

**History of Weather Observations
Logan, Iowa
1860 - 2005**

**Stephen R. Doty
Station History Writer
Information Manufacturing Corporation
Rocket Center, West Virginia**

**Harry J. Hillaker
State Climatologist
Iowa Department of Agriculture and Land Stewardship
Des Moines, Iowa**

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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
Logan, Iowa
1860 – 2005

Stephen R. Doty
Information Manufacturing Corporation

INTRODUCTION

Executive Summary

For one hundred years the Stern family of Logan, Iowa, recorded weather observations as volunteers. Jacob T. Stern began the effort in 1860 at his farm south of Logan in Harris Grove. By the 1880's the family had moved to town. Observing duties were passed from Jacob Stern to his wife Millicent, then to his son Willis and his sons and daughters; Glenn, Andrew, and Mary Jean. Finally, a great-granddaughter of Jacob's, Amy Ann Stern completed the family effort serving from 1927 until 1960. Several other families then took up the effort including M. C. Minshall, Sheriff Louis Allstot, and Howard Holben. In 1988 the observing site was moved to the Logan Sewage Plant where Robert Salter and Scott Muxfeldt have carried on the observing duties to the present time.

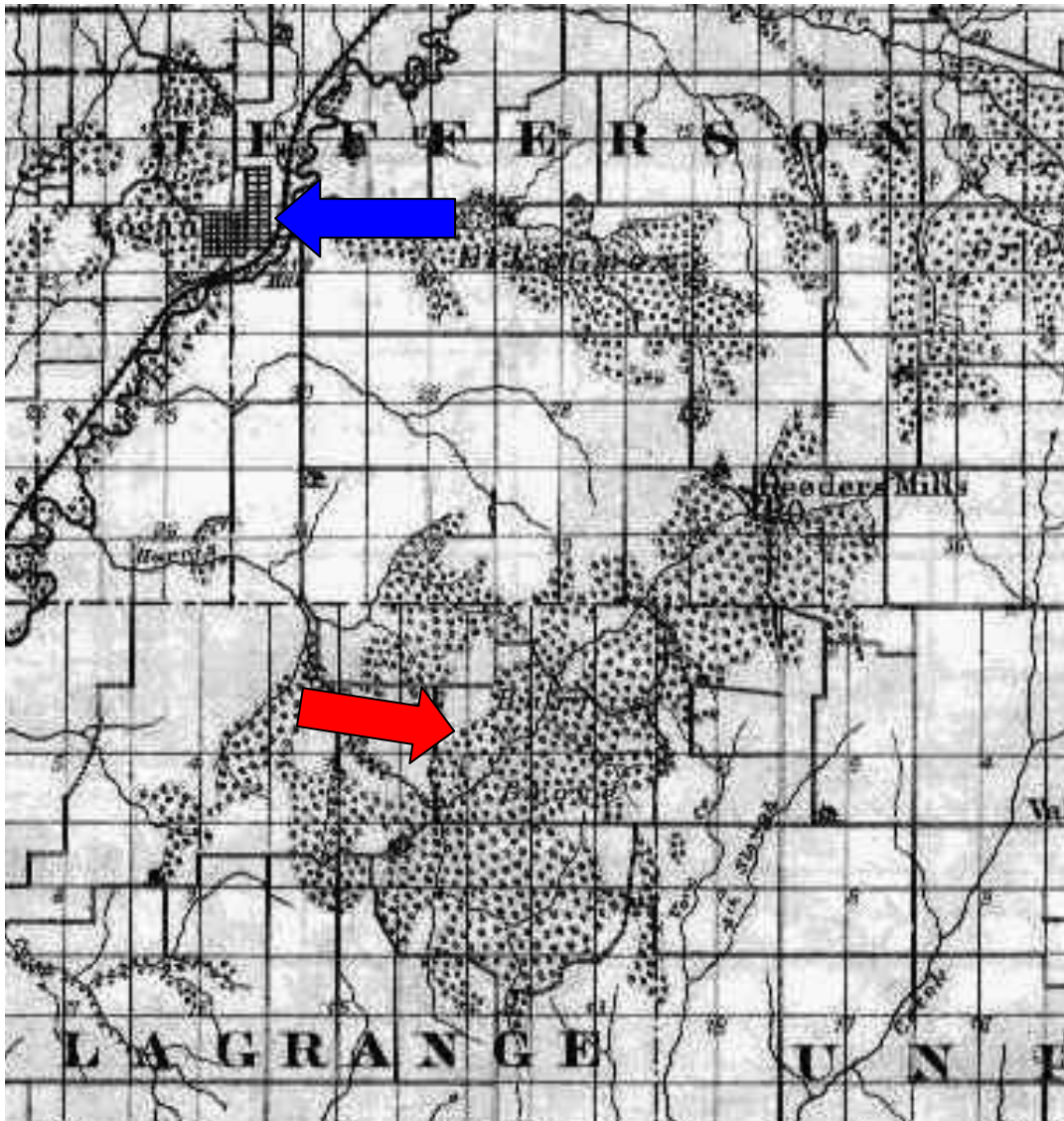
Logan, Iowa has remained a relatively small community over the last 150 years. In 1880 the population was 644 but doubling to over 1,300 by 1900. Since then the population has remained nearly constant peaking at 1,700 in 1940 but dropping back a bit by the year 2000 to just over 1,500.

