

CHAPTER 2: HOW WE GOT HERE—DISSEMINATION, FROM THE ARMY SIGNAL SERVICE TO NOAA WEATHER RADIO

The predominant, modern American model of warning dissemination is one of public-private partnership. “Most warnings, including all official warnings, are issued by government agencies. Most dissemination and distribution systems are owned and operated by private companies. Liability issues make it problematic for private entities to originate warnings. Public entities typically cannot afford to duplicate private dissemination and distribution systems.”⁴⁶ NOAA Weather Radio distinctively contravenes this public-private arrangement “in its ability to provide federal, state and local communications directly to the public on government operated spectrum, unfiltered by any other source,”⁴⁷ but nonetheless, most Americans learn of the approach of dangerous weather conditions via the commercial media. While “the development of this [public-private] partnership started in earnest in the 1940s,”⁴⁸ signs of its eventual form

⁴⁶ National Science and Technology Council, Committee on Environment and Natural Resources. *Effective Disaster Warnings: Report by the Working Group on Natural Disaster Information Systems, Subcommittee on Natural Disaster Reduction*. November 2000: 6.

⁴⁷ NWR System Advocates. “Comments to the Department of Justice on Homeland Security System.” NWR System Advocates is a group of seven companies which responded to a 12 March 2002 solicitation of comments by the Department of Justice and Office of Homeland Security upon announcement of the Homeland Security Advisory System. [See Fed. Reg. 12047.] The seven companies are: RadioShack Corporation, Midland Radio Corporation, Topaz3, LLC, Sharecom Inc., SIMA Power and Communication, The Whistler Group, Inc., and Cobra Electronics Corporation.

⁴⁸ Gross, Ed. “Public-Private Partnerships: An Issue for National Meteorological Services Around the World.” Speech given at a lecture on “Access to Meteorological

are discernable even in the earliest days of official United States warning services, simply by virtue of the government's early partnerships with commercial telegraph services,⁴⁹ which often donated free messaging to the cause of warning dissemination.

"The telegraph made meteorology a practical science,"⁵⁰ and inauguration of the first commercial telegraph line on 1 April 1845⁵¹ marked the beginning of a communications network that could at last bring weather analysis and dissemination to the forefront of scientific progress. When that first for-profit telegraphic service went on-line, "many people saw the possibility of 'forecasting' storms by simply telegraphing ahead what was coming. The first person to do something about it was Joseph Henry, Secretary of the new Smithsonian Institution."⁵² On 8 December 1847, Henry proposed to the Smithsonian's Regents "a system of observation which shall extend as far as possible over the North American continent.... The citizens of the United States are now scattered over every part of the southern and western portions of North America, and the extended lines of the telegraph will furnish a ready means of warning the more northern and eastern observers to be on the watch from the first appearance of an advancing storm."⁵³ Within two years, Henry's network of observers comprised 150 scattered volunteers, regularly reporting conditions directly to the Smithsonian. In 1850, Henry began posting the first daily weather maps in the hall of the Institution for public viewing. The

Data: The Situation Today and Future Developments" at the University of Cologne on 27 September 1996. Gross was then Chief of the Office of Industrial Meteorology at the National Weather Service.

⁴⁹ Hughes, Patrick. *A Century of Weather Service: A History of the Birth and Growth of the National Weather Service, 1870-1970*. New York: Gordon and Breach, Science Publishers. 1970: 16.

⁵⁰ Ibid.: 5.

⁵¹ Ibid.

⁵² Ibid.

⁵³ Ibid.

telegraphed information, brought to Henry courtesy of “an arrangement with the telegraph companies,” gave him the data he needed “to predict or show the possibility of predicting storms and weather; a matter that he had frequently urged on the attention of Congress.”⁵⁴



Figure 1. Joseph Henry⁵⁵

⁵⁴ Weber, Gustavus. *The Weather Bureau: Its History, Activities and Organization*. New York: D. Appleton and Co. 1922: 3.

⁵⁵ Hughes: 4.

