THE HISTORY OF WEATHER OBSERVING IN ATCHISON, KANSAS, 1865-2004

Current as of
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Prepared by:
Stephen R. Doty
Information Manufacturing Corporation
Rocket Center, West Virginia

Prepared in cooperation with:
Ms. Mary Knapp
State Climatologist, Kansas
Kansas State University
Manhattan, Kansas

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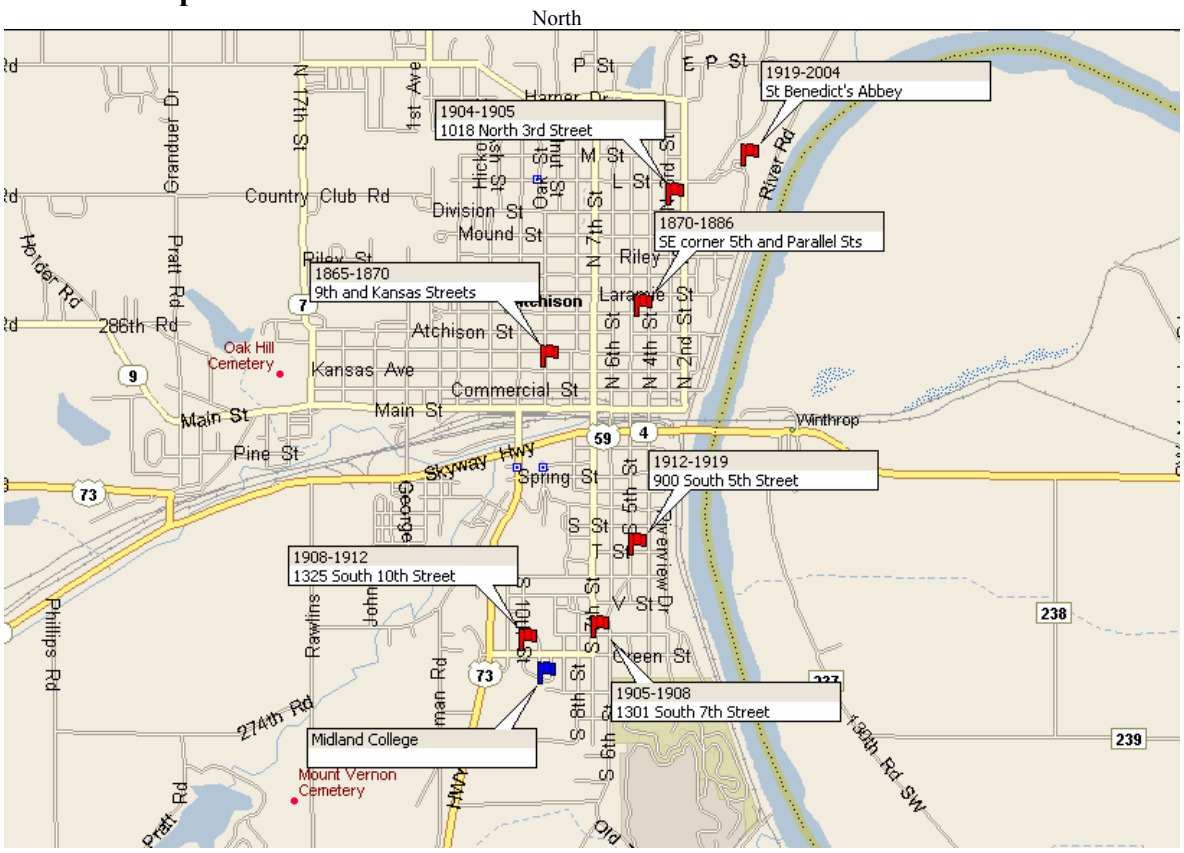
Executive Summary

By the efforts of a long series of volunteer observers, weather observations in Atchison, Kansas, have been taken since 1865. Dr. H. B. Horn began the observations as a Smithsonian Observer from his residence close to downtown Atchison. He later moved a few blocks north. In 1891, the observational program moved to Midland College, south of downtown but returned to the north side of town for one year in 1904/05. The program again moved south to the Midland College area in late 1905, where a series of three observers continued the work until 1919. At this point the monks at St. Benedict's Abbey began observing - a work they continue to this day.