Goal of Study

The goal of this study is to document the primary weather observational path at Logan, 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

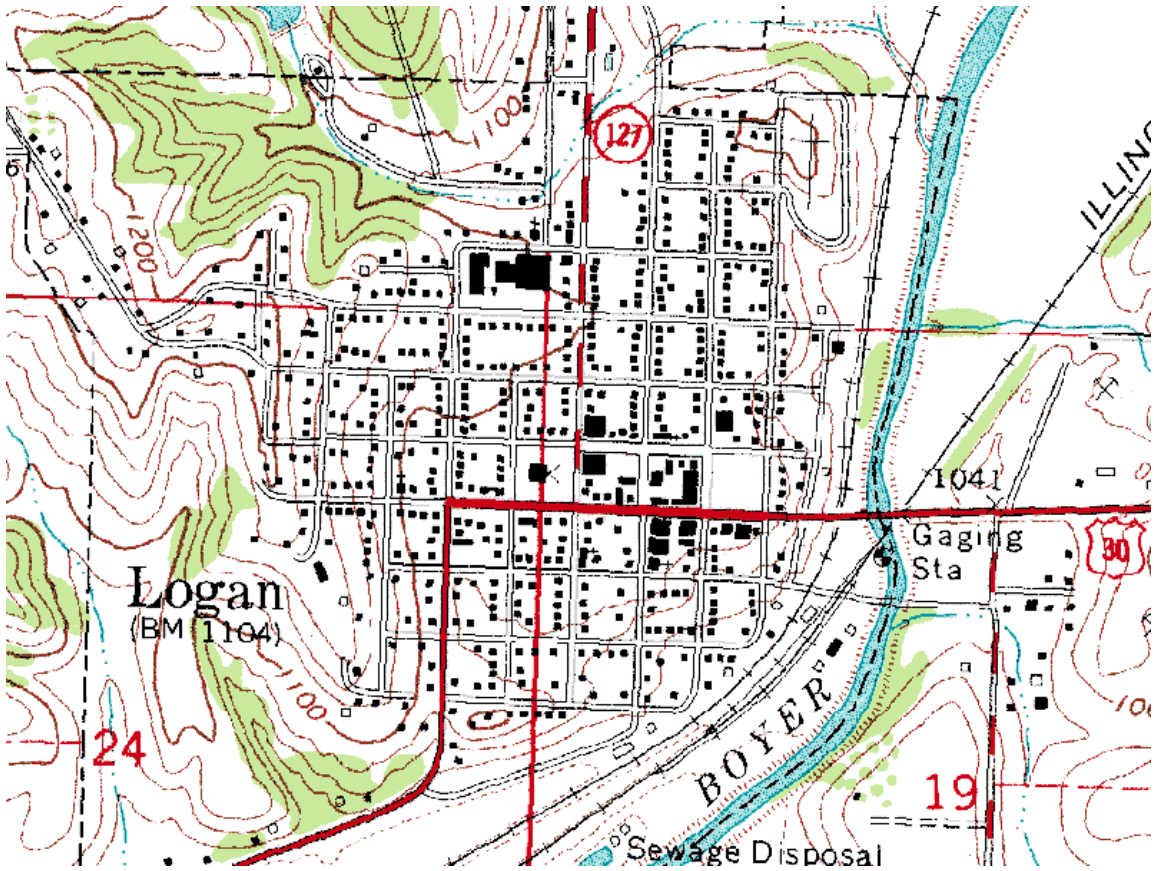
Location maps



**Map 1. The location of weather observing sites in the Logan, Iowa area. Red arrow indicates the Harris Grove area where observations were taken prior to 1883. The blue arrow indicates the city of Logan where observations were taken after 1883. North is to the top of the map.
Source: rootsweb.com**



Map 2. The location of weather observing sites in downtown Logan, Iowa, 1883 – 2005. North is to the top of the map.



**Map 3. Elevation contours within Logan, Iowa. North is to the top of the map.
Source: Topozone.com**

Chronology of locations and elevations

The following lists the chronology of weather station locations at Logan, Iowa, during the period 1860-2005. The latitude and longitude entries, when listed to seconds, were taken from Harry Hillaker's *Climate of Iowa Report 2002-1*. Elevations are from observational forms, station history forms, and the Iowa Report.

May 1860 – 1883/4 – Elevation 928 feet – Approximately 41° 38' N, 95° 47' W

- Harris Grove, Observer Jacob T. Stern

1883/4 – October 1904 – Elevation approximately 1,096 feet – Approximately 41° 38' N, 95° 47' W

- Palmer Subdivision on West 8th Street, Observer Jacob T. Stern and Millicent B. Stern

November 1904 – April 1927 – Elevation approximately 1,094 feet – Approximately 41° 38' N, 95° 47' W

- In town, on 3rd Street (this is more likely 3rd Avenue) at the residence of observers father, Willis L. Stern, observers Glenn Howard Stern, Andrew (Teddy) Stern and Mary Jean Stern

May 1927 – October 1960 – Elevation 1,190 feet –41° 38’ 36’’ N, 95° 47’ 42’’ W

- Residence, 402 West 7th Street, observer Amy Ann Stern

November 1960 – March 1966 – Elevation 1,115 feet – 41° 38’ 32’’ N, 95° 47’ 36’’ W

- Residence, 110 South Elm Avenue, observer Mr. M. C. Minshall

April 1966 – April 1967 – Elevation 1,094 feet –41° 38’ 34’’ N, 95° 47’ 24’’ W

- County jail, southwest corner of 7th Street and 2nd Avenue, observer Sheriff Louis E. Allstot

