

Robert Marc Friedman, *Appropriating the Weather*

Appropriating Science for a Weathered Area

Vera Schwach

Around 1920, in cooperation with Norwegian and Swedish colleagues, the physicist Vilhelm Bjerknes (1862–1951) established a new conceptual foundation for atmospheric science; their formulation was based on the concepts of fronts and air masses. The theory and models constructed in Bergen came to be recognized as a principal turning point for meteorology and for science-based weather forecasting. Bjerknes and his colleagues developed their concept at the Geophysical Institute at Bergens Museum and tested the theories and models in daily cooperation with the western Norwegian weather forecasting station (Vervarslinga på Vestlandet), a regional office of the national weather forecasting office, the Norwegian Meteorological Institute (Meteorologisk institutt). In the following decades these meteorological principles and models for weather forecasts were exported from Bergen to neighboring Scandinavia, to Germany, and to the United States.

The story of the “Bergen School,” a term coined by the local meteorologists, lived on in anecdotes and jubilee histories, when the retired meteorologists, journalists, and lay historians all told stories from years past. Well into the 1980s, history of science researched and written in accordance with professional scholarly standards was almost nonexistent in Norway. Such minimal science history as did exist was embedded in, and subordinated to, philosophy and history of ideas. In general, histories of science had emphasized intentions, scientific norms, and experiments, often using examples from physics. Research in areas where field studies played a prominent part was absent, and historical writings seldom included extensive examinations of archival files. Admittedly, the situation was somewhat different at the university in Uppsala and a few other institutions in Sweden; here professional historians worked within a wider purview: history of learning and knowledge (*lärdoms*historie). Alas, these Swedish groups were small in number, and contacts across the scholarly communities were scarce.

The introduction of history of science as a distinct academic field in Norway, especially, was largely due to imported knowledge; the American historian Robert Marc Friedman played a significant role for the ingress of a new academic field. His monograph *Appropriating the Weather* was published in the United States in 1989 but was immediately picked up and became a point of

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reference in Scandinavia.¹ The book is well composed and a captivating read: one learns about Bjerknes, the various motives for collecting measurements and observations, and how the Bergen School constructed its models of low and high pressure and the “polar front.” The pressure on Bergen meteorologists to predict rain and storms with accuracy, so as to prevent shipwrecks, deaths at sea, and crop loss, formed their research. Bjerknes had pursued theoretical investigations of the atmosphere for roughly twenty years. In Bergen he and his assistants began to apply their concepts in the service of daily weather forecasting. The experiments and models built for weather forecasting then led to their discovery regarding the nature of cyclones.

Absorbing reading aside, what made *Appropriating the Weather* important for history of science at the time of its release and turned the story of Bjerknes, weather, and Bergen into a classic, worth a second look in *Isis* thirty years after its initial publication? A starting point for an explanation may be a historiography outlining the intellectual background of the book. It all began when Friedman, as a Ph.D. student at the Johns Hopkins University in the early 1970s, decided to write a dissertation about the formation of the modern discipline of meteorology—a body of knowledge very different from laboratory sciences and physics, which as late as 1990 still dominated the history of science. Friedman’s aim was to trace why, and how, concepts that would become a driving force that changed the field of meteorology and weather forecasting in the United States were constructed in Bergen in the early twentieth century. A scholarship from the American Fulbright Foundation enabled him to spend a year in Norway; Friedman’s first visit was in 1974, and he would return many times in the years to come.² In 1978 he defended his thesis, and roughly a decade later Cornell University Press published a substantially revised version of the dissertation. Through his book, Friedman helped to bring a new field of knowledge—atmospheric science—to the attention of the international, but American-dominated, community of science historians. Although *Appropriating the Weather* won notice in North America, my purpose here is to comment on the book’s influence in the northwestern corner of Europe. A likely guess as to why such ample attention was paid to Friedman in Norway is flattery: Norwegians were flattered that a professional American historian found research done in a small city on the western coast of their country interesting; after all, Bergen lay at a considerable distance from the prestigious universities and advanced laboratories of Europe. The assumption of flattery pertains to both the academic community and the broader public: an indication of the public interest in Friedman’s work on science and weather forecasting is that in 1983 the Norwegian public broadcasting system (NRK) produced and aired a television film based on his dissertation.

Friedman’s book demonstrated the interest of history of science as a research area for professional historians, one founded on the sort of tedious examinations of primary sources that they were familiar with and trusted. Friedman showed the Norwegian academic community what history of science as a professional activity looked like, and he met the scholarly standards of that discipline in treating a theme and a case at the core of national interest. Meteorologists and their weather forecasts are important in a “rugged and weathered country above the water,” to quote the national anthem. Norway is a long country with a varied climate and experiences rapid shifts in weather conditions. Those familiar with the local conditions and culture know the importance of weather forecasts for the economy, maintenance of the country’s infrastruc-

¹ Robert Marc Friedman, *Appropriating the Weather: Vilhelm Bjerknes and the Construction of a Modern Meteorology* (Ithaca, N.Y.: Cornell Univ. Press, 1989).

² Robert Marc Friedman, “Vilhelm Bjerknes and the Bergen School of Meteorology, 1918–1923: A Study of the Economic and Military Foundations for the Transformation of Atmospheric Science” (Ph.D. diss., Johns Hopkins Univ., 1978). Regarding Friedman’s visits to Norway see Tonje Gravås, “En new yorker i Norge” [“A New Yorker in Norway”], interview with Robert Marc Friedman, *Forskning.no*, 9 Apr. 2002, www.forskning.no/2008/02/en-new-yorker-i-norge (accessed 2 Oct. 2017).

ture, and people's daily lives. Bjerknes and Bergen belong to the history of a scientific field with close proximity to societal needs.