Goal of Study

The goal of this study is to document the primary weather observational path at Atchison, Kansas, leading to the current and on-going National Weather Service's Cooperative observers. 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 Maps



Map 1. The locations of weather observing sites at Atchison, Kansas, 1865-2004.

Map 2. A view of Atchison, Kansas, 1864, looking southwest. Midland College would later be located to the upper left of the map and St. Benedict's Abbey is located to the lower right of the map on the bluff overlooking the Missouri River. From the Library of Congress, Division of Maps, G4204 .A8A3 1869 .R8 Rug 65

The following lists the chronology of weather station locations in Atchison, Kansas, 1865 until 2004: (Ground level elevations are presented when known.)

April 1865 – September 1886 - Elevation 990 feet in 1884

Dr. H. B. Horn, Kansas and 9th Streets (1865) and southeast corner of 5th and Parallel Streets (1870)

Note: No observations are available from January 1877 until January 1884.

October 1891 – September 1904 – Elevation unknown

Professor Elworth B. Knerr, residence in Highland Park

September 1904 – October 1905 – Elevation unknown

Miss Lilly Groves, residence at 1018 North 3rd Street

November 1905 – July 1908 – Elevation 973 feet

W. E. Anderson, 13201 South 7th Street

August 1908 – May 1912 – Elevation 973 feet
Reverend Millard F. Troxell, residence 1325 South 10th Street
Note: Observations may have been taken on the campus of Midland College.

May 1912 – Jun 1919 – Elevation 973 feet
Professor E. M. Stahl, 900 South 5th Street until November 1, 1916, then 911 South 5th Street.

June 1919 – November 2004 – Elevation 945 feet - 39° 34' 29"N 95° 06' 41 "W
Monks at the St Benedict's Abbey, 1020 North 2nd Street

Location and Instrument Descriptions

1865 – 1886: Dr. H. (Hosea?) B. Horn, an Oculist, recorded observations from his residence at Kansas and 9th Streets beginning in April 1865 as part of the Smithsonian Institution's volunteer program. See Figure 1 for a present day, June 2004, picture of the location. He changed his residence by 1870 to a location at the southeast corner of 5th and Parallel Streets (424 North 5th?). This location was a vacant lot in June 2004. He continued as a Smithsonian Observer until December 1876. The record begins again in February 1884 with Dr. Horn as a U.S. Signal Service volunteer observer. He continued his observations at the North 5th Street location until September 1886.

Figure 1. The northwest corner of Kansas and 9th Streets, Atchison, Kansas, as of June 2004. This is only presented to show the terrain in the area. No photographs were found for the period 1865-1870. Photograph by Stephen R. Doty.

Thermometer – Location and type are unknown.

Rain gage – Location and type are unknown.

1891 – 1904: Professor Elsworth B. Knerr became the observer in October 1891 after a five year gap in the records. Professor Knerr was associated with Midland College which was located in the southern part of Atchison. The exact location of his observing site is unknown however; his residence was in Highland Park which would place the site just north of the campus. The observations are speculated to have been at his residence because he noted on one of his observational forms that "The thermometers are under the eaves of the porch." Professor Knerr continued observing until September 1904.

Thermometer – Located under the eaves of the porch.

Rain gage – Location and type are unknown

1904 – 1905: The observing program then moved north again when Miss Lilly Groves began observing in September 1904. The instruments were located either at her residence at 1018 North 3rd or at the Martin School where she was the principal. The address for the Martin School has not been determined. Figure 2 shows the 1018 North 3rd Street location as it appeared in June 2004.

Figure 2. The 1018 N. 3rd Street area in Atchison, Kansas, as taken in June 2004. Photograph by Stephen R. Doty.