May 1967 – July 1973 – Elevation 1,102 feet – 41° 38’ 46’’ N, 95° 47’ 22’’ W

- Holben Rest Home, Southwest corner of 4th Street and 2nd Avenue North, observer Howard Holben

July 1973 – January 1988 – Elevation 1,101 feet – 41° 38’ 45’’ N, 95° 47’ 22’’ W

- Residence, 315 2nd Avenue, observer Howard Holben

May 1988 - Present – Elevation 1,030 feet –41° 38’ 17’’N, 95° 47’ 16’’ W

- Sewage Treatment Plant, Observer Bob Salter and Scott Muxfeldt

OBSERVERS AND INSTRUMENTATION

1860 – 1883/4:

A Smithsonian Institution volunteer observer, Jacob T. Stern, began his observations as early as 1860, however monthly observational forms are not available until May 1866. Yearly rainfall amounts from 1861 until 1885 were published in the “History of Harrison County, Iowa” in 1888. He lived on the “Lynnwood Farm” [or Linnwood] in Harris Grove. The farm was located in Section 14, LaGrange Township. The exact location is unknown making it difficult to determine the exact elevation since the terrain is very rolling. The Harris Grove Post Office closed in 1867 and little remains of the community today. There is a Linwood Cemetery at the corner of Overton Avenue and Price Place. A couple miles to the northeast is the Harris Grove Church at the corner of 296th Street and Quentin Trail.

Mr. Stern entered either Harris Grove or Logan on his observational forms in a rather random pattern before entering only Logan after August 1870. The 1880 United States Census lists Jacob T. Stern as living in LaGrange Township. The exact date of his

leaving his farm in Harris Grove and moving to Logan is unknown. Mr. Stern became a U. S. Army Signal Service volunteer observer in April 1876.

In February 1868 Mr. Stern included the following hand written note on his observational form as submitted to the Smithsonian.

“I desire to extend my observations – would like to have a good barometer. Does the Smithsonian Institution furnish any thing of this kind – I would also like an ambrometer [Note: handwriting difficult to read] – I measure the rain at present in an old fruit can. I would measure more accurately as well as more coincidentally with a better instrument. I am permanently located ??? and if furnished with any such instruments would make good use of them. Respectfully, Jacob T. Stern”

In September 1883 Jacob Stern entered the following on his observational form:

“My granddaughter has kept the Records for 5 months in my absence while traveling through New England and Canada.”

However, the granddaughter continued to enter Mr. Stern’s name on the forms not her own name.

Thermometer - No information is available on the type or location of the thermometer. However, in a newspaper article published on 14 January 1960 it is mentioned that Jacob Stern, in 1857, had “...purchased in own instruments...”

Rain gage – As mentioned above in February 1868 Mr. Stern was using an “old fruit can” as a gage.

1883/4 – 1904:

It is speculated that sometime in 1883 or 1884 Jacob T. Stern, continuing as a Signal Service observer, moved into the town of Logan. In September 1883 he listed his location as being on a “high bluff” which would describe the western edge of Logan. It is known that in March 1884 he purchased several lots in the Palmer Subdivision in Logan. This was a location at the western edge of Logan on West 8th Street near its intersection with South Elm Avenue. He continued recording observations through March 1888. Mr. Stern died in 1892.

From November 1885 through March 1886, Effie Adams recorded the observations “for Jacob T. Stern.”

The Signal Service volunteer changed to Millicent B. Stern (Mrs. Jacob T. Stern) in 1888. In August 1891 she became the official Weather Bureau observer. She recorded observations from April 1888 until October 1904. She died on 12 November 1904.

Thermometer – No information on the instruments was found for the period before 1892. In August 1892, soon after the station became a Weather Bureau station, there was a Richardson dry thermometer, a Green maximum thermometer (serial number 1361) and a Green minimum thermometer (serial number 1340). The thermometers were located 5 feet above the ground.

Rain gage – In February 1884 Jacob Stern listed his gage as being two inches in diameter and 20 inches above the ground. In August 1892 the gage was listed simply as a “government” gage being located 5 feet above the ground.

1904 – 1927:

With the death of Millicent Stern, the weather observing duties were assumed by her son Willis L. Stern and his children. The Weather Bureau volunteer observer changed to Glenn Howard Stern in November 1904. Glenn would have been 12 years old at this time. There is also some hint that Willis might have taken observations along with his son but his name does not appear on the observational forms themselves.

The observations probably were taken be at the residence of Willis Stern. In 1906 the Weather Bureau inspector listed the location as “in town, on 3rd St,” however, a more correct address might be 3rd Avenue which places the location close to the center of Logan, i.e., in town. This location on 3rd Avenue also fits better with information found the station history form for the next observing site indicating that the new site was “a little less than half a mile west from P. O. and about same distance west of former location at residence of W. L. Stern.” See Map 2. He continued observing until July 1914.

The Weather Bureau volunteer observer changed to Andrew (Teddy) Stern, another son of Willis Stern, in November 1914. Teddy, or Ted as it was often entered on the forms, was about 13 years old when he assumed the duties. He continued observing through October 1918 when he left for college.

In November 1918 the Weather Bureau volunteer observer changed to Mary Jean Stern. Ms. Stern was the daughter of Willis Stern. She was about 15 years old when she began observing. She continued observations until April 1927.

