THE CORPS THAT ALMOST WASN'T

The Signal Service years were roughly 1870 – 1891

The 1800s were a turning point in meteorological observation and study, and the Pikes Peak region was a key element in that development. Despite the fact regular daily weather observations can be traced to fifth century Greece, however the first technological advancement, the anemometer (used to clock wind speeds), was not invented by Leonardo Da Vinci until 1483, and the thermometer and barometer were not invented until the 1600s. These instruments changed how recordings of the weather were monitored. Regular weather diaries were not common until the eighteenth century compliments of such individuals such as "Thomas Jefferson and James Madison in Virginia, John Winthrop in Massachusetts, and Dr. John Lining along with a few others in South Carolina."[i] More specific to the Pikes Peak region are the travel journals from Zebulon Montgomery Pike which also include fairly regular commentary on weather conditions, as well as how the weather directly impacted his travels through the Colorado Springs area.

After the Civil War, the Army was facing budget cuts and departmental reductions across the board; the Secretary of War did not see a need for a separate weather focused Signal Corp, assuming those suggested responsibilities could be performed by the already established engineer corps. Why assign responsibility of a weather agency to the military at all? Congressman Halbert E. Paine thought the War Department would be best to oversee such an operation because "military discipline would probably secure the greatest promptness, regularity, and accuracy in the required observations."[ii] This is ironic considering one of the first entries from the Pikes Peak summit house is missing the first mornings' worth of readings due to the fact the sergeant overslept…we all have our bad mornings, even enlisted men.

To ensure the longevity of the Signal Corp, Brigadier General Albert J. Myer advocated for the implementation of weather observation and studies as part of the Signal Corps responsibilities. Decades before, Thomas Jefferson envisioned a national weather network given weather has always been a vital part of American life; with a dedicated weather corps and advancing technologies, the nation was one step closer to realizing Jefferson's vision. Even Lewis and Clark were ordered to keep detailed weather observations on their expedition.

One of the first structured weather organizations came at the hands of Surgeon General of the Army James Tilton when he ordered military hospitals to keep detailed weather records in 1812. Eventually that endeavor grew to a network of ninety-seven hospital bases with a weather detail directed by James P. Espy, later to be appointed by Congress as Meteorologist to the United States government in 1842.

By 1841 volunteers were mailing weather reports to Washington, D.C. What was initially a small group grew to one hundred and fifty stations in eight years being supervised by Joseph Henry, then Secretary of the Smithsonian Institute. In 1860 Henry secured participation alongside Western Union to open their communication lines every morning before business hours to answer the question, "Good morning, what is the weather?"[iii] The introduction of new technologies with emerging sciences would propel the fledgling weather project into a structured national movement.

There was sincere concern that "the true causes of the production of storms [were] so far from being understood that little [information which was] settled could] be advanced."[iv] The United States was already lagging behind French, Dutch, and British scientists who were not only tracking the weather, but as early as 1855 had technologies in place for forecasting. Seeing the growing need for the same technological advancements, on 9 February 1870 a Joint Resolution from President Grant allowed "for taking meteorological observations at the military stations in the interior of the continent and at other points in the states and Territories of the Unites States, and for giving notice on the northern lakes and at the seacoast, by magnetic telegraph and marine signals, of the approach and force of storms."[v] From this unimposing legislation was born the Signal Service. Just two years later the agency would see an expansion; on 10 June 1872 an act of Congress extended weather services throughout the United States, not just for forecasting, but including a system of storm and wind signals as well; "for expenses of storm signals announcing the probable approach and force of storms throughout the [U.S.] for the benefit of commerce and agriculture."[vi] Initially the United States was divided into specific districts, Chicago, New York, Washington, St. Paul, etcetera. Also, with the legislative expansion, "nearly every [weather] observer [was] authorized to make local forecasts; each station was equipped with a barometer [to measure atmospheric pressure], thermometer [temperature], hygrometer [moisture content], anemometer [wind speed], wind vane [directionality], and rain gauge [accumulation]."[vii]

The department's first official title was The Division of Telegrams and Reports for the Benefit of Commerce; they were assigned to the Signal Service Corps under Brigadier General Myer. These weather men were called 'observing sergeants' and initially stationed at twenty-two different military bases across the country; although those locations would quickly expand to include locales such as the summit of Pikes Peak, Colorado Springs, CO., the second yet highest mountain top weather station.

