

**HISTORY OF WEATHER OBSERVATIONS
Des Moines, Iowa
1835-2005**

November 2005
Updated December 2005

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**This report was prepared for the Midwestern Regional Climate Center
under the auspices of the Climate Database Modernization Program,
NOAA's National Climatic Data Center, Asheville, North Carolina**

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ACKNOWLEDGEMENTS

I would like to thank Harry Hillaker the State Climatologist for Iowa for his assistance. Harry has a special love for the history of weather observing in Iowa and his actions reflect this passion. The staff of the State Historical Society of Iowa was especially helpful in locating many photographs and other information. And I would like to thank Brenda Brock and her staff at the National Weather Service office in Johnston, Iowa.

The author would also like to thank Glen Conner and Gary Grice for their advice and direction as it concerned the formulation of this report and its contents. And a special thanks to Joe Elms and the staff of the Climate Database Modernization Program at the National Climatic Data Center for their support and assistance.

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**HISTORY OF WEATHER OBSERVATIONS
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**Stephen R. Doty
Information Manufacturing Corporation**

INTRODUCTION

Executive Summary

Weather observing in Des Moines, Iowa, began under the auspices of United States Army surgeon's in 1835 at the newly established Fort Des Moines. The surgeons recorded the weather during two periods, 1835-1837 and 1843-1846. During the period 1865 until 1898 observations were taken by a series of volunteer observers at several locations scattered around the city. See Map 1. In 1878 the U. S. Army Signal Service began taking observations in downtown Des Moines. The observing program moved to the Weather Bureau in 1891. The downtown locations continued through a series of moves including the McCaine Building (1878-1886), the Clapp Building (1886-1889), the Post Office Building (1889-1929), and the U. S. Courthouse (1929-1973). See Map 2. By 1928 an observing program was begun at the new Des Moines Municipal Airport where it remains to this day. See Map 3. The National Weather Service established a limited observing program at its new office building in Johnston, Iowa, just north of Des Moines in 1993. See Map 4.

Goal of Study

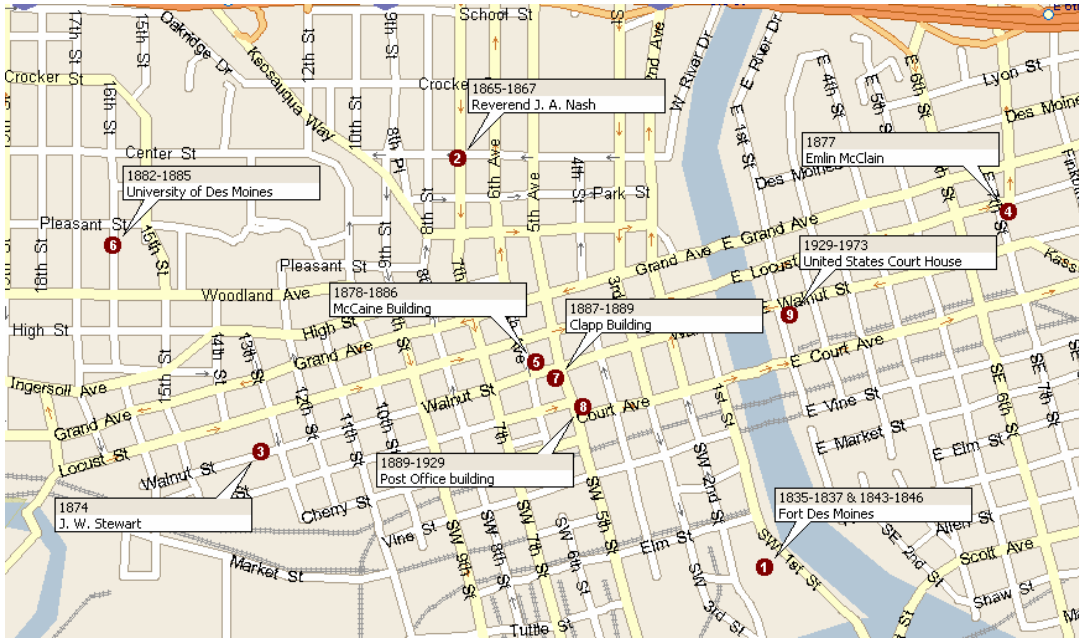
The goal of this study is to document the primary weather observational path at Des Moines, Iowa. Throughout the research for and preparation of this study, the goal was to produce a document that future studies can use to evaluate the validity of the data that were collected here, judge the trustworthiness of the observers who collected them, and determine the climatological significance of the whatever variability may be discerned.