Daily weather analysis was an important achievement, but the issuance of official government weather warnings was a different matter. The nation still lacked any department with a specific charge of issuing such warnings. National Weather Service historian Patrick Hughes wrote in his 1970 history of that agency that “the man who started the chain of events leading to [the Weather Bureau’s] creation” was Professor Increase A. Lapham of Milwaukee, a student of meteorology and a member of Henry’s network of observers. In 1868, Lapham, citing numerous and costly Great Lakes shipping disasters, “sought support for a storm warning service for the Lakes” from General Halbert E. Paine, Congressman from Wisconsin. Lapham’s letter to Paine referred to “the duty of the Government to see whether anything can be done to prevent, at least,

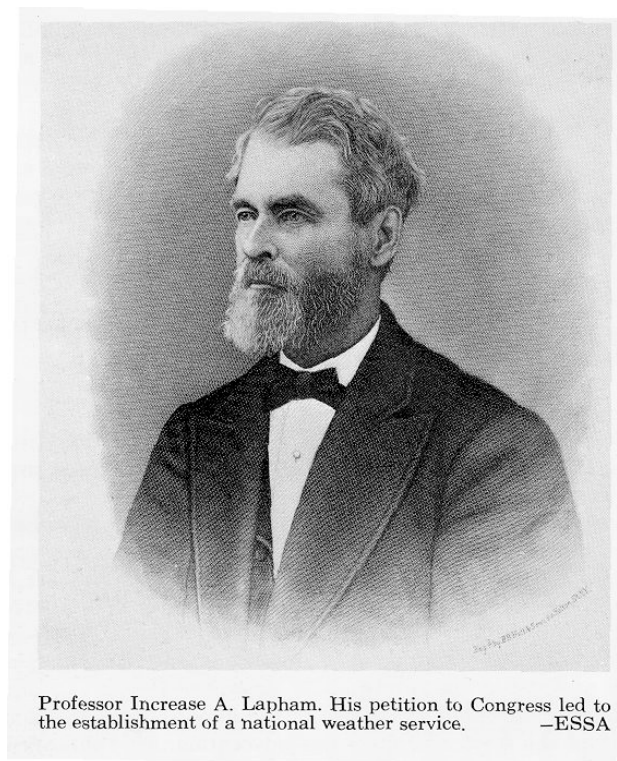
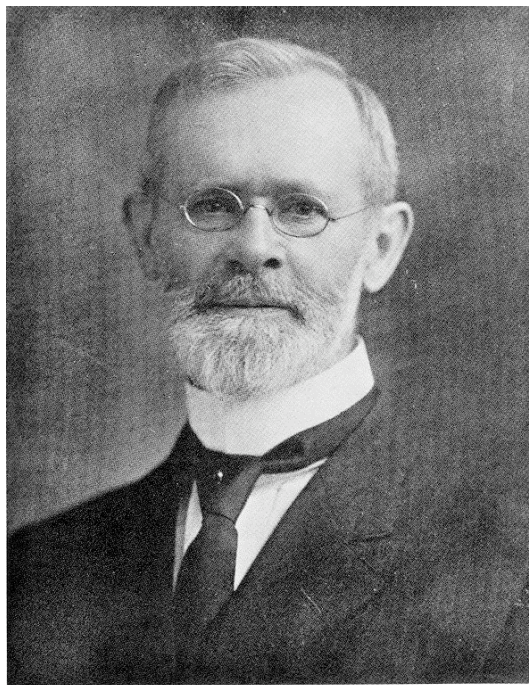


Figure 2. Increase Lapham⁵⁶
some portion of this sad loss in the future.”⁵⁷

⁵⁶ Ibid.: 8.

Another central figure in the creation of today's Weather Service was Professor Cleveland Abbe, who, as director of the Mitchell Astronomical Observatory in Cincinnati, Ohio, demonstrated during the years 1868 to 1870 "the practicability of rendering a definite daily service in forecasting the weather." Abbe secured funding from the Cincinnati Chamber of Commerce, as well as the cooperation of the Western Union Telegraph Company, to build a network of about 30 reporting stations. Their daily dispatches, begun on 1 September 1869, allowed Abbe "for a short time" to mount analysis and forecasting efforts similar to the work that was on-going at the Smithsonian.⁵⁸



Cleveland Abbe's work in Cincinnati showed the practicability of a public weather service. —ESSA