Thermometer – Location and type are unknown.

Rain gage – Location and type are unknown.

1905 – 1908: In November 1905 the observational duties were assumed by Professor W. E. Anderson at his residence at 1301 South 7th Street. This location marks a move back to the southern part of the city.

Thermometer – The shelter was attached to the north side of a small outhouse, 3 feet above ground, with the door opening north. Instruments listed as being "Weather Bureau".

Rain gage - The gage was on the ground, 25 feet from some very low trees with the top of the gage 2.5 feet above ground level. Gage was listed as being "Weather Bureau."

1908 – 1912: In August 1908 the duties shifted to Reverend Millard F. Troxell in the area of Midland College. The location was either on the campus or at his residence at 1325 South 10th Street (across the street from the campus.) A picture of the residence at 1327 South 10th Street (no 1325 could be found) was taken in June 2004, see Figure 3. Rev. Troxell continued observing until May 1912 despite becoming the President of Midland College in 1910.

Thermometer – The "standard" instruments were in a shelter over sod, located 30 feet from the house and barn. The door opened to the south with the floor of the shelter 4 feet above the ground.

Rain gage – The "standard" rain gage was on a fence post, 30 feet from the house and 20 feet from the barn, northeast. The top of the gage was 8 feet above the ground.

1912 – 1919: Another Midland College professor assumed the duties in May 1912. Professor E. M. Stahl resided at 900 South 5th Street, and the instruments were located in the back yard. He moved next door to 911 South 5th Street in November 1916, where he continued observing until June 1919. The station was located "about midway of a long slope from south to north, in heart of a good residence section of Atchison."

Figure 3. The residence at 1327 South 10th Street, Atchison, Kansas as taken in June 2004. Notice the buildings of Midland College in the background to the left of the house. Photograph by Stephen R. Doty.

Thermometer – In 1914, at the home of E. M. Stahl, 900 South 5th Street, the instruments are still listed as "standard." The shelter is "In the back yard of Cooperative Observer over thick blue grass sod, 8 feet west of a 2 story brick building and 10 feet northeast of a pear tree 15 feet high. Floor of shelter 4.5 feet above ground. Door opens to north."

In February 1918, Prof Stahl moved next door at 911 South 5th Street. The instruments were still in the back of the residence. The shelter faced north and the bottom was at 3 feet above the ground. The shelter sat over bare earth to the west and sod to the east. The shelter was found to need painting. It was 15 feet west of the two story residence and there "is a possibility that the readings of the thermometers might be affected by reflection from the house on hot afternoons, arrangements were made to have the shelter moved 15 feet farther west, where it will be entirely in the open. This change will be made as soon as frost is out of the ground."

Rain gage – In 1914, the rain gage was "On ground about 100 feet west of shelter. 19 feet north of house wall of which is 20 feet high and 16 feet north of house wall of which is 18 feet high, and 31 feet west of tree 40 feet high."

The move in 1918 saw the rain gage, with its top 3 feet above the ground, located in the open "at present, but a young fruit tree about 12 feet west of it will be large enough in two or three years to affect its exposure."

1919 – 2004: The weather observing duties were moved north again in June 1919 to St. Benedict's Abbey on the grounds of what is now known as Benedictine College. A long series of monks have maintained the observations through to the current time. The instrument location has changed at least three times, but the general location remains the same - on the bluff overlooking the Missouri River. See Figure 4.

Figure 4. A view (looking northwest) from the bluff overlooking the Missouri River taken from St. Benedict's Abbey in June 2004. Photograph by Stephen R. Doty.

Thermometer – Upon moving the observing program to the Abbey the instruments were situated on ground about the average elevation of the surrounding country, which is rather rolling. The Weather Bureau inspection of August 13, 1921 found the instrument shelter was "well located about 100 feet north east of the Classroom building of the College." The minimum thermometer was found to have a 1 degree long bubble in it which was removed. The inspector noted that "there was no way of ascertaining how long the bubble has existed. The maximum was found to be a retreater and steps have been taken to have it replaced. Here again, there is no way of telling what effect this may have had on the temperature record."

