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The History of Weather Observation – Boise Idaho

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THE
HISTORY

of

WEATHER
OBSERVATION

BOISE IDAHO

Joshua D. Smith

NATIONAL WEATHER SERVICE • BOISE, IDAHO

History of Weather Observations in Boise, Idaho

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“Using the term ‘meteorologist’ to describe a man makes him sound very dull and uninteresting. On the contrary. He is one of the most interesting men I have known. More commonly known as the ‘weather man’, his job ranks very high in importance in our modern world. Requirements for his position in life are very high, they have to be, for on his shoulders rests a very heavy burden.”

– In Every Conversation, The Weather: How Forecasts Are Made. Daniel J. Smith, 1947

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Introduction

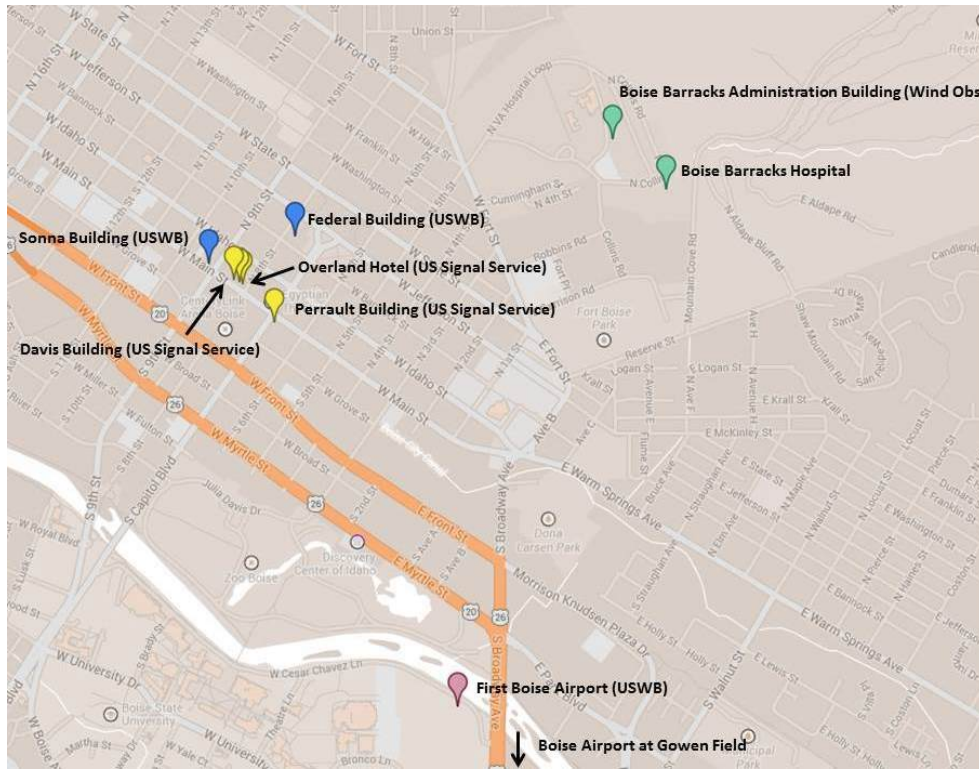
Weather observation in the city of Boise, Idaho spans over 150 years, beginning on 01 February 1864, seven months after the establishment of Fort Boise. The Fort was established on 04 July 1863 to protect settlers traveling the Oregon Trail and nearby mining operations from Indian attacks. As a requirement of their daily duties, the post surgeon at Fort Boise, renamed Boise Barracks in 1879, would take three daily weather observations of temperature, wind, and precipitation which continued uninterrupted through November of 1898. The United States Army's Signal Service and the U.S. Weather Bureau took weather observations from downtown Boise from 1877 through 1939. The U.S. Weather Bureau, now known as the National Weather Service, has taken hourly observations at the Boise Airport on Gowen Field since 1940.

The goal of this study is to provide documentation of the official weather observational path in Boise, Idaho as part of the National Weather Service observational program. Only weather observations established as part of the historical record for the National Weather Service in Boise are included in this study, with one exception; a frost and freeze study conducted in 1910 and 1911, which assessed how representative the sheltered roof thermometers on the U.S. Federal Building were to the near surface temperatures at two other locations in Boise. Although not extensively discussed, information on the radiosonde program is provided in Appendix 2. To give even greater context to the weather observations themselves, biographical profiles of some of the earliest observers and meteorologist are also presented.

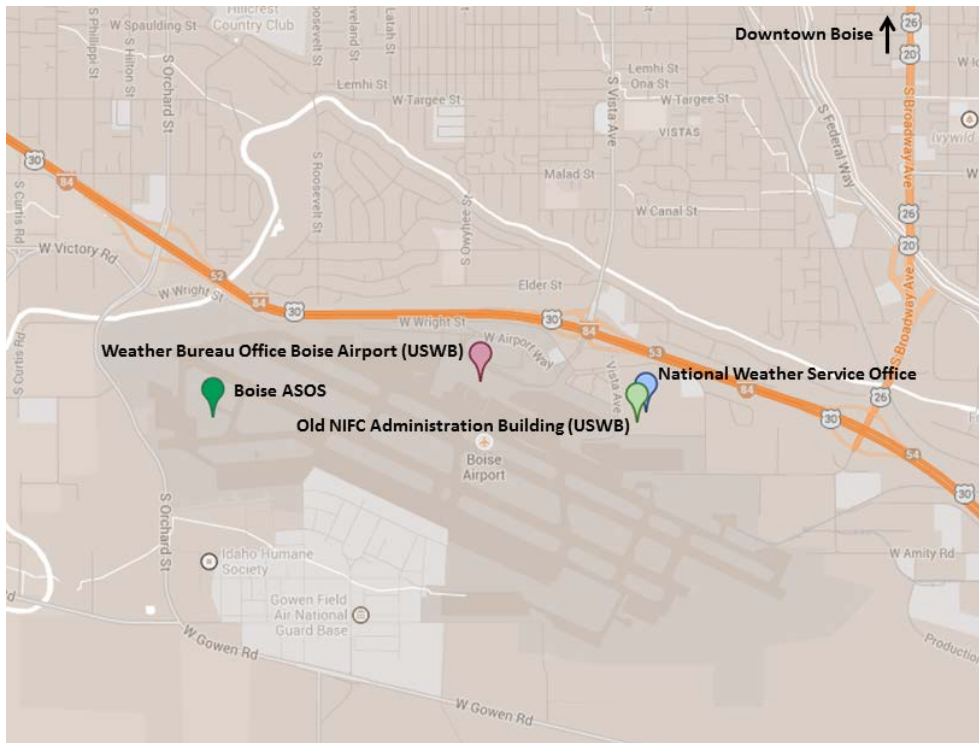
Chronology of Station Location in Boise, Idaho

Official weather observations have been taken at twelve locations in Boise, Idaho from 1864 through 2015. A map and table with the location and timeline of observations, along with elevation, is given in Table 1.

Table 1: Chronology of Station Location in Boise, Idaho 1864-Present						
Location	Station Type	Period		Latitude	Longitude	Elevation
		From	To			
Boise Barracks (Fort Boise), Post Hospital	U.S. Army Post Surgeon	02/01/1864	11/30/1898	43 37' N	116 11' W	2800
Overland Hotel (2nd floor)	U.S. Army Signal Service	07/01/1877	04/16/1878	43 37' N	116 12' W	2732
Overland Hotel (3rd floor)	U.S. Army Signal Service	04/16/1878	09/01/1880	43 37' N	116 12' W	2740
Davis Building (adjoining Overland Hotel)	U.S. Army Signal Service	09/01/1880	01/01/1888	43 37' N	116 12' W	2732
Perrault Building (2nd floor)	U.S. Army Signal Service	01/01/1888	06/30/1890	43 37' N	116 12' W	2734
Boise Barracks (Fort Boise) Office of Post Surgeon	COOP/Surgeon General	07/01/1890	11/30/1898	43 37' N	116 11' W	2815
Sonna Building (3rd Floor)	U.S. Weather Bureau	12/01/1898	03/16/1905	43 37' N	116 12' W	2703
Federal Building (4th Floor)	U.S. Weather Bureau	03/16/1905	06/30/1939	43 37' N	116 12' W	2713
First Boise Airport (Communications building)	U.S. Weather Bureau Airport Station/CAA	10/13/1931	12/18/1939	43 36' N	116 12' W	2699
Boise Municipal Airport (Administration Building)	U.S. Weather Bureau Airport Station	12/18/1939	06/04/1969	43 34' N	116 13' W	2826
Old Administration Building (2nd Floor) NIFC	U.S. Weather Bureau Forecast Office	06/05/1969	07/20/1993	43 34" N	116 13' W	2838
National Weather Service Office, NIFC	National Weather Service Forecast Office	07/21/1993	Present	43° 34' 02" N	116° 12' 41" W	2814
Boise Airport Automated Station	ASOS	11/10/1994	Present	43° 34' 1" N	116° 14' 26" W	2822



Map 1. Location of weather observation sites in downtown Boise, from 1864 until 1939. Map from Google.



Map 2. Location of weather observations at the Boise Municipal Airport, about 3 miles south of the city center from 1940 through present. Map from Google.

U.S. Army Medical Department at Boise Barracks 1864-1898

Post Hospital at Fort Boise

Fort Boise was established by the Union Army on 04 July 1863 by Major Pinkney Lugenbeel (Idaho State Historical Society 1965). This was the same day the Idaho Territory was created, with its capital in Lewiston, and one day after the Battle of Gettysburg. A serious concern for the military was diseases, which killed more soldiers than combat. It was believed there was a possible link between human disease and weather, which prompted the Surgeon General of the U.S. Army, Doctor James Tilton, to order U.S. Army senior medical officers on 02 May 1814 to “keep a diary of the weather” at each military station (Mock and Dupigny-Giroux 2009; U.S. Army 1856). The senior medical officer was expected to instruct hospital stewards in the proper taking and recording of observations. This eventually became the first national weather observing network, with monthly weather reports sent by mail to the U.S. Army Medical Department Headquarters in Washington D.C. (Mock and Dupigny-Giroux 2009). The first meteorological observations of high and low temperature and daily precipitation began at Fort Boise on 01 February 1864 (U.S. Weather Bureau 1954). Wind observations began some time later, though the exact date is unknown. This was the only record of meteorological observations in Boise until 1877 when the U.S. Signal Service station was opened. Fort Boise was renamed the Boise Barracks on 05 April 1879 per Signal Order No. 2 from the Division of Pacific (Hammarsten 1983).



Figure 1. Boise Barracks Post Hospital with cotton region shelter (white) and rain gauge near porch. Date of Photograph: 1880 to 1895. Source: The History of Medicine (NLM), No. A01048.

The original monthly weather records for the Boise Barracks could not be located before January 1888. (See Appendix 1: Data Sources and Location of records for more information.) The only documentation found on the barrack’s weather observations comes from the U.S. Weather Bureau Form “500-1 Station History” completed in December of 1954, the original Climatological Record Book from 1898-1910, and two letters written by the Idaho State Climatologist in the 1960s. The only known

photograph of the weather instruments at the Boise Barracks Post Hospital is shown in Figure 1, from the History of Medicine (NLM) photograph collection.

Location of Weather Instruments:

U.S. Weather Bureau (1954) states observations were taken at the Post Hospital from 01 February 1864 to 01 July 1877 and then at the Office of Post Surgeon from 01 July 1890 to 30 November 1898. There is no notation in U.S. Weather Bureau (1954) on where observations were taken from 02 July 1877 to 30 June 1890. The monthly meteorological registrars and Reports of the Chief Signal Officer confirm observations were taken at the barracks during this period. The post hospital, one of the first buildings built at the fort in 1863, was located 300 feet north-northeast of the Quartermaster's Headquarters, along Cottonwood Creek (Billings 1875; U.S. Weather Bureau 1954). The surgeon's residence was the first building to the west of the Post Hospital in the Officer's Quarters, shown in Figure 2 and Figure 6. U.S. Weather Bureau (1954) gave the following on the instruments location:

"No record of instruments or exposures. Paper boy recalls possible window-shelter on north side of Surgeon General's Res."

The paperboy was Mr. A. R. Thomas¹ who, along with Mr. Ern Eagleson², provided information on the location of the fort buildings in an interview. Mr. Thomas delivered papers to the residence of Major Alfred C. Girard, the surgeon who was stationed at the barracks between 1885 and 1889, as shown in Table 2 (U.S. Army Medical Department 2012). It's certainly possible the thermometer shelter and rain gauge could have been located at the surgeon's residence for a period of time. It is known that the instruments were located in a cotton region shelter at the Post Hospital by 1891. The exact date the wind instruments were installed isn't known, but the observations from 1888 through 1898 were taken at the administration building.

¹ Thought to be Arthur R. Thomas. University of Idaho Graduate and Boise City Engineer (J. Jacobsen 2013, personal communication). In 1954, lived at 5200 Cedar Street, Boise, Idaho (U.S. Weather Bureau 1954).

² Ernest "Ern" G. Eagleson moved to Boise in 1891 and was appointed the city engineer in 1893 where he served for 8 years (not consecutive years). He was elected the mayor of Boise in 1919 and again in 1925 (Hawley 1920a). In 1954, lived at 410 Jefferson Street, Boise, Idaho (U.S. Weather Bureau 1954).

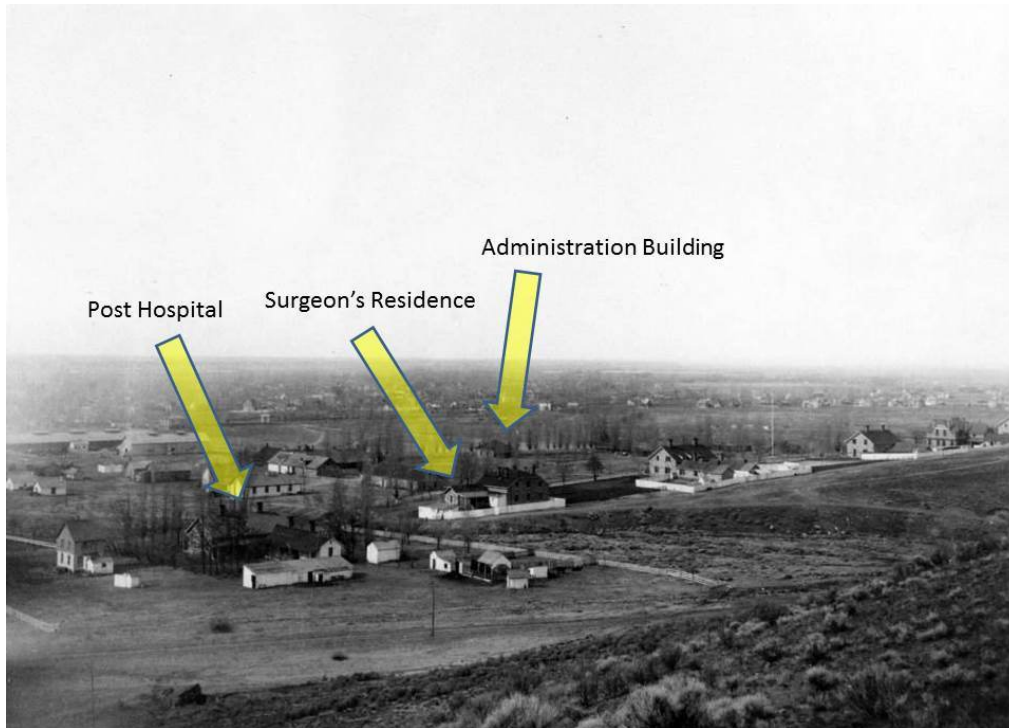


Figure 2. Looking west-southwest from the Boise Foothills at the Boise Barracks. Annotated are the locations of the Post Hospital (Figure 1), Administration Building (Figure 5) and Surgeon's Residence. Date of Photograph: Circa 1902. Photograph by: Joseph F. Zanlter. Source: Idaho State Archives, Idaho State Historical Society E67-73.56.