LOCATION OF OBSERVATIONS

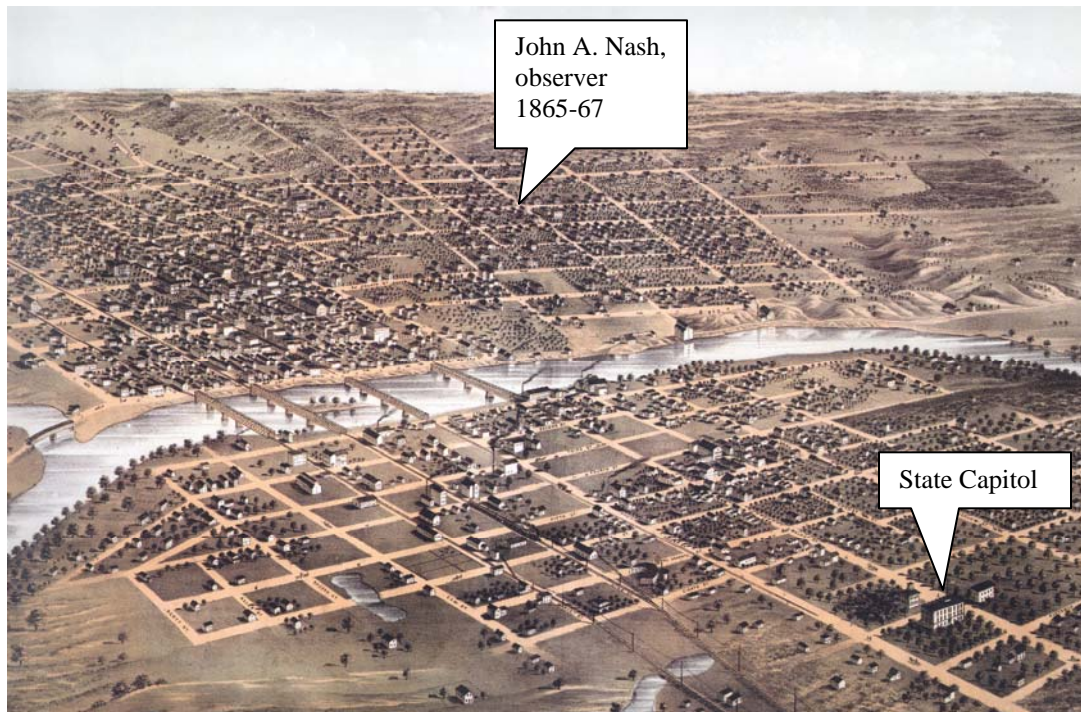
Location maps



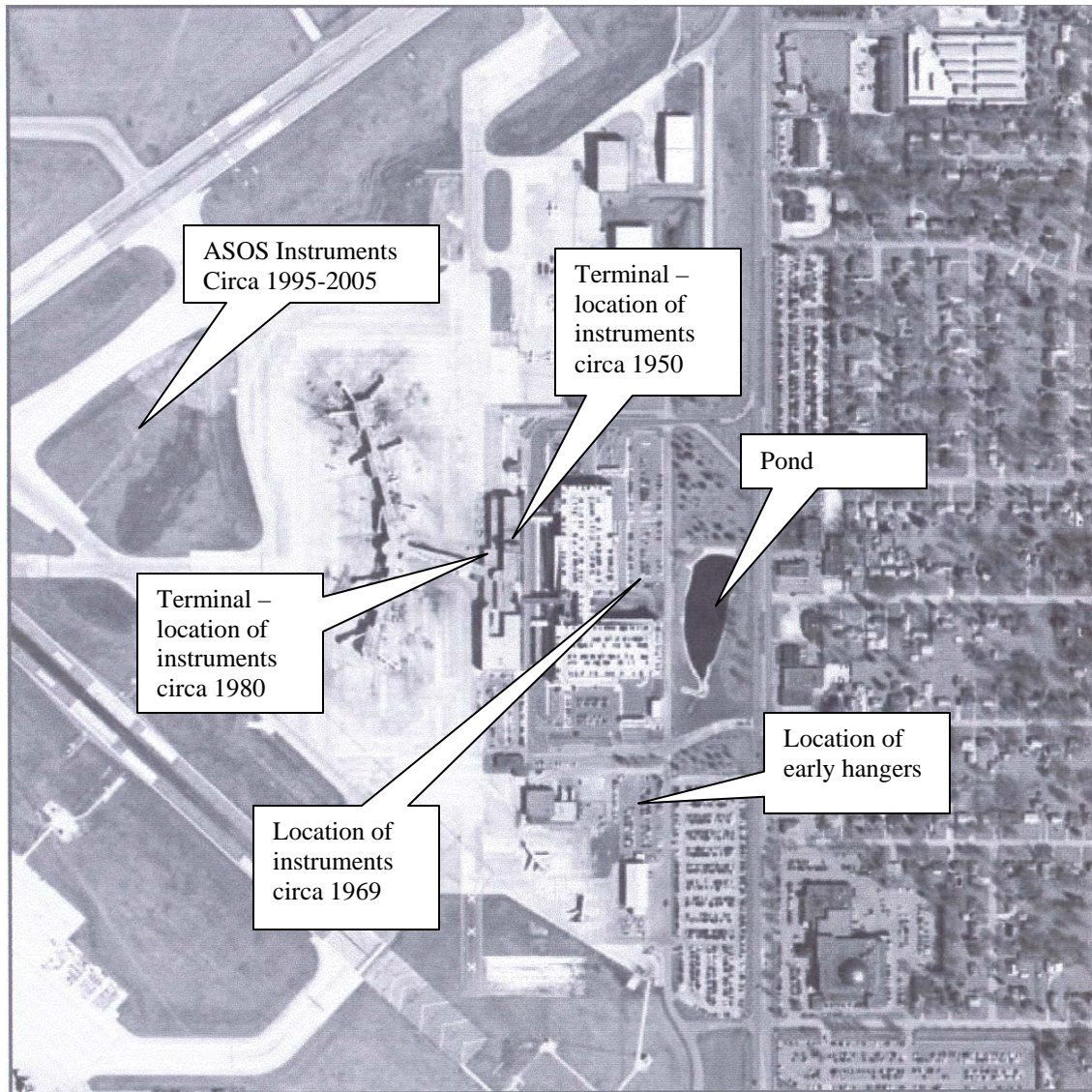
Map 1. The location of weather observing sites in the Des Moines, Iowa, area 1835 – 2005. North is to the top of the map.



Map 2. The location of weather observing sites in downtown Des Moines, Iowa, 1835 – 1973. North is to the top of the map.

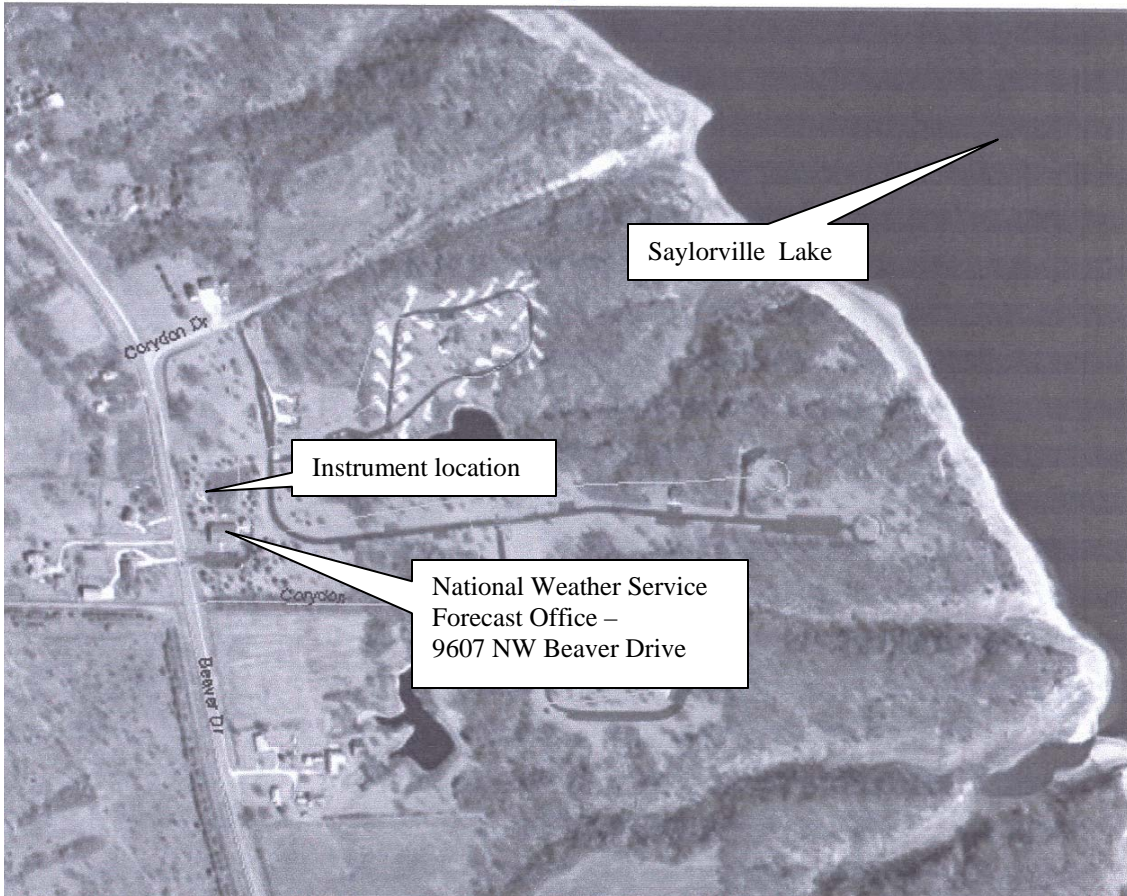


Map 3. Des Moines, Iowa as of 1868. View is looking west.
Source: Author's collection of maps.



Map 4. Photomap of the Des Moines, Iowa airport, circa 2002. North is to the top of the map.

Source: Iowa State University GIS Facility



Map 5. Photomap of the area around the National Weather Service Forecast Office in Johnston, Iowa, circa 2002. North is to the top of the map. Source: Iowa State University GIS Facility

Chronology of locations and elevations

The following lists the chronology of weather station locations at Des Moines, Iowa, during the period 1835-2005: (The latitude and longitude entries, when listed to seconds, were derived using U. S. Geological Survey maps as presented on Topozone.com.)