Figure 3. Cleveland Abbe⁵⁹

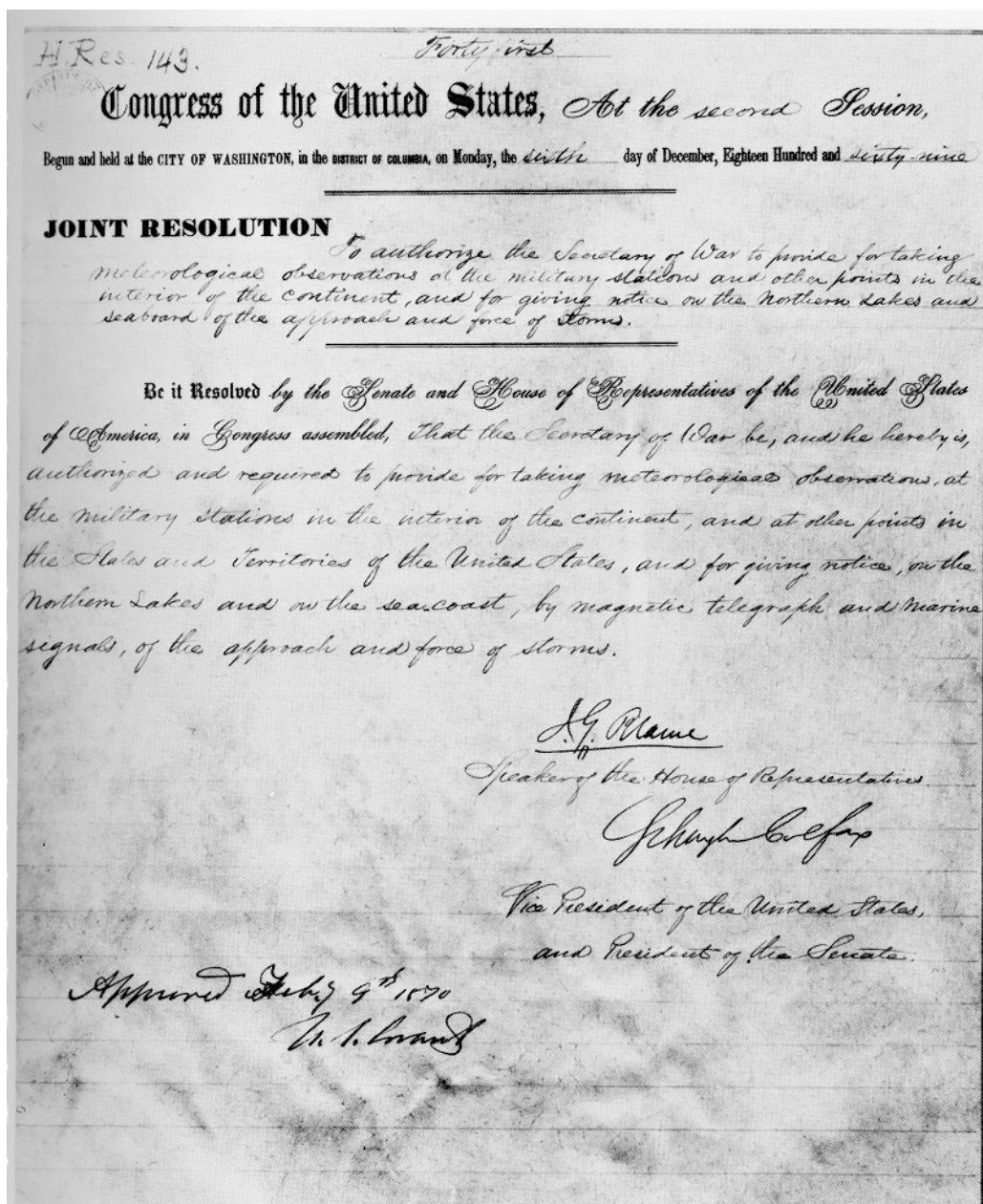
⁵⁷ Ibid.: 7.

⁵⁸ Weber: 3.

⁵⁹ Hughes: 18.

On 2 February 1870, Paine introduced a Joint Congressional Resolution requiring the Secretary of War “to provide for taking meteorological observations at the military stations in the interior of the continent and at other points in the States and Territories... and for giving notice on the northern (Great) lakes and on the seacoast by magnetic telegraph and marine signals, of the approach and force of storms.” Paine cited the likelihood that military discipline “would probably secure the greatest promptness, regularity, and accuracy in the required observations”⁶⁰ in explaining why he proposed the War Department as the agency most capable of executing the government’s meteorological observation and warning responsibilities.