Thermometers:

Little is known about the exposure of the thermometers, but it was “understood” that the thermometers were sheltered sometime later according to U.S. Weather Bureau (1911). It’s thought the “sheltered sometime later” is referring to the installation of the cotton region shelter. It was required by the U.S. Army Medical Department in 1856 that all thermometers be sheltered from direct sunlight (U.S. Army 1856). Until the mid-1880s, the most common shelter used was the window shelter which is believed to have been used at the Post Hospital through the late 1880s (Hazen 1885, U.S. Weather Bureau 1954). In 1960, the exposure of the thermometers was investigated by the State Climatologist, David J. Stevlingson. In particular, he was looking at the high temperature records set on 17 August 1871. Peter Moffatt, U.S. Army Assistant Surgeon, recorded a temperature of 111 degrees at his 2 P.M. observation, but in the remarks column on the meteorological register there appeared the note: "Temperature 3 p.m. 121 degrees." This would be an all-time record high temperature for Boise, Idaho. At the time, all temperature records were based on observations made by the assistant surgeon at 7 A.M., 2 P.M., and 7 P.M. since, according to Stevlingson (1960), the barracks did not have self-registering maximum and minimum thermometers until January 1872 (U.S. Army 1858). A report on the hygiene of the United States Army for the War Department in 1875 indicates that observations with the self-registering thermometers began in April 1872 shown in Figure 3 (Billings 1875). The exact installation date of the self-registering thermometers could not be verified, since the original monthly registers were not available.

Meteorological report, Fort Boise, Idaho, 1870-'74.

Month.	1870-'71.				1871-'72.				1872-'73.				1873-'74.			
	Temperature.			Rain-fall in inches.	Temperature.			Rain-fall in inches.	Temperature.			Rain-fall in inches.	Temperature.			Rain-fall in inches.
	Mean.	Max.	Min.		Mean.	Max.	Min.		Mean.	Max.	Min.		Mean.	Max.	Min.	
July	79.34	113	55	0.44	77.34	108	55	0.14	76.40	107*	50	0.00	79.63	107*	55	0.15
August	72.43	92	47	0.00	73.93	121	50	0.00	74.20	102*	54	0.41	74.38	103*	54	1.65
September	65.60	93	38	0.00	66.80	97	42	0.11	62.48	95*	34	0.76	64.63	97*	32	0.15
October	52.43	88	25	0.24	52.41	91	24	0.27	56.92	95*	32	0.92	49.32	83*	20	0.54
November	41.30	68	25	2.13	41.37	74	21	1.90	34.86	74*	7	0.26	45.50	75*	20	3.85
December	23.56	50	0	1.98	35.23	50	7	5.96	33.53	67*	5	1.87	33.43	57*	2	4.19
January	33.45	56	13	3.54	32.50	59	6	4.60	33.76	52*	18	3.22	39.24	60*	9	2.35
February	35.31	56	23	1.29	40.03	69	0	6.49	31.39	54*	7	0.81	31.49	53*	- 2	1.29
March	38.38	61	22	7.66	45.15	78	24	0.83	45.69	83*	14	0.91	40.30	64*	15	2.69
April	46.51	76	27	1.54	45.99	81*	33	0.84	49.73	83*	31	1.53	50.12	81*	32	1.30
May	59.94	91	36	2.75	59.87	91*	37	0.73	57.70	88*	41	0.49	63.54	95*	36	1.35
June	74.29	106	41	0.64	74.26	104*	52	0.22	70.16	100*	47	0.15	68.25	96*	48	0.63
For the year	51.89	113	0	21.49	53.49	121	0	22.09	52.24	107*	5	11.33	53.28	107*	- 2	20.24

* These observations are made with self-registering thermometers. The mean is from the standard thermometer.

Figure 3. Meteorological Report 1870-1874. Source: Billings (1875).

In a press release for the removal of the maximum temperature on 17 August 1871, Stevlingson says:

“The principal factor in disregarding the early records is the great doubt about the exposure of the thermometers. So far as we know the exposure was not in the type of shelter used by the Weather Bureau since its establishment in 1890. To the best of our knowledge the thermometers at Fort Boise were exposed in something called a “window shelter.” It is doubtful that this type of shelter permitted free ventilation of the instruments.”

This report led to the removal of data before 1875 from the official record. It’s not clear as to why the official observational record begins January 1875. The data from January 1875 to July 1877 was taken at the Post Hospital with the same thermometer sheltering as before 1875. Also, the U.S. Signal Service office used the same type of thermometer sheltering from July 1877 to December 1884. It is reasonable to assume that data from at least April 1872, when the self-registering thermometers were installed, is of the same quality as data from January 1875 to December 1884.

A cotton region shelter was installed at the barracks between 1885 and 1891. A photograph (Figure 1) from the National Library of Medicine’s History of Medicine shows the cotton region shelter next to the Post Hospital. The exact date of the photograph is unknown. However, Dr. Steven Greenberg with the National Library of Medicine stated it was an Albumen Print, the most common photographic print between 1880 and 1895 (2012, Personal Communication). The U.S. Signal Service Station in Boise installed their cotton region shelter on 01 December 1885, after the U.S. Signal Service required all station to use these shelters in 1884 (Hazen 1885). Therefore, it’s possible a cotton region shelter was installed at the Boise Barracks around the same time. The photograph matches the description of the shelter given in an article in the Idaho Statesman on 25 July 1891 (The Idaho Statesman 1891).



Figure 4. Close up of the cotton region shelter and rain gauge next to the post hospital. Date of Photograph: 1880 to 1895. Source: The History of Medicine (NLM), No. A01048.

Barometer:

No barometric pressure measurements were taken at the barracks.

Wind Instruments:

No specific information on the type wind instruments used or when wind observations began has been found. The first report of wind speed and direction found was in the Monthly Meteorological Record for September 1888. A photograph of the Administration Building at the Boise Barracks taken around the 1890s has the wind instruments on the top of the roof, as shown in Figure 5. The Administration Building was located in the center of the barracks, shown in Figure 6, with a row of tall trees to the southwest. This building was built either in 1885 or 1886 (U.S. Department of Interior 2011). The building was demolished in 2011 (Preservation Idaho 2013).

Rain Gauge:

There was a standard rain gauge with daily precipitation records from 01 February 1864 through 30 November 1898. The only other rain gauge documentation is in Figure 4, showing the eight-inch standard rain gauge next to the cotton region shelter.



Figure 5. Boise Barracks Administration Building with Weather Vane and Anemometer Mounted on the Roof. This Building was in the Center of the Fort Complex. Date of Photo: Circa 1890. Photo Credit: Idaho State Archives 77-180.2/L.

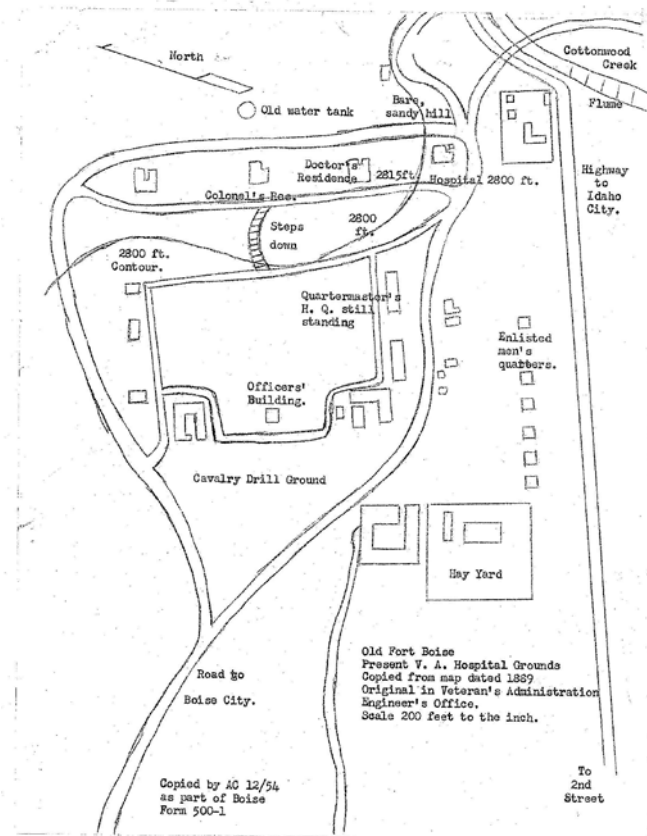


Figure 6. Boise Barracks Map from U.S. Weather Bureau (1954). Date of map: 1889. Source: National Climatic Data Center EDADS.

U.S. Army Post Surgeon Observers

The U.S. Army Post Surgeons were required to take daily weather observation (Mock and Dupigny-Giroux 2009). Assistant Surgeons and Hospital Stewards usually took the observations, as the Post Surgeon was regularly deployed with troops in the field. A list of the Boise Barrack's Post Surgeons and Hospital Stewards, shown in Table 2, was created from a variety of digitized sources available on Google as well as signatures on the cooperative observer forms from the U.S. Weather Bureau. The information in Table 2 should not be considered complete. Brief biographies of a few of the surgeons are shared below.

Table 2: Boise Barracks Post Surgeon Weather Observers 1864-1898

Observer:	Position	Period at the Barracks:
Dr. Adam H. Cochrane	Post Surgeon	October 1863 – May 1866
Dr. Charles C. Furley	Assistant Surgeon	May 1864 ³ – September 1864 ⁴
Lieutenant-Colonel Clinton Wagner	Chief Surgeon ⁵	July 1866 – November 1868
Sergeant Edward H. Lyons ⁶	Hospital Steward	04 June 1867 – 04 June 1873
Captain George P. Jaquett	Assistant Surgeon	December 1868 – April 1869
1 st Lieutenant Charles B. Byrne	Assistant Surgeon	April 1869 – October 1869
Captain Peter Moffatt	Assistant Surgeon	October 1869 – December 1871
Dr. Passmore Treadwell	Post/Contract Surgeon	December 1871 – September 1877
Gustave Smith ⁷	Hospital Steward	February 1873 – May 1888
Captain Jenkins (John) A. FitzGerald	Assistant Surgeon	08 November 1877 – 05 October 1878
<i>1st Lieutenant William G. Spencer</i>	<i>Assistant Surgeon</i>	<i>30 May 1878 – 06 August 1878</i>
1 st Lieutenant William R. Hall	Assistant Surgeon	03 October 1878 – June 1879
Captain Timothy E. Wilcox	Assistant Surgeon	19 June 1879 - August 1882
1 st Lieutenant Rudolph G. Ebert	Assistant Surgeon	19 August 1882 – July 1885
<i>1st Lieutenant Philip G. Wales</i>	<i>Assistant Surgeon</i>	<i>August 1885 - September 1885</i>
Major Alfred C. Girard	Assistant Surgeon	August 1885 ⁸ - November 1889 ⁹
Dr. Wilfrid H. Schuyler	Hospital Steward	May 1888 – October 1889 ¹⁰
<i>1st Lieutenant Henry P. Birmingham</i>	<i>Assistant Surgeon</i>	<i>25 September – 07 October 1889</i>
Sergeant Charles W. R. Von Radesky ¹¹	Hospital Steward	03 October 1889 – September 1892

³ National Archives and Records Administration (NARA); Washington, D.C.; Returns from U.S. Military Posts, 1800-1916; Microfilm Serial: M617; Microfilm Roll: 122.

⁴ He resigned his post at the Fort Boise (The Idaho Statesman, 01 September 1864).

⁵ Chief Surgeon of the District of Owyhee and Boise.

⁶ "United States Registers of Enlistments in the U.S. Army, 1798-1914", index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/QJDR-TJN3> : accessed 26 Aug 2014), Edward Lyons, 1870.

⁷ "United States Registers of Enlistments in the U.S. Army, 1798-1914", index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/QJDR-TDXW> : accessed 14 Oct 2014), Gustave Smith, 1865.

⁸ Medical Department of U.S. Army, 1885: Official List of Changes in the Stations and Duties of Officers Serving in the Medical Department U.S. Army from 29 August 1885 to 04 September 1885, *Boston Med. Surg. J.*, **113**, 264.

⁹ Medical Department of U.S. Army, 1889: Official List of Changes in the Stations and Duties of Officers serving in the Medical Department of the U.S. Army Division of the Pacific from 16 October 1889 to 16 November 1889, *Occidental Medical Times*, **3**, 676.

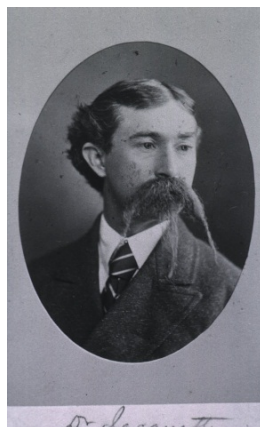
¹⁰ The Idaho Statesman, 1889: Personal. The Idaho Statesman; Date: 03 October, XXVII, 3.

Captain Marcus E. Taylor	Assistant Surgeon	23 November 1889 – February 1890
<i>Captain Edward C. Carter</i>	<i>Assistant Surgeon</i>	<i>March 1890 - April 1890</i>
1 st Lieutenant Henry P. Birmingham	Assistant Surgeon	April 1890 – August 1892
<i>1st Lieutenant Robert R. Ball</i>	<i>Assistant Surgeon</i>	<i>March 1891 – 01 July 1891</i>
Captain William Stephenson	Assistant Surgeon	September 1892 – December 1894
Dr. Wilfrid H. Schuyler	Hospital Steward	October 1892 – January 1898
<i>1st Lieutenant Ernest V. Smith</i>	<i>4th Infantry</i>	<i>August 1893, November 1893</i>
<i>1st Lieutenant Charles Wilcox</i>	<i>Assistant Surgeon</i>	<i>December 1893 - February 1894</i>
<i>1st Lieutenant Henry P. Birmingham</i>	<i>Assistant Surgeon</i>	<i>March 1894 - September 1894</i>
Major Marshall William Wood	Post Surgeon	October 1894 – October 1898
<i>1st Lieutenant John S. Kulp</i>	<i>Post Surgeon</i>	<i>August 1897 – 02 September 1897</i>
Patrick Haughey	Hospital Steward	February 1898 - July 1898
<i>1st Lieutenant Robert D. Walsh</i>	<i>4th Cavalry</i>	<i>October 1898 – November 1898</i>

Observers in red were temporary.