A new instrument shelter was installed in 1927 at the same location as the previous shelter. However it is noted that a 2-story brick building used as a bakery had been constructed 15 feet to the southeast of the shelter. The inspector noted "The location of the shelter is considered satisfactory as there is a free circulation of air about it and no glare from reflected heat."

By 1937, the instruments had been relocated about midway between the Monastery and Administration Building. The precise date of the move is unknown. This new site was one half mile north of the previous location and on higher ground. The shelter faced north and the bottom was 2.5 feet above ground. The shelter needed painting. The inspector noted "the shelter is too close to the ground. It appears that when it was moved from its previous location the lower part of the legs, probably rotted, had been cut off. Arrangements were made to have a new support constructed and made so the bottom of the shelter would be held 1.5 to 2 feet higher." The overall rating of the exposure was listed as "satisfactory" as the instruments were entirely in the open.

The Weather Bureau inspector, in a September 1950 report, included a sketch of the instrument locations, see Figure 5. No further details were included.

In an undocumented move, probably in the 1980's, the instruments were moved to a location near the east wall of the Abbey. The thermometer was changed to a standard National Weather Service Maximum Minimum Thermometer Sensor (MMTS) system.

In June 1991, the instruments were moved to a location within the courtyard of the Abbey. The observer requested that this move be made due the vandalism that had been taking place at the previous location. The courtyard is 125 feet square, surrounded on all four sides by 5-6 story brick walls. See Figure 6 for a picture of the courtyard taken in June 2004. The actual move was 200 feet from the previous location. A MMTS thermometer system continued to be used.

Rain gage - At the time of the relocation to the Abbey the rain gage was approximately 500 feet north of the shelter and only 18 feet southeast of a mulberry tree 20 feet high, which the inspector noted "might affect its catch." The location of the rain gage remained unchanged until 1937 when the gage was moved to a spot between the Monastery and the Administration Building. See Figure 5 for the location of the gage in relationship to the shelter and the surroundings as of September 1950.

The rain gage was moved to a location near the east wall of the Abbey sometime in the 1980's but the exact date and location is unknown. In 1991, the eight-inch gage was moved to the interior courtyard of the Abbey as shown in Figure 6.

