

Remarks

ON

CEREBRO-SPINAL FEVER IN CAMPS AND BARRACKS.

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SLIGHT outbreaks in two of the camps in this country have aroused interest in this disease, to which soldiers have been peculiarly liable.

Few infections have so remarkable a history. Belonging to the *nova febrilium cohors* of Horace, it appeared (or revived?) in the early years of the nineteenth century. It is not likely that an affection with such striking symptoms could have been overlooked by the seventeenth and eighteenth century physicians. Geographically it has a world-wide distribution, as may be seen by reference to vol. ix of Series I and vol. x of Series II of the *Index Catalogue* of the Surgeon-General's Library, in which epidemics are noted in all quarters of the globe, with special prevalence in France, parts of Scandinavia, and the United States. These islands have enjoyed a singularly happy freedom. Dr. Ormerod's list in vol. i of Allbutt and Rolleston's *System of Medicine* shows how slight and unimportant have been the outbreaks until the Glasgow epidemic of 1907, with 1,000 cases and 595 deaths (Chalmers); and that of Belfast, with, for the eighteen months ending June, 1908, 725 cases, with 548 deaths (Robb).

There has been lately an increase of the disease in England. Dr. Newsholme has kindly furnished me with the figures taken from the investigations of Dr. R. J. Reece. In 1912 there were 272 cases; in 1913, 304; and in 1914, 310. This notable increase above the 30 to 40 cases annually in the eighties and nineties may be accounted for in part by the more accurate diagnosis, and the existence of a meningitic type of poliomyelitis, but there appears to be no doubt that sporadic cases have become more frequent. From inquiries at some of the London hospitals I cannot find that there has been an increase during the past few months. Both of the present outbreaks in camps are in the southern counties. There was a local epidemic in Bristol and the neighbourhood in 1913, reported by Michell Clarke and Symes.¹

Waves of epidemics occur, of which we are in the fifth since 1805. The present period began about 1893, and has been characterized by some of the most severe epidemics on record, notably that of New York, and for the first time in its history the disease became serious in this country.

The disease spreads slowly, or not at all, from foci of prevalence in various parts of a country. For example, in 1893 it broke out in two or three mining towns in Western Maryland, dragged on for the winter months, did not extend, then disappeared, and we heard nothing more of the disease in the State until 1898, when an outbreak occurred in Baltimore and Washington. In this year it prevailed in a mild form in twenty-seven States of the American Union. In 1904-5 a very severe epidemic occurred in New York, while Philadelphia, less than 100 miles distant, was not attacked. The cases may be confined to a gaol or barrack, or to a few scattered villages, as in the outbreak a few years ago in the Eastern Counties, or to a single house. It has prevailed chiefly in the winter and spring months, and an epidemic rarely lasts into the summer.

With a higher death-rate than any acute infection except plague and cholera, the total mortality is not great, as the case incidence in the community is low. With these two diseases it shares the malign capacity to kill within twenty-four hours. Death has indeed followed within six hours of the onset. During the outbreak in 1898 a healthy young man was attacked at 4 p.m. with pain in the head, dizziness and vomiting. At 6 p.m. he had a convulsion; at 10 p.m., when I saw him, the temperature was 105°, a pin-point purpura was beginning in the hyperaemic skin, the neck was drawn back, he was unconscious, and death occurred a little after 4 a.m., just

twelve hours from the onset. Among types of inflammation of the meninges this is the only one from which recovery takes place, in from 25 to 50 per cent. of the cases.

The meningococcus, first described by Weichselbaum, has well-defined cultural and morphological properties, and, like the pneumococcus, has various strains. It is found in the cerebro-spinal exudate, in the blood, in the joints, in the visceral lesions, and in the secretions of the naso-pharynx. A curative serum has been prepared with which good results have been obtained, but in the preparation it is probable that sufficient attention has not been paid to the strains of the germ. Prophylactic vaccination has been carried out on a small scale, and Sophian and Black have found immune bodies in the blood more than two years after inoculation. The meningococci are found in the naso-pharynx of patients, but what is of special importance is the discovery that persons in contact with the sick may harbour the germs in the nose and throat. During outbreaks carriers have been found in large numbers among those living in close contact with the sick; in fact, the intensity of an epidemic appears to bear some proportion to the number of the carriers. As a rule, the germs disappear from the naso-pharynx of healthy contacts in the course of a few weeks. Like the pneumococcus, the germ may be found in the naso-pharynx of healthy persons not exposed to infection—in 158 soldiers among 9,111 in the Munich garrison at a time when the disease was not prevailing!

