

**FISKE FUND PRIZE DISSERTATION;  
NO. XLIX. THE ETIOLOGY AND  
DIAGNOSIS OF EPIDEMIC  
CEREBRO-SPINAL MENINGITIS**

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**ARCHIBALD WILLIAM TAVES**

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FISKE FUND PRIZE DISSERTATION. No. XLIX.

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THE ETIOLOGY AND DIAGNOSIS  
OF  
EPIDEMIC  
CEREBRO-SPINAL MENINGITIS

MOTTO:

"Keep Watch."

BY

ARCHIBALD WILLIAM TAVES, M. D.,  
NEW YORK, N. Y.

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1906

THE Trustees of the Fiske Fund, at the annual meeting of the Rhode Island Medical Society, held at Providence, May 31, 1906, announced that they had awarded a premium of two hundred and fifty dollars to an essay on "The Etiology and Diagnosis of Epidemic Cerebro-Spinal Meningitis," bearing the motto:

"Keep Watch."

The author was found to be ARCHIBALD WILLIAM TAYES, M. D., of New York, N. Y.

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19249

THE ETIOLOGY AND DIAGNOSIS OF EPIDEMIC  
CEREBRO-SPINAL MENINGITIS.

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FOR several hundred years there have been more or less extensive epidemics in Europe, which, viewed from our present knowledge, were probably epidemics of cerebro-spinal meningitis. But it remained for Vieusseaux at Geneva in 1805 to recognize the disease. Hirsch,<sup>1</sup> in an elaborate history of the disease which has been extensively quoted, divides the epidemic into four periods. The first ranged from 1805 to 1830. The outbreaks in Europe during this period differed from those in the United States by not being very widespread. In this country the New England States were particularly involved, and the States lying to the border of the Mississippi, and as far north as Canada. The second period, from 1837 to 1850, involved Western Europe, but France especially, and touched at Algiers, Sicily, and even Denmark and Iceland. During this period a widespread epidemic occurred in this country among the Western and Southern States. The third period, from 1854 to 1874, affected mainly Sweden, Germany and parts of Russia. In this country the disease spread widely during the civil war, and covered a large area. During the

fourth period, from 1876 to the present time, there have been no extensive epidemics in Europe, and none in this country except one during the last decade, which has selected mainly the Northern and Eastern States. During the past few years there have been a few thousand cases in New York City alone.

The disease occurs in unusual waves, distributed irregularly, and with a peculiar commencement and cessation of activity. It spreads at times by means of no well-defined channels, breaking out at apparently disconnected places. There is no regular curve of ascent, maximum and decline, and its behavior is spasmodic and erratic. Very large geographical sections do not ever seem to be extensively involved. An epidemic generally remains somewhat localized, where it stays for a variable length of time; and then it disappears, or recurs during successive seasons. There is no continuous extension; comparatively few in a community are attacked.

During the first half year of 1905 I had the opportunity of seeing 105 consecutive cases at Gouverneur Hospital in New York City, and have since studied the notes, records and charts made at the time. In this paper I shall refer to these cases as the "Gouverneur series" or the "Gouverneur cases."

*Race and Sex:* The statement that there seems to be no special racial disposition to the disease is borne



out by reading the geographical history of epidemic cerebro-spinal meningitis. The sexes are about equally liable to it, as far as can be gleaned from the literature of the subject. Of 365 cases collected by Billings,<sup>2</sup> in the recent epidemic in New York, 56 per cent. were in males.

*Age:* Hirsch collected statistics in 1267 fatal cases, and found that 71 per cent. were under fifteen years, 26 per cent. were between fifteen and forty years, and only three per cent. were over forty. The following table is from the Gouverneur series :

1 year or younger,	9 per cent. ; youngest, four months.	
1 to 5 years,	38 per cent. ;	} 82 per cent. } between 1 } and 15 yrs.
5 to 10 years,	23 per cent. ;	
10 to 15 years,	21 per cent. ;	
15 to 20 years,	6 per cent. ;	
20 to 25 years,	3 per cent. ; oldest, 25 yrs.	

Although a large proportion of the cases are generally between the ages of one and fifteen, still some epidemics have confined themselves to adults in early middle-life, as, for instance, the Italian epidemic between 1840 and 1845, and the one studied by Ames<sup>3</sup> in Montgomery, Alabama. The epidemics in camp and garrison life are also another instance of this.

There seems to be some difference of opinion as to the occurrence of the disease under one year. Coun-

cilman<sup>4</sup> believes it is exceedingly rare under that age. Undoubtedly before the discovery of the meningococcus, and the recognition of the facility with which lumbar punctures could be made and the diagnostic value of the fluid, a large number of deaths under one year have been erroneously attributed to epidemic cerebro-spinal meningitis. But, on the other hand, its prevalence under one year appears to be more common than is generally supposed. Thus, in the figures collected by Billings already referred to, out of 424 cases reported as epidemic cerebro-spinal meningitis 50 were deducted as not being genuine cases. Of the remaining 365 apparently true cases, 60 cases, or sixteen per cent. were under one year. In our own series nine per cent. were one year or younger.

*Predisposition and Immunity:* The question of predisposition or susceptibility is a very interesting one. There seems to be practically no racial predisposition. Concerning personal susceptibility, it is a well-known fact that comparatively few in a community are attacked during an epidemic; from this it would seem that personal susceptibility is uncommon, or, conversely that personal immunity is common. The fact that few in a community are attacked, however, does not appear to be an argument in favor of personal immunity, but rather one tending to prove that, comparatively, the disease is not readily communicable. It is well-known that several cases may

occur in the same house, a large number of cases in a small district, and often a large proportion of the occupants of a jail, camp, or barracks. The way in which a particular regiment has sometimes been decimated by it, speaks against personal immunity being very general or a very important factor in the matter.

Can immunity be acquired by a previous attack? This is a question which is difficult to settle. That one attack does not always confer immunity seems to be beyond any doubt. North,<sup>5</sup> in 1811, mentions a case in which the second attack followed the first by over two years; and another in which an interval of nine months elapsed. Several instances of a second attack are mentioned in the literature of the subject, and yet few in proportion to the number of first attacks. This fact has led Councilman to believe that a relatively high degree of immunity must be conferred by a single attack. We undoubtedly need more light on the subject, for, in the first place, owing to the nature of the disease, it is not always easy to differentiate a subsequent attack from a relapse. The disease is irregular in its course, and characterized by exacerbations and relapses. A relapse may occur after the patient has been walking about in the ward, apparently well. It appears plausible that the meningococci may remain latent in the cerebro-spinal fluid for a variable length of time, and then take on renewed activity and virulence. Then again, the mortality is high and the prospect is not very great of a patient becoming ex-