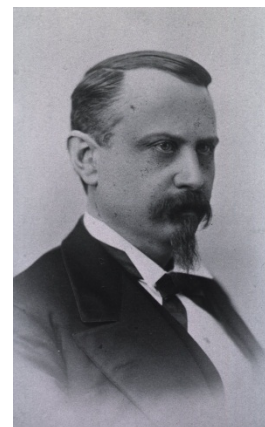
Dr. Charles Furley¹²



Capt. George Jaquett



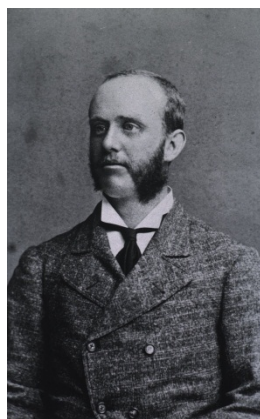
1st LT Charles Byrne



Capt. Peter Moffatt



Capt. Jenkins (John)
FitzGerald



1st LT William Hall



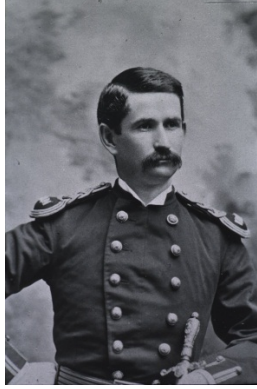
Capt. Timothy Wilcox



1st LT Rudolph Ebert

¹¹ Buried in the Arlington National Cemetery, Section 4, Sites 2969-A.

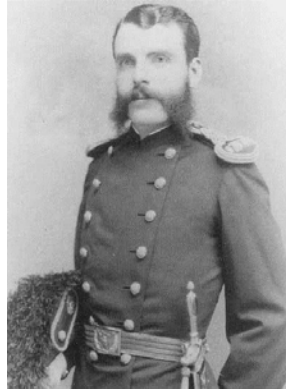
¹² Photograph from the Kansas Historical Society archives.



Capt. Marcus Taylor



1st LT Robert R. Ball



**1st LT Henry
Birmingham**



**Capt. William
Stephenson**

All photographs are from the History of Medicine collections at <http://www.nlm.nih.gov/hmd/ihm/>, except where noted.

Dr. Adam H. Cochrane (1863-1866)

Doctor Adam Hutchinson Cochrane¹³ was the first Post Surgeon at Fort Boise and is believed to have taken the first weather observation on 01 February 1864. He was born in Paisley, Scotland on 09 June 1831,¹⁴ and came to the United States when he was eleven years old (Ward 1886). He worked until he was seventeen years old, when he attended the Academy at Glens Falls, New York. He later attended Seminary at Charlotteville, New York and then New York State Normal School. He went to Castleton Medical College (now Castleton State College) in Castleton, Vermont for two courses and then attended Albany Medical College graduating in 1857. He practiced medicine in New York City until 12 July 1862 when he entered the volunteer service for the Union Army as 2nd Assistant Surgeon in the 15th New York Engineers. He became a 1st Assistant Surgeon when he was detached for medical duty in the defense of Washington. He rejoined the regiment for the Battle of Fredericksburg and then again was detached to a battalion of Regular Army Engineers for the Battle of Chancellorsville. He was mustered out of volunteer service on 25 June 1863 and reassigned to the Military Division of the Pacific in California. He was assigned Post Surgeon at Fort Boise and arrived in October of 1863. While stationed at Fort Boise, he was also in the field during parts of the Snake War (1864-1868) in Idaho, Oregon, and Nevada. He was part of Drew's Expedition from June 1864 through September 1864, which ended early due to a number of men getting dysentery (Michno 2007). He remained stationed as the Post Surgeon until May of 1866. From October 1866 to April of 1867, he was a Contract Surgeon at Fort Wagner in South-Central Oregon (Sohn 1998). He was one of two surgeons with the Wheeler Survey Expedition in Southern California and Nevada from April 1871 to January 1872. He left the Army in 1873 and began a private practice in Watsonville, California. He moved to San Jose, California in 1876 and married Bertha R. Clow on 29 November 1876¹⁵. He practiced medicine in San Jose and was a member of the Grand

¹³ "California, Great Registers, 1866-1910," index, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/VTXF-5DH> : accessed 18 Jan 2013), Adam Hutchinson Cochrane, 1876.

¹⁴ Birth date of 10 June 1831 reported in *The San Francisco Call Newspaper* on 05 April 1895.

¹⁵ "California, County Marriages, 1850-1952," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/K8D2-91C> : accessed 18 Jan 2013), A H Cachrane and Bertha R Polon, 1876.

Army of the Republic, Phil Sheridan Post No. 7, until his death on 04 April 1895¹⁶. He is buried at Oak Hill Memorial Park Cemetery¹⁷ in San Jose, California.

Lieutenant-Colonel Clinton Wagner (1866-1868)



Lieutenant-Colonel Clinton Wagner was the Chief Surgeon at Fort Boise from July 1866 to November 1868 (Henry 1878). He was born in Baltimore, Maryland on 28 October 1837 (White 1898). He received his undergraduate degree at St. James College in Hagerstown, Maryland and got his medical degree from the University of Maryland at Baltimore in March 1859 (The Military Surgeon 1915; White 1898). He joined the U.S. Army as a Lieutenant and Assistant Surgeon in October 1860 and was stationed at Camp Cooper, Texas. During the Civil War, he was rapidly promoted becoming the Surgeon-in-Chief of the Second Division, Fifth Army Corps, Army of the Potomac, with the rank of Lieutenant Colonel. He established numerous field hospitals and organized the first floating hospital on western waters (Gulf of Mexico and the Mississippi River). He served during several battles including Chancellorsville, Mine Run and Gettysburg. During the Battle of Gettysburg, he established a field hospital near Little Round Top at Jacob Weikert's farm during the fiercest fighting (ALA 1915; White 1898). He resigned from active service in June of 1864 due to his health, and was assigned to establish a general hospital in Beverly, New Jersey in which he requested it be used for the African American soldiers. After the war, he continued with the U.S. Army Medical Department at San Francisco, California, Fort Vancouver, Washington and Fort Boise, Idaho before resigning from the service altogether in 1869. He briefly lived in Boise in 1870¹⁸ before he went abroad to study Laryngology, a branch of medicine that specializes with disorders, diseases, and injuries of the vocal apparatus or larynx. When he returned home, he established himself as a specialist in New York and later established the Metropolitan Throat Hospital and Dispensary. At the time, he was an expert of the thyrotomy and his techniques for the operation were described in a thesis. He was also a professor of throat and nose diseases at both the University of Vermont and New York Postgraduate Medical School and Hospital. He retired from active practice and spent several years in Colorado Springs, Colorado studying climatology,

¹⁶ *The San Francisco call.* (San Francisco [Calif.]), 05 April 1895. *Chronicling America: Historic American Newspapers.* Lib. of Congress. <<http://chroniclingamerica.loc.gov/lccn/sn85066387/1895-04-05/ed-1/seq-1/>>

¹⁷ "United States, Records of Headstones of Deceased Union Veterans, 1879-1903," index and images, FamilySearch(<https://familysearch.org/pal:/MM9.1.1/V6HQ-CLR> : accessed 08 Feb 2013), Adam H Cochrane, 1895.

¹⁸ "United States Census, 1870," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MN3G-WGZ> : accessed 08 Feb 2013), Clinton Wagner in household of William Wagner, Maryland, United States; citing p. 55, family 441, NARA microfilm publication M593, FHL microfilm 0552095.

publishing several papers on the topic. He married 28 August 1882, to Elizabeth Vaughn, of New York. He died in Geneva, Switzerland on 25 November 1914 (The Military Surgeon 1915). He is buried with his wife in Arlington National Cemetery¹⁹.

The photograph of Lieutenant-Colonel Clinton Wagner is from the Civil War carte de visite (CDV) of Civil War surgeon by Charles Henry Alden, Brigadier General, Medical Corps, U.S. Army taken 30 April 1865. The photograph available is from the American Civil War Surgical Antiques at <http://www.medicalantiques.com/civilwar/>.

Dr. Passmore Treadwell (1871-1877)

Dr. Passmore Treadwell served as Assistant Surgeon at the Boise Barracks from 1871 to 1877 (Conn 1906). He was born in Portsmouth, New Hampshire on 19 September 1839. He grew up in Concord, New Hampshire as his father, Thomas Passmore Treadwell, was New Hampshire's Secretary of State²⁰. He went to Jefferson Medical School of Pennsylvania graduating in 1862. He joined the U.S. Navy as an Assistant Surgeon on 30 June 1862 and served on the three ships, U.S.S. Vixen²¹, U.S.S. Relief²², and U.S.S. Columbia. He also served in the Mississippi River Squadron during the Civil War. He was captured by the Confederate Army at Fort Fisher on 16 January 1863 when the U.S.S. Columbia ran accidentally ran aground on a shoal in the Masonboro Inlet, North Carolina two days earlier (Porter 1998; Couthouy 1899). He was paroled as a noncombatant and returned to the U.S. Navy on 31 January 1863. He was discharged from the U.S. Navy on 28 March 1867 and worked in private practice in New York City and Brooklyn, New York for five years (Conn 1906). He re-enlisted in the U.S. Army and was assigned to the Boise Barracks as an Assistant Surgeon per S.O. No. 181 Headquarters, Department of the Columbia on 29 November 1871 (R. M. Hill 2012, personal communication). He became a Citizen Surgeon or Contract Surgeon on 30 September 1876 but resigned about in late 1877 due to his failing health from diabetes. He had a private practice in Boise, Idaho until his death on 23 May 1881. He married Harriet B. Brown and they later had three children²³, Elizabeth, Thomas Percy, and Robert. He was described as a skillful surgeon, a true patriot, an excellent citizen and a kind husband and father (The Idaho Statesman 1881b). He is buried in Pioneer Cemetery²⁴, Boise, Idaho.

¹⁹ Find a Grave, Cited 2013: Dr. Clinton Wagner. [Available online at <http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GSln=Wagner&GSfn=Clinton&GSbyrel=all&GSdyrel=all&GSob=n&GRid=43470807&df=all&>]

²⁰ "United States Census, 1850," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MWZJ-XWP> : accessed 02 May 2013), Passmore Treadwell in entry for Thomas P Treadwell, 1850.

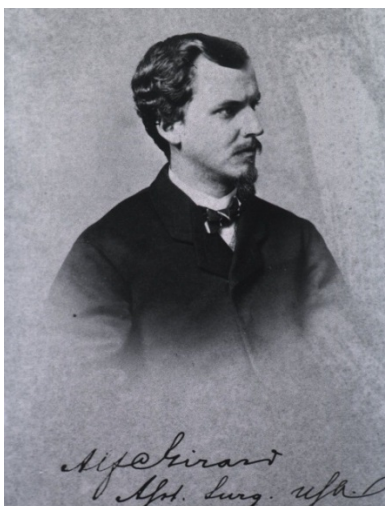
²¹ The Vixen was a gunboat part of the blockade at Ossabaw Sound, Georgia and expedition against Confederate works at Pocotaligo, South Carolina in 1862. Decommissioned in November 1862.

²² The Relief was a supply ship serving in the Gulf of Mexico as a ship store station at Ship Island, Mississippi Sound.

²³ "United States Census, 1880," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/M4ZN-NM1> : accessed 08 Feb 2013), Pasmore Treadwell, Boise City, Ada, Idaho, United States; citing sheet 16D, family 0, NARA microfilm publication T9-0173.

²⁴ Find a Grave, Cited 2013: Passmore Treadwell. [Available online at <http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GSln=treadwell&GSfn=passmore&GSbyrel=all&GSdyrel=all&GSob=n&GRid=43878879&df=all&>]

Brigadier General Alfred C. Girard (1885-1889)



Brigadier General Alfred Conrad Girard was born in Basel, Switzerland on 31 July 1841 the son of Conrad Girard a University of Basel professor (The Military Surgeon 1914). He received a degree from the University of Basel in 1857 then attended the University of Würzburg, Germany where he received his medical degree in 1864. He was attracted by the opportunity to service in the military during the U.S. Civil War and joined the Union Army on 19 January 1865 as an Acting Assistant Surgeon. He was serving in Charleston, South Carolina when he was commissioned as an Assistant Surgeon in the U.S. Army Medical Department on 14 May 1867. He served at several locations as the Post Surgeon across the United States, including the United States Military Academy at West Point. He spent 1878 to 1884 at the busy post of Fort Keogh near Miles City, Montana, during which time he was in the field with Colonel Nelson A. Miles in a campaign against the Sioux in 1879. In 1880, he accompanied an exploring party which spent two months in Yellowstone National Park. He served as the Assistant Surgeon at the Boise Barracks from August of 1885 to November of 1889. He was appointed a Medical Inspector and assigned to the construction of a General Hospital at the Presidio of San Francisco on 12 April 1899. He was appointed Commanding Officer of the hospital on 01 June 1899 and held this position until 29 June 1902. He served in the office of the Surgeon General in Washington D.C. from July to November 1902 and then at his own request was sent to Manila as Chief Surgeon of the Department of the Philippines. He returned to San Francisco in February 1904, where he served as Chief Surgeon of the Department of California until his retirement. He was promoted to the grade of Brigadier General on 06 April 1905 and, at his own request, was retired the following day (The Army Medical Bulletin 1939).

He is described as an accomplished surgeon and a pioneer in the American employment of the antiseptic method in the operating room. He was well-versed with modern European languages, as well as English, with a pronounced foreign accent. He was a large man with a strong face, abundant hair, full beard, and moustache. He married Anna R. Epping from South Carolina and they later had two children, Alfred O.²⁵ and Flora Elizabeth²⁶. He died from appendicitis in Walter Reed General Hospital,

²⁵ "Wisconsin, Marriages, 1836-1930," index, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/XRVD-858> : accessed 08 Feb 2013), Alfred C. Girard in entry for Alfred O. Girard and Josephine Edna Carder, 05 Nov 1895.

²⁶ "Wisconsin, Marriages, 1836-1930," index, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/XRV6-945> : accessed 08 Feb 2013), A. C. Gerrard in entry for Ross Leonard Bush and Flora Elizabeth Gerrard, 10 Jul 1893.

Washington D.C. on 31 January 1914²⁷. He was buried near the Ft. Myer gate in Arlington Cemetery²⁸ on 02 February 1914. The photograph of Alfred Conrad Girard is from the History of Medicine (NLM), Old Negative no. 82-292.