Required education for weather observers was specific to enlisted soldiers. A school of meteorology was added to the existing curriculum in telegraphy and military signaling at what was then Fort Whipple (now Fort Myer), Virginia. Learning meteorology was "like learning a new language," courses included military tactics, signaling, telegraphy, telegraphic line construction, electricity, meteorology, and practical applications in meteorological observation.[viii] The training school for meteorology at Fort Myer was dismantled in 1886 by the Secretary of War, however, by 1900 "increasing attention given to the subject of meteorology in

schools and colleges throughout the country…resulted in large demands upon the officials of the Weather Bureau for lectures and other forms of instruction on" weather studies.[ix]

Initially, weather reports were made via telegraphic summaries sent to Washington, D.C. from the various observation sites around the nation, then distributed out to the public via railroad stations and news media outlets. The Pikes Peak mountain observation site was connected to the city of Colorado Springs down below by telegraph line #99. Harsh winds and heavy snow fall often downed the line, at times the poles themselves. Notice the large rocks atop the roof. The shabby construction of the first summit house left it and its' residents victim to the fierce mountain weather; it was not uncommon for strong winds to pull up the roof.

At least seven (7) factors were measured on a consistent basis:

barometric pressure/change since last report
temperature/24 hour change (if any)
relative humidity
wind velocity
pressure of wind in pounds per square foot
amount/type of clouds
state of weather (overall)

Earning roughly $77.25 a month for sergeants/$60.43 for privates, soldiers were required to take, put into cipher, and furnish the results of observations made at predetermined times based on the aforementioned factors. Measurements were taken daily at three fixed moments of physical time (7:35 a.m., 4:35 p.m., and 11 p.m. Washington, D.C. mean time) throughout the whole extent of the territory of the United States. The results were to be telegraphed thrice daily each day, at the prescribed fixed times. Three other observations were to be taken at the local times, 7 a.m., 2 p.m., and 9 p.m., also taken and recorded at each station. A seventh and especial observation was taken and recorded at noon on each day local time. If at this observation such instrumental changes were noted as to cause alarm, that anomaly was telegraphed to the central office in D.C. An eighth observation was required to be taken at the exact hour of sunset at each location. This

observation, embracing the appearance of the western sky, the direction of the wind, the amount and style of cloud, the readings of the barometer, thermometer, and hydrometer, and amount of rain-fall since last preceding report, was relayed with the midnight report. The average time the data collected was telegraphed to Washington, D.C. and then disseminated to press and various media outlets was roughly two hours. Considering there was no Twitter or Facebook in 1870 that was a pretty good turnaround.

Despite the Signal Service operating as a military organization, on 8 November 1870 it employed its first civilian and subsequently disseminated its first civilian weather report care of Professor Increase A. Lapham of Milwaukee; a proponent of an advanced storm warning service for the Great Lakes area. His first weather report read:

> High wind all day yesterday at Cheyenne and Omaha; a very high wind this morning at Omaha; barometer falling with high winds at Chicago and Milwaukee today; barometer falling and thermometer rising at Chicago, Detroit, Toledo, Cleveland, Buffalo and Rochester; high winds probable along the Lakes.

Not all activity of the Signal Service was specifically weather related. A 17 May 1877 memo from the War Department ordered a Sergeant to observe any Rocky Mountain locust should they appear near his station. The Sergeant was to note the "date of appearance; direction from which they came; direction and velocity of wind and character of weather at time of appearance; length of time they remain in [the] neighborhood; damage done by them," etcetera. Personal journals of those stationed atop Pikes Peak tell of the spiders, flies, bumblebees, rats, grasshoppers, mosquitoes, and gray and brown moths in which they encountered.