City Locations

April 1835 – March 1837 – Elevation 810 feet - 41° 35' N, 93° 37' W

- Fort Des Moines

July 1843 – February 1846 – Elevation 810 feet - 41° 35' N, 93° 37' W

- Fort Des Moines

August 1865 – June 1867 – Elevation approximately 855 feet - 41° 35' N, 93° 37' W

- Residence, 7th and Center Streets, Reverend John Anson Nash, observer

February 1874 – November 1874 – Elevation approximately 840 feet - 41° 35' N, 93° 37' W

- Residence, Walnut between 13th and 14th Streets, J. W. Stewart, observer

July 1877 – September 1877 – Elevation approximately 820 feet - 41° 35' N, 93° 37' W

- Residence, 737 East Locust Street, Mr. Emlin McClain, observer

February 1878 – October 1883 – Elevation 940 feet – 41° 33' N, 93° 37' W

- Capital City Nursery, Clifton (now Southwest 9th) Avenue near Park Avenue

August 1878 – December 1886 – Elevation 810 feet – 41° 35' 10" N, 93° 37' 20" W

- George E. D. McCaine Block (Building), 6th Avenue and Walnut Street, northeast corner

April 1882 – December 1885 – Elevation approximately 840 feet – 41° 35' 20" N, 93° 38' 21" W

- University of Des Moines, 677 16th Street, George D. Purrington, observer

April 1881 – May 1891 – Elevation approximately 885 feet – 41° 31' 48" N, 93° 33' 27" W

- 3000 block of East Payton Avenue, five and a half miles southeast of Des Moines, Adolphus Voegeli, observer

March 1887 – April 1889 – Elevation unknown –

- Location unknown, Charles R. Keyes, observer

January 1887 – March 1889 – Elevation 809 feet – 41° 35' 10" N, 93° 37' 25" W

- Clapp Block (Building), 5th Avenue and Walnut Street, northwest corner

April 1889 – September 1929 – Elevation 806 feet – 41° 35' 07" N, 93° 37' 22" W

- Post Office Building, 5th Avenue and Court Street, northeast corner

March 1896 – October 1898 – Elevation approximately 850 feet - 41° 32' 29" N, 93° 40' 40" W

- Residence, Millman area of Des Moines, W. H. Shaul, observer

October 1929 – December 1973 – Elevation 802 feet – 41° 35' 14" N, 93° 36' 57" W

- U. S. Courthouse, East 1st Street and Walnut Street, southeast corner

Airport Locations

February 1928 – January 1939 – Elevation 953 feet – 41° 32' N, 93° 39' W

- Municipal Airport, Boeing Hanger, Southwest 21st Street and Army Post Road

February 1939 – October 1950 – Elevation 954 feet – 41° 32' N, 93° 39' W

- Municipal Airport, Municipal Hanger, Southwest 21st Street (now Fleur Drive) and Army Post Road

October 1950 – 2005 – Elevation 948 feet – 41° 32' 06" N, 93° 39' 14" W

- Municipal Airport, Fleur Drive and Army Post Road

Area Locations

September 1993 – 2005 – Elevation 953 feet – 41° 44' 10" N, 93° 43' 25" W

- National Weather Service Building, 9607 NW Beaver Drive, Johnston, Iowa

OBSERVERS AND INSTRUMENTATION

City Locations:

1835-1837 & 1843 – 1846:

Weather observations were taken by U. S. Army surgeons at Fort Des Moines from April 1835 until March 1837 and from July 1843 until February 1846. Fort Des Moines was located on the west bank above the confluence of the Raccoon and Des Moines Rivers. No further information is available as to the instruments being used or their exact location.

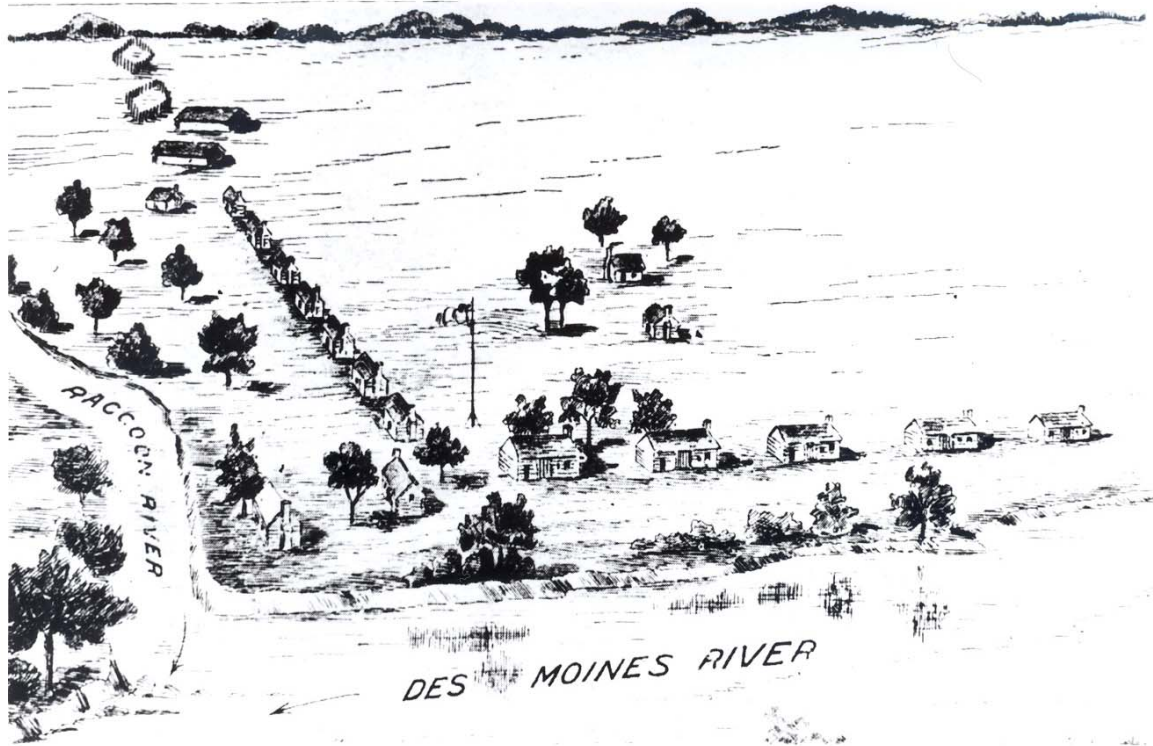


Figure 1. A sketch of Fort Des Moines, Iowa, circa 1844. West is to the top of the sketch.

Source: State Historical Society of Iowa

1865 – 1867:

Reverend John Anson Nash, a Smithsonian Institution volunteer weather observer recorded observations in the Des Moines area from August 1865 until June 1867. He was a Baptist clergyman. He lived at the corner of 7th and Center Streets. No further information is available as to the instruments being used or their exact location.

1874:

J. W. Stewart, a Smithsonian Institution volunteer weather observer recorded precipitation observations in the Des Moines area from February 1874 until November 1874. He lived on Walnut Street between 13th and 14th Streets. No further information is available as to the instruments being used or their exact location.

1877:

An Iowa Weather Service volunteer weather observer was recording observations in the Des Moines area from July 1877 until September 1877. Mr. Emlin McClain, an attorney, resided at 737 East Locust Street. No observational forms have been located.

No further information is available as to the instruments being used or their exact location.

1878 – 1883:

Iowa Weather Service volunteer weather observers were recording observations at the Capital City Nursery on Clifton Avenue, now Southwest 9th, near Park Avenue from February 1878 until October 1883. This location was some two miles south southwest of Fort Des Moines. George F. Hard, a horticulturist, was the observer from February 1878 until August 1880 and Charles L. Watrous, proprietor, for the remainder of the period. Limited summarized data were published for this period being listed as “Des Moines S.” No observational forms have been located. No further information is available as to the instruments being used or their exact location.

1878 – 1886:

The U. S. Army Signal Service opened an office in the George E. D. McCaine Building on 1 August 1878. The building was on the northeast corner of 6th Avenue and Walnut Street. The official address was 525 Walnut Street. The office was on the second floor in a northwest corner room. Sergeant P. Conner was the observer from August 1878 until December 1880. Sergeant F. N. Conrad was the observer from January 1881 until September 1886. Sergeant P. Conner resumed the observer duties in October 1886. The Signal Service remained in this location through December 1886.

Thermometer – The extreme thermometers were at a height of 35 feet above the ground being mounted in a north window shelter.

Barometer – The barometer was at a height of 843.0 feet above mean sea level.

Rain gage – The eight-inch rain gage was located on the roof 45 feet above the ground.