To these main facts in the story of epidemic cerebro-spinal fever there remains to add another—namely, the constant sporadic presence of the disease as the posterior basic meningitis of children, and as an acute meningococcus meningitis of young adults. A large proportion of the 310 cases for 1914 certified in this country were doubtless of these types, though the pneumococcus and the streptococcus may also cause primary meningitis. The posterior basic form of Gee and Barlow occurs in children under 2 years of age, but in young adults the meningococcus meningitis is not very uncommon, and during an epidemic wave cases may occur in places far distant from the centre of prevalence. Thus in 1893, when meningitis was prevailing in Western Maryland, but not in Baltimore, two young adults were admitted to my wards with the disease; and 5 cases occurred in one household in the city—the mother, two sisters, and two brothers, one of whom came under my care.

In certain characters cerebro-spinal fever resembles pneumonia—in the epidemic localization in gaols, barracks, and houses; in seasonal peculiarities, in the fibrinous quality of the pathological exudate, and in the prevalence of the organism in the naso-pharynx of healthy persons. On the other hand, there are striking differences—in the age incidence, in the dominance of sporadic cases, and in the character of the complications. Briefly, then, the meningococcus is a germ of low virulence, widely spread in the community, and of intense virulence in an individual once it has passed the portals of protection. It is doubtless carried from one person to another, not necessarily from patient to patient, as nurses, doctors, and attendants are very rarely attacked, but in a large proportion the germ is transmitted by a healthy carrier. That the carrier does not always, as has been suggested, harbour a mild, non-pathogenic type is shown by the occurrence of meningitis after the presence of the germ has been determined. How the germ gains access is still under discussion—whether by direct invasion of the meninges from the naso-pharynx through the ethmoidal or sphenoidal routes or by the blood stream. I think the latter the more likely, as no evidence has been found of special involvement of the tissues in either of the routes suggested. Then the fulminant form kills with the features of an acute septicaemia. Since 1899, when Gwyn first isolated the meningococcus from the blood of one of my patients, the organisms have been frequently found in blood cultures. The localization in the meninges is no proof of direct invasion, as tuberculous meningitis, obviously a blood-stream infection, presents the same peculiarity.

Of the causes of the outbreaks, whether increased virulency in a widespread germ, or increased susceptibility under changed atmospheric or telluric conditions, we are as ignorant as when Sydenham summed up the

experience of twenty years' close study of the *genius epidemicus* of London:

Wherefore I conjecture that diseases have certain periods according to the occult and unaccountable alterations which happen in the bowels of the earth, to wit, according to the various age and duration of the same.

In cerebro-spinal fever we may be witnessing the struggle of a new disease to win a place among the great epidemics of the world. In the past decade it has everywhere shown an ominous activity. Again, Sydenham touches the marrow of the matter in a famous passage in which he refers to the briefness of our experience in comparison with the long ages of the world.

And as there have been other diseases heretofore which are either now utterly extinct, or at least, being almost wasted by age, fade away, and very rarely appear . . . so the diseases which now reign will vanish in time, and give place to other kinds, whereof indeed we are not able so much as to guess. This may be so, whatever we, who are so short-liv'd, think of it, who are born as it were one day and die another; nor are the most ancient authors that have written observations of diseases of much longer age, if they are compared with the beginning of the world.

Our present interest relates to the disease as met with in barracks, camps, and campaigns, and this comforting fact comes out of a review of the outbreaks—that while soldiers are peculiarly liable, cerebro-spinal fever has never been a great war pestilence. Jaeger (to whom we are indebted for important studies on the meningococcus) has published a monograph dealing with the occurrence of the disease in armies, and for this purpose has tabulated the epidemics of the nineteenth century in different countries. France, which has suffered most severely, had sixty-two epidemics, of which forty-three (69 per cent.) were confined to troops. In Germany there have been many small outbreaks in garrisons, particularly in Würtemberg and Bavaria. The incidence of the disease has risen during the past twenty-five years. In Italy the outbreaks have been chiefly in the military population. In these islands there has been no severe outbreak in garrison or camp. In 1868 four cases occurred within three weeks at the Shorncliffe Camp, and in 1876 two cases were reported among the militia at Oxford. Jaeger's analysis shows an increase of the disease in the European armies since 1870. The epidemics are usually small, restricted to a garrison, sometimes to a single barrack in a town.

