of what I had read and for lack of a better name, but it seems to me likely enough that it also was a variant of the influenzal picture.

I shall be grateful to any reader who can help me to more knowledge of the above-described variety of haematorrhachis.

SOME BACTERIOLOGICAL FINDINGS IN EPIDEMIC INFLUENZA.

BY

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ACTING on instructions, I visited the Duke of York's Training School, Brentwood, on October 14th, Hare Hall Camp, Romford, on October 16th, and Purfleet Military Hospital on October 22nd. Serious outbreaks of influenza were reported from these three centres.

At the Duke of York's Training School, Hare Hall Camp, Romford, and Purfleet Military Hospital, it was decided to take nasopharyngeal swabs. Keeping in mind that two cases died of cerebro-spinal fever during the July epidemic of 1918 (cases which had been missed among the large numbers suffering from influenza), it was thought advisable to inoculate serum tryptic agar plates as well as plates of blood-smeared agar; thereby it was hoped that the possibility of any cases being meningococcal carriers might be eliminated; by blood-smeared agar it was hoped to grow Pfeiffer's bacillus, should it be present.

At Brentwood fifty boys suffering from influenza were examined in this way. A striking feature clinically was the injection of the tonsils and the swollen uvula. Most of the boys had high temperatures, and were decidedly ill. At the time of examination there were none with serious pulmonary complications. West's swab was always used, so as to avoid contamination with the *Streptococcus salivarius*. It was found that a streptococcus was present in 40 out of 50 swabs plated; it was strongly haemolytic, similar to the *Streptococcus anginosus*. The pneumococcus was present in several cases; *Micrococcus catarrhalis* was also present. In two cases only was the influenza bacillus found, and no plate showed a meningococcus.

The cases at Hare Hall Camp, Romford, did not seem so severe. Fifty men were swabbed; streptococci and staphylococci were the predominating organisms. Two cases showed meningococcal-like colonies, but these did not agglutinate with any of Gordon's four types of serums. The bacillus of Pfeiffer was not found.

In Purfleet Military Hospital were several cases which had gone on to pneumonia or bronchopneumonia; the chief unit from which the cases came was a Canadian Railway Troop Dépôt. There were about 3,000 Canadian troops in this area, some from recent drafts, and many men who had never been ill in their lives. Swabs were taken from fifty of these men; thirty-one showed a streptococcus to be the predominating organism. None of these men complained of illness, though some showed injected fauces. The meningococcus was not found, and no plate showed the influenza bacillus. Unfortunately Matthew's medium was unknown to me at the time these swabs were taken, and the later medium used by me for the isolation of Pfeiffer's bacillus had not been prepared.

Examination of the Sputa of Cases of Influenza, and Pulmonary Complications following Influenza.

Over 150 sputa were examined by film and by culture. For slide examination a small greenish-yellow portion of the sputum was spread in a thin film, stained by Gram and counter-stained by a solution of ordinary carbol-fuchsin diluted 1 in 10 with sterile water. This was allowed to act for ten minutes. In about half the number of sputa examined short Gram-negative bacilli were found on the slide.

In some specimens these occurred in enormous numbers, but there was never wanting plenty of Gram-positive diplococci and streptococci.

Gram-negative diplococci were also seen and none of these proved to be a meningococcus. They were probably *Micrococcus catarrhalis* or members of that group. Staphylococci were seen fairly commonly.

Cultures.—In the first series of specimens the sputum was spread on blood-smeared agar, similar to that used for the nasopharyngeal swabs. In only one instance was Pfeiffer's bacillus grown, and this from a case not called influenza but a purulent bronchitis. In all cases of pulmonary complications pneumococci and streptococci were grown in culture from the sputa. It occurred to me that an agar medium neutral in reaction to phenolphthalein and containing blood or a solution of haemoglobin would be better for the growth and isolation of Pfeiffer's bacillus. Human haemoglobin was used. When patients were sent for the Wassermann test blood was taken under strict aseptic conditions, the serum kept for the Wassermann test, the

haemoglobin was dissolved out and added to 3 per cent. tryptic agar. This medium proved much more suitable for all purposes. It was fairly clear and if a small greenish-yellow part was picked out from the sputum it was common to find the influenza bacillus at the end of twenty-four hours. Its growth was slow. It appeared as small dew-like colonies not attaining to any size until about the third day. It was not always easy to grow these on subcultures, but it was done in slope culture of the same medium. About fifty sputa were cultured on haemoglobin tryptic agar and the influenza bacillus was found in forty of these plates. It is worthy of note that blood smeared agar was used in the first 100 sputa examined and Pfeiffer's bacillus was only isolated on a very few occasions. I had used, for the most part, my own blood to smear the agar, and I suffered from an attack of "influenza" in July; this may have had something to do with the want of success.

Summary.

The principal organisms found in the material examined were pneumococcus, streptococcus, the influenza bacillus, staphylococcus, and *Micrococcus catarrhalis*. At the time of the investigation the laboratory did not hold a licence, so that it was not possible to test the pathogenicity of any organism. It is suggested that the influenza bacillus was probably present in all cases at the beginning of the illness and that the pneumococcus and the streptococcus were mainly responsible for the pulmonary complications. It is seen that the influenza bacillus could be recovered in 80 per cent. of the cases on a medium containing human haemoglobin. The influenza bacillus requires some determination, and it is pointed out here that what is taken as the influenza bacillus is a short Gram-negative bacillus growing on a blood medium and showing in twenty-four hours small pin-point colonies. These will not grow in subculture on ordinary agar. Further, the influenza bacillus is difficult to stain. It does not show up well stained by Gram and counter-stained by neutral red. It is better to use a dilution of 1 in 10 of ordinary carbol-fuchsin, and counter-stain for ten minutes.

A further report dealing with the results of vaccine therapy in these cases will be submitted by the physicians of the Military Hospital. The complete examination of the results obtained by vaccines prepared in the district laboratory will require considerable time.

I wish to record my indebtedness to my colleague Dr. Hugh Vallance, who has all along been associated with me in the work of this laboratory.

A TYPHOID CARRIER FOR THIRTY-SEVEN YEARS.

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WHILE investigating a case of typhoid fever which occurred at S—, in the Central Otago district (N.Z.), Inspector Armour, of the Government Health Department, suspected A. M., the subject of this note, to be a carrier, and requested him to go into hospital at Dunedin for examination. The facts are as follows:

A. M., male, aged 72, single, had worked at sheep-shearing, bush-felling, and as a general farm servant in and about the same district for nearly forty years. He had never been engaged in cooking or otherwise handling food at the farms or stations at which he worked. On being interviewed in Dunedin, the old man was rather proud of the fact that he had escaped infection in several outbreaks of typhoid fever to which many of his mates had fallen victims. He stated that he had had typhoid fever in 1881, when he was admitted to the Clyde Hospital suffering from fever, severe headache, and painful diarrhoea. He suffered a relapse, and was in hospital thirty-seven weeks; from his account he was evidently seriously ill. At the same time there were several cases of typhoid fever in the district, five of which were admitted to the same hospital as A. M., and two were fatal. The medical practitioner who was in charge of the hospital is long since dead; but I have elicited these facts from the old man in support of his contention that the illness from which he suffered in 1881 was typhoid fever. He gave the following subsequent history.

1. Shortly after having recovered from his attack of typhoid fever he was one of a party of shearers at P— station where typhoid fever broke out, and there were 13 or 14 cases amongst his mates, of whom several died.