⁶⁰ Ibid.: 7.



The Joint Congressional Resolution creating the Government's first official weather service. Signed by President Grant on February 9, 1870.

—THE NATIONAL ARCHIVES

Figure 4. 9 February 1870 Joint Congressional Resolution creating the nation's first weather service⁶¹

⁶¹ Ibid.: 9.

One week later, on 9 February, President Ulysses S. Grant signed into law the bill that Congressman Paine had written, officially vesting ultimate responsibility for weather services in the hands of the Secretary of War.⁶² Thus did our national weather service come to life, an offspring of the United States Signal Service, later called the Signal Corps—“the first signal organization in military history.”⁶³ Therefore, even though our National Weather Service is clearly a child of many fathers, credit for our modern agency’s genesis belongs largely also to the father of modern signaling, the man who in 1861 had founded of the Army Signal Department, Dr. Albert James Myer. On 28 February 1870, Secretary William W. Belknap notified Myer that the job would belong to the Signal Service.⁶⁴

Myer was an Army surgeon who “first became fascinated with the problems of communication, though not with their application to the military,” while studying medicine at Hobart College and Buffalo Medical College.⁶⁵ (Myer’s thesis topic: “A Sign Language for Deaf Mutes.”⁶⁶) While serving in New Mexico in 1856, Myer noticed the facility with which Comanches signaled one another with their lances, and these insights led him to develop “the now familiar code of wigwag signals with flags and torches.”⁶⁷ The New York physician’s pioneering work in communication studies and signaling techniques met with such success and endorsement in the fields of Civil War battle that by the end of the war his department boasted a roster of “more than 2,000 officers and

⁶² Whitnah, Donald R. *A History of the United States Weather Bureau*. 1961: University of Illinois P.: 19.

⁶³ Army Times. *A History of the United States Signal Corps*. New York: G. P. Putnam Sons. 1961: 7, 8.

⁶⁴ Whitnah: 19.

⁶⁵ Army Times: 11, 12.

⁶⁶ Ibid.: 12.

⁶⁷ Hughes: 8.

men,”⁶⁸ had strung more than 15,000 miles of telegraph wire, and had transmitted more than 7 million messages.⁶⁹



Brevet Brigadier General Albert J. Myer organized the new weather service, which he established as a division of the Army Signal Service.
—ESSA

Figure 5. Albert Myer, founding father of the weather service⁷⁰

⁶⁸ Army Times: 53.

⁶⁹ Ibid.: 55.

⁷⁰ Hughes: 10.

Myer's department—soon popularly referred to as “the Weather Bureau”—assumed the responsibility of issuing weather warnings “with only one great asset for the task—the telegraphic facilities. For meteorological knowledge, it had to turn to civilians,”⁷¹ and “the higher technical work from the beginning was directed and performed by” non-military personnel, “at the head of whom was Professor Abbe.”⁷² Professor Lapham, too, found a place in the new organization whose creation he had urged, for on 8 November 1870, Myer requested that Lapham assume responsibility for the Great Lakes area, “and Lapham obliged by issuing the first storm warning that very day. The dispatch...read: ‘High wind all day yesterday at Cheyenne and Omaha; a very high wind this morning at Omaha; barometer falling and thermometer rising at Chicago, Detroit, Toledo, Cleveland, Buffalo and Rochester; high winds probable along the Lakes.’”⁷³ The government issued its first-ever hurricane warning in August 1873⁷⁴ “when the Signal Corps warned against a storm approaching the coast between Cape May, New Jersey and New London, Connecticut.”⁷⁵

Also in 1873, the Signal Service made a giant leap in dissemination services by posting daily weather analyses in thousands of rural post offices—a practice that continued until 1881, “when local signal flags replaced the bulletins.”⁷⁶ (Specific

⁷¹ Whitnah: 22.

⁷² Weber: 4.

⁷³ Whitnah: 22.

⁷⁴ Ibid.: 32.

⁷⁵ National Weather Service. *Hurricane! A Familiarization Booklet*. Apr. 1993: 11. 17 Nov. 2002 <<http://www.nws.noaa.gov/om/brochures/hurfam.pdf>>.

⁷⁶ Hughes: 21.