Thermometer – In February 1906, the station had a Schneider Brothers maximum thermometer, serial number 5575 and the minimum

thermometer, serial number 3592, which were located in a shelter with a sloping roof and sides but without a front. It was located on the side of a “leanto or shed of house.” It was located over sod, door opened to north, it contained no bottom and was four feet high.

The March 1927 inspection report lists the station has having standard Weather Bureau maximum and minimum thermometers mounted in a Cotton Region Shelter. The shelter faced north and the bottom of the shelter was four feet above sod. The shelter was found to be in poor condition and could not be moved to the new location.

Rain gage – In 1906, the station was equipped with a three-inch diameter gage, 14.5 inches deep. It was located on top of a post some two feet four inches above the ground.

The next record of instruments in 1927 when the gage was listed as a standard Weather Bureau eight-inch gage mounted so that the top was three and a half feet above the ground. In March 1927 the gage support was found to be unserviceable and thus was not moved to the new location.

1927 – 1960:

In May 1927 Amy Ann Stern became the Weather Bureau volunteer observer. At the time of her appointment she was the youngest volunteer weather observer at the age of 12. She was the great-granddaughter of Jacob Stern and a second cousin to Mary Jean Stern. She continued observing until October 1960 ending 100 years of observing by the Stern family. It must be noted that Mrs. C. Albert Stern, Amy’s mother, recorded the observations “for Amy Ann Stern” in September and October 1960 after she was married in August 1960. The observations were taken at 402 West 7th Street some four tenths of a mile west of the Post Office in Logan. As with earlier locations, this site was on a high bluff west of downtown Logan and the Boyer River. See Figures 1 and 2.

Thermometer – Upon the establishment of this station in May 1927 the station had standard Weather Bureau maximum (serial number 26991) and minimum (serial number 16219) thermometers mounted in a Cotton Region Shelter. The shelter was over sod and the door opened to the north. The shelter was “about four feet above soil. See Figure 1 for a photograph of the Cotton Region Shelter in January 1960.

The 18 March 1938 inspection report noted that the shelter faced north and the bottom was three and a half feet above sod. The minimum thermometer had to be replaced because of a badly corroded back and the Townsend thermometer support was replaced. It was further indicated

that the shelter was not anchored nor was it level. Additional stakes were installed and the shelter was securely anchored at that time. In May 1955 the station was listed as having a self-registering maximum and minimum thermometer.

Rain gage – The gage was a standard Weather Bureau eight-inch gage, serial number 5549, located about ten feet east of shelter, over sod, and clear from any high obstructions in May 1927. The 18 March 1938 inspection found the gage in poor condition having several leaks and it had to be re-soldered. The top of the gage was three feet above the ground. Gage was relocated 89 feet west on 4 May 1955 to improve exposure.



Figure 1. Ms. Amy Ann Stern and weather instruments 28 January 1960 in Logan Iowa. Notice that the site is on a bluff sloping down to the east. The camera is facing southeast.

Source: Des Moines Register.



Figure 2. A view looking east down 7th Street in Logan, Iowa. It is quite evident that the downtown area is lower than the area of 402 West 7th the site of weather observations from 1927-1960.

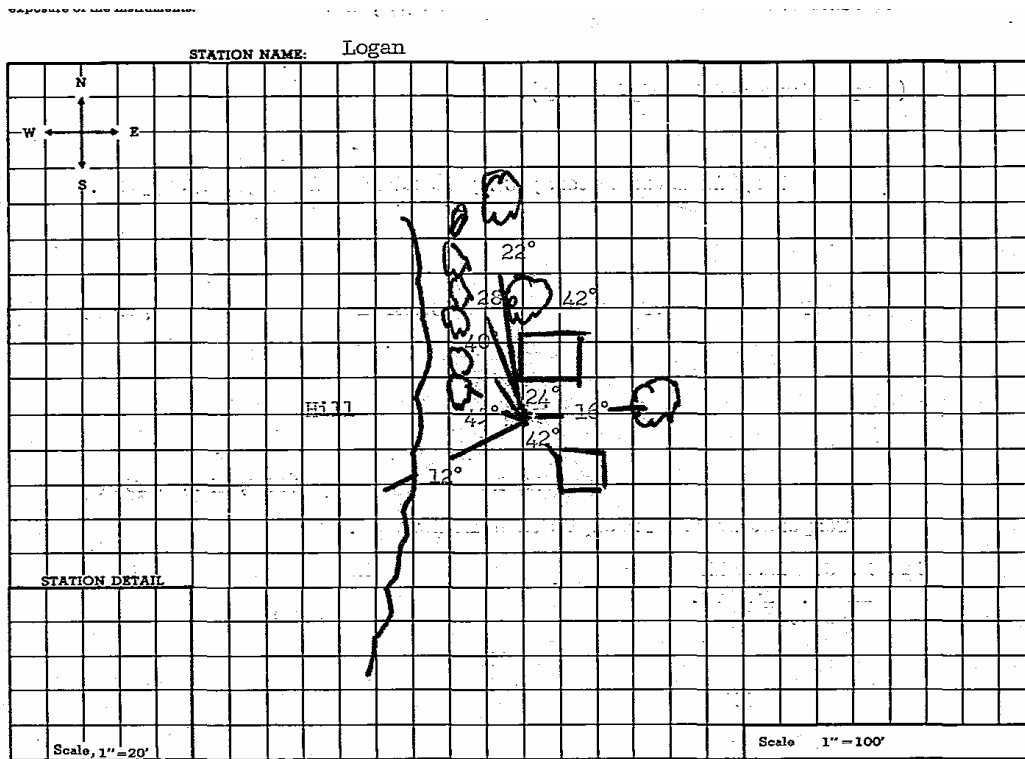
Source: Photograph by author.