Wind equipment – The wind instruments were located on the roof 60 feet above the ground.

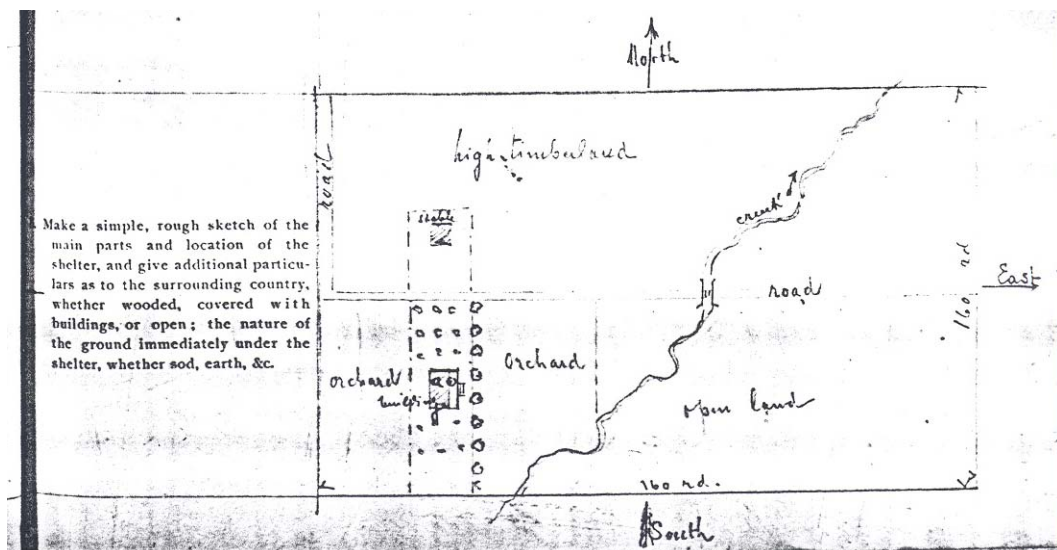
1882 – 1884:

An Iowa Weather Service volunteer observer, Professor George D. Purrington, was taking observations at a location one-half mile west of downtown Des Moines from April 1882 until December 1884. He was the acting President of the University of Des Moines in 1882-83. The University was located at 677 16th Street. Limited summarized

data were published for this period being listed as “Des Moines W.” No observational forms have been located. No further information is available as to the instruments being used or their exact location.

1881 – 1891:

In April 1881, Adolphus Voegeli began his services as a Signal Service volunteer observer. He listed his location as being on “my farm” five and one-half miles southeast of Des Moines. See Figure 2 for a sketch of his location, unfortunately, the precise address has not been found. However, by comparing his sketch with topographic maps his location could be in the vicinity of 3000 East Payton Avenue. He continued observing through May 1891.



Make a simple, rough sketch of the main parts and location of the shelter, and give additional particulars as to the surrounding country, whether wooded, covered with buildings, or open; the nature of the ground immediately under the shelter, whether sod, earth, &c.

Figure 2. A sketch of the location of the weather observing station in Des Moines, Iowa, 15 December 1883. Location was listed as five and a half miles southeast of Des Moines but exact location has yet to be determined.

Source: Report on Thermometer Exposure, 1883, Signal Service.

Thermometer – The thermometer in use was a Green maximum, serial number 5580, 5356, and 5809; and a minimum, serial number 6182. The shelter was attached to the east side of the house under a porch roof. The thermometers were five feet above the porch floor and seven feet above the ground. The wooden roof of the porch was about three feet from the thermometers. See Figure 3.

Barometer – A Green barometer, serial number 2680 was installed at an elevation of 830 feet.

Rain gage – A standard eight-inch gage was being used. It was listed as being “broken” from March 1884 through September 1890.

Wind equipment – The site had an anemometer and a wind vane, no further details are known.

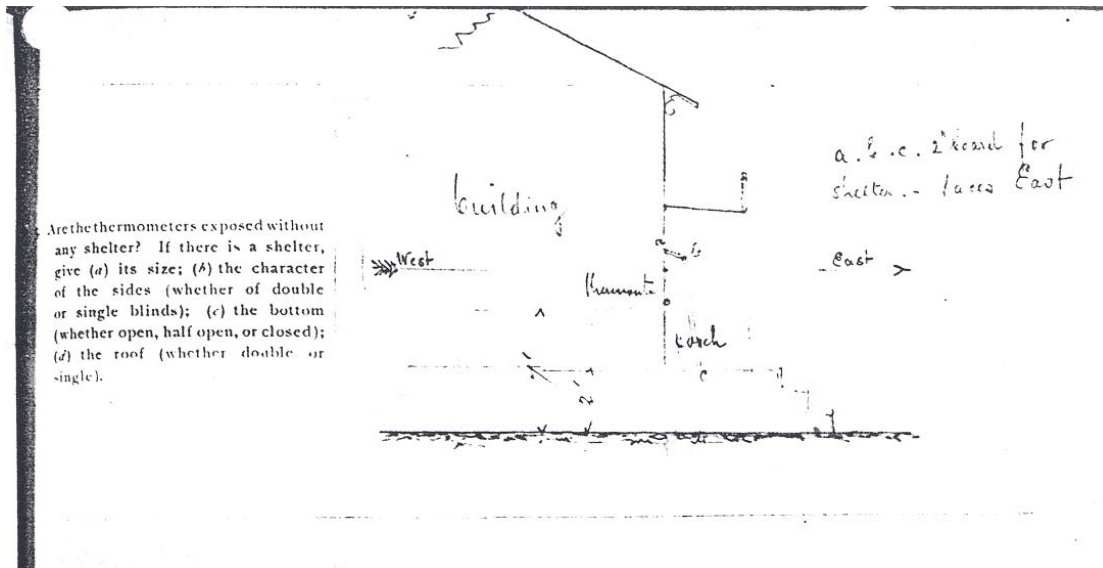


Figure 3. The placement of the thermometers at Des Moines, Iowa, on 13 December 1883. Notice that the thermometers were placed in an east facing wall under a porch roof.

Source: Report on Thermometer Exposure, 1883, Signal Service.

1887 – 1889:

Limited summarized data from a station simply listed as “Des Moines” was published by the Iowa Weather Service from March 1887 to April 1889. The location of this station and the types of instruments being used are not known. Reference was found that the observer was Charles R. Keyes but without observational forms this is difficult to verify.

1887 – 1889:

On 1 January 1887 the U. S. Army Signal Service moved their offices to the Clapp Building located on the southwest corner of 5th Avenue and Walnut Street. See Figure 4. This was a move of some 250 feet east of their previous location. The Service occupied several fourth floor rooms including room 39 upon opening the office and rooms 46 and 51 by 1888. Sergeant P. Conner was the observer from January 1887 until

July 1888. Sergeant George M. Chappel was placed in charge of the station on 14 August 1888.



Figure 4. The Clapp Building (left) in downtown Des Moines, Iowa, circa 1887. The building was located at the corner of Walnut and 5th Streets. The instrument shelter can be seen on the roof to the far left of the photograph. View is looking west on Walnut Street.

Source: State Historical Society of Iowa.

Thermometer - The extreme thermometers were located in a Cotton Region Shelter on the roof of the building some 74 feet above the ground, see Figure 4.

Barometer – The barometer was located 859.5 feet above mean sea level.

Rain gage – The eight-inch rain gage was mounted on the roof, 65 feet above the ground until 9 December 1887 when it was lowered by one foot to 64 feet above the ground.

Wind equipment – The wind instruments were located on the roof of the building 78 feet above the ground. The wind vane can be seen in Figure 4 just above the building peak.

1889 – 1929:

On 1 April 1889 the location for weather observing was moved to the Federal Building (later called the Post Office Building) located on the northeast corner of 5th Avenue and Court Street. This was a move of 400 feet southeast from the previous location. The offices were located on the fourth floor, rooms 15 and 17. See Figure 5. The building was razed in July 1968.

