvenience caused by the notification.

Rist discussed this subject at some length in a recent post-graduate lecture in Paris. Since 1923 he has been chief medical referee for tuberculosis to all the nursing staff of the hospitals of the Assistance Publique. While the latter correspond to the municipal hospitals now under the L.C.C. they actually include nearly all the hospital beds available in Paris, as voluntary hospitals consist of only a few religious institutions. All staff diagnosed as, or suspected of, pulmonary