1960 – 1966:

Mr. M. C. Minshall became the first non-Stern family observer in Logan on 5 November 1960. Mr. Minshall continued observing through March 1966 at his residence located at 110 South Elm Avenue. See Figure 3 for details on the rain gage's surroundings and Figure 4 for a view of the residence as it appeared in August 2005.

Thermometer –The station had standard Weather Bureau maximum and minimum thermometers mounted in a Cotton Region Shelter. The shelter was located at 110 South Elm Avenue.

Rain gage - The gage was a standard Weather Bureau eight-inch gage. It was located two houses south of the instrument shelter, approximately 120 feet, at 122 South Elm Avenue.



TOPOGRAPHY: (State briefly the general nature of the topography within 3 to 5 miles radius.)
 Station located in town on east facing slope. Slope ends at river approximately 3/4 mile east of station. Area is very rolling to steep along creeks.

Figure 3. The location of the rain gage in Logan, Iowa, as of 5 November 1960. Station was located in town at 122 South Elm Street on an east facing slope. Source: Official station history files at the National Climatic Data Center



**Figure 4. The residence at 110 South Elm Street in Logan, Iowa, August 2005. View is looking west clearly showing the rise in elevation. The instrument shelter was located at this location.
Source: Photograph by author.**

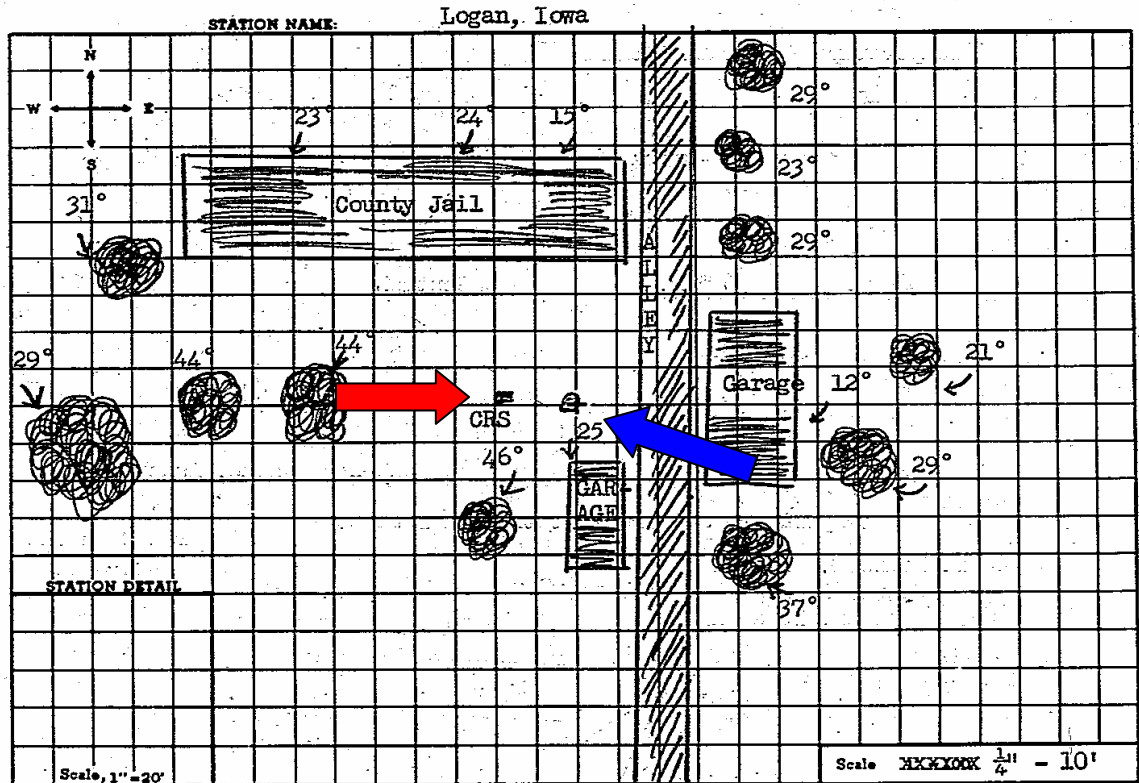
1966 - 1967:

The Weather Bureau volunteer observer changed to Louis E. Allstot in April 1966. He continued observing until April 1967 at a site just behind the Harrison County Jail. See Figures 5 and 6 for the location of the instruments relative to the county jail.

Thermometer –The station had standard Weather Bureau maximum and minimum thermometers mounted in a Cotton Region Shelter. In March 1967 the Weather Bureau inspector found the station in “sad condition.” The maximum thermometer was found broken and was replaced.

Rain gage - The gage was a standard Weather Bureau eight-inch gage. When it moved to this site the inner tube had to be soldered because of a leak. The Weather Bureau inspector also noted that the “exposure could be better.”

A new diagram is required (even when substation is closed) whenever the old sketch does not accurately represent the exposure of the instruments.
 ← Highway #30 →



TOPOGRAPHY: (State briefly the general nature of the topography within 3 to 5 miles radius.)

Generally flat at station to hilly within 5 mile radius.