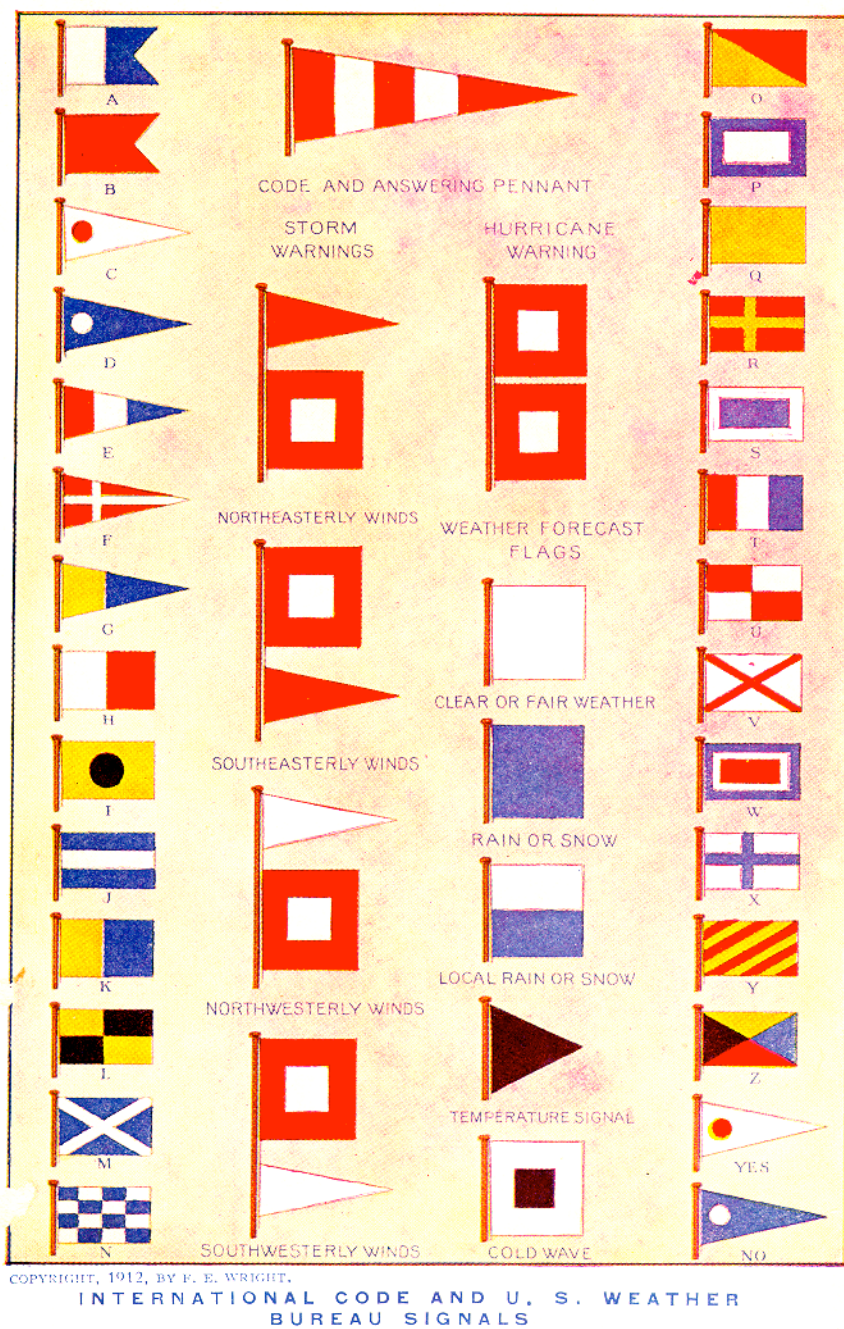


Figure 6. Signal flags, a Myer legacy. Scanned plate from the 1914 *People's Cyclopedia*, Syndicate Publishing Co., New York.