Lieutenant-Colonel Marshall W. Wood (1894-1898)



Major Marshall William Wood became the Post Surgeon at the Boise Barracks in 1894. He was born in Watertown, New York on 03 June 1846. He enlisted for a year in the 186th New York Infantry Regiment, Company E, as a private on 05 September 1864 at Orleans, New York (Adjutant General of New York 1905). During the Battle of Five Forks on 01 April 1865 near Petersburg, Virginia, he was shot in the right leg. The U.S. Civil War ended 8 days later on 09 April 1865. He was mustered out of the company on 02 June 1865 near Alexandria, Virginia. He became a medical assistant for National Home's Northwestern Branch for disabled volunteer soldiers in Milwaukee, Wisconsin on 03 November 1865²⁹ and worked there until 14 June 1870. He went to Rush Medical College in Chicago, Illinois completing five terms of postgraduate and research work, graduating in 1873 (Wickersham 1922; Hamersley 1918). He married Helen Jerene Hawes on 07 December 1870 and they later had four children Clara L., Mary L., Agnes A., and George. He re-enlisted in the U.S. Army in June 1875 as an assistant surgeon and served in the Indian campaigns from 1876 to 1890 before arriving in Boise as the Post Surgeon in October 1894. While in Boise, he documented cases of Rocky Mountain Spotted Fever, which was common at the time in the Treasure Valley of southwest Idaho, and published the first findings on this fever in 1896³⁰. In 1898, he served as Chief Surgeon of General Shafter's Division in the Spanish-American War and also served in World War I as a Medical Examiner of physicians entering the service. He retired in 1919 a Lieutenant Colonel and made his home in Boise until his death on 05 August 1933³¹. He was officially

²⁷ "District of Columbia Deaths and Burials, 1840-1964,"

index, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/F7Y3-N7V> : accessed 08 Feb 2013), Alfred C. Girard, 31 Jan 1914.

²⁸ Medical Department of U.S. Army, Office of Medical History, Biographies: <http://history.amedd.army.mil/biographies/girard.html>

²⁹ "United States, National Homes for Disabled Volunteer Soldiers, 1866-1938," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/VH4N-Y51> : accessed 13 Aug 2012), Marshall W Wood, 1867.

³⁰ Marshall W. Wood, "Spotted fever as reported from Idaho," Report of the Surgeon General, U. S. Army, 1896, Government Printing Office (1896).

³¹ "Idaho, Death Certificates, 1911-1937," index and Images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/FLY2-6MC> : accessed 27 Jan 2013), Marshal W Wood, 05 Aug 1933.

commended three times for Distinguished Service in the U.S. Army. In 1894, he was given an Honorary Master of Arts from Bowdoin College in Brunswick, Maine. He is buried in Morris Hill Cemetery³² in Boise, Idaho. The photograph of Marshall W. Wood is from grover68 available on Ancestry.com.

U.S. Army's Signal Service in Boise, Idaho 1877 – 1890

On 09 February 1876, former Idaho Territory Governor and U.S. House of Representative, Thomas Warren Bennett, made an application to the U.S. Army's Signal Service to establish stations at Boise City and Silver City, Idaho; Walla Walla, Washington; and Baker City, Oregon (U.S. Army 1876). On 21 May 1877, Sergeant Barnet E. Light of the U.S. Signal Service was order, per S. O. No. 62, to establish a station (Official Number 145) at Boise City, Idaho Territory.

U.S. Signal Service Station at the Overland Hotel 1877-1880

On 22 June 1877, the station was established on the second floor of the Overland Hotel on the northwest corner of 8th and Main Street (U.S. Department of Agriculture 1902; U.S. Army 1877). Observations of temperature, rain, snow, barometric pressure, wind speed and direction began on 01 July 1877. Seven observations were taken a day which were sent by telegraph as well as by U.S. Mail each month (U.S. Army 1878). Sergeant Light had only ten minutes to prepare and send these observations by telegraph. The first monthly mean report (Form 22) for Boise in July 1877 is shown in Figure 11.

A small third story addition was built shortly after Mr. Hosea Bradford Eastman from Whitefield, New Hampshire, bought the Overland Hotel (also known as the Overland House) in early 1878 (U.S. Weather Bureau 1911; The Idaho Statesman 1878a; Craig 1878). The station was moved to the new addition on 16 April 1878, shown in Figure 7, which the U.S. Signal Service rented for \$30.00 a month (U.S. Department of Agriculture 1902; Craig 1878). No information has been found on the first station on the second floor of the hotel as an inspection didn't take place until October of 1878. A diagram of the third floor station is shown in Figure 8. Both the inspections in October 1878 and August 1879, found the station in good order and all records were in excellent condition (Craig 1878; McClellan 1879).

³² Find a Grave, Cited 2013: Marshall Wood. [Available online at <http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GSln=Wood&GSfn=Marshall&GSmn=William&GSbyrel=all&GSdyrel=all&GSob=n&GRid=61953314&df=all&>]

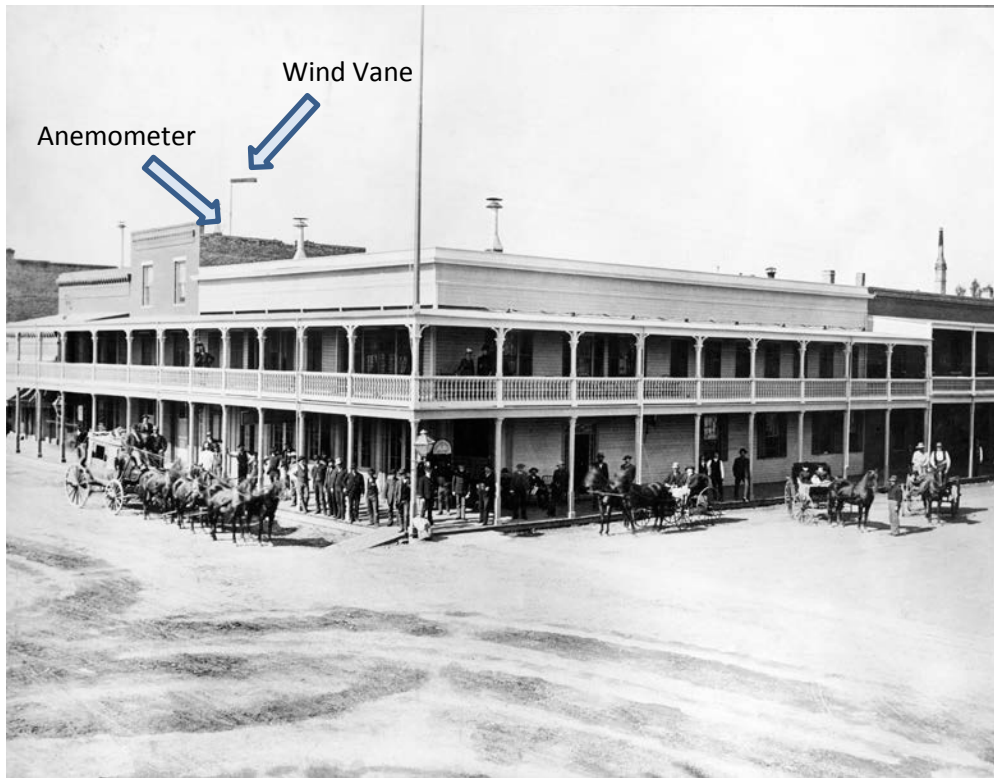


Figure 7. The U.S. Signal Service Station in the third story addition at the Overland Hotel. Wind wave can be seen on the roof of three story building. Date of Photo: 1878-1880. Source: Charles Hummel, Boise Rotary Club web page (<http://boiserotary.org/history-charter-member-ben-eastman/>).

In his semi-annual reports, Sergeant Light noted public support for the U.S. Signal Service weather reports.

“The weekly and monthly reports have been regularly published in the Idaho Statesman (a tri weekly newspaper). The office still continues to be visited by the leading citizens of the city and vicinity (U.S. Army 1879).”

“There does not seem to be any abatement in the interest felt here for the service, and the records are taken as authority. In a great many cases inquiry is made as the time of frost in previous years, also as to amount of rainfall. The office continues to be visited by the leading men of the city, and a deep interest is manifested in the service. The weekly, monthly, and yearly reports are published regularly in the papers (U.S. Army 1880).”

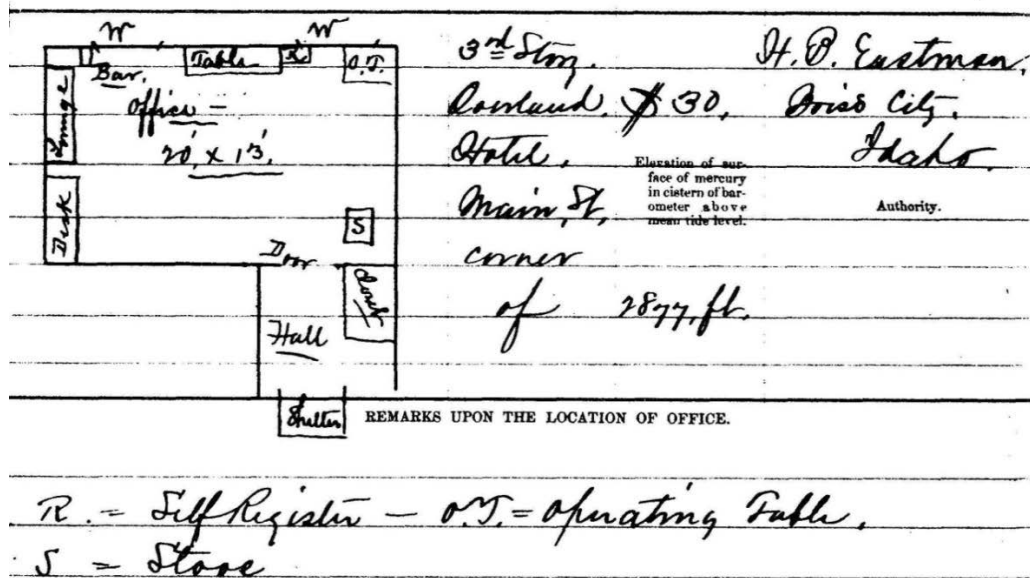


Figure 8. Diagram of the U.S. Signal Service station in the Overland Hotel. Date: 27-29 August 1879. Source: McClellan (1879). Credit: National Climate Data Center's (NCDC) Environmental Document Access and Display System (EDADS).

Thermometers:

The thermometers were placed in a standard window shelter attached to a north-northeast facing window on the second (1877-1878) then third (1878-1880) floors (U.S. Weather Bureau 1911; Craig 1878; McClellan 1879). A detail drawing of the window shelter was included in Craig (1878) and is shown in Figure 9. The shelter was constructed of double lattice, attached to the hall window facing about 40 degrees east of north. The shelter was 5 feet, 9 inches tall, 2 feet, 10 inches wide and 20 and a half inches deep (Craig 1878; McClellan 1879). Both Craig (1878) and McClellan (1879) found the instrument in good working order and properly situated.

Table 3: Thermometers in Window Shelter at the Overland Hotel

Date	Standard		Maximum		Minimum		Hygrometers		Source
	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	
3-7 October 1878	324	25' 4"	328	26' 2"	217	24' 4"	711	25' 4"	Craig (1878)
	321	Extra	327	Extra			712	25' 4"	
							713	Extra	
							714	Extra	
27th-29th August 1879	N/A	25'	N/A	25' 10"	N/A	26'	N/A	25'	McClellan (1879)
	N/A	Extra	N/A	Extra			N/A	25'	

Kind of shelter, size and location, with position of instruments.

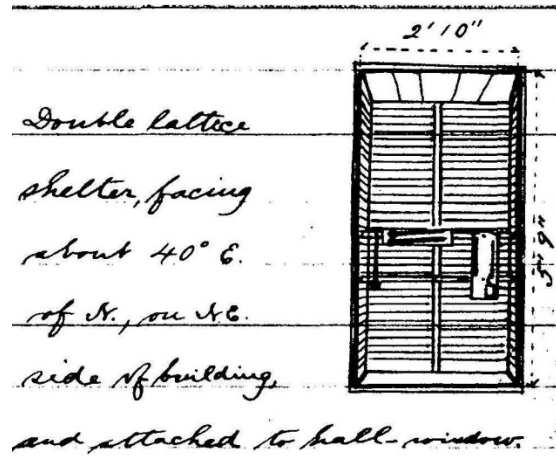


Figure 9. Drawing of the standard window shelter for thermometers. Date: 3-7 October 1878. Source: Craig (1878). Credit: NCDC EDADS.

Barometer:

The elevation of the second floor and third floor barometers were 2732 and 2740 feet above sea level, respectively (U.S. Department of Agriculture 1902; U.S. Weather Bureau 1954). The elevations of the barometers were updated several times over the years, with the last change in elevation reported in U.S. Weather Bureau (1954). The barometer, number 253, was located on the southeast corner of the room near the window about 24 feet above ground labeled BAR in Figure 8 (Craig 1878). No problems were noted with the barometer.

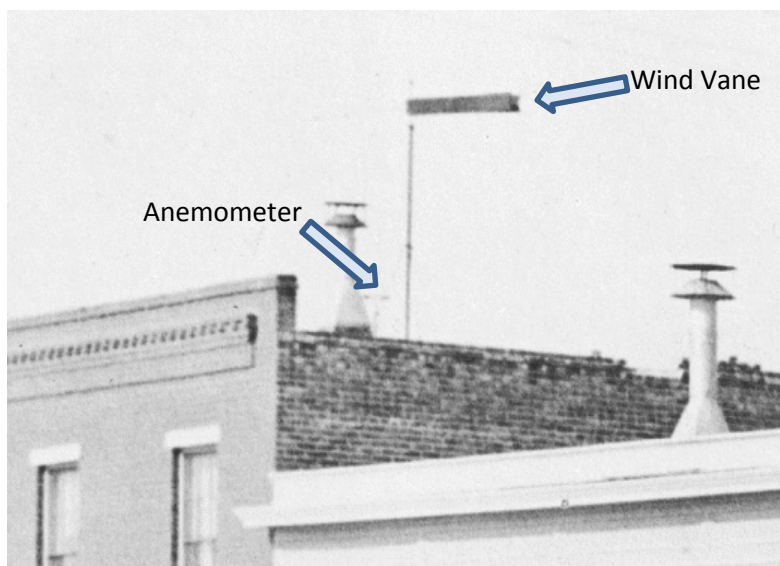


Figure 10. Close up of the wind instruments on the third story addition at the Overland Hotel. Date of Photo: 1878-1880. Source: Charles Hummel, Boise Rotary Club web page (<http://boiserotary.org/history-charter-member-ben-eastman/>).

