

I: “The Case for Weather Forecasting: Victorian Meteorology and the Press”

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III: *Extended abstract*

The second half of the nineteenth century witnessed intensive negotiations over the public role of science as scientists claimed a more prominent role in education, politics and cultural life. In Britain, meteorology was a key science in these developments for several reasons. It was an early example of new forms of state funding for research, and the controversial nature of forecasting raised questions about the relative priority of service or research considerations – problems that have familiar modern counterparts. But above all, meteorology and weather prediction provided a catalyst for concerns with the relationship of scientists and popular audiences. Weather forecasting forced scientists into a closer engagement with popular interests than they often desired, as they sought to distinguish scientific forecasting from popular prophecy, create intelligible maps and charts, and reconcile their observation programmes with the demand for accurate prediction. This paper will examine some examples of these tensions in the introduction of weather maps in the 1860s and 1870s and consider how concerns with scientific communication shaped the history of weather forecasting

Nineteenth-century meteorologists recognized that mapping techniques were critical to the development of their science. In 1816 Heinrich Wilhelm Brandes had proposed that observations collected by the Meteorological Society of the Palatinate between 1781 to 1792 could be presented in the form of a series of daily maps of Europe; in subsequent papers, Brandes demonstrated the characteristic centre of low pressure through analysis of two severe storms. In 1817, Alexander von Humboldt, following Edmund Halley’s innovative charts of magnetic variation of a century earlier, connected points of average equal temperature on global maps. Humboldt’s name is of course closely associated with projects of thematic mapping and isolines in general and he was explicit about their advantages. Maps managed statistics, Humboldt argued, producing a picture of a great number of facts in a form that “speak[s] to the senses without fatiguing the mind.”¹ In subsequent decades, meteorologists repeatedly pointed to the importance of each of these innovations, synoptic storm maps and general iso-line maps. A historical narrative for this period can move smoothly from Brandes and Humboldt to Hermann Berghaus’ *Physical Atlas* in 1836, to the work of Elias Loomis and Heinrich Dove in the 1840s, to the charts and maps produced by national meteorological organizations in Europe and America when these organizations emerged around mid-century. By 1887, it was a commonplace to assert, as did one meteorologist, that “maps entirely alter the

¹ Arthur H Robinson and Helen Wallis, *Cartographical innovations: An international handbook of mapping terms to 1900* (Tring, Eng: Map Collector Publications in association with the International Cartographic Association, 1987). See also Robinson and Wallis, “Humboldt’s Map of Isothermal Lines: A Milestone in the History of Thematic Cartography,” *Cartographic Journal* 2 (1967) 119-23. For a recent overview see Mark Monmonier, *Air Apparent: How Meteorologists Learned to Map, Predict and Dramatize Weather* (Chicago: University of Chicago Press, 1999).

attitude of mind with which we regard weather changes.” At the end of the century, Gustav Hellmann reprinted a selection of rare maps as milestones of the science.²

Yet there are some features of the history of weather mapping that this account can obscure. The first is the experimentation with maps by meteorologists. The form of meteorological maps was far from fixed and meteorologists showed a marked ability to find their own maps excitingly transparent and the maps of others meaningless. This diversity, with its accompanying arguments about intelligibility, show maps often provided points of divergence rather than convergence for the discipline of meteorology. The second feature that needs attention is the public dimension of mapping. Within the rich visual culture of the nineteenth century, maps of particular catastrophic storms, or daily weather maps in the newspapers or official publications, aroused a great deal of interest. In addition to their own sense of the scientific importance of maps, then, meteorologists recognized that maps helped define the relationship between elite and popular forms of weather knowledge. Maps according exposed the ways that meteorologists themselves understood their practices and scientific claims on the one hand and the place of meteorology in modern society on the other hand. Because the history of weather maps reveals the complex interactions between meteorologists and their audiences, it moves the historical perspective away from any simple model for the transmission of knowledge. But a focus on maps and their audiences also provides another advantage. It suggests a way to analyse the experiments with different mapping techniques among meteorologists mentioned above. Coupling the public world of maps with the instability of mapping forms shows that both reflect the same feature – the challenging gap between maps as a spatially organized record of facts and maps as an interpretative statement about the dynamics of the atmosphere.

To develop this argument, I will look first at the work of Francis Galton in his 1863 *Meteorographica*, and Galton’s later efforts in developing the Met Office weather map in the 1870s. These will be briefly compared with Urbain LeVerrier’s initiatives in the *Bulletin International* of the Paris Observatory. I will then examine at the discussion of mapping in Ralph Abercromby’s 1887 *Weather*, a textbook on meteorology published in the joint British-U.S. publishing venture, the International Scientific Series. In conclusion, these examples can be used to explore the interesting remark made by Napier Shaw in the 1920s that maps had created “a curious alienation” of the “theoretical or experimental physicist,” interested in precision observations themselves, from the meteorologist, interested in exploiting the visual suggestions of forces provided by mapping such observations.³

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² Ralph Abercromby, *Weather: A Popular Exposition of the nature of Weather Changes from Day to Day* (London: Kegan Paul, Trench, 1887) 10; Gustav Hellman, *Meteorologische karten 1688, 1817, 1846, 1863, 1864. Sechs tafeln in lichtdruck mit einer einleitung* (Berlin: Asher 1897).

³ Napier Shaw, *Manual of Meteorology*. 4 vols. (Cambridge: Cambridge University Press, 1926), I:154.