Observations were originally taken at this site by U.S. Army Signal Service personnel but on 29 March 1891 the duties transferred to the new U.S. Department of Agriculture Weather Bureau. Sergeant Chappel was discharged from the Signal Service and was re-employed by the Weather Bureau at the time of this transfer.

Thermometer – The extreme thermometers were in Cotton Region Shelter located on the roof at 84 feet above the ground. See Figure 5.

Barometer – The barometer was located at 860.371 feet above mean sea level based on U. S. Geological Survey benchmarks established in 1929. Earlier heights were listed as 869, 867, and 861.1 feet.

Rain gage – The station had a standard eight inch Weather Bureau gage located on the roof at 75 feet above ground. This height was corrected to 76 feet on 1 January 1904.

Wind equipment – The anemometer was located on the roof at a height of 88 feet above the ground, see Figure 5, until 27 February 1902 when it was raised to 100 feet. This height was corrected to 101 feet on 1 January 1904. The wind instruments were lowered to 97 feet on 1 November 1910.



**Figure 5. The Post Office Building in Des Moines, Iowa, circa 1900. Building was located on the northeast corner of Court and 5th Streets. Weather instruments are clearly visible on the roof. View is looking northeast.
Source: State Historical Society of Iowa.**

1896 – 1898:

Mr. W. H. Shaul served as a volunteer Weather Bureau Cooperative observer from March 1896 until October 1898. His daily precipitation observations were published in the *Monthly Review of the Iowa Weather and Crop Service* as “Des Moines Millman.” The Millman area of Des Moines is on the western boundary of the present airport. No further information is available as to the type of rain gage being used.

1929 – 1973:

On 1 October 1929 the Weather Bureau offices were moved to the United States Courthouse located on the southeast corner of East 1st Street and Walnut Street. This was a move of four-tenths of a mile to the east northeast. The offices were located on the fourth floor in rooms 400 through 404. The observational program ended on 31

December 1973. The official observer changed from the Weather Bureau to the Iowa Weather Service on 1 April 1973.

Thermometer – The extreme thermometers were located in a Cotton Region Shelter located five feet above the ground. The shelter was located in a grassy area west of 1st Street opposite the Courthouse on the top of the left bank of the Des Moines River. This location was 10 feet above river level. This Waterfront Park location was about 170 feet southwest of the Courthouse. In the early years a fence made of slender iron pickets four feet high surrounded the 16 by 24 foot site. See Figures 6 and 7.

Barometer – The barometer, serial number 133, was located 872.196 feet above mean sea level.

Rain gage - The rain gages were located in a grassy area west of 1st Street opposite the Courthouse on the top of the left bank of the Des Moines River. See Figures 6 and 7. There was a standard Weather Bureau eight-inch gage located three feet above the ground, a tipping bucket gage located three feet above the ground, and a weighing gage located four feet above the ground. The nearest obstruction was the U. S. Courthouse 200 feet northeast, rising 90 feet above the gages. The tipping bucket gage was removed on 15 October 1950.

Wind equipment - The wind equipment was located on the roof of the building some 99 feet above the ground and 18 feet above the roof, see Figure 6. Wind equipment was removed from the building on 15 October 1950.

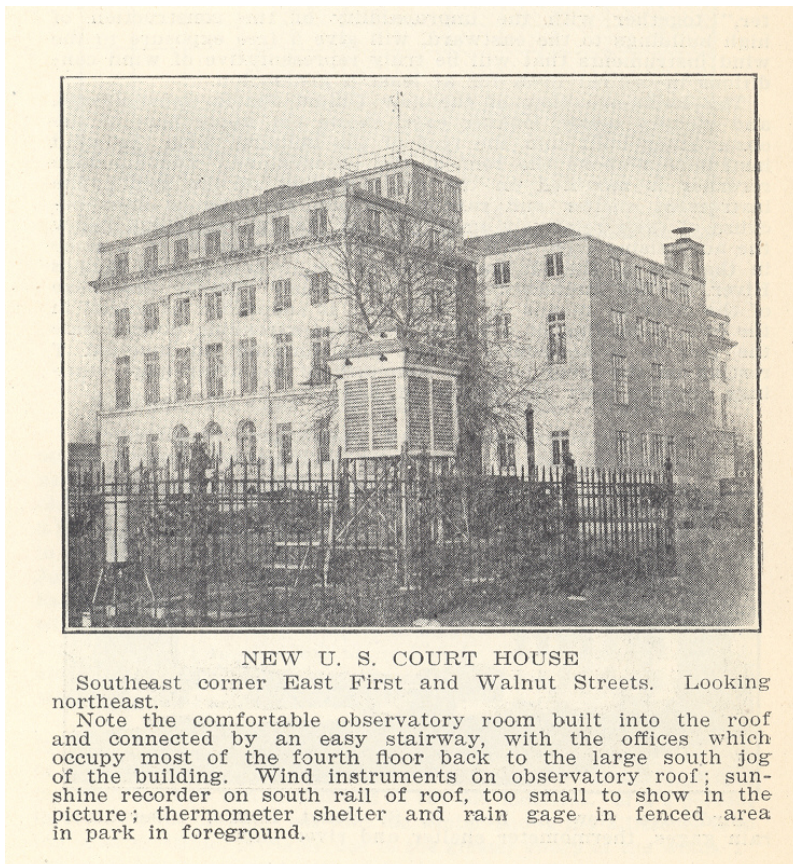


Figure 6. The United States Courthouse in Des Moines, Iowa, circa 1929. View is looking northeast.

Source: *1929 Annual Meteorological Summary – Des Moines, Weather Bureau*



Figure 7. View of the weather instruments located near the United States Courthouse in Des Moines, Iowa, circa late 1940's. View is looking northeast. Source: State Historical Society of Iowa.

Airport Locations:

1928 – 1939:

On 1 February 1928 the Boeing Air Transportation Company began taking observations at the Boeing hangar located at the Des Moines Municipal Airport. In 1931 the airline became known as United Airlines. See Figure 8. The building was at Southwest 21st Street and Army Post Road. This location was some four miles south southwest of the downtown location. Boeing personnel continued to take observations until 1933 when Civil Aviation Administration (CAA) personnel assumed the duties.



Figure 8. The Des Moines, Iowa, United Airlines Hangar at the Municipal Airport, circa, 1930's. The wind instrument can be seen on the roof just above the "U" in United. View is looking north northeast. Source: State Historical Society of Iowa.

Thermometer – The extreme thermometers were located 19 feet above the ground.

Barometer - The barometer was located 969 feet above mean sea level.

Rain gage – The standard eight-inch gage was located 17 feet above the ground.

Wind equipment – The wind instruments were located 29 feet above the ground on the corner of the hangar.

1939 – 1950:

The Weather Bureau established an office at the Des Moines Municipal Airport on 1 December 1938. However, official observations were not begun until 1 February 1939. The office was located in the Municipal Hangar 350 feet south of the Boeing Hangar. The Weather Bureau space was in a second floor location on the west side of the

hangar. The address was now Fleur Drive (21st Street was renamed Fleur Drive in 1941) and Army Post Road. Observations continued at this location until 15 October 1950.