Wind Instrument:

The wind vane wasn't installed on the roof until 16 July 1877, according to U.S. Signal Service Form 4 and Form 22. It's not known where on the roof the anemometer was installed in 1877. The weather vane was mounted on the roof of the new addition, shown in Figure 7 and Figure 10, with the direction dial mounted on the ceiling of the station (The Idaho Statesman 1878b; Craig 1878). An electrical self-registering anemometer (No. 132) was connected to the anemometer equipment (No. 229), which was 47 feet, 6 inches above ground. The anemometer can be seen between the chimney and wind vane pole in Figure 10. The wind vane was mounted on another pole, 57 feet and 4 inches above ground. Errors with the maximum wind velocity observations were found between 1877 and 1879. Sergeant Light was using the maximum hourly wind velocity from one of the regular observations instead of the maximum wind velocity from midnight to midnight (Craig 1878). The error was noted again in McClellan (1879) with the report stating Sergeant Light correctly read the anemometer dial but he didn't record the readings to make the correct daily wind calculations. There was no wind obstructions noted in either 1878 or 1879 inspection reports.

Rain and Snow Gauges:

U.S. Signal Service Form 4 stated the rain gauge was not installed when the office was opened on 01 July, but didn't give a date on when the gauge was installed. Form 22 Monthly Mean Report showed precipitation regularly after 20 July 1877. No diagram of the instrument locations on the roof was included in either of the 1878 or 1879 inspection reports. The station inspection in October of 1878 states "the rain gauge was found in a large box, [the] latter tied to a chimney" (Craig 1878). It should be noted that the digital copy of the inspection report's remarks were partially cut off, so a few words were not legible. A rain gauge stand was ordered at a cost of \$1.50 and was placed on the center of the roof for better exposure (U.S. Army 1879; Craig 1878). The rain gauge was 36 feet, 2 inches above ground (Craig 1878). There was no mention of a snow gauge in either report.

War Department.

SIGNAL SERVICE U. S. ARMY,

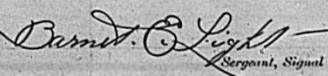
DIVISION OF REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

TABLE showing Daily and Monthly Means of Barometer and Thermometer, Monthly Velocity of Wind, and Amount of Rainfall, with the prevailing Direction of Wind, &c., for the month of July, 1877.

DATE	TELEGRAPHIC OBSERVATIONS.									LOCAL OBSERVATIONS.			TEMPERATURE.		WIND.																		
	BAROMETER.			THERMOMETER.			RAINFALL OR MELTED SNOW, IN INCHES.			Mean Daily Pressure.	Mean Daily Thermometer.	Mean Daily Velocity.	Maximum.	Minimum.	Prevailing direction.	Maximum Daily Velocity.	NUMBER OF TIMES OBSERVED BLOWING FROM THE—																
	A. M.	P. M.	Midnight.	A. M.	P. M.	Midnight.	A. M.	P. M.	Midnight.								E.	S. E.	S.	S. W.	W.	N. W.	N.	N. E.	C.								
1	30.985	30.727	30.616	59	61	65				30.724	65.25	11.07	71	44.4																			
2	30.571	30.574	30.343	60	63	63				30.457	61.87	10.67	69	57																			
3	30.519	30.597	30.504	55	67	60				30.458	60.09	10.00	67	57																			
4	30.650	30.626	30.547	53	74	66				30.469	64.35	10.33	73	52																			
5	30.685	30.431	30.413	57	73	71				30.491	70.07	10.33	76	57																			
6	30.677	30.574	30.602	60	70	70				30.610	70.07	10.33	82	57																			
7	30.747	30.535	30.537	57	77	71				30.600	70.50	10.67	89	53																			
8	30.704	30.492	30.577	57	74	71				30.579	70.25	10.33	84	57																			
9	30.610	30.271	30.276	63	70	75				30.562	70.07	10.33	102	60																			
10	30.548	30.418	30.416	63	79	77				30.433	70.07	10.33	91	63																			
11	30.747	30.561	30.515	60	72	71				30.624	70.25	10.67	84	57																			
12	30.557	30.639	30.745	55	74	72				30.532	70.07	10.33	85	52																			
13	30.578	30.471	30.449	53	77	75				30.576	70.07	10.67	81	67																			
14	30.671	30.574	30.414	57	70	71				30.371	70.25	10.33	82	47																			
15	30.763	30.271	30.411	52	72	72				30.357	70.07	10.67	85	41																			
16	30.579	30.156	30.347	53	73	72				30.357	70.25	10.67	94	38																			
17	30.639	30.150	30.500	69	70	72				30.373	70.25	10.67	92	66																			
18	30.676	30.431	30.271	69	71	76				30.357	70.07	10.67	99	63																			
19	30.471	30.273	30.276	70	103	95				30.377	70.25	10.67	103	72																			
20	30.579	30.273	30.246	70	106	95			0.03	30.330	70.07	10.67	106	74																			
21	30.459	30.342	30.676	83	97	75			0.03	30.330	70.07	10.67	102	73																			
22	30.657	30.443	30.415	70	70	52			0.03	30.274	70.25	10.67	93	68																			
23	30.579	30.325	30.399	62	70	73			0.03	30.224	70.07	10.67	91	62																			
24	30.669	30.449	30.369	53	73	73				30.231	70.25	10.33	84	58																			
25	30.573	30.380	30.414	56	70	70				30.422	70.07	10.33	83	67																			
26	30.657	30.544	30.570	55	76	70				30.372	70.07	10.67	114	67																			
27	30.125	30.632	30.571	57	70	73				30.442	70.25	10.67	83	57																			
28	30.603	30.428	30.262	64	70	79				30.333	68.75	10.33	92	63																			
29	30.477	30.436	30.562	57	71	63				30.353	68.75	10.33	81	67																			
30	30.752	30.627	30.646	49	70	64				30.664	68.75	10.33	72	46																			
31	30.743	30.574	30.536	57	72	77				30.576	70.07	10.67	72	57																			
Sum.....	9192.84	9135.70	9139.79	1853	2626	2314	0.03	0.03	0.33	91478	43031	11404	2652	1719												16	3	10	17	8	9	28	10
Mean Monthly Barometer	30.654	30.470	30.493	58.94	64.71	70.65				30.509	70.94	10.67	86.52	57.71																			

Highest Barometer, 30.914 (Date) 17 14
 Lowest Barometer, 30.125 (Date) 27 12
 Monthly range of Barometer, 0.789
 Highest Temperature, 106° (Date) 20 14
 Lowest Temperature, 44° (Date) 1 24
 Monthly range of Temperature, 62°
 Greatest daily range of Temperature, 42° (Date) 17 14
 Least daily range of Temperature, 1.2° (Date) 3 62
 Mean of Maximum Temperatures, 86.53
 Mean of Minimum Temperatures, 57.71
 Mean daily range of Temperature, 28.81
 Total rainfall or melted snow, 0.03 inches.
 Depth of unmelted snow lying on ground at end of month, 0 inches.
 Prevailing wind, N.E.
 Total increment of wind, 32.74 miles.
 Maximum velocity of wind and direction, 30 miles per hour from N.W. on 27th (Date).
 Number of Foggy days, 0
 Number of Cloudy days on which rain fell, 2
 Number of Cloudy days on which no rain fell, 1
 Total number of days on which rain or snow fell, 3

DATE	RAIN OR SNOW.	TIME OF COMMENCEMENT.	TIME OF ENDING.	Direction of wind and amount (if each observation.)	Direction of wind at three (3) observations, prevailing rain or snow.	Direction of wind at three (3) observations, following rain or snow.
July 20	Rain	5:10 Am	1:30 Pm	N. wind	Same as Station	Same as Station
" 21st	"	6:35 Pm	7:10 "	N.E.	N. S.E. S.E. N.N.E. N.E.	" " " "
" 24th	"	3:20 "	10 "	N.E.	" " " "	" " " "
" 28th	"	4:20 "	4:40 "	N.E.	S.W. N.W. N. N.E. N.E.	" " " "
" "	"	6:10 "	8:20 "	N.O.	" " " "	" " " "


 Barnet C. Light
 Sergeant, Signal Service U. S. A.

Station: Brice City, Idaho
 Date: August 1st, 1877.

* In determining what is a foggy day the three (3) telegraphic and the midday observations only should be considered. If three (3) of the four (4) observations show fog the day is reported foggy.

Figure 11. July 1877 Form 22 Monthly Mean Report signed by Sergeant Barnet Light. Source: National Climatic Data Center EDADS.

U.S. Signal Service Station at the Davis Building adjoining the Overland Hotel 1880-1888

On 01 September 1880, the U.S. Signal Service station was moved to the second floor of the Davis Building adjoining the Overland Hotel on Main Street between 8th and 9th streets (U.S. Department of Agriculture 1902). The station was in the back room of the second floor rented from Thomas J. Davis for \$25.00 a month with the front rooms of the second floor being rented by Doctor H. L. Dausman (The Idaho Statesman 1880; Glassford 1880a). It's not known why the station was moved from the Overland Hotel to the Davis Building. Figure 12 is a basic diagram of the station with location of the instruments from Glassford (1880a). The station layout was changed on 01 December 1885 when the thermometers were moved to a cotton region shelter on the roof. A diagram of the station and location of the instruments on the roof were included in both Day (1886a) and Greene (1887a) inspection reports. Both diagrams have a bedroom for the observer which was common practice as the observers were required to take observations day and night during significant weather event.

There were several missing or fragmented observations forms prior to Sergeant Kenealy's arrival in February 1884 (Kenealy 1884). In a letter to Lieutenant Greene dated 06 July 1884, Sergeant Kenealy wrote that nine Form 113a (Monthly Weather Summary) along with their original records and four months of the anemometer record sheet were not completed. The records that remained from the previous observer were almost illegible, contained numerous errors, or missing altogether. Sergeant Kenealy reported that he fixed all nine of the Form 113a, seven of which were without errors. Weather observations from May of 1883 through January of 1884 are not of the highest quality.

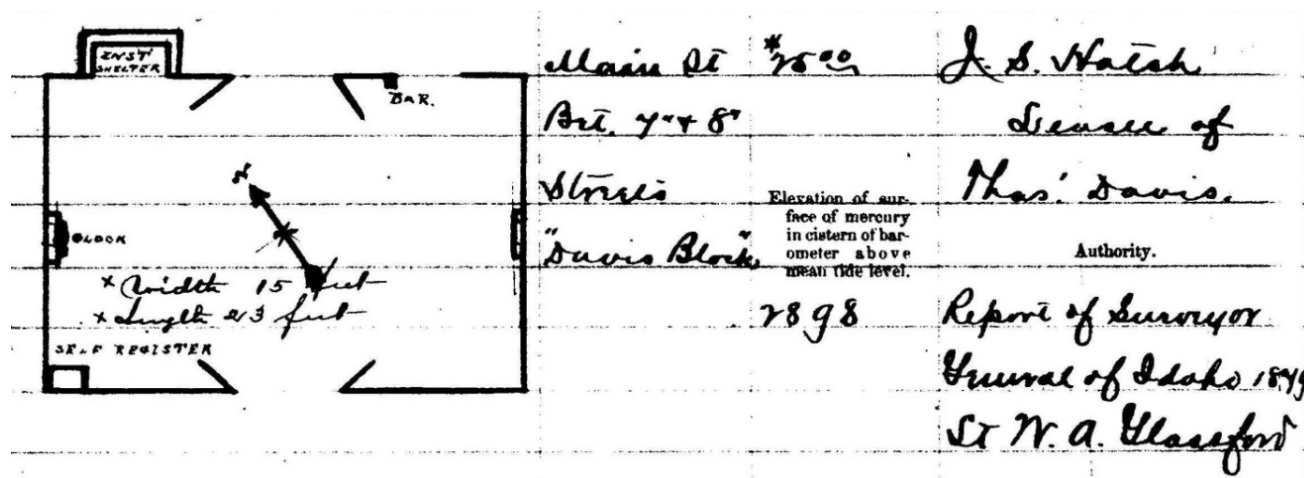


Figure 12. Diagram of the U.S. Signal Service station in the Davis Building from Glassford (1880a). Date: 4-6 September 1880. Source: National Climatic Data Center EDADS.

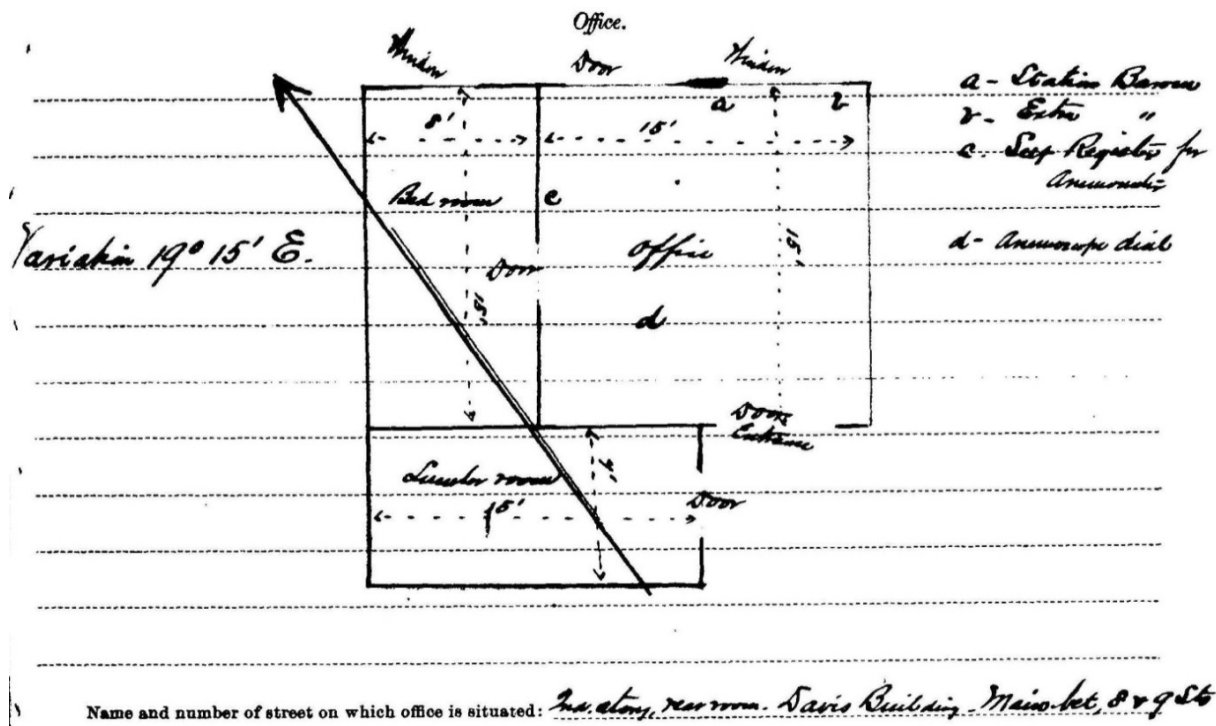


Figure 13. Diagram of the U.S. Signal Service station in the Davis Building from Greene (1887a). Date: 8-10 November 1887. Source: National Climatic Data Center EDADS.