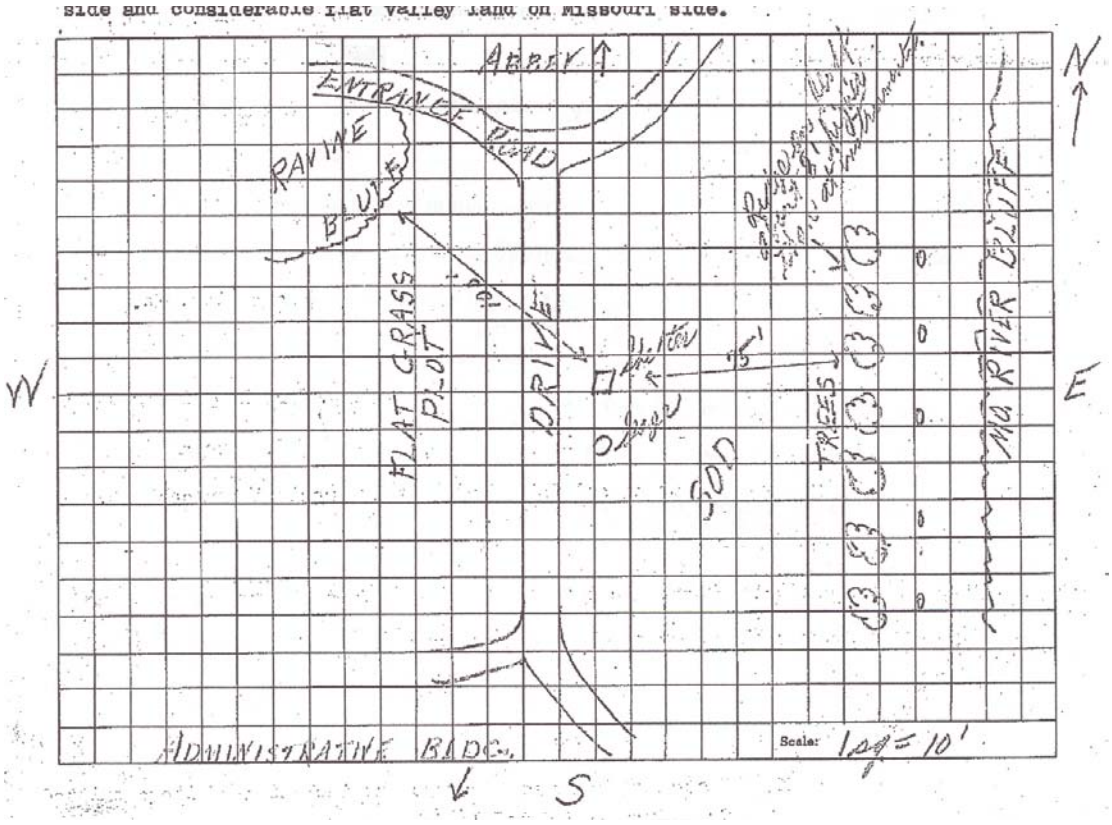


Figure 5. Sketch depicting the location of the weather instruments at the St. Benedict's Abbey, Atchison, Kansas, in September 1950. From official Station History files at the National Climatic Data Center, Asheville, NC.