Figure 5. The location of the instruments in Logan, Iowa, on 30 March 1966. The red arrow points to the location of the Cotton Region Shelter, while the blue arrow indicates the location of the rain gage.

Source: Official station history files at the National Climatic Data Center.



Figure 6. The rear of the “old” county jail on West 6th Street in Logan, Iowa. The white one-story structure was added in 1987. The weather instruments would have been just off the picture to the right. The building was demolished in 2002 to make room for the new jail. View is looking northeast.

Source: Sheriff Terry Baxter, Harrison County, Iowa.

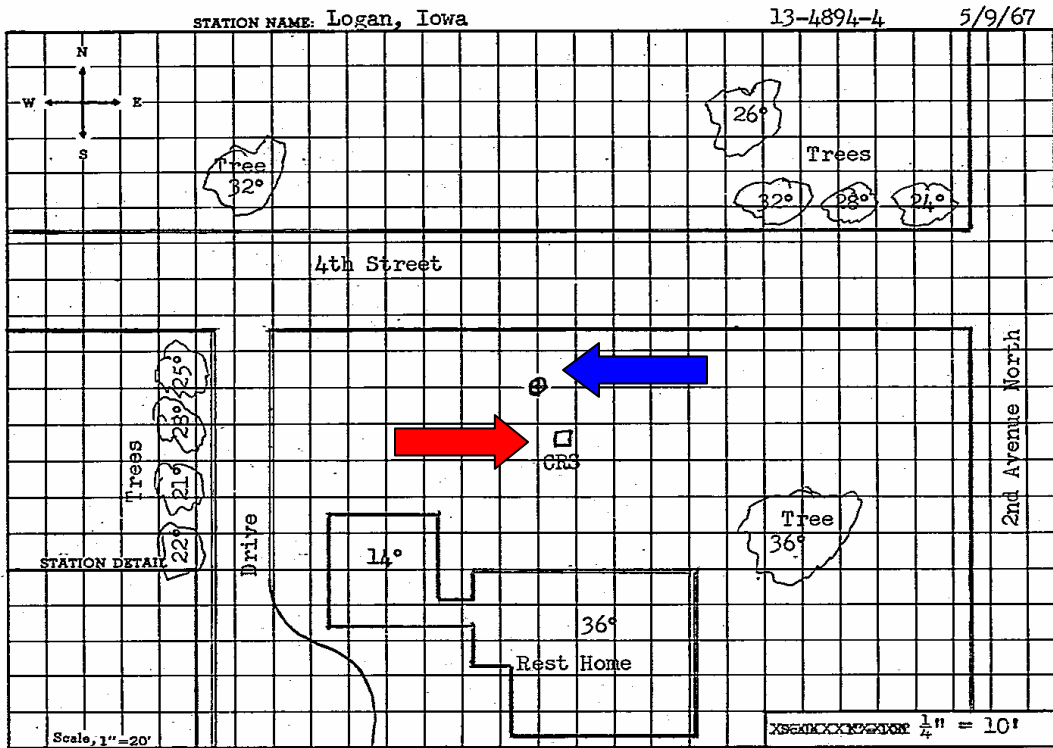
1967 – 1973:

In May 1967 the observational program in Logan moved to the Holben Rest Home where Howard Holben became the official Weather Bureau volunteer observer. The location was on the southwest corner of 4th Street and 2nd Avenue north. Observations were taken from this location until July 1973. See Figures 7 and 8 for the location of the instruments relative to the Rest Home.

Thermometer –The station had standard Weather Bureau maximum and minimum thermometers mounted in a Cotton Region Shelter.

Rain gage - The gage was a standard Weather Bureau eight-inch gage.

exposure of the instruments.



Generally flat at station to hilly within 5 mile radius.

Figure 7. Location of instruments in Logan, Iowa, on 9 May 1967. The red arrow points to the location of the Cotton Region Shelter, while the blue arrow indicates the location of the rain gage.

Source: Official station history files at the National Climatic Data Center.



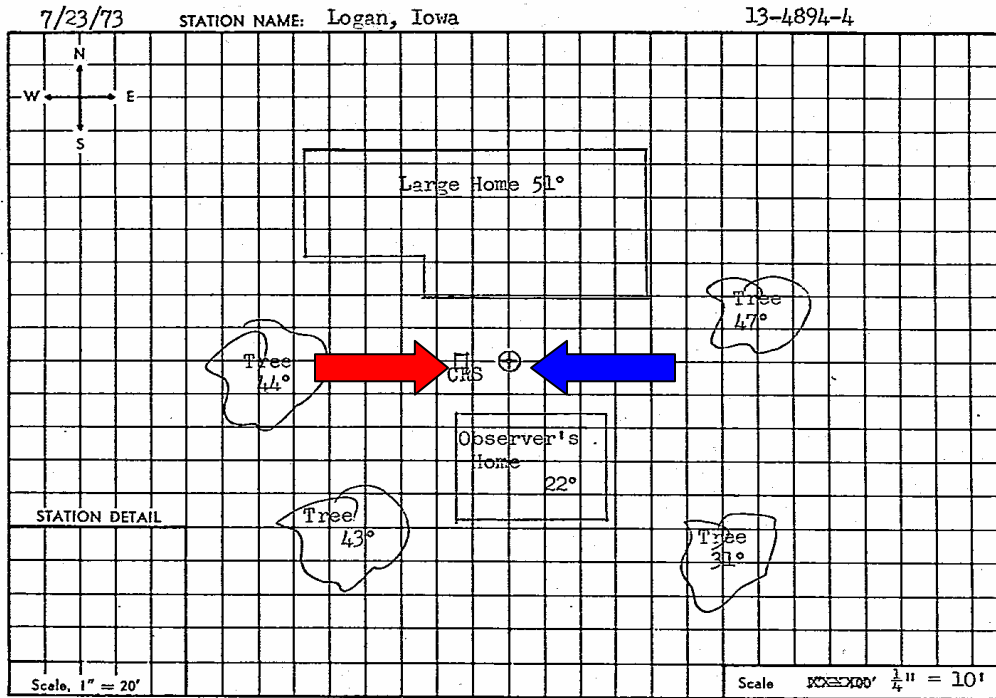
**Figure 8. The building in Logan, Iowa, that once served as the Holben Rest Home. Photograph taken in August 2005. The instruments would have been located in the yard at the lower right corner of the photograph. View is looking southwest from the corner of 4th Street and North 2nd Avenue.
Source: Photograph by author.**