Thermometers:

The standard, maximum and minimum thermometers along with the hygrometers were placed in a standard window shelter attached to the north-northeast side of the building. The window shelter was made of double lattice with a single board roof (Greene 1884). The shelter was painted white which had almost completely disappeared by 1884. The outside lattice dimensions were 6 feet, 4 inches high by 6 feet, 4 inches wide and 2 feet, 8 inches deep. The inner lattice dimensions were 5 feet, 4 inches high by 4 feet wide and 1 foot, 10 inches deep with 10 inches of air space between the outer and inner lattice. Greene (1884) noted that shelter was still in serviceable condition. Included in Greene (1884) is a letter dated 06 July 1884 in response to a letter from the Chief of the Signal Service in which he questioned the exposure of the anemometer and temperature shelter at the station. 2nd Lieutenant Frank Greene stated that the size of the shelter and air circulation was good but that “the presence of an unpainted tin roof about 4 feet below the thermometers is perhaps objectionable on account of [the] radiation.” He noted a grassy yard surrounding a church near the station that could be used for comparisons but, the shelter could not be placed at the church. Greene (1884) also noted that the thermometers were not properly set up with the standard thermometer to the right of the wet bulb thermometer. The thermometers were changed as required by U.S. Army (1881b).

Table 4: Thermometers in the Window Shelter at the Davis Building

Date	Dry		Maximum		Minimum		Hygrometers		Source
	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	
06 September 1880	324	19' 8"	328	19' 10"	278	20' ½"	712	19' 10"	Glassford (1880a)
	321	Extra	327	½"			711	19' 10"	
				Extra			713	Extra	
							714	Extra	
4-6 July 1884	324	20' 1"	328	20' 6"	278	20' 8"	712	20' 2 ¼"	Greene (1884)
	321	Extra	327	Extra	682	Extra	711	20' 2 ¼"	
					739	Extra	713	Extra	
							714	Extra	
February 1885	580	-	732	-	805	-	1041	-	Form 113a

The cotton region shelter was installed 01 December 1885 according to the Monthly Meteorological Report Form No. 113a for December 1885. The roof shelter measurements were 3 feet tall by 3 feet wide by 3 and half feet deep (Day 1886a). In Greene (1887a), the shelter was measured to be 2 feet, 8 inches wide. The floor of the shelter was 9 feet, 10.5 inches above the roof. The dry and wet bulb thermometers and the whirling apparatus were installed too low so that a temperature below 60 degrees Fahrenheit was block by the bottom part of the shelter frame and could not be read. The observer raised the thermometers about three inches (Greene 1887a). The shelter was placed in the center of the roof shown in Figure 14.

Table 5: Thermometers in the Roof Shelter at the Davis Building

Date	Dry (Mercurial)		Wet (Mercurial)		Maximum		Minimum		Source
	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	
01 December 1885	2971	-	1035	-	1131	-	640	-	Form 113a; Form 101B
	1041	Extra			733	Extra	805	Extra	
	580	Extra							
February 1886	2971	-	1035	-	1131	-	805	-	Form 113a
18 September 1886	1041*	40.9'	1035	41.0'	1131	41.1'	805	41.3'	Day (1886a)
	2971*	Extra			732	Extra	640	Extra	
	580	Extra							
May 1887	1812	-	1823	-	1131	-	805	-	Form 113
06 July 1887	1812	-	1823	-	1131	-	640	-	Form 113
7-9 November 1887	1812	39' 9"	1823	39' 9"	1131	41' 1"	640	41' 2"	Greene (1887a)
	2971	½"			732	Extra	1394	Extra	
	580	Extra							

* Standard thermometer, No. 2971, was replaced after inspection by thermometer No. 1041 as it was a graduated instrument (Day 1886a). No. 1041 was listed as exposed thermometer in use on the Monthly Meteorological Report for October 1886 Form No. 113a.

Barometer:

The mercury barometer, number 253, was located on northeast side of the station, 18 feet, 3 inches above ground for an elevation of 2750 feet above sea level (U.S. Department of Agriculture 1902; Glassford 1880a). The barometer elevation was adjusted several times through 1887. Glassford (1880a) gave the elevation of the barometer as 2898 feet based on the report of the Surveyor General of Idaho in 1849. U.S. Army (1881a) had 2768 feet above sea level and U.S. Army (1882) had 2750 feet above sea level based on new land surveys for the railroad (Greene 1884). The elevation was measured again in 1887 as the 2570 feet elevation in 1882 was thought to be 100 feet too low (Greene 1887a). Level runs were made by Lieutenant Day in September 1886 from the railroad station in Nampa, Idaho to the station in Boise and compared to level runs from Kuna, Idaho to the station (Day 1886a; Greene 1887a). Both runs determined the height of the station barometer was 2744.8 feet above sea level which was close to 2750 feet above sea level reported in 1882 (Greene 1887a). The official height of the barometer above sea level was left at 2750 feet.

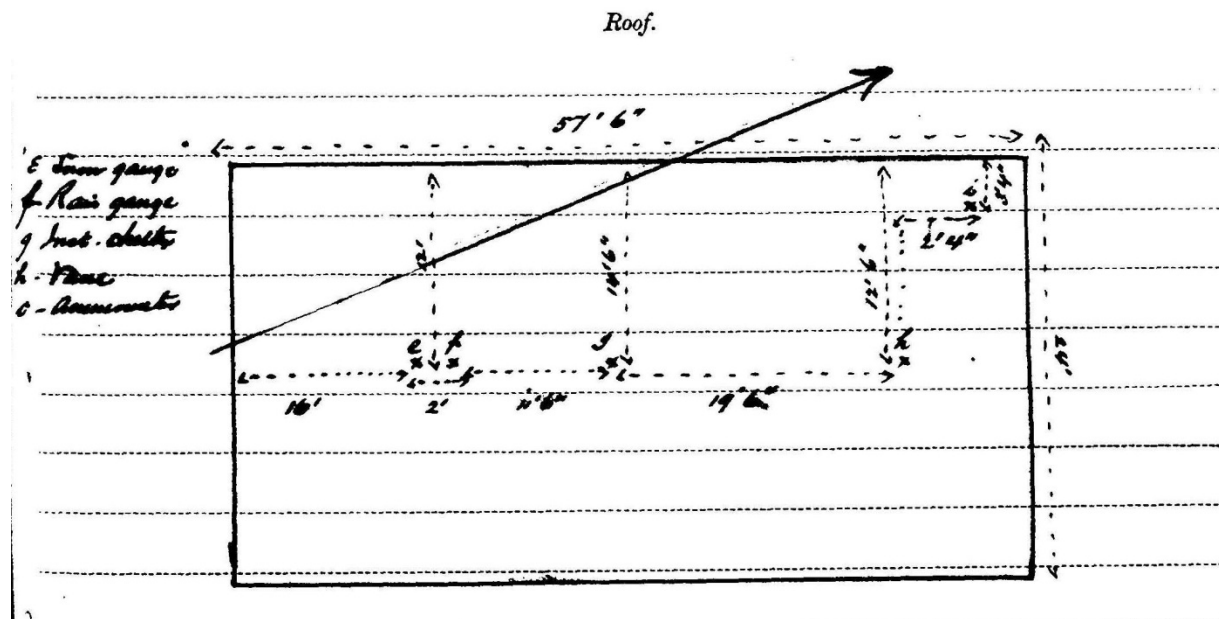


Figure 14. Diagram of the U.S. Signal Service station in the Davis Building from Greene (1887a). Date: 8-10 November 1887. Source: National Climatic Data Center EDADS.

Wind Instruments:

The anemometer and wind vane were mounted on the roof of the Davis Building labeled “C” and “H” respectively in Figure 14 (Glassford 1880a). Interestingly, included within 2nd Lieutenant Frank Greene inspection report was a letter he wrote to the Chief of the Signal Service William Hazen about the exposure of the wind vane (Greene 1884). Chief Hazen believed the wind directions reported were erroneous as the winds were predominantly from the northwest or southeast. Lieutenant Greene found the exposure of the wind vane to be good and stated in a letter dated 06 July 1884, that he believed the northwest (up valley) and southeast (down valley) wind directions to be from the “conformation of the land”. The letter is included in Appendix 4.

Table 6: Anemometer and Wind Vane at the Davis Building

Date	Anemometer		Wind Vane		Self-Registering Anemometer		Anemoscope		Source
	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	
06 September 1880	229	44' 11"	N/A	53' 1"	132	N/A	N/A	N/A	Glassford (1880a)
4-6 July 1884	229	45' 2 3/8"	N/A	N/A	132	N/A	N/A	54' 6 5/8"	Greene (1884)
18 September 1886	229 523	45.2' Extra	N/A N/A	54.55' Extra	-	-	-	-	Day (1886a)
7-9 November 1887	229 523	45' 0" Extra	N/A N/A	54' 3 1/2" Extra	-	-	-	-	Greene (1887a)

Rain and Snow Gauges:

The rain gauge and snow gauge were on the roof labeled "E" and "R" respectively in Figure 14 (Day 1886a). The positions of the rain and snow gauges were changed in November 1887 due to a 5 foot fire wall that was 6 feet away from the gauges (Greene 1887a). The rain and snow gauges were moved 18 and 16 feet away from the fire wall, respectively. There is no mention of a snow gauge before 1886 in the report so it's believe the snow gauge was installed between 1884 and 1886.

Table 7: Rain and Snow Gauges at the Davis Building

Date	Standard Rain Gauge		Standard Snow Gauge		Source
	No.	Height (AGL)	No.	Height (AGL)	
6 September 1880	N/A	32' 1"	-	-	Glassford (1880a)
4-6 July 1884	N/A	32' 3 7/8"	-	-	Greene (1884)
18 September 1886	N/A	Not Given	N/A	Not Given	Day (1886a)
7-9 November 1887	188	31' 9 1/2"	N/A	31' 11"	Greene (1887a)

U.S. Signal Service Station at the Perrault Building 1888-1890

On 01 January 1888, the U.S. Signal Service station and weather observations were moved to room 2 on the second floor of the Perrault Building³³ on the southeast corner of Capital (also known as 7th street) and Main streets (U.S. Army 1890a; U.S. Department of Agriculture 1902; U.S. Weather Bureau 1911). The station was moved to room 4 on the second floor on 04 April 1890 (U.S. Army 1890b). The move from the Davis Building was strongly recommended by 2nd Lieutenant Frank Greene after his inspection of the station in 1887 (Greene 1887a). He recommended the station be moved immediately for the following three reasons. First, the rent of \$25 a month was above the city average of \$10 a month. Second, the Davis Building location was above a saloon known as the "Naked Truth Saloon"³⁴ which opened in early 1886 with the entrance to the station next to the saloon entrance. Lastly, the

³³ Later known as the Perrault-Fritchman Building.

³⁴Health Instruction Yearbook 149. [Available online at <http://books.google.com/books?id=JpWiAAAAIAAJ>]

station was in the rear room of the second floor with poor window lighting. He suggested that the station be moved to the Boise National Bank Building where a two windowed room 15 feet by 24 feet could be rented for \$15 a month. The first Boise City National Bank was located in the Perrault Building from 1886 to 1889 (Idaho State Historical Society 1981). The station was closed 30 June 1890 due to a lack of funding (U.S. Army 1891; U.S. Weather Bureau 1911).

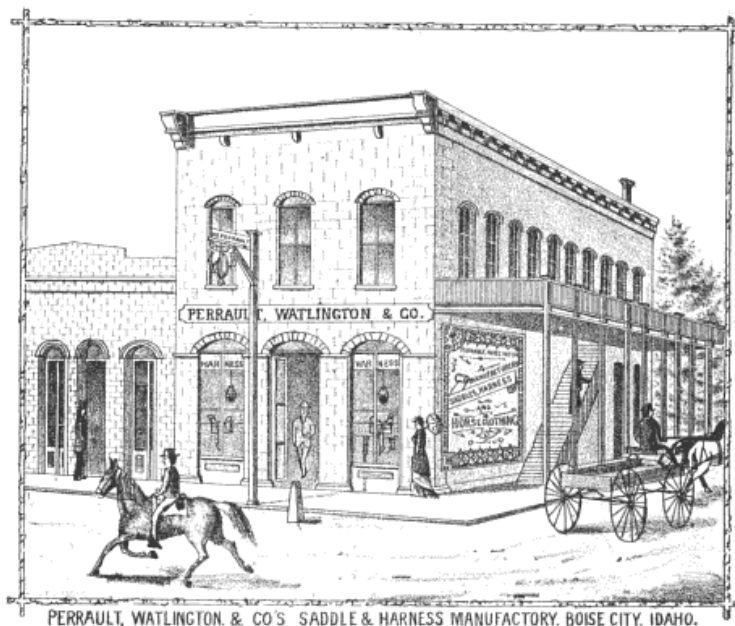


Figure 15. The Perrault Building. Date: Circa 1884. Source: Elliott, W.W., and Company (1884).

The station was only inspected once in the two years it was at the Perrault Building. A station layout and instruments diagram is shown in Figure 16 and Figure 17 from Maxfield (1888).

Thermometer:

The thermometers were placed in a standard shelter on the central part of the roof 43 feet above ground labeled as “S” in Figure 17 (U.S. Weather Bureau 1911; U.S. Army 1890a). The shelter was over 15 feet away from the closest chimney (Maxfield 1888).

Table 8: Thermometers in Roof Shelter at the Perrault Building

Date	Dry (Mercurial)		Wet (Mercurial)		Maximum		Minimum		Source
	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	
January 1888	1812	-	1823	-	1131	-	N/A	-	Form No. 113
February 1888	1823	-	1812* 2327*	-	1131	-	1540	-	Form No. 113
7-9 August 1888	1823 580 2527 2971	38.3' Extra Extra Extra	2327	38.3'	1131 732	39.3' Extra	1540 1518 1394 1613	39.5' Extra Extra Extra	Maxfield (1888)

*Wet-Bulb thermometer No. 1812 was switched with No. 2327 in February 1888.

Barometer:

The mercury barometer, number 253, was 2751.4 feet above sea level (U.S. Department of Agriculture 1902). The elevation was later revised based on the Sonna Building elevation in 1954 to 2734 feet above sea level (U.S. Weather Bureau 1954). The barometer was located by the window in the northwest corner of the office (Maxfield 1888). The barometer number 253 was replaced by barometer number 448 on 03 January 1890 (U.S. Army 1890a).

Wind Instruments:

The anemometer and wind vane were mounted on the roof marked “A” and “B” respectively shown in Figure 17 (Maxfield 1888). Both wind instruments were slightly below the roof of the instrument shelter which was 20 feet away. There was also a small tower on the adjoining building to the northeast about 10 feet taller than the wind instruments.

