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BOOK REVIEW

Thomas M. Daniel. Wade Hampton Frost. Pioneer epidemiologist 1880–1938. Up to the mountain

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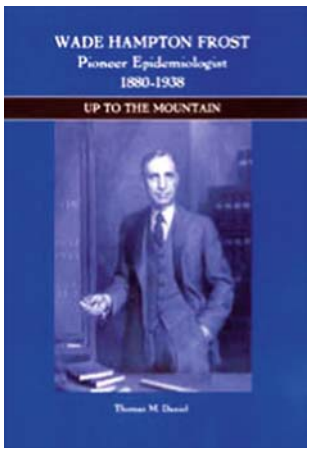

Wade Hampton Frost and Lowell Jacob Reed (from the Johns Hopkins University M. Bloomberg School of Public Health website).

Why Daniel gave a biblical subtitle (''Up to the Mountain'', from Isaiah 2:3) to his fine biography of Wade Hampton Frost, the first American Professor of Epidemiology, is not clear to me. Religion does not seem to have been a very important component of Frost's life.

The true puzzle about Frost's legacy is stated by George Comstock in the Foreword: ''When several senior epidemiologists find such breadth of wisdom in Frost's epidemiologic thinking, it is surpassing strange that modern teachers mention his works so infrequently'' ([1], p. xii). Frost played a major role in setting the foundations of classic epidemiology as it would emerge in the second half of the 20th century [2]. When Frost became an epidemiologist, in 1905, our young discipline was centered on the analysis of vital statistics and the investigation of outbreaks of infectious diseases. At the time of Frost's premature death, in 1938, the center of gravity had shifted towards association studies. Frost himself had launched cohort studies on tuberculosis, refined the methods to analyze them and written a chapter of a textbook of public health, which outlined many characteristics of classic epidemiology.

The book of Daniel (another strange biblical reminiscence, right?) does not make full justice of the crucial contribution of Frost as methodologist. It does not replace the tributes to Frost's scientific contribution made by epidemiologists who followed in his footsteps in the Department of Epidemiology he has created at The Johns Hopkins University School of Hygiene and Public Health. Maxcy [3], Sartwell [4], Lilienfeld [5], and Comstock [6] had a deeper understanding than Daniel of the methods and concepts Frost dealt with. Moreover, it is really challenging to write a reader's digest of Frost's work. Frost was not particularly prolific (63 publications). His publications are easy to obtain, easy to read and still worth reading [7].

We were lacking a description of Frost the man, and Daniel has filled this gap with a wonderful biography. The style and the chronological exposé of Frost's life are simple and clear. There is no critical discussion of Frost's decisions and choices, but neither does the author try to present Frost as a romantic, scientific hero. Daniel describes in abundant detail, and probably in as much detail as will ever be possible, Frost's journey as a man and as a scientist. Woven into the narrative of Frost's life are lots of revealing anecdotes about his familial background and character. I learned for example that Wade Hampton was named after the confederate general with whom his father had served (p. 1), but that friends and relatives called him ''Jack'' (p. 3). He was not a flamboyant speaker (p. 145), but his lectures were clear and well prepared, and he excelled as a teacher in labs or as a thesis advisor (p. 151). His meticulous critiques on the theses of his

advisees had the reputation of being ''frosting'' (p. 159). Frost was always concerned about the presence of confounding factors, which he called ''jokers'' (p. 175).

Frost was born in 1880 in Marshall, Virginia. He received a Doctor of Medicine degree from the University of Virginia in 1903 and joined the United States Public Health Service. In 1906 he was sent to New Orleans to investigate an outbreak of yellow fever. In 1908 he was assigned to the Division of Pathology and Bacteriology of the Hygienic Laboratory in Washington, headed by Milton J Rosenau. There he conducted investigations on outbreaks of infectious diseases such as poliomyelitis, typhoid fever, diphtheria, meningococcal meningitis, and streptococcal sore throat. In 1916, he helped Haven Emerson, New York City's health commissioner, to investigate a polio outbreak. In a paper published the same year in the Public Health Report he concluded that polio was an infectious disease and that there existed ''passive human carriers''.

Of current interest are the studies of the 1918 influenza epidemic that Frost carried out in the following years (p. 168). Frost was able to demonstrate, using telling graphics, how much more serious the 1918 outbreak had been compared to the previous ones. At the end of the 1918 pandemic, Frost was invited by William Henry Welch to set up a Department of Epidemiology at the newly created School of Hygiene and Public Health in Baltimore.

When Frost was appointed in 1919 first Lecturer of Epidemiology, one of his tasks was to create a curriculum of epidemiology. He was probably the first scientist ever to address this type of question. Frost notes, ''the field of epidemiology ... is not yet clearly defined'' (p. 137). The solution he came up with will sound familiar to anyone who studied in Frost's department for decades after his death and at least until 1990. Initially three courses in epidemiology were offered: Epidemiology 1, Epidemiology 2 and Epidemiology 3. Epidemiology 1, which was given for the first time in the spring of 1920, met for three half-day long sessions each week –a1-h lecture followed by a 3-h laboratory exercise. Epidemiology 2 required basic knowledge of statistics as a prerequisite, and Epidemiology 3 included special studies, such as student fieldwork leading to a thesis. Interestingly, the final question of the exam concluding the 1927 session of Epidemiology 1 asked the students to plan an *association* study of the relationship between childhood tuberculosis and malnutrition (p. 152).

At Hopkins, Frost made a successful duet (see Picture) with Lowell Jacob Reed (1937–1946) of the Department of Biometry and Biostatistics (p. 152), in particular for the application of life table analysis to epidemiologic data. Together they developed the Reed-Frost model of epidemic curves (p. 153) [8] and both will be Deans of the Johns Hopkins School of Hygiene and Public Health.

In the 1930's he turned his attention to the epidemiology of tuberculosis, a disease he knew personally well since he had suffered from it most of his life and spent some time in a sanatorium. He first studied the mortality of children with tuberculosis at the Harriet Lane Clinic in Baltimore and then conducted studies in three Tennessee locations: Trenton, Kingsport, and Williamson County. The Kingsport's study was a follow-up of African-American families. Frost was concerned by the very long follow-up needed to study tuberculosis and, according to Comstock, ''Frost hit upon the non-concurrent prospective or historical cohort approach'' (p. 186). He obtained the household past history and reconstructed the cohorts.

Frost was an addicted smoker and he died prematurely at age 58 of an esophageal cancer. We should for once establish the toll that our discipline has paid to the tobacco epidemic. But my feeling is that his early death provides the answer to the mystery of the ''surpassing'' oblivion (beyond the members of his own Department) of Frost's major role as an early epidemiologist in establishing the foundations on which classic epidemiologists was built. Frost died too young to write the textbook, which would have crystallized his vision and contributions. Daniel probably does not insist enough on the fact that the chapter entitled ''Epidemiology'', which appeared in Haven Emerson's textbook on preventive medicine and public health in 1928, reads like the outline of a more extensive work [7] that Frost did not get to perform. Frost did not publish either his work on epidemic curves [8] or his cohort analysis paper [9, 10] the draft of which was ready when he died. Both works appeared as posthumous publications.

For an epidemiologist, Daniel's book reads as the biography of a friend or a colleague. Those who spent some time in the Department of Epidemiology at Johns Hopkins will be amused by the conservatism of the venerable institution with respect to Frost's legacy. Many aspects of the curriculum were, at least until 1990, organized and named as they had been by Frost in the 1920's. No doubt, the spirit of Wade Hampton Frost still paces the corridors of his Epidemiology Department.

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