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## BOOK REVIEW

# *Wade Hampton Frost, Pioneer Epidemiologist 1880–1938: Up to the Mountain*

**By Thomas M. Daniel**

ISBN 1-58046-177-8, University of Rochester Press, Rochester, New York (Telephone: 585-275-0419, Fax: 585-271-8778, E-mail: boydell@boydellusa.net, Website: http://www.urpress.com/80461778.HTM), 2004, 264 pp., $45.00 (Hardback)

''Few have taught us more when we have gone to the mountain and walked in their ways'' (1, p. 198)—so summarizes Thomas M. Daniel's new biography of Wade Hampton Frost. As Daniel notes, Frost is a ''little known. . .major academic medical figure'' (1, p. xvi) from whom much can still be learned and admired by modern students of epidemiology. Epidemiologists routinely apply the concepts of identifying index cases, of using life-table methodology to express incidence in person-years and to estimate secondary attack rates, and of representing an epidemic in mathematical terms; however, few recall the critical role Frost played in defining these methods. Epidemiologists learn the natural history of infectious diseases, such as influenza, tuberculosis, and polio; however, few appreciate the pioneering role Frost played in the epidemiologic investigation of these illnesses and the foundation he helped to establish for the future study of noninfectious chronic diseases. In Daniel's scholarly biography, we are inspired by both Frost's seminal scientific contributions and his public health leadership as an officer in the early US Public Health Service and as the first professor of epidemiology at Johns Hopkins University in the first Department of Epidemiology in the United States.

The book is organized chronologically into 11 chapters that describe Frost's life from his family's tradition of medicine and public service, to his years as a commissioned Public Health Service officer, and to his final years as a professor of epidemiology. Frost's life is presented as an evolution over time, shaped by personal and professional experience and discussed within the medical and social context of the late 19th and early 20th centuries. The first three chapters depict Frost's family history and humble childhood in the rural community of Marshall, Virginia. Frost's lineage, although somewhat tediously presented, establishes the family tradition of medicine and service and the high value Frost's family placed on education and ''cerebral activities'' (1, p. 27).

The next four chapters chronicle Frost's medical school experience at the University of Virginia, his motivations for choosing a career in public health, and his broad and productive experience as an early public health officer investigating the major health problems of his day. Daniel's descriptions of Frost's disease outbreak investigations serve as good case examples for those interested in public health practice and epidemic control. For instance, Frost's participation in the mosquito-control and quarantine efforts during the 1906 yellow fever outbreak in New Orleans, Louisiana, resulted in the first successful arrest of a yellow fever epidemic in the United States before winter frosts occurred. Other examples include Frost's application of microbiology laboratory techniques to field investigations involving water pollution and typhoid outbreaks, his study of polio transmission, and his ''seminal analysis of influenza incidence data'' (1, p. 106) from the 1918 flu pandemic. In fact, Frost's thorough and detailed investigations of infectious disease outbreaks and environmental factors are model examples of exemplar ''shoe leather epidemiology.''

The remaining chapters focus on Frost's academic tenure at Johns Hopkins University, where he was its first professor of epidemiology. Frost was responsible for creating ''an academic curriculum in a discipline where none existed'' (1, p. 135). His emphasis on the laboratory method of teaching utilizing real data remains a core component of the curriculum today. Frost's collaboration with Lowell Reed of the Department of Biostatistics established the close working relationship witnessed today between the two disciplines. Their collaboration also generated important scientific contributions, such as the Reed-Frost model of epidemics, the first mathematical expression of the epidemic curve. Daniel also writes that, for a decade, Frost served on faculty while maintaining his Public Health Service commission, thereby providing a model for ''future productive cooperation'' (1, p. 162) between academia and public health practitioners.

Daniel points out how Frost's early field investigations served as focal points for subsequent academic research on the spread of infection in the household and in the community. For instance, Frost's involvement in the Tennessee tuberculosis studies exemplifies his continued study of the natural history of disease and his continued work to advance the methods and scientific discipline of epidemiology. However, Daniels notes that perhaps Frost's greatest academic legacy may have been the mentoring and empowerment that he provided his graduate students. As Daniels documents, many went on to remarkable careers as academic and public health leaders. Frost challenged them to always look for the ''joker'' or confounder in their data, a recommendation which still rings true for modern epidemiologists.

Despite the noteworthy accomplishments of Wade Hampton Frost, George W. Comstock (Alumni Centennial Professor Emeritus of Epidemiology at the Johns Hopkins Bloomberg School of Public Health) observes that there is little reference to Frost in contemporary epidemiology textbooks (2). Over the years, several reknowed epidemiologists and biostatisticians

have commented on the contributions of Frost (3–7), but Daniel's biography is the first to fully describe Frost's life and work, to put it into historical context, and to demonstrate its importance.

Daniel's biography is well researched and includes study of archived material on the history of the Department of Epidemiology at the Johns Hopkins University and review of all of Frost's personal papers archived at the University of Virginia, including tape recordings of interviews with Frost's associates. The personal reflections and anecdotes included in the book not only make the biography enjoyable to read but also make Frost come to life as a man, not just a footnoted citation. Daniel acknowledges that his biography is not a detailed analysis or critique of Frost's scientific papers. Instead, the author provides a complete bibliography of Frost's publications for those interested in further study.

Daniel's biography of Wade Hampton Frost is highly recommended for all students of epidemiology and those interested in medical history. It is indeed inspiring to ''walk in the ways'' of this pioneer epidemiologist.

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