1973 – 1988:

Mr. Holben continued as the volunteer observer in Logan but on 27 July 1973 his instruments were moved to his residence at 315 2nd Avenue North. Observations were taken at this location through January 1988. See Figure 9 for the location of the instruments relative to the observer's residence. See Figure 10 for a view of the home as of August 2005.

Thermometer –The station had standard National Weather Service maximum and minimum thermometers mounted in a Cotton Region Shelter.

Rain gage - The gage was a standard National Weather Service eight-inch gage.



TOPOGRAPHY: (State briefly the general nature of the topography within 3 to 5 miles radius.)
 Generally flat at station to hilly within 5 mile radius.

Figure 9. The location of instruments at Logan, Iowa, on 27 July 1973. The red arrow points to the location of the Cotton Region Shelter, while the blue arrow indicates the location of the rain gage.
 Source: Official station history files at the National Climatic Data Center.



Figure 10. Residence at 315 West 2nd Avenue in Logan, Iowa as of August 2005. View is looking west. Perhaps the large tree in the yard is the same one diagrammed in Figure 9. The weather instruments would have been placed to the right of the yellow residence between it and the two-story home. Source: Photograph by author.

1988 – Present

Weather observations were moved to the Logan Sewage Treatment Plant some seven tenths of a mile south of town in May 1988. Robert Salter was the observer from May 1988 unto March 2002 at which time Scott Muxfeldt assumed the duties. They served as a National Weather Service cooperative observers.

Thermometer – The station has a standard National Weather Service Maximum and Minimum Temperature System (MMTS). The instrument is located ten feet north of a small white shed, see Figure 11.

Rain gage - The gage is a standard National Weather Service eight-inch gage. The gage is 33 feet north of a one-story brick building. See Figure 11. The gage was originally located some 40 feet west of its present location being moved in 2002 for the convenience of the observer. Originally it was over grass but now is over a gravel area.



Figure 11. Weather instruments at Logan, Iowa, August 2005. View is looking west.

Source: Photograph by author.

APPENDICES

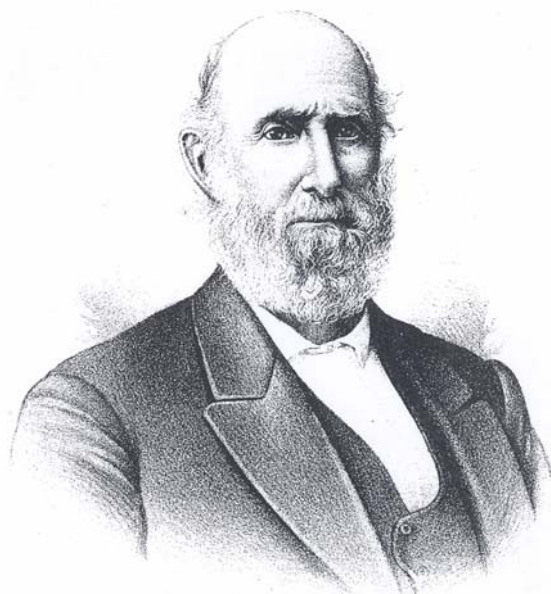
Appendix 1 – Observer Stories

The following was extracted from the *1891 Harrison County Iowa History*:

“Jacob T. STERN, better known as "Father STERN," has been a resident of Harrison County just a third of a century, coming as he did from the old Keystone State, and locating in Harris Grove, or what has come to be known as the "Linwood Farm," April 30, 1857. A brief sketch of his eventful career, can find no more appropriate place than upon the pages of a history of the county in which he has lived so long; where he has accomplished so much for himself and for others, and where he is surrounded by a multitude of friends, whose name is Legion.”

“Mr. STERN comes from good old Quaker stock and was born in Kennett,

Chester County, Pa., July 2, 1814. His father was John STERN and his mother Phoebe (McFARLAND) STERN, who were both natives of Pennsylvania and the parents of fifteen children, twelve of whom grew to manhood and womanhood. None ever came farther West than Ohio, except our subject, Jacob T. Mr. STERN attended the same school which Bayard Taylor, the distinguished poet and traveler did. Very early in life our subject was bereft of his parents, the father dying when he was but six years of age. His mother died one year prior. He was placed in the family of a Quaker, Lewis PUSEY, who was quite wealthy and with whom he remained nine years. He then went with his brother George to learn the trade of a house-plasterer, following the same for four years, attending school during the winters. He worked at his trade in Chester County and near Philadelphia, until 1853, after which he followed farming four years then went West. He went to St. Louis by railway and from that city by water to Florence, Neb., and soon came to this county.”



