none of these conditions is there trustworthy evidence that an acidosis exists; in fact, from the absence of respiratory symptoms its presence is extremely unlikely.

The last 10 years have made a great difference in our knowledge of the subject, but even now it is hardly out of its infancy. Workers of many nations have contributed to the advance. I do not think that we in this country need be ashamed of the share we have had in it. There are three names to whom before all others the modern conception of acidosis is due. They are Hasselbalch, of Copenhagen, and Haldane and Barcroft, of the Oxford and Cambridge schools.

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THE ABSENCE OF THE *BACILLUS INFLUENZÆ* IN THE EXUDATE FROM THE UPPER AIR-PASSAGES IN THE PRESENT EPIDEMIC.¹

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Is the present widely spread epidemic one of influenza or is it something new?

In recent years influenza has been only endemic, hence there has been little opportunity to study its causative organism by modern laboratory methods. The last great epidemic began about 1889, and lasted until about 1892. It rapidly spread over the civilised world. The present epidemic is also widely spread. Several camps have experienced it. A few weeks ago the — area began to have cases. It rapidly spread through bodies of men. One reserve battalion had about 8 per cent. of its men develop the symptoms during 36 hours. Another reserve had 300 cases in four days. One camp reported an average of 40 cases per day for 12 days. Up to the present in the areas covered by this laboratory there have been about 1000 cases.

Symptoms.

Clinically the disease simulates influenza. It is an acute febrile infectious condition of three or four days' duration. The most striking symptoms are: Sudden onset with chills, severe headache with pain in cervical, dorsal, and lumbar regions, also pain in limbs and general malaise. The face is somewhat flushed and herpes labialis is to be noticed in a few cases. The fever soon attains its maximum, which varies from 99° to 102°. Several cases were observed in which the maximum temperature was 103° to 104°. Usually the highest point is reached on the second day, then follows an abrupt crisis, and on the fourth day the man feels practically normal. Many cases develop a cough, harsh in nature, with a thick sputum, scanty in amount and constant in appearance. It is not the greenish sputum of influenza proper, but is of a white mucoid nature. The urine is somewhat scanty, the appetite poor, and the bowels are constipated.

It will be noted: (1) That the pyrexia is of shorter duration; (2) that the total course of the disease is shorter; (3) that the gastro-intestinal symptoms are slighter than in the form of influenza due to the *Bacillus influenzae*, commonly called Pfeiffer's bacillus. It is also noteworthy that convalescence is rapid and that as yet we have noted no cases of relapse, recurrence, or of complications. It must be remembered that the cases under our observation were young healthy soldiers in prime physical condition.

Owing to the rapidity of the spread we had no doubt that the causative organism was carried in the upper air-passages and that the infection was passed on by direct personal contact, drinking utensils, &c. This laboratory undertook an investigation of the epidemic.

Results of Laboratory Investigation.

The following examinations were carried out in 20 cases: (1) Urinary examinations; (2) leucocyte counts; (3) leucocyte differential counts; (4) blood cultures; (5) bacteriological examinations from naso-pharynx, throat, and sputum. The following are the results.

Urine.—Somewhat scanty and typically febrile, with a fair diminution of the chlorides; otherwise normal.

Blood counts.—Contrary to our expectation, we found that there is very little leucocytosis, the highest being 13,000 per c.mm., the average being 8000 per c.mm. The highest polymorphonuclear proportion was 60 per cent., the lowest 35 per cent., the average 47.5 per cent. We found that there was present a proportional lymphocytosis, the highest being 60 per cent., the lowest 32 per cent., the average 43.6 per cent. The blood picture is one of very little, if any, leucocytosis, with a decided increase in the relative number of small lymphocytes.

Blood cultures.—These all proved sterile.

Bacteriological examinations.—These were very interesting. We observed in all the cases studied that direct smears from the naso-pharynx, throat, and sputum contained among the organisms present one which was in outstanding predominance. It was a very small Gram-positive diplococcus, distinctly flattened on its apposing sides. Some of these smears contained no other organisms. In no smear examined were we able to discover the *Bacillus influenzae*.

Cultures were made in these 20 cases from the two locations mentioned and from the sputum. Legumin serum agar plates were used. All the plates showed among other colonies one sort which was exceedingly abundant. In fact, in a few naso-pharyngeal plates it was in pure culture. In all the plates this colony was present vastly in excess of any other. It is a small, transparent, granular colony, strikingly like that of streptococcus. In each plate it proved to be composed of the same organism that we had noted in the preliminary direct smears. From no plates were we able to obtain colonies of *Bacillus influenzae*.

It may be contended that this is due to the fact that we did not use media containing whole blood. It has been our experience that *Bacillus influenzae* grows abundantly on legumin serum agar. We frequently obtain it when making routine bacteriological examinations from the naso-pharynx.

This diplococcus, we find, grows with reluctance on ordinary media. It prefers those containing serum. Hæmoglobin also accelerates its growth. It grows abundantly on Löffler's blood serum, legumin serum agar, blood agar, and in bouillon containing a little blood. On blood agar plates there is no hæmolytic, but in blood bouillon the erythrocytes appear broken up. The organism does not split either dextrose, lævulose, maltose, lactose, saccharose, or mannite. It has a slight tendency to anaerobic growth, and in fluid media containing blood a distinct tendency to chain formation.

When inoculated intraperitoneally it proved non-pathogenic to mice. The temperature of some was raised slightly for 24 hours. They showed a slight but distinct roughening of the hair. These reactions, however, might very well be due to the introduction of foreign protein. Further animal inoculation is being undertaken.

It will be noted that we found this organism in universal predominance and that we were able to cultivate it in the laboratory, thus fulfilling Koch's first two postulates. His final postulate we have not as yet, however, fulfilled.

Conclusion.

In conclusion, we wish to point out that although this epidemic has been called influenza for the want of a better name, yet in our opinion it cannot properly be considered such for the following reasons:—

1. The clinical course, though similar to that of influenza, is of very short duration, and there is, so far as we have observed, an absence of relapses, recurrence, or complications.
2. The present epidemic is not characterised by a sharp leucocytosis and polynucleosis, but rather by a very slight leucocytosis with a proportional lymphocytosis of the small mononuclear variety.
3. The organism of influenza—viz., *Bacillus influenzae*—was in all cases absent and there was present with no exception a Gram-positive diplococcus.

Of course, it has long been recognised that attacks of so-called influenza are often due to organisms other than the *Bacillus influenzae*. Many have been indicated. The purpose of our work was to determine the causative organism of the present epidemic. We consider this to be the above-mentioned diplococcus.

¹ A paper read before the — Area Medical Society on July 2nd, 1918.