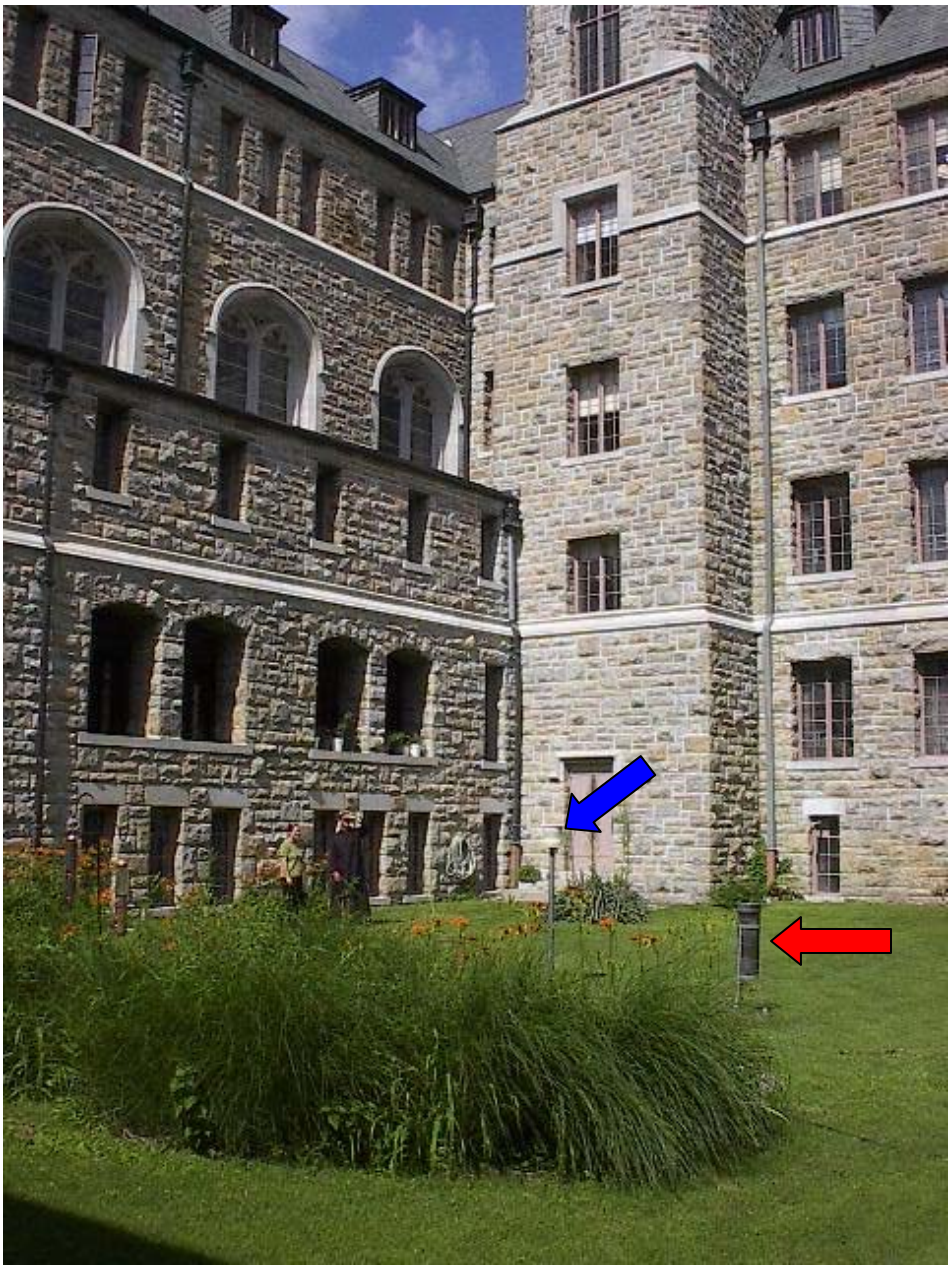


Figure 6. The courtyard at the St. Benedict's Abbey in June 2004. The MMTS system (blue arrow) and the rain gage (red arrow) can be seen just above the daylily flowers. Mary Knapp, the State Climatologist for Kansas and Brother Joseph Ryan, the current observer are to the left of the MMTS system. Photograph by Stephen R. Doty.

Observer Stories

Observer stories are somewhat limited for the Atchison volunteers. Dr. Horn was a medical doctor, listing himself as an "Oculist, diseases of the eye". Later he became the business manager and editor of a local paper called the "Atchison Patriot". It is

interesting to see how he signed his forms each month, as it gives us a bit of insight into his personal life. Beginning in 1865 and continuing until December 1868 he signed the forms as "Dr. H. B. & wife Clotilde Horn." Then from January 1869 until December 1876 he entered "Dr. H. B. & wife Martha Horn." And finally, from February 1884 until September 1886 he entered only "H. B. Horn, MD."

Midland College, opened in 1889, was the first college in Kansas founded under the auspices of the general synod of the Evangelical Lutheran Church. Atchison was chosen as the location of the college as the city was the most liberal in its donations of money and land, $50,000 and 25 acres in Highland Park. Several of the Atchison weather observers were professors at the college and Reverend Millard F. Troxell became its President in 1910. The campus is currently known as the Maur Hill Prep School.

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 files

Atchison County Historical Society Museum

Atchison City Directories available at the Atchison Public Library

Brother Joseph Ryan, St. Benedict's Abbey

APPENDIX I - METHODOLOGY

The primary sources of information for this study were the Atchison observers' daily weather records themselves. Copies of their monthly reports were available from the National Climatic Data Center's on-line system called WSSRD. The monthly reports are primary sources because they were written by the observers and not altered by subsequent readers. Station history files at the Data Center also provide details as to station and instrument history.

A variety of secondary sources held information about the city and its weather observers including the Atchison County Historic Society, and the Atchison Public Library. Ms. Mary Knapp, the State Climatologist for Kansas, and Brother Joseph Ryan of St. Benedictine Abbey also provided valuable assistance.

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 Atchison, Kansas. Maps, drawings, and photographs were included when appropriate to illustrate the information.

The street map was generated using Microsoft's Streets and Trips software.