Jacob T. Stern

Figure 12. Portrait of Jacob T. Stern, date unknown.

“Politically, our subject is a firm believer in the principles of the Republican party, and is always ready to give an intelligent reason for the political hope within him.”

“In religious matters both Mr. and Mrs. STERN hold the generally accepted faith of the Quaker church.”

“In looking over the long list of pioneer farmers of Harrison County, no one name stands out in more prominence than does that of "Father STERN." Observing the improvements made on "Linnwood Farm" and a knowledge of the fact that this man has been not only a scientific but practical agriculturist, one sees the necessity of coupling intelligence with manual labor in order to become a successful farmer. The numerous Farmer's Clubs found in this county, owe their origin and excellent workings to Mr. STERN, who has labored in season and out of season, for their success.”

“During a period of thirty-one years he has been a weather and crop reporter from Harrison County to the Smithsonian Institute and War Department, a table of which is given elsewhere in this work.”

“Having become well advanced in years and been quite successful in farming, he very wisely left his farm and moved to the village of Logan, where he will probably spend the remainder of his days. While time has made its inroads upon this grand old pioneer, yet his mental faculties are but little impaired. The newspaper files of the county as well as of the Eastern journals, together with the Agricultural Society, Old Settler's Association, etc., have all felt the influence and sentiment of this man's practical talks and pen sketches. In the days of Abolition he was a strong anti-slavery advocate, making himself felt in the debating club, and was prominent in the "under-ground railroad" service, (assisting slaves from this country into Canada) and was a personal friend of the abolition agitators, including Fred DOUGLASS, who sent him letters of congratulations, upon his Golden Wedding anniversary occasion, which took place September 30, of the present year.”

“Mr. and Mrs. STERN, by reason of their genial whole-souled manners have become very popular in all parts of Harrison County, and indeed their exemplary lives shine forth with a brilliancy which may well be patterned after by the rising generations, as theirs has been a life of true nobility, of which the world has none too many.”

The following was extracted from the *History of Harrison County Iowa* by Joe. H. Smith published in 1888.

“Through the politeness of Mr. Jacob T. Stern, of Logan, Iowa, I am furnished with a report of the average rainfall and temperature of each year from 1860 to 1885, of this county, for which I at this time tender him my sincere thanks.”

“In 1860, Mr. Stern, then a resident on Lynnwood farm, in Harris Grove, in this county, was appointed by the Smithsonian Institute to keep a record of the rainfall and temperature of this locality and report the same to that institution, once per month, which Mr. Stern promptly performed until this business was taken out of

the hands of the aforesaid institution by the War Department, since which time Father Stern has been continued in position and reported as formerly, once per month, to the proper officer. When Mr. Stern first took upon himself this task, there was not another station west of Des Moines, which status continued for more than ten years. This business of keeping a record of the rainfall and temperature of each year, was done by Mr. Stern for his own satisfaction and the reporting thereof to the Smithsonian Institute and War Department, an act *pro bono publico*, and like the old gospel plan of salvation, without money and without price.'

"I take great pride in having the privilege of inserting this report herein, from the fact that there is not another report of this character of any county west of Des Moines, nor can there be, because no such record was kept."

The following was written by Amy Ann (Stern) Gregory and was extracted from the *Harrison County, Iowa History Book, 1981*:

"As it has been written in the histories of my great grandfather, Jacob T. Stern, and of my great uncle, Willis L. Stern, there began, long before my time, a tradition that some member of the Stern family would keep a daily record of the local weather, of maximum and minimum temperatures, and of the amounts of rain or snowfall. Monthly reports were submitted to the Department of Agriculture or Commerce. The very early records were given to the Smithsonian Institution. When I was twelve years old, Uncle Willis passed on to me this interesting task. With a little help now and then from members of my family, I was the official Weather Observer for the next 33 years. It was only when I married Melvin Gregory (on August 7, 1960) and moved to Wisconsin that the Stern's weather tradition ended. This concluded 100 years of nonremunerative observations by the Stern family."

On 22 March 1967 the Weather Bureau station inspector visited the Logan site. The following was extracted from the report of that visit:

"Went to the sheriff's office when I first arrived and found that he was in court. Got to see him during a short recess and he indicated that he would like to give the station up but would continue to run it. When I went to the jail to check the equipment I was met by the sheriff's wife and had to take quite a lot of abuse. She should have been elected sheriff. Much larger and rougher than the sheriff could ever hope to be. I have several interested parties and organization looking for some that is interested in taking the station. They will drop me a card and I will return and move the station."

Appendix 2 - Methodology

The primary sources of information for this study were the Logan 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 Logan, 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. The elevation contour map is from Topozone.com. Elevations, latitude, and longitude are generally from Harry Hillaker's *Climate of Iowa Report 2002-1*.

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 and the files of the Iowa State Climatologist.

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Missouri Valley Times, 14 January 1960

www.rootsweb.com

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Harrison County, Iowa History Book, published in 1981

Harrison County, Iowa, Office of Recorder and GIS Office

Climate of Iowa Report 2002-1, A Detailed Station History for Selected Historical Climate Network Stations in Iowa, 1893-2002, Harry J. Hillaker, State Climatologist

Climate of Iowa Report 2004-1, A Detailed Station History for selected Co-op Stations in Iowa, 1900-2004, Harry J. Hillaker, State Climatologist