Local forecasts were not issued until 1881, “when a very few stations, including New York City, were given permission to issue such indications.”⁷⁷⁾

The tenure of Albert Myer as head of the Signal Service, and thus of the nation’s only official weather service, “was comparatively free from large-scale attempts to alter the internal structure of the service.”⁷⁸ Myer was popularly deemed an effective manager of resources both technical and human, and the service generally prospered under his leadership despite occasional calls from politicians for transfer of the weather service to civilian control. Myer’s death in 1880, however, and the appointment of his successor General William B. Hazen, marked the beginning of the end for military purview in national meteorological services. A series of public controversies and Congressional investigations of Hazen’s administration led to increasingly frequent calls from Congress, the public, and even the ranks of Signal Service officers, for transfer of the Weather Bureau to civilian control. A Congressional commission reported in its findings on 8 June 1886 that the postal, internal revenue, lighthouse, and lifesaving duties were all under civilian jurisdiction, and that the weather service should have similar status.⁷⁹ Hazen died in 1887, but his successor General A. W. Greely failed to quiet rumblings of discontent with the status quo. By 1889, government “supporters of the change maintained a vast majority of sentiment,” and Greely seemed almost to welcome the prospect of ceding the quarrelsome and complex service. President Benjamin Harrison approved a Congressional measure placing the Weather Bureau under the auspices of the Department

⁷⁷ Whitnah: 24.

⁷⁸ Ibid.: 43.

⁷⁹ Ibid: 55.

of Agriculture, and at noon on 1 July 1891, the physical plant and personnel (honorably discharged) were finally transferred to civilian control.

Hughes describes the ensuing explosion of dissemination services that carried Weather Bureau information at the turn of the century:

“By 1901, Bureau forecasts were daily disseminated by telegraph, telephone, and mail to about 80,000 recipients. Weather maps and bulletins were posted in hotels, stores, office buildings, post offices, railway stations, and even trolley cars, while railroad trains carried weather signals on the sides of their baggage cars. Meanwhile, the recently inaugurated rural free mail delivery system was bringing the forecasts to heretofore inaccessible farming communities, and telephone operators were reading them to their companies’ subscribers.”⁸⁰

In 1910, “public interest in weather prompted the Weather Bureau to install kiosks at 29 cities. Kiosks, built on iron stands and placed along thoroughfares or in parks, contained instruments, showing the passer-by at a glance the current temperature, humidity, and rainfall data.”⁸¹

⁸⁰ Hughes: 45, 47.

⁸¹ Whitnah: 98.

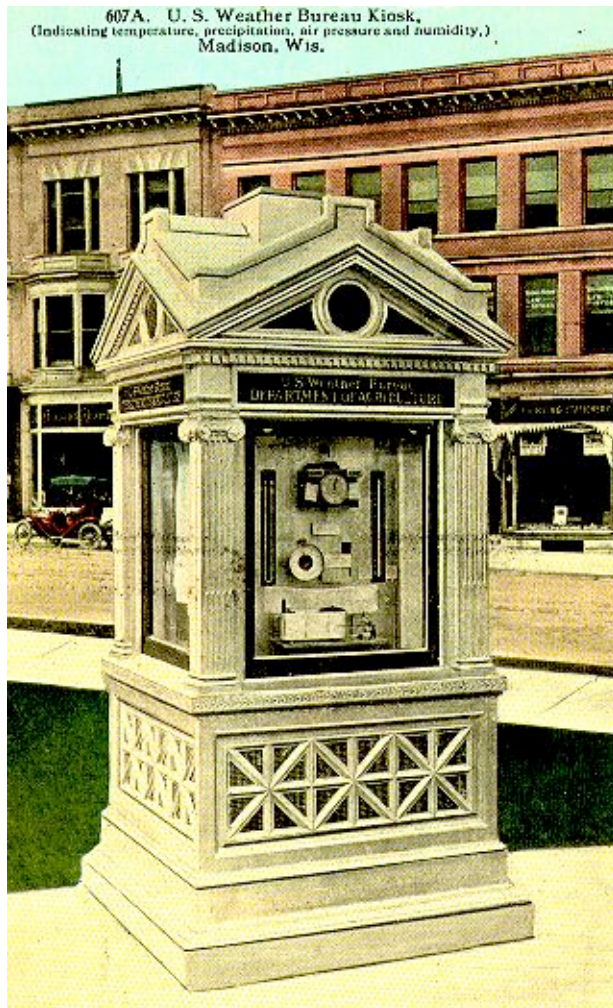


Figure 7. Madison, Wisconsin Weather Bureau urban kiosk.
Photo from postcard, postmarked 4 November 1914.

In further consideration of the growth of dissemination services during the opening years of the 20th century, we observe that “in 1904 some 60,000 farmers in Ohio alone were receiving a daily weather forecast by telephone within an hour of their issue; by 1926 there were some 5,500,000 rural subscribers to this service.”⁸² In 1938, teletype services covered all but three of the 48 states.⁸³

⁸² Hughes: 47.