It is reassuring to find that in the great campaigns of the nineteenth century cerebro-spinal fever played no part as a camp disease. There is no reference to it in the Napoleonic, the Crimean, the Italian, or the Danish wars. In the Franco-Prussian wars there were a few cases, chiefly about Paris. Isolated cases occurred in the Russo-Japanese war, but no serious epidemic, and the same is true of the South African war. The only exception in the history of the century is the Civil War in America, during which there were outbreaks in both the Northern and Southern armies in '61, '62, '63, none of them, however, very widespread, and as a camp disease it did not enter into the same category with typhoid, dysentery, and malaria.

Meningitis is a rare disease among the troops in these islands. Sporadic cases occur, but neither at home or abroad has it ever prevailed as an extensive epidemic, so far as I can find, in any camp or barracks. In 1910-11 there were 10 cases, with 8 deaths; in 1912 there were 6 cases, with 5 deaths; no differentiation is made between the forms of the disease. I have not heard of any cases among the Expeditionary Force. The existing outbreaks are not extensive, in one less than 40 cases occurred in four months among more than 30,000 men. Details of the others have not yet come to hand.

The German troops from the south-west may carry the disease into the field, and the French army has always centres of infection. Metz and Strassburg have a bad name in the history of the disease; but we may hope that the experience of 1870-71 may be repeated.

In the outbreaks among the troops there have always been three strong predisposing factors: overcrowding in camps or barracks, the cold winter weather, and over-muscular exertion among young recruits. Two of these conditions have prevailed in this country during the past

three months. The weather has been atrocious, and an enormous number of young recruits have been in active training. One cannot say that there has been special overcrowding, but a great many men have been in tents, in the ordinary regulation form of which nine men live in close contact, and I can testify from personal examination that the ventilation is not always good. It is this very intimate contact that seems to favour the communication of the disease. With fresh air, sunlight, and scrupulous personal cleanliness, the epidemics, as a rule, quickly subside.

I may add that stringent preventive measures have been taken—isolation of the sick, systematic examination of the contacts, and the disinfection of the nasopharynx of any carriers, which should suffice to limit the outbreaks. In a circular issued a year or two ago in the French army Vincent recommends the following mixture as an inhalation: Iodine 12 grams, guaiacol 2 grams, thymol 35 cg., alcohol 200 grams, with 6 grams of potassium iodide, used five or six times a day. Disinfection of the pharynx is carried out by swabbing with a 3 to 5 per cent. solution of glycerine and iodine. In the recent Texas epidemic Sophian found that hydrogen peroxide 1 per cent., with argyrol 9 per cent., used as a spray, destroyed the meningococcus quicker than any other measure. Urotropin, which is secreted into the cerebro-spinal fluid, has been recommended by Cushing as a prophylactic.

The reader is referred to Stillé's monograph, 1867, for the fullest details as to symptoms; to Hirsch's *Geographical Pathology* for the epidemics; to Jaeger's *Die Cerebrospinalmeningitis als Heeresseuche*, Berlin, 1901, for an exhaustive consideration of the disease as it affects soldiers; to Koplik's article in my *System of Medicine*; and for bacteriology and treatment to the recent publication of Sophian, *Epidemic Cerebro-spinal Meningitis* (London, Henry Kimpton, 1913), and to Heiman and Feldstein's *Meningococcus Meningitis* (London, J. B. Lippincott Co., 1914).

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, June 13th, 1914.

SURGICAL EXPERIENCES AT THE 1ST SOUTHERN GENERAL HOSPITAL, BIRMINGHAM.*

[WITH SPECIAL PLATE.]

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THE 1st Southern General Hospital is housed in the new buildings of the university at Bournbrook. The service at first consisted of about 500 beds; these have been lately added to, until now 800 beds are available, of which some 140 are placed in the Great Hall.

The staff is almost entirely derived from the staffs of the General and Queen's Hospitals; its head is Lieutenant-Colonel Marsh (the administrator), the registrar is Major Sawyer, and the whole time of both these officers is devoted to the service of the hospital. Four resident lieutenants, also full-time officers, carry out the duties usually falling to the lot of resident medical officers in hospitals. The visiting staff consists of five physicians, eight surgeons, an ophthalmic surgeon, and an anaesthetist, the surgical cases so far predominating in number; and the rank of these officers, according to seniority, varies from lieutenant-colonel to captain. The nursing staff consists of a principal matron, whose duties are mainly advisory, a matron with the usual assistants, and about 126 nurses. Orderlies to the number of fifty also assist in the nursing of the patients, and about 100 others are employed in various duties about the building. As time goes on the number of beds will probably be largely augmented and the staff increased. To the foresight of Sir Alfred Keogh we owe the existence of a system of hospitals, of which this is one, spread all over the country to provide for sick and wounded soldiers in case of war.

* Read at a meeting of the Birmingham Branch, January 14th, 1915.