Friedman pointed to meteorologists who converted economic and social issues into research questions and actively transformed scientific knowledge for practical use. In doing this, he demonstrated how fruitful it was to combine internal and external perspectives in historical writing. This was a time when the choice of point of view was at the core of principal disputes in the communities of history/philosophy/theory of science.

In a national and Scandinavian context, the close intersection of meteorology and weather forecasting may be considered one example of a strong emphasis on science-based, instrumental rationality as a basis for societal reforms and economic modernization. Friedman's thinking resonated with historians: the concept was readily adopted and influential, in that science gradually came to be viewed as an element in various modernization processes.

Friedman showed how the weather's increased role in the political economy of Norway and the other Scandinavian nation-states was not only a consequence of the development of meteorology as a scientific field, but also a strong constituent in the making of meteorology and modern weather forecasting. In pointing out this two-way connection, he indirectly cast doubt on an influential but simple linear understanding prevalent in science policy and at the universities: the idea of precise distinctions between basic and applied science and well-defined boundaries between science and society.

Interestingly, while he might initially have assumed that military and commercial aviation were significant driving forces behind the formation of modern meteorology, in the course of his research Friedman came to emphasize other forces. The political and economic systems in the Scandinavian countries were (and are) different from those of the United States. One inconspicuous dissimilarity is the comparative size and importance for scientific development of the military-industrial complex in the United States and in Scandinavia. With the partial exception of Sweden, in Scandinavia civil industries, needs, and interests are more prevalent. Thus Friedman came to recognize that in Norway understanding specific civil needs, especially those linked to agriculture, fishing, shipping, and sailing, was essential to understanding public funding and the expectations that rested on science-based weather forecasting. Commercial aviation, in contrast, was not seen as a particularly relevant issue in the 1920s when Bjerknes formulated his theorem.

Friedman's book shows how knowledge traveled, illustrating one particular route: meteorology traveled from Norway to the United States—and then history traveled back, arriving with the "luggage" of history of science as an academic field. As such, this case is an eminent example of the valuable exchange of knowledge across the Atlantic Ocean. The cultural prerequisite was an outward-oriented society with an affinity, especially, for the Anglo-Saxon countries.

Three elements qualify *Appropriating the Weather* for the honor of being called a classic. First, the book is well written. Second, it raised the quality of work in history of science in Norway and Scandinavia—and it did so with research in an important and easily approachable area. Third, Friedman highlighted and examined the connections between science, politics, and the economy. He implicitly questioned a linear understanding of distinct boundaries between basic and applied science, as well as those between science and society.

In retrospect, one notes that Friedman was dealing with perspectives and topics that later came into vogue. Atmospheric sciences gained importance owing to international political concerns regarding air pollution and, somewhat later, saw renewed impetus thanks to a growing awareness of climate change. The same goes for the history of field-based research areas, which have expanded greatly since 1990. In this respect, Friedman was a forerunner. In Norway and Scandinavia history of science is now an established area of academic history, although with an emphasis on institutional histories of universities, public research institutes, and organizations for

public management of research. In addition, history of science has found a foothold within science and technology studies (STS), even though the current position of history (of science) within STS may be difficult to decipher.

When it comes to meteorology and weather forecasting, Friedman's themes have been elaborated and his topics written into a larger intellectual context. In 2017 a comprehensive history of meteorology in Norway (1760–2016), *Vinden dreier* ["The Wind Changes"], was published.³ Friedman set up a contradiction between the "old" meteorology at the mother institution—the Norwegian Meteorological Institute, established in 1866—and the "new" Bergen School, situated at the regional weather forecasting station. In *Vinden dreier*, the historians Yngve Nilsen and Magnus Vollset have implicitly questioned whether this dichotomy is correct, and they have emphasized the continuity in meteorological research and Bergen's connection to the national weather service. Perhaps Friedman, seeking to investigate why concepts that changed meteorology and weather forecasting in the United States were developed in Bergen, overlooked a broader disciplinary context over time? Despite some shortcomings, *Appropriating the Weather* is definitely worth a second look—and the attention of a new generation of readers—thirty years after it was originally published.

³ Yngve Nilsen and Magnus Vollset, *Vinden dreier: Meteorologiens historie i Norge* ["The Wind Changes: The History of Meteorology in Norway"] (Oslo: Spartacus forlag/Scandinavian Academic Press, 2016). See also Thorleif Aass Kristiansen, "Meteorologi på reise: Veivalg og impulser i Arnt Eliassen og Ragnar Fjørtofts forskerkarrierer" ["Meteorology on a Journey: Crossroads and Impulses in Arnt Eliassen and Ragnar Fjørtoft's Scientific Careers"] (Ph.D. diss., Univ. Bergen, 2016).

A Forecasting Classic in Hindsight

Peder Roberts

I begin this essay with a confession regarding the first time I laid eyes on *Appropriating the Weather*. The scene was the university bookstore. I was a rather naive and intellectually lazy graduate student, and while I immediately felt that I *ought* to read this book, I really didn't *want* to. It was about Norway, yes; and Norwegian science in the early twentieth century looked like it would feature in my dissertation. But the front cover illustration evoked the mechanics of atmospheric phenomena—and memories of high school struggles with math and physics. And worse still, for someone who had recently grappled with poststructuralism for the first time, the introduction warned that "readers may discern the ghost of the late Michel Foucault lurking in some analyses and questions."¹ The book remained on the shelf.

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¹ Robert Marc Friedman, *Appropriating the Weather: Vilhelm Bjerknes and the Construction of a Modern Meteorology* (Ithaca, N.Y.: Cornell Univ. Press, 1989), p. xiv (hereafter references to this book will appear in the text in parentheses).