7. *Adrenalin Test.*—Two drops of the ordinary adrenalin solution (1 in 1,000) were dropped into the eye in a few cases. No alteration in the size of the pupil or change in the pulse rate was observed. It is hoped to reinvestigate with various strengths of adrenalin this test, which may prove to be a highly important one.

8. *Effect on the Pulse Rate of Deep Pressure on the Eyeball.*—The result was not constant. In one marked case the pulse rate dropped from 130 to 90; in another the pulse died under one's fingers and became quite imperceptible; and in yet another the pressure in the pulse seemed to decrease markedly, and the rate fell from 120 to 100. In the normal person the pulse rate is retarded 6 to 10 beats a minute.

It is not out of place here to mention that, a short time previously to observing these cases, Lieutenant W. R. Stuart, R.A.M.C., and I made similar observations on 200 cases of men who were in need of a rest from the line. In these the heart, pulse, and vasomotor condition were all very similar to what has been mentioned above, and in fact the patients, with the exception of there being no exophthalmos, presented an identical clinical picture.

SUMMARY.

The points which I desire to draw attention to are:

(a) The occurrence of a definite condition of exophthalmos in exhausted soldiers.

(b) The fact that this exophthalmos is present in the early stage of advanced conditions of exhaustion, and that it is only temporary, lasting usually two to three weeks.

(c) When it disappears the patient at once merges into the group of cases labelled "neurasthenia," and is indistinguishable from them.

The following hypothesis therefore appears possible:

1. That a large number of so-called psychoneuroses are cases in which the symptoms are due to a state of disordered internal secretion the result largely of emotional exhaustion, and, to a less degree, of physical exhaustion.

2. That many cases which are later diagnosed irritable heart, D.A.H., soldier's heart, and neurasthenia, are really cases of this class, and that possibly many have passed through a slight state of exophthalmos without its importance being realized.

I would therefore suggest the advisability of classing the whole group under a suitable term.

Exhaustion syndrome would appear to be most applicable, and would possess the great advantage of not suggesting a period of chronic invalidism—such as a soldier associates with D.A.H., neurasthenia, and similar terms.

Having observed some thousands of cases of breakdown in the line—in men otherwise healthy—I have become impressed by the fundamental unity of the group, and by the fact that exhaustion is the active etiological factor.

[I am indebted to Lieut.-Colonel Gordon Holmes for helpful criticism in the arrangement of this paper.]

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NOTE ON HAEMORRHAGIC SPINAL EFFUSIONS.

BY

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(By leave of the Director-General Medical Services, British Armies in France.)

I HAVE lately seen two examples of a malady which is new to me, and I wish to put this brief note of them on record, incomplete though it is, in order to elicit information.

The cases occurred in Belgium in January, 1919. Both patients were British private soldiers of different units, and the influenza epidemic was still severe among the troops in the neighbourhood. The patients were treated in No. 48 Casualty Clearing Station at Namur.

General Clinical Features.

The clinical features of the illness were so nearly identical in the two cases (with exceptions which will be noted) that one description will serve for both.

The patient fell ill suddenly with extreme frontal headache and stiffness of the neck, and vomited once or twice but no more. He was practically afebrile throughout, though a twelve-hourly chart showed fitful elevations of temperature to 100° F. or less. His face had the peculiar subcyanotic tint so characteristic of the present epidemic of influenza. Mentally he was clear and exhibited none of the lethargy and torpor to be expected in a victim of cerebro-spinal meningitis having the same degree of headache. The pulse rate was normal and no complaint was made of generalized aching. Kernig's sign was not conclusively present.

Lumbar puncture (in one instance on the second day of the disease, in the other on the fourth) produced 40 to 50 c.cm. of a highly bloody fluid, under considerable pressure. A test tube full of this fluid left standing for twenty-four hours showed a clear supernatant fluid and a deposit of blood cells in about equal proportions. Repetition of the puncture on the two succeeding days produced 30 to 40 c.cm. of a similar fluid, but visibly less bloody. By this time in each case amelioration of symptoms was so far advanced that nothing further was done. One patient was evacuated to the base, convalescent, the other had reached the seventeenth day of his illness when I last heard of him and bade fair to make a good recovery, though both of them were slow in getting rid of their headaches.

Examination of Spinal Fluids.

The examination of the spinal fluids was carried out under great difficulties (his laboratory being some twenty miles away) by Captain G. A. Wyon, R.A.M.C., of the 19th Mobile Laboratory, to whom I am indebted for the following particulars:

1. No organisms could be found in films (five examinations).
2. Each spinal fluid was cultivated twice and all the cultures remained sterile.
3. The cytology of the fluid is uncertain. In one case no count was made, but Captain Wyon's clear impression is that polymorphonuclear leucocytes predominated, and were in excess relatively to the red blood cells. In the other case a single relative count of leucocytes gave the following result: Polymorphonuclears 96 per cent., lymphocytes 3 per cent., large mononuclears 1 per cent.

Differences between the Cases.

I spoke above of items not common to both patients.

(a) The first patient was taken ill at the conclusion of a three days' journey in a lorry, and a note from his regimental medical officer said that a number of men who had made the same journey had been seized with headache and vomiting and themselves attributed their symptoms to gassing by petrol fumes while in the lorry. We, however, in the casualty clearing station saw no more of these patients, so that it is to be presumed that the symptoms were fugitive.

(b) The second patient had made no such journey, and he also differed from the other in two subordinate respects: (1) He had a persistent cough, with expectoration; (2) the stiffness of his neck was associated with a band of bilateral hyperaesthesia (which he plotted out spontaneously in the most certain fashion). This band was about 2 inches broad, and ran downward from the cervical spine along the upper border of the trapezius to the top of the shoulder on each side.

Commentary.

I do not know what this ailment was, but it pretty certainly was not cerebro-spinal meningitis, of which disease I saw a few sporadic cases at about this time. At a guess I should say it was a variety of influenza, mainly because the complexion of its victims was that of the influenzal, and I have not observed that peculiar bluish flush in any other malady.

I saw the same flush in another anomalous patient during this period. His symptoms were high fever, lethargy, and right hemiparesis. His cerebro-spinal fluid was perfectly clear. He recovered in about three weeks, sufficiently, at least, to be sent to the base convalescent. I called his ailment "lethargic encephalitis" on the score

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

CAPTAIN WILLIAM T. MUNRO, R.A.M.C.

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.