Table 9: Anemometer and Wind Vane at the Perrault Building

Date	Anemometer		Wind Vane		Self-Registering Anemometer		Source
	No.	Height (AGL)	No.	Height (AGL)	No.	Height (AGL)	
January 1888	229	-	-	-	-	-	Form No. 113
February 1888	523	-	-	-	-	-	Form No. 113
7-9 August 1888	229* 523*	40.6' Extra	6 ft. 12 ft. 3 ft.	36.4' Extra Extra	132	19.1'	Maxfield (1888)
October 1888	229	-	-	-	-	-	Form No. 113

*Monthly Form No. 133 claims anemometer No. 523 was in use until October 1888. However, Maxfield (1888) states anemometer No. 229 was in use but believe this is an error.

Rain and Snow Gauges:

The standard rain gauge was placed on the roof 29.2 feet above ground shown as “M” in Figure 17 (Maxfield 1888). U.S. Army (1890a) reported the gauge height as 36 feet above ground which is believed to be an error. The snow gauge was on the roof 29 feet above ground shown as “L” in Figure 17 (Maxfield 1888). It was made of galvanized iron 8 inches in diameter and 2 feet in length.

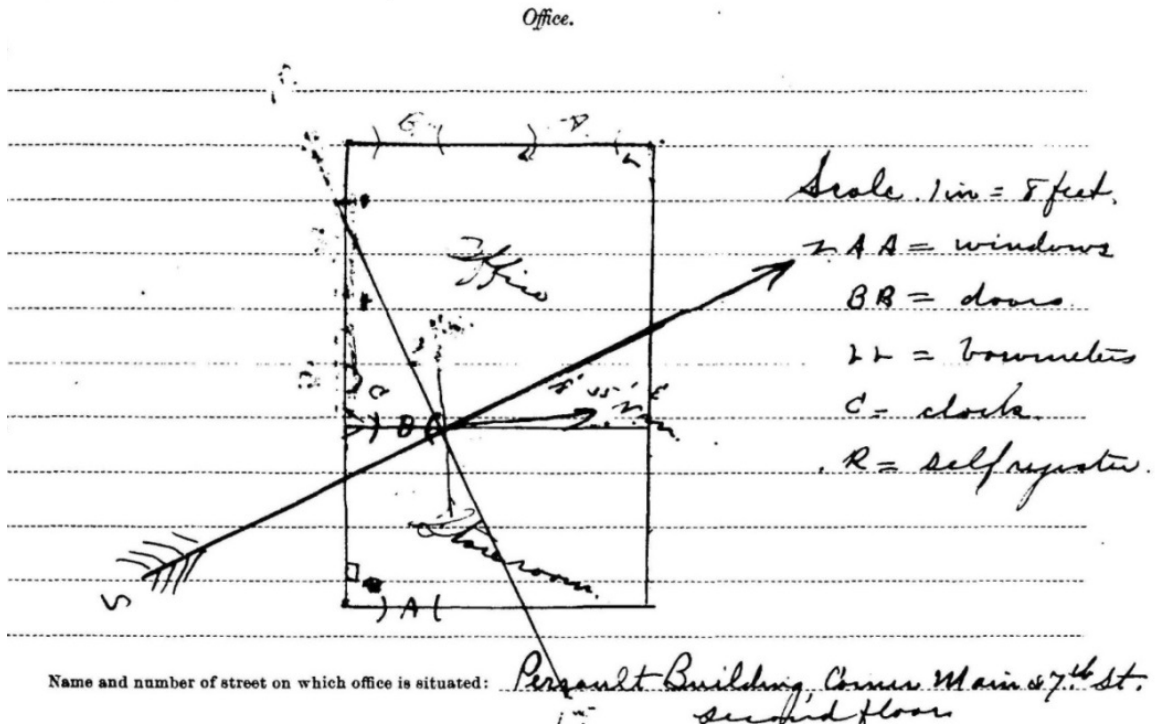


Figure 16. Diagram of the U.S. Signal Service station in room #2 at the Perrault Building from Maxfield (1888). Date 7-9 August 1888. Source: National Climatic Data Center EDADS.

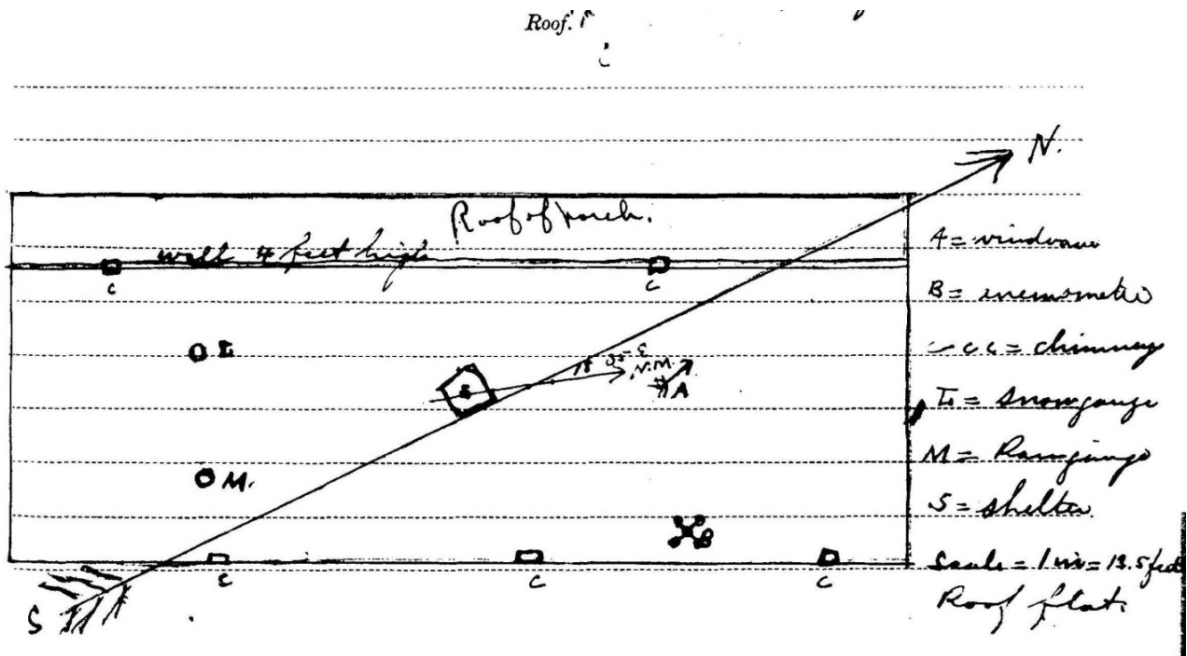


Figure 17. Diagram of the U.S. Signal Service station roof at the Perrault Building from Maxfield (1888). Date: 7-9 August 1888. Source: National Climatic Data Center EDADS.

U.S. Signal Service Observers

"A signal service officer makes a melancholy observation which is true of more things than weather predictions. Everybody notices it just as soon as a fellow makes a miss. But they never pay any attention to his bullseyes." –Idaho Statesman, 06 November 1891.

There were five U.S. Signal Service observers assigned to the Boise station between 1877 and 1890. One observer was unable to take charge of the station due to illness. There was only one observers working at the station which meant they were always on duty to take weather observations (U.S. Army 1879; U.S. Army 1880). U.S. Signal Service observers were enlisted in the U.S. Army but remain only in the signal branch and cannot be transferred to other services (The Idaho Statesman 1877c). They were enlist for a term and held ranks as officers in the U.S. Army. The observers received their training at Fort Myer, Virginia, previously named Fort Whipple. The training comprises of theoretical instruction in the Manual of Signals, Pope's Telegraphy, Loomis's Meteorology, practical instructions in field signals (General Service and International Codes), in the Morse Code of Telegraphy, and in the care of electrical batteries (U.S. Army 1876). Biographies of the five observers are given below.

Sergeant Barnet E. Light (1877-1884)



BARNET E. LIGHT.

A handwritten signature in cursive script that reads "Barnet E. Light". The signature is written in dark ink on a white background.

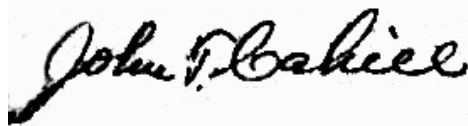
Sergeant Barnet Edward Light was the first trained weather observer in Boise, Idaho. He was born on 06 October 1849 in Hedgesville, West Virginia but he grew up in Sharpsburg, Maryland (Elliott, W.W., and Company 1884). He joined the U.S. Signal Service in Washington D.C. on 29 May 1871 as a Private and began his assistant observer training at Fort Whipple, Virginia on 09 April 1873 (U.S. Army 1873). Upon completion, he was assigned to the Davenport, Iowa station as an assistant and started on

03 June 1873. While working in Davenport, he met his wife, Mary E. Keeler, a Davenport, Iowa native, in 1873. They married on 14 June 1875³⁵ in Iowa and later had five children Mary C., Barnard E., Charles E., Grace I. and Margaret M. Light. He was relieved from the Davenport station on 24 June 1876 to begin his Sergeant Training at Fort Whipple on 09 August 1876 (U.S. Army 1877). He was promoted to the rank of Sergeant on 01 November 1876 after he completed his training and was assigned to Cape Hatteras, North Carolina station (Elliott, W.W., and Company 1884; The Idaho Statesman 1877b).

He was ordered to establish a U.S. Signal Service station in Boise, Idaho on 21 May 1877 and arrived on 20 June 1877 (The Idaho Statesman 1877a; U.S. Army 1877). He was described as an enthusiast in his profession, and a true disciple of "old probabilities"³⁶. Before his enlistment up, he was offered by the Chief of the Signal Service to establish a station in Point Barrow, Alaska, in 1881 (The Idaho Statesman 1881a). He turned it down as he wanted to enter the private sector. He was supposed to be discharged in October of 1883 but his replacement, Sergeant John T. Cahill, arrived in Boise on 04 October 1883 very ill and was unable to take charge of the station (The Idaho Statesman 1883b). So his discharge was postponed and he remained in charge of the station until 03 February 1884 when Sergeant James Kenealy arrived to relieve him (The Idaho Statesman 1884a). The delay in his discharge didn't sit well with him as he neglected most of his duties according to Greene (1884) and Kenealy (1884). 2nd Lieutenant Greene went so far as to recommend that Sergeant Light never be allowed to work in the U.S. Signal Service again.

After his discharge, he remained in Boise and opened an upholstering business (The Idaho Statesman 1884b). He was a painter in 1900³⁷ and then a clerk at an investment company until he retired in the late 1920s. He died on 24 April 1936³⁸ and is buried in Morris Hill Cemetery³⁹ Boise, Idaho. The sketch of Sergeant Barnet E. Light is from Elliott, W.W., and Company (1884).

Private 1st Class John T. Cahill (1883)

A handwritten signature in cursive script that reads "John T. Cahill". The ink is dark and the handwriting is fluid and somewhat slanted to the right.

Private 1st Class John T. Cahill arrived in Boise, Idaho on 04 October 1883 to relieve Sergeant Light but was too ill and remained confined to his room at the Overland Hotel (The Idaho Statesman 1883b). Idaho Statesman (1883b) gave his rank as a Sergeant which was an error. He was born in

³⁵ "Iowa, Marriages, 1809-1992," index, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/XJLS-8YM> : accessed 19 July 2012), Barnet E. Light, 1875.

³⁶This is a reference to Meteorologist Professor Abbe Cleveland.

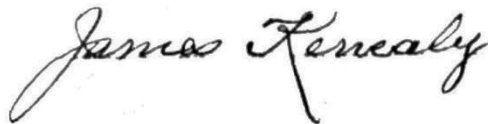
³⁷ "United States Census, 1900," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MM52-V98> : accessed 20 Feb 2013), Barnett E Light, ED 1 Boise Precinct 1 Boise city Ward 1, Ada, Idaho, United States; citing sheet 8A, family 190, NARA microfilm publication T623, FHL microfilm 1240231.

³⁸ "Idaho Death Certificates, 1911-1937," index, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/FLB6-N7Q> : accessed 27 April 2012), Barnet Edward Light (1936).

³⁹ Find A Grave, Cited 2012: Barnet Edward Light. [Available online at <http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GSln=LI&GSfn=b&GSpartial=1&GSbyrel=all&GSdyrel=all&GSst=15&GSctry=4&GSob=n&GRid=59831078&df=all&>]

Bradford, England in 1852⁴⁰ and immigrated to the South Boston, Massachusetts area shortly after his birth. He enlisted in the U.S. Signal Service on 04 July 1878⁴¹ and as a Private worked for the Office of the Chief Signal Officer as a printer in 1880⁴². He began observer training on 10 November 1880 at Fort Myer, Virginia, and completed the training on 24 May 1881 (U.S. Army 1881a). He was assigned to the Springfield, Massachusetts station on 09 June 1881 and took charge of the station on 18 June 1881 (U.S. Army 1881a; Powell 1882a). He was relieved on 02 July 1881 and reported to Boston, Massachusetts station the next day as assistant and printer relieving Private William Korts (Powell 1882a; Powell 1882b). He was relieved from the Boston Station on 20 February 1883 and was stationed at Pittsburgh, Pennsylvania⁴³ where he reenlisted on 04 July 1883 and given the rank of Private 1st Class. He arrived in Boise on 04 October 1883 but was too unwell to take charge of the Boise station (The Idaho Statesman 1883b). He was reassigned to the Los Angeles, California station a few weeks later but was unable to recover from tuberculosis and died on 01 February 1884 (Los Angeles Herald 1884).

Sergeant James Kenealy (1884-1887)



Sergeant James Kenealy reported to the Boise Station on 29 January 1884 and relieved Sergeant Light on 04 February 1884 (The Idaho Statesman 1884a; Kenealy 1884; Day 1886a). He was born in Stamford, Connecticut in February 1852⁴⁴ to John and Johanna (Fitzgerald) Kenealy from Waterford, Ireland. After obtaining a common school education he worked for a printing office learning the trade of a printer for several years (The Perrysburg Journal 1912). He joined the U.S. Signal Service as a Private and began his assistant observer training on 28 August 1876 (U.S. Army 1877). He was assigned to the Burlington, Iowa station on 07 November 1876 then the Galveston, Texas station on 17 May 1877. He took charge of the Indianola, Texas station on 18 May 1878 relieving Sergeant H. S. Foster who had been reduced in rank to private for neglect of duty (U.S. Army 1878). He was relieved from the Indianola station on 05 December 1878 and reported for duty at the Chicago, Illinois station as an assistant and printer on 17 December 1878 (U.S. Army 1880; Gilman 1878). He left the Chicago station on 23 July 1879

⁴⁰ "Massachusetts, State Census, 1865," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/MQHH-P2J> : accessed 10 Aug 2012), John Cahill in household of Patk Cahill, Boston, Ward 07, Suffolk, Massachusetts.

⁴¹ "United States Registers of Enlistments in the U.S. Army, 1798-1914," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/QJDR-3LDT> : accessed 07 Jun 2014), John T Cahill, 04 Jul 1878; citing p. 228, volume 078, Washington, Washington, District Of Columbia, United States, NARA microfilm publication M233, roll 41, National Archives and Records Administration, Washington D.C.; FHL microfilm 350347.