⁸³ Ibid.: 44.

The advent of telephone and wireless telegraphy—the Weather Bureau was the first U. S. government agency to make use of the latter⁸⁴—and of commercial radio, began to thrust the work of the Bureau more and more into the public eye. It was, however, the growth of commercial aviation that ensured the Weather Bureau’s exponential growth in funding and level of service. Indeed, Hughes wrote that “American aviation and the Weather Bureau grew to maturity together,” and that the 1926 Air Commerce Act, establishing official Weather Bureau responsibility for civilian aviation services, was the primary factor leading to the terrific growth of the nation’s weather service, “and the catalyst for major advances in the science of meteorology itself.”⁸⁵ Aviation services also became the impetus for inauguration of the VHF-FM broadcasts which would evolve into today’s NOAA Weather Radio service, more about which below. The importance and growth of the Weather Bureau’s services to aviation brought about the agency’s transfer on 30 June 1940 from Agriculture to the Department of Commerce, where it remains to this day.

Dissemination of weather forecasts continued inevitably to improve with modern technologies. FAX and teletype services to newspapers, and even direct broadcasts over commercial radio stations by Weather Bureau personnel, became increasingly commonplace during and after World War II. Donald Whitnah wrote in his excellent history of the Weather Bureau that shortly after the war, “600 commercial stations gave daily weather data to the public, with over one-fourth of these supplying microphones for direct broadcasts from Weather Bureau offices.”⁸⁶ When television entered the scene, a

⁸⁴ Hughes: 31.

⁸⁵ Ibid.: 34.

⁸⁶ Whitnah: 229.

similar arrangement began to assert itself—and the public persona of the Weather Bureau took on truly high visibility in localities where local Bureau officials became TV personalities. Earl Estelle, a retired Chief of Public Services with the National Weather Service, recalled in interviews how his own boss’s on-air activities in Sacramento—and the TV and radio presentations of other local Bureau meteorologists around the nation—began during the 1960s to provoke debate over the propriety of having government officials serve as on-air “talent” for commercial broadcast stations.⁸⁷

In May of 1964, that debate was in some measure described in the pages of *Topics*, an internal Weather Bureau monthly periodical. A partially redacted exchange of letters between then-chief of the Weather Bureau, Robert M. White, and a “private meteorologist,” shows the unease with which some weather professionals regarded direct government involvement in weather broadcasts over the commercial airwaves at that time. The private meteorologist, whose name was not published, stated, “Of course, we realize that the provision of extensive weather information for dissemination to the general public over radio channels is one of the broad and necessary functions of the Bureau. However, we would question the actual broadcasting by Weather Bureau personnel, who, in effect, are acting in the capacity of ‘talent’ for the radio stations involved.”⁸⁸

White’s response is revealing, both in that which he conceded, and in that which he did not:

“In general,” replied White, “I am quite sympathetic to your views that the marketing of weather information to radio stations is a proper area for the private

⁸⁷ Estelle. Telephone interviews. 10 July and 6 September 2002.

⁸⁸ United States Weather Bureau. *Topics*, 23.5 (1964): 70, 82.

meteorologist. However, I also believe that the Weather Bureau must have direct access to all mass communications media.” So, while White sought to down-play the role of government forecasters as on-air talent—“Our direct broadcasts are now limited in most areas where we provide them to a minimum number per day”—he at least kept the door open to direct dissemination, from Bureau to public.

White also stated, “I can assure you...that we will never consciously duplicate or adopt a format proposed by a private meteorological company with the intent to compete.”

“It wasn’t long,” Estelle said, “before White put an end to personal appearances on TV by Weather Bureau people, except in emergencies.” We conclude from this debate that during the mid-20th century the Weather Bureau was still trying to define its role in the public arena, and still searching for its own voice in the field of dissemination. By then, the public-private dissemination partnership was unquestioned, but the propriety of having the voices of government agents go over the air was still a somewhat open issue.

Despite these conflicts and pressures, an on-going “experiment” in VHF-FM broadcasts was even then securing to the federal government a toe-hold in the field of direct broadcast through facilities owned and controlled by the Weather Bureau, and constituted the first milestone in the development of today’s NOAA Weather Radio network.