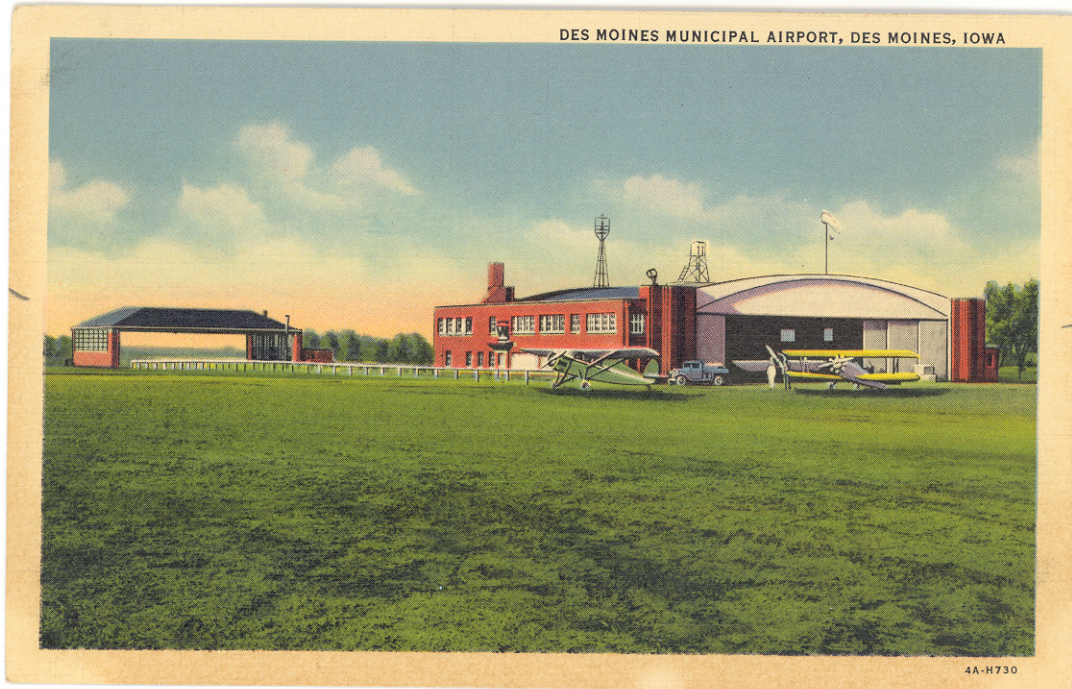
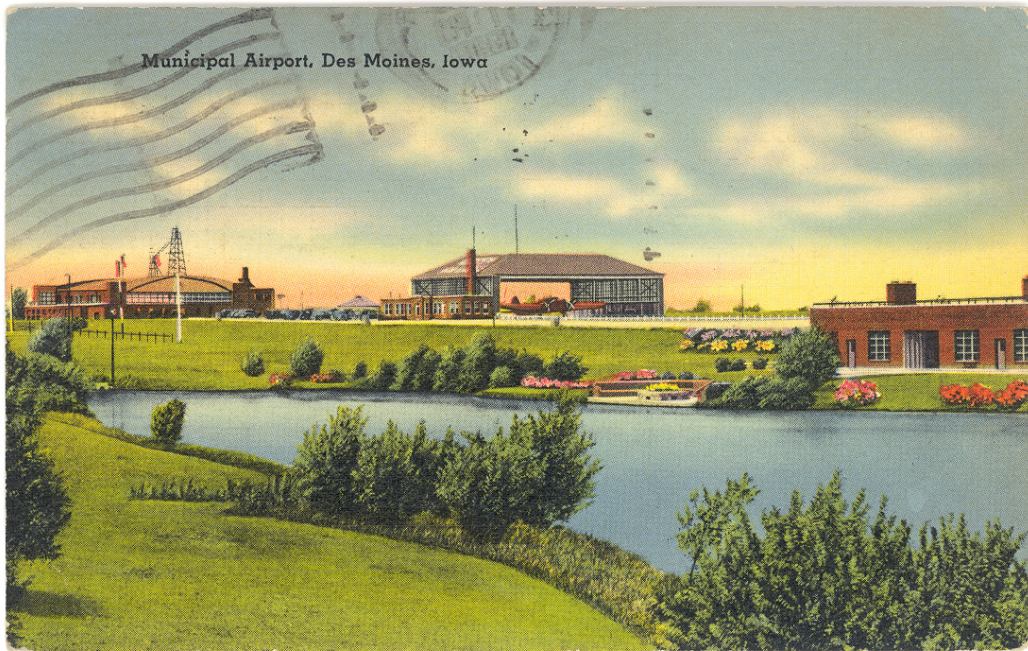


Figure 9. The Des Moines, Iowa, Municipal Airport Hangar, circa 1940's. View is looking northwest. The United (Boeing) Hangar is to the left. Source: Author's collection of post cards.



**Figure 10. The Des Moines, Iowa, Municipal Airport Hangar and the United Airlines Hangar, circa 1940's. The United Hanger is in the center. Notice the pond in the foreground that exists to the present.
Source: Author's collection of post cards.**



**Figure 11. The Des Moines, Iowa, Municipal Airport Hangar, circa 1930's. View is looking southeast.
Source: State Historical Society of Iowa.**

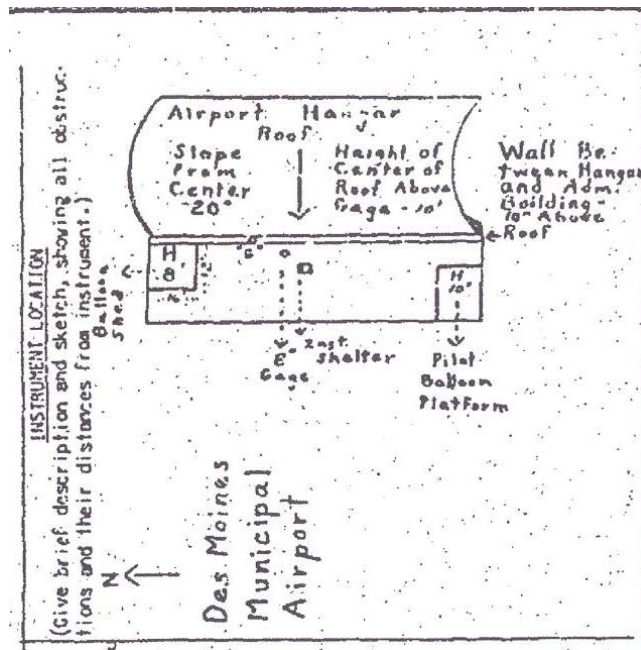


Figure 12. Location of weather instruments on the roof of the Municipal Hangar at the Des Moines, Iowa, Municipal Airport, circa 1946. North is to the left. Source: Official station history files at the National Climatic Data Center.

Thermometer – The Cotton Region Shelter was located 31 feet above the ground being mounted on the peak of the arched hangar roof. See Figures 9 and 11. In October 1945 the shelter was moved from the top of the roof about 50 feet to the west to a lower roof position. This new location was 26 feet above the ground. See Figure 12.

Barometer – The barometer, serial number 1125, was located at 967.97 feet above mean sea level. By July 1948 the barometer had been changed with the new barometer having a serial number of 649. The exact date of the change is unknown.

Rain gage – The rain gage was a standard National Weather Service eight-inch gage mounted on the roof just above the Weather Bureau office at a height of 22 feet above the ground. See Figure 12. The station also had a weighing gage located 24 feet above the ground.

Wind equipment – The wind instruments were located 47 feet above the ground being mounted on the peak of the arched hangar roof.