It took but a few months atop the summit of Pikes Peak to be able to distinguish patterns in the weather and then to be able to make adequate generalizations in turn pertaining to the weather. For example, most "winter storms occurred with wind coming from the southwest, and when gale winds changed directions the snow would abate, however, if the winds again veered to blow from the southwest [then] snow [would begin] to fall again."[x] The signal men thought they had figured out patterns in the weather wherein patterns could be made to predict things like flash floods along the Front Range. And of course, "it was well known that [even in the 1800s, like today], the forecasters of the Weather Bureau often [made] mistakes in their efforts to interpret the probable changes in [the weather from day to day]…and that in consequence they are subject to criticism by the public for their failures."[xi]

In 1890 President Benjamin Harrison transferred the weather service out of the War Department and into the Department of Agriculture. "As the science of meteorology developed and as the demands of commerce, agriculture, and navigation with regard to warnings of storms, frosts, and other atmospheric disturbances and floods increased, the urgent need of a new organization, devoid of militarism, and with a more real scientific status, became apparent."[xii] This was

significant because not only did the presidential act divorce the weather bureau from the military, it created an "independent bureau devoted to the sole purpose of scientific meteorological agency."[xiii] As we enter an era where "the economic costs of severe weather events have exceeded [upwards of] $50 billion per incident, [just in 2011 alone], prevention of catastrophic damages relies on reliable information from agencies like NOAA.[xiv]

For more information on the continued development of the National Oceanic and Atmospheric Administration, please visit their web site at:
NOAA History
www.history.noaa.gov

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[i] Vernon Preston, *Lewis and Clark : Weather and Climate Data from the Expedition Journals.* Boston: American Meteorological Society, 2007, 21.
[ii] Lesley-Ann Dupigny, *Historical Climate Variability and Impacts in North America*. New York: Springer Publishing, 2009, 183.
[iii] George S. Bliss, "The Weather Business: A History of Weather Records, and the Words of the U.S. Weather Bureau," *Scientific America* 84, supplemental no. 2172 (August 18, 1917), p. 110.
[iv] Frank H. Bigelow, *Storms, Storm Tracks, and Weather Forecasting*. Washington: Government Printing Office, 1897, p. 17.
[v] *The Weather Bureau: Its History, Activities and Organization* Gustavus A. Weber New York: D. Appleton and Company, 1922, pg. 4.
[vi] *The Weather Bureau: Its History, Activities and Organization* Gustavus A. Weber New York: D. Appleton and Company, 1922, pg. 9.
[vii] Lesley-Ann Dupigny, *Historical Climate Variability and Impacts in North America*. New York: Springer Publishing, 2009, 183.
[viii] Frank H. Bigelow, Storms, Storm Tracks, and Weather Forecasting. Washington: Government Printing Office, 1897, p. 6
[ix] United States, Weather Bureau. *Report of the Chief of the Weather Bureau, Volume 1*. Washington: Government Printing Office, 1900, p. 13.
[x] *Weather Pioneers: The Signal Corps Station at Pikes Peak* Phyllis Smith Athens: Swallow Press, 1993, pg, 46.
[xi] Frank H. Bigelow, Storms, Storm Tracks, and Weather Forecasting. Washington: Government Printing Office, 1897, p. 17
[xii] *The Weather Bureau: Its History, Activities and Organization* Gustavus A. Weber New York: D. Appleton and Company, 1922, pg. 6.
[xiii] *The Weather Bureau: Its History, Activities and Organization* Gustavus A. Weber New York: D. Appleton and Company, 1922, pg. 6.
[xiv] Hearing before the Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard of the Committee on Commerce, Science, and Transportation – United States Senat, One Hundred Twelfth Congress First Session November 16, 2011.