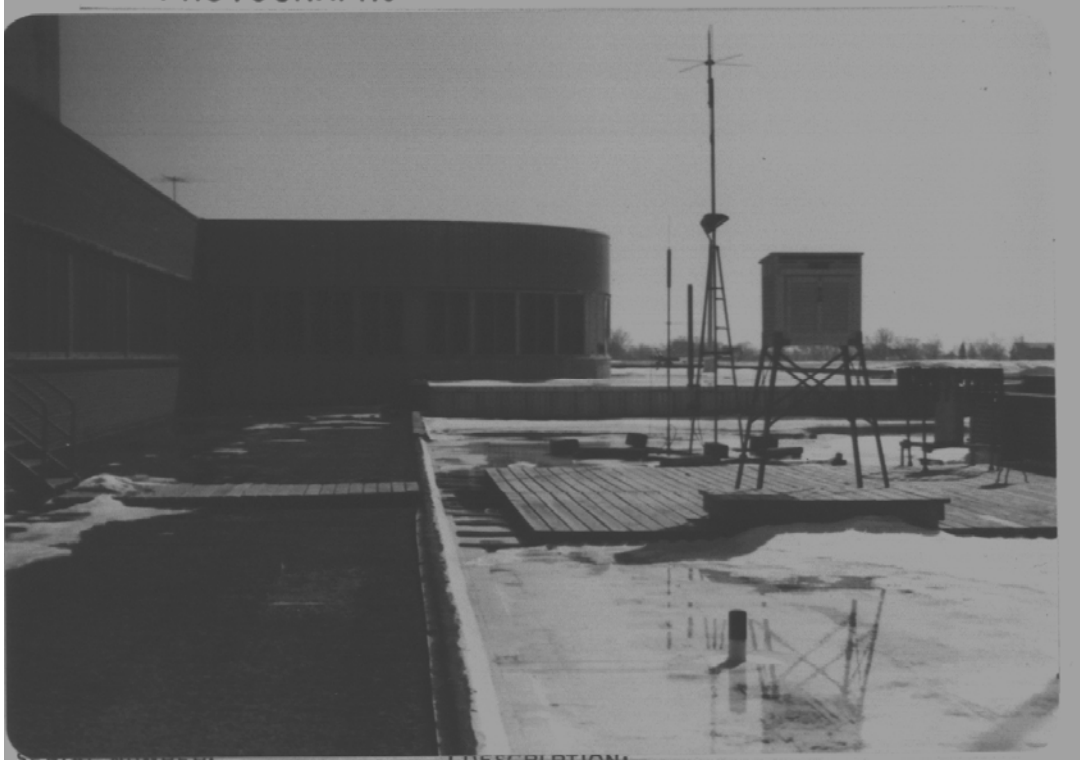
1950 – Present:

The Weather Bureau offices were moved to the new Terminal Building in late September 1950. This location was 1,400 feet north of the previous location. The first pressure reading was taken at the new site on 2 October 1950. The offices remained in the same second floor space despite major building expansions in 1961 and 1969. The National Weather Service Forecast Office moved to Johnston, Iowa, in September 1993. The observational instruments remained at the airport.



Figure 13. The Terminal Building at the Municipal Airport in Des Moines, Iowa, circa 1952. View is looking southeast. The instrument shelter can be clearly seen mounted on the north roof and the wind instruments on the roof of the control tower.

Source: Author's collection of post cards.



**Figure 14. The weather instruments mounted on the roof of the Des Moines, Iowa, airport terminal building in March 1982. View is looking south.
Source: Official station history files at the National Climatic Data Center.**

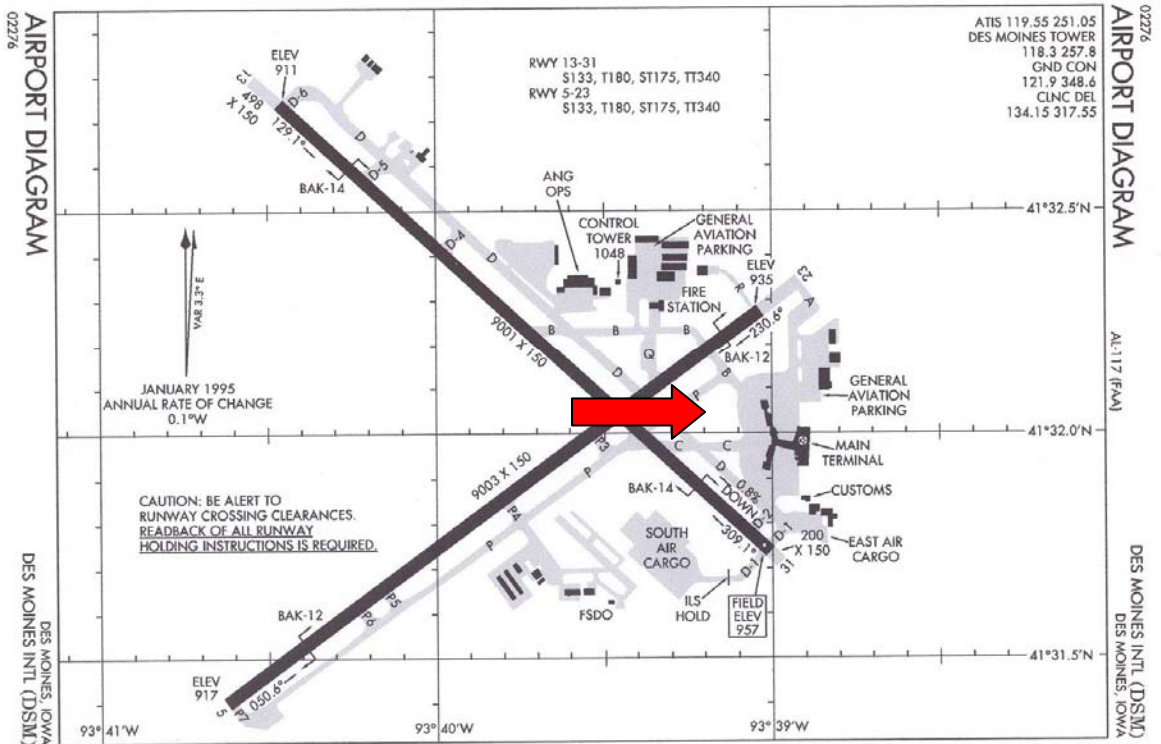


Figure 15. The layout of the Des Moines, Iowa, airport as of 1995. The red arrow indicates the location of the ASOS weather instruments as of December 1995. North is to the top.

Thermometer – The extreme thermometers were located on the first floor roof at the north end of the terminal building some 19 feet above the ground, see Figure 13. The shelter was relocated on the roof on 18 July 1961 changing the height to 21 feet above the ground. The shelter was relocated on 3 December 1969 to a ground location 400 feet east of Terminal Building, east of the parking lot and over grass. This was a move of 505 feet east southeast from the previous location. This placed the instruments between the parking lot and the airport pond, 60 feet from the radar modulator building. The height above ground was now at five feet. The extreme thermometers were moved on 9 June 1980 to a new roof location at a height of 18 feet above the ground. See Figure 14. As of 1 December 1995 an ASOS suite of sensors was commissioned being located west of the Terminal Building. See Figures 15 and 16.

The station was also equipped with a Psychrometer at 21 feet above the ground in 1950. This instrument was moved to the location east of the Terminal Building on 3 December 1969 and back to the roof at 18 feet on 9 June 1980. The hygrometer, an HO-60, was commissioned at a location 1,500 feet west northwest of the Terminal Building on 18 July

1961. The instrument was changed to an HO-83 on 1 October 1985. With the commissioning of the hygrothermometer the extreme thermometers were only used as a back-up.

Barometer – The barometer, serial number 649, was located at a height of 965.75 feet above mean sea level. On 1 December 1995 an ASOS system was commissioned changing the elevation of the barometer to 971.0 feet above sea level.

Rain gage – The standard eight-inch gage was located on the roof 14 feet above the ground. The weighing gage, shielded, was at 16 feet above the ground. On 12 July 1961 the gages were moved from the roof to a grass island in the roadway some 300 feet northeast of previous location. The gages were now three feet above the ground. The nearest obstruction was the Administration Building some 200 feet southwest and 50 feet above the instruments.

On 3 December 1969 the gages were moved to a new location 535 feet east of previous location and 400 feet east of Terminal Building. The height of the eight-inch gage was now three feet above the ground and the weighing gage was at five feet. On 9 June 1980 the gages were moved back to a roof location on the Terminal Building changing the height to 15 feet for the eight-inch gage and 17 feet for the shielded weighing gage. See Figure 14. The nearest obstruction was the Terminal Building 28 feet east, rising 37 feet above the instruments. The weighing gage was repositioned on 1 September 1980.

The tipping bucket gage was originally located on the roof of the Terminal Building at a height of 17 feet above the ground. It was moved on 12 July 1961 67 feet south southeast to a second floor roof location, resulting in a new height above ground of 31 feet. The nearest obstruction was the Terminal Building 43 feet north, rising 15 above the instruments. The gage was moved on 15 August 1987 changing the height to 16 feet above the ground. An ASOS tipping bucket gage was commissioned on 1 December 1995 at a location west of the Terminal Building. See Figures 15 and 16.

Wind equipment – The wind instruments were mounted on the roof of the control tower some 63 feet above the ground, see Figure 13. On 16 June 1955 the instruments were raised to 69 feet because of the effects of a large Radome being installed. On 18 July 1961 the instruments were moved to a center field location, 1,500 feet northwest, reducing the height to 20 feet above the ground. A standard ASOS wind sensor was commissioned on 1 December 1995 at a location west of the Terminal Building. See Figures 15 and 16.

Additional information and details as to other instruments in use at Des Moines can be found in the official station history archives at the National Climatic Data Center, Asheville, North Carolina.



Figure 16. The Automated Surface Observing System at the Des Moines, Iowa, airport as of 2005. View is looking northeast.

Source: National Weather Service Office, Johnston, Iowa.

With the move of National Weather Service personnel to the Johnston location in 1993 and the commissioning of the ASOS instruments in 1995, the airport location was left without any human observers. The National Weather Service initially established a cooperative observing site at the Des Moines Water Works facility in Water Works Park. This location was approximately two and one-half miles north of the airport. This precipitation only observational program lasted from 1 December 1995 through 31 March 1996. These winter precipitation observations from this site were published in the Des Moines Local Climatological Data (LCD) publication. Precipitation and snowfall observations continued at the Water Works site until 31 December 1996. These values were used by the National Weather Service as official snowfall records for Des Moines for 1996. Throughout the Water Works era, December 1995 – December 1996, ASOS precipitation was used when it was accurate (which was generally the case except when frozen precipitation occurred.)

From 1 April 1996 until 31 December 2001, ASOS precipitation values were published in the LCD. However, snow depth data were taken from measurements made

by the Federal Aviation Administration contract weather observer at the airport. On the occasions when the 6 a.m. snow depth measurements were unavailable the Iowa State Climatologist would provide estimates. Beginning 1 January 2002 and continuing through 30 November 2004 all precipitation values published in the Des Moines LCD were actually taken by National Weather Service personnel at their Johnston office location. The precipitation observing program returned to the airport on 1 December 2004 when an FAA contract observer assumed the effort.

Area Locations:

1993 – Present:

The National Weather Service moved the Weather Service Forecast Office to Camp Dodge near Johnston, Iowa, in late 1993. Beginning on 19 November 1993 an official cooperative weather station was established at the office. The official station name changed from Des Moines WSFO – Camp Dodge to Des Moines WSFO – Johnston in August 1998. Observations continue at this site to the present.



Figure 17. A view of the weather instruments at the National Weather Service Forecast Office in Johnston, Iowa, August 2005. View is looking northeast. Source: Photograph by author.

Thermometer – The thermometer system was a standard National Weather Service Maximum Minimum Temperature System (MMTS). See Figure 17. The MMTS was originally installed just north of the Fisher-Porter gage (to the right of the gage in Figure 17). Over time new four foot wide sidewalks were constructed up to the base of the instrument. A few years after the sidewalks were installed, on 6 September 2004, the instrument was moved to the present location.

Rain gage - The official gage was a Universal Weighing gage. However, the station also had an eight-inch gage, a tipping bucket gage, and a Fisher-Porter gage (not routinely used.) See Figure 17.

APPENDICES

Appendix 1 – Observer Stories

John Anson Nash

The following was extracted from the Manuscript Register, Papers of John Anson Nash, Special Collections Department, University of Iowa Libraries, Iowa City, Iowa:

“John Anson Nash was born on July 11, 1816, near Sherburne, New York. Orphaned at the age of five, he was raised by his aunt and uncle. From 1836 to 1844 he attended the Hamilton Literary and Theological Institution (later to become Madison University). A Baptist minister, his first pastorate was in Watertown, New York. In 1851, the American Baptist Home Mission Society sent him to Fort Des Moines, Iowa, where he helped organize the First Baptist Church of Des Moines. Nash retained that pastorate for eighteen years, while helping to establish many other Baptist churches in central Iowa, including ones in Grinnel, Ames, and Newton.

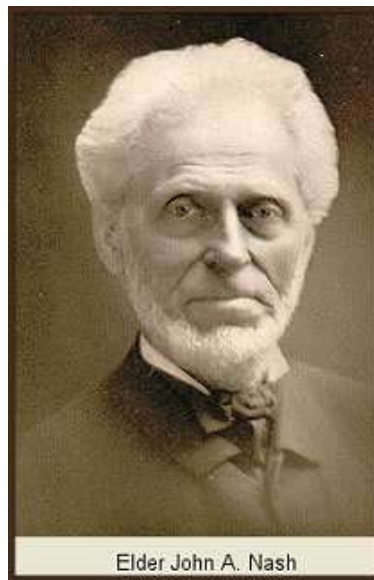


Figure 18. John A. Nash, circa 1860's. Elder Nash recorded weather observations in Des Moines, Iowa, from 1865 until 1867.

Source: www.usgennet.org/usa/topic/historical/Polk_siteid.html

Rev. Nash was deeply interested in promoting education. With his wife's assistance, he opened a private school at his five acre home in Des Moines. It was very successful and eventually grew into the Forest Home Seminary. Not satisfied with this school alone, Nash wanted to establish a still higher institution of learning. In 1865, he founded the Des Moines University, became its first financial agent, and served as its first president.

Politically, Nash was actively sympathetic to the abolitionists and was one of the original members of the Republican Party in Iowa. However, after the Civil War and the emancipation of the slaves, he turned his energy to the cause of temperance. Nash became a leader in the Prohibition Party, accepting the party's nomination to Congress in 1884. Rev. John Anson Nash died in Des Moines on February 14, 1890 at the age of seventy-three."

Weather Bureau Chief Meteorologists and National Weather Service Meteorologists-in-Charge

Since the Weather Bureau established an office in Des Moines in 1890, ten men and women have served as the local Chief Meteorologist or Meteorologist-in-Charge (MIC). It seems that a history of weather observing would not be complete without listing their names. Of course, the men and women that served under their direction deserve a large thank you.

June 1891	John R. Sage
January 1908	George M. Chappel
April 1918	Charles Dana (CD) Reed
March 1945	H. C. S. Thom
May 1948	Clarence Lamoureux
October 1970	Harold M. Gibson (first MIC)
July 1972	Warren C. Caldwell
January 1980	Perry L. Baker
August 1992	John Feldt
January 1998	Brenda Brock

Appendix 2 - Methodology

The primary sources of information for this study were the Des Moines observers' daily weather records themselves. Copies of these reports were available from the National Climatic Data Center's on-line system called WSSRD. These reports were considered the primary sources because they were written by the original observers and not altered by subsequent readers.

All these sources were gleaned to obtain a glimpse of the lives of the observers, the location of the observation site, and the historical environment that produced the climatic history of Des Moines, Iowa. Maps, drawings, and photographs were included when appropriate to illustrate the information.

The street maps were generated using Microsoft's Streets and Trips software. Elevations, latitude, and longitude were determined from the United States Geological

Survey maps available on Topozone.com.

REFERENCES AND DATA SOURCES

Observational forms as found in the National Climatic Data Center archives

Station history forms as found in the National Climatic Data Center archives.

1873 Annual Report of the Smithsonian Institution, Washington, DC

1929 Annual Meteorological Summary – Des Moines, Weather Bureau

State Historical Society of Iowa, Des Moines, Iowa

Report of the Iowa Weather Service, Des Moines, Iowa

Iowa State University and MIT, Web site at: <http://cairo.gis.iastate.edu>

National Weather Service, Johnston, Iowa