⁴² "United States Census, 1880," index, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/M6C4-B6Z> : accessed 31 July 2012), John T. Cahill in household of Sarah Hutchins, Washington, Washington, District of Columbia.

⁴³ "United States Registers of Enlistments in the U.S. Army, 1798-1914," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/QJDR-3RC3> : accessed 07 Jun 2014), John T Cahill, 04 Jul 1883; citing p. 313, volume 078, Allegheny Arsenal, , Pennsylvania, United States, NARA microfilm publication M233, roll 41, National Archives and Records Administration, Washington D.C.; FHL microfilm 350347.

⁴⁴ "United States Census, 1900," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/MMZ9-HTG> : accessed 29 April 2012), James Kenealy (Cleveland City, Cuyahoga, Ohio).

and was assigned as a clerk in the Central Office in Washington D.C.⁴⁵ (Glassford 1880b). He returned to the field as an assistant and printer at the St. Louis, Missouri station on 23 February 1881 (Sebree 1881b). During the station inspection in early 1881, he was recommended for promotion to corporal for his attention to detail and ability to perform all the duties. He reenlisted in St. Louis, MO on 24 June 1881⁴⁶ and was promoted to Private 1st Class and reassigned to the Office of the Chief Signal Officer in Washington D.C. the very next day (Army and Navy Journal Inc. 1881). He was promoted to Sergeant and placed in charge of the Vicksburg, Mississippi station on 01 August 1882 (Army and Navy Journal Inc. 1882). He was assigned to the Boise, Idaho station on 01 May 1883 to take charge of the station but didn't report to Boise until 1884 (U.S. Army 1884). During the station inspection in 1886, he requested to be reassigned to Central Office in Washington D.C. as he wanted to forecast the weather (Day 1886a). The Boise station only took observations and posted forecasts for Boise that were made by the Central Office in Washington D.C.. The U.S. Signal Service Inspector Lieutenant Day recommended he be reassigned stating "he is a faithful, steady and conscientious observer". He was reassigned to the clerical force of the Indications Division on 11 January 1887 and was relieved of duty at the Boise Station on 31 December 1886 (Greene 1887a).

He was discharged from the U.S. Signal Service on 08 October 1888 with an excellent record and joined the U.S. Weather Bureau (U.S. Army 1887a). He married Hattie Combs in Washington D.C. on 26 November 1888 and later had two daughters Bessie and Amy and two sons Edward and Willis⁴⁷. He worked at the U.S. Weather Bureau office in Duluth, Minnesota⁴⁸ as a forecaster from November 1893⁴⁹ to July 1898⁵⁰. He became the Lead Forecaster in charge of the office in Cleveland, Ohio in September of 1898⁵¹. He worked there until his death on 17 June 1912⁵² (U.S. Department of Agriculture 1913). He published several papers on a wide variety of topics. Some of his more interesting published works were on the first lightning detection system and its use in forecasting⁵³ and on the duties performed at the U.S. Weather Bureau⁵⁴. He is buried in Lakeview Cemetery⁵⁵ in Cleveland, Ohio.

⁴⁵ "United States Census, 1880," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/M6C4-RR2> : accessed 22 Aug 2014), James Kenealy in household of Mary L Wilson, Washington, Washington, District of Columbia, United States; citing sheet 253C, NARA microfilm publication T9.

⁴⁶ "United States Registers of Enlistments in the U.S. Army, 1798-1914", index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/QJDR-QNWT> : accessed 22 Aug 2014), James Kenealy, 1881.

⁴⁷ "United States Census, 1900," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MMZ9-HTG> : accessed 21 July 2012), James Kenealy, ED 75 Precinct G Cleveland City Ward 18, Cuyahoga, Ohio, United States.

⁴⁸ "Minnesota State Census, 1895," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MQD7-TV6> : accessed 29 April 2012), James Kenealy (Duluth city, Ward 05, St. Louis, Minnesota).

⁴⁹ Original Monthly Report of Observations Duluth, Minnesota, November 1893 Form No. 1001 –MetL.

⁵⁰ Original Monthly Report of Observations Duluth, Minnesota, July 1898 Form No. 1001 –MetL.

⁵¹ Original Monthly Report of Observations Cleveland, Ohio, September 1898 Form No. 1001 –MetL.

⁵² "Ohio, Deaths, 1908-1953," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/X6XY-DHD> : accessed 25 Apr 2013), James Kenealy, 1912.

⁵³ Kenealy, J., 1902: Lightning Recorders and their utility in forecasting thunderstorms. Preprints, Second Convention of Weather Bureau Officials. Milwaukee, Wisconsin.

⁵⁴ "Weather Bureau Stations and Their Duties," Yearbook of the Department of Agriculture: 1903 (Washington D.C., 1904), 109-20, esp.115-7

⁵⁵ Find a Grave, Cited 2013: James Kenealy. [Available online at <http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GSln=Kenealy&GSfn=James&GSbyrel=all&GSdyrel=all&GSob=n&GRid=78133193&df=all&>]

Private 2nd Class Henry R. Boynton (1887-1888)



H. R. Boynton

Private 2nd Class Henry Roscoe Boynton relieved Sergeant James Kenealy on 05 January 1887 (The Idaho Statesman 1887). He was born in Somerset, Michigan in February 1847⁵⁶. He attended Olivet College in Olivet, Michigan where he graduated in 1874⁵⁷ with a Bachelor's Degree of Law. He worked in Grand Haven, Michigan at a Mill⁵⁸ until he enlisted in the U.S. Signal Service in Washington D.C. on 14 December 1880⁵⁹. He began his assistant observer training on 20 December 1880 at Fort Myer, Virginia which was completed on 04 August 1881 (U.S. Army 1881a; U.S. Army 1882). He received his orders on 30 August 1881 for assignment as an assistant at Augusta, Georgia and reported for duty on 10 September 1881 (Craig 1883). He was replaced at Augusta in April 1883 due to a long sickness. He recovered a month later and was reassigned to the Eagle Rock, Idaho (now named Idaho Falls, Idaho) station. He was relieved on 17 May 1883 and arrived in Eagle Rock in late May of 1883. He only

⁵⁶ "United States, Registers of Enlistments in the U. S. Army, 1798 - 1914," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/VRQD-RXY> : accessed 31 July 2012), Henry R Boynton, 1885.

⁵⁷ Olivet College, 1884: *Catalogue of the Officers and Students of Olivet College*. Unknown, 89.

⁵⁸ "United States Census, 1880," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MW34-8N1> : accessed 17 Feb 2013), Henry R. Boynton, Grand Haven, Ottawa, Michigan, United States; citing sheet 359D, family 0, NARA microfilm publication T9-0600.

⁵⁹ "United States, National Homes for Disabled Volunteer Soldiers, 1866-1938," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/V8M9-P7B> : accessed 31 July 2012), Henry R Boynton, 1928.

remained in charge until 15 June 1883 when the station was closed⁶⁰. He reported for duty on 07 October 1883 at Fort Bridger, Wyoming station and worked as an assistant until he was relieved on 21 November 1883 (Day 1886b). He worked as an assistant at the Portland, Maine station from 30 November 1883 to the 28 April 1885 (Powell 1884b; Day 1885). According to Boynton (1884), he was assigned to Cantonment, Indian Territory⁶¹ station but no official records as of yet could verify this. He returned to Fort Bridger on 04 November 1884 (Day 1886b). On 23 December 1886 he was reassigned to the Boise station (Greene 1887a; Greene 1887b). He had a great reputation while he worked in Boise. 2nd Lieutenant Maxfield's station inspection report in 1888 said,

"He is well spoken of in the town as a man who attends strictly to his own business and has a reputation as a sober, attentive, (and) intelligent man. I take him to be a man to be depended upon and is competent to manage this station (Maxfield, 1888). He has been in the service for seven years and although I did not find his station as clean as it should have been I don't hesitate to recommend that he be promoted corporal."

Lieutenant Maxfield recognized his skills as a telegraph operator and recommended he be reassigned to a telegraph station. He wanted to work in private business so he applied for a discharge in September 1888 and was discharged (S. O. 253) on 20 November 1888 (The Idaho Statesman 1888a). He moved to Seattle, Washington where his daughter Lucy lived with her family and worked as a real-estate agent⁶².

He reenlisted as a Private 1st Class in the U.S. Signal Service on 24 February 1890 at Fort Abraham Lincoln, North Dakota and reported to the Fort Custer, Montana station in April 1890⁶³. When Congress transferred the U.S. Signal Service's Weather Bureau to the Department of Agriculture, he was discharge from the U.S. Signal Service on 30 June 1891⁶⁴ and transferred to the U.S. Weather Bureau. He closed the Fort Custer, Montana station on 30 September 1890 and opened a U.S. Weather Bureau office at Miles City, Montana on 01 October 1891⁶⁵. He was the weather observer in Miles City until 04 December 1894⁶⁶ when he transferred to the Key West, Florida⁶⁷ office. He was an assistant to Henry B. Boyer until 24 January 1899⁶⁸ when he took charge of the office. He retired from the U.S. Weather Bureau on 18 October 1899⁶⁹ and he moved to Onaway, Michigan and worked as a merchant⁷⁰. He later worked as a school teacher in Washington D.C. before he retired in 1928 to Los Angeles, California. He married Minerva "Minnie" C. Reed and had two children, son Harry Reed and daughter Lucy Mabel. He

⁶⁰ Monthly Meteorological Report for Eagle Rock, Idaho, May 1883 Form No. 113a.

⁶¹ A temporary fort along the Canadian River north of Canton, OK.

⁶² 1889 King County Census, 2009. Washington Secretary of State. [Available online at <http://www.digitalarchives.wa.gov/Record/View/09DCC5C455CC8895E799E83EABE03B0B>]

⁶³ Original Monthly Record of Observations Fort Custer, Montana for April 1890. Signal Service Form No. 101 and 113.

⁶⁴ "United States, Registers of Enlistments in the U.S. Army, 1798-1914," index and images, FamilySearch(<https://familysearch.org/pal:/MM9.1.1/VRQD-1J2> : accessed 24 Apr 2013), Henry R Boynton, 1890.

⁶⁵ Original Monthly Record of Observations Miles City, Montana, October 1891. Form No. 1001-MetL.

⁶⁶ Original Monthly Record of Observations Miles City, Montana, December 1894. Form No. 1001-MetL.

⁶⁷ Olivet College, 1894: *Catalogue of the Officers and Students of Olivet College For 1894-95*. Frank N. Green, 80.

⁶⁸ Original Monthly Record of Observations Key West, Florida, January 1899. Form No. 1001-MetL.

⁶⁹ Original Monthly Record of Observations Key West, Florida, October 1899. Form No. 1001-MetL.

⁷⁰ "United States Census, 1900," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MS9R-VDV> : accessed 22 Nov 2012), Roscoe Boynton in household of Merritt Chandler, ED 146 Allis township Onaway village, Presque Isle, Michigan, United States; citing sheet 8A, family 151, NARA microfilm publication T623, FHL microfilm 1240738.

died in Los Angeles, California on 07 November 1937⁷¹. The portrait of Private Henry R. Boynton is from user *slkctc* on Ancestry.com.

Sergeant William A. Korts (1888-1890)

A handwritten signature in black ink that reads "Wm A. Korts". The signature is written in a cursive style with a large, sweeping flourish at the end of the name.

Sergeant William A. Korts was the observer from 20 November 1888 through 30 June 1890 (Victor, H., et al. 1890; *The Idaho Statesman* 1890a). He was born in Cumberland, Maryland in September 1853⁷² but the family moved to Alexandria, Virginia in 1860⁷³. He worked as a printer⁷⁴ in Washington D.C. in the 1880 before he enlisted in the U.S. Signal Service as a private. He began his training as an assistant observer at Fort Myer, Virginia on 22 June 1880 (U.S. Army 1881a). He completed his training on 15 November 1880 and received orders for assignment to report as an assistant observer and printer on 22 November 1880 to the Boston, Massachusetts station (Sebree 1881a). He worked at the Boston station from 27 November 1880 until 03 July 1881 when he was relieved by Private John T. Cahill (Sebree 1881a; Powell 1882a). He was reassigned to the U.S. Signal Service Central Office on 25 June 1881 where he arrived in early July 1881 (*Army and Navy Journal Inc.* 1881). He reenlisted in the U.S. Signal Service on 19 June 1885⁷⁵ and continued to work in the Central Office Printing Room until 02 September 1886 when he was reassigned to the U.S. Signal Service station in Salt Lake City, UT (Conner 2005a). He was promoted to Corporal on 05 October 1886 as directed in General Order No. 40 dated 12 October 1886 and then promoted to Sergeant in December 1887 (U.S. Army 1887b). He married Fanny Johnson of Salt Lake City, Utah on 14 August 1888⁷⁶ in Salt Lake City, Utah and they later had two children Linnie⁷⁷ and William. He was relieved on 15 August 1888 and according to *The Salt Lake Herald* (1888) he was reassigned to the New York City, New York station. He was only in New York for just over a month when he was reassigned to the Boise, Idaho station and relieved Private Boynton on 18 November 1888 (*The Idaho Statesman* 1888b). When the U.S. Signal Service decided to close the Boise station they offered to send him to any station but he wanted to stay in Boise and was discharged with a very good record on 18 June 1890⁷⁸ (*The Idaho Statesman* 1919). He was hired by the *Idaho Statesman* to run the *Statesman's* printing company on 08 July 1890 where he

⁷¹ "United States, Applications for Headstones for Military Veterans, 1925-1941," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/VHZW-G6S> : accessed 31 Jul 2012), Henry R Boynton, 1933.

⁷² "United States Census, 1900," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/MM52-2V6> : accessed 29 April 2012), William A Korta (Boise city, Ada, Idaho).

⁷³ "United States Census, 1860," index, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/M41M-SLN> : accessed 29 Nov 2012), Wm A Korts, , Alexandria, Virginia; citing p. 127, family 931; NARA microfilm publication M653, FHL microfilm 805331.

⁷⁴ "United States Census, 1880," index, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/M6CH-PZY> : accessed 20 July 2012), William A. Korts in household of Rosanna Korts, Washington, Washington, District of Columbia.

⁷⁵ "United States Registers of Enlistments in the U.S. Army, 1798-1914," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/VRQ6-VHY> : accessed 24 Oct 2013), Wm A Korts, 1885.

⁷⁶ "Utah, County Marriages, 1887-1937," index, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/F8GK-JBZ> : accessed 24 July 2012), William A. Korts, 1888.

⁷⁷ Married Frank Crowe who was the chief engineer of the Hoover Dam.

⁷⁸ "United States, Registers of Enlistments in the U. S. Army, 1798 - 1914," index and images, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/VRQ6-VHY> : accessed 29 April 2012), Wm A Korts (1885).

worked until his health forced him to retire in 1917 (O'Hare 1919; The Idaho Statesman 1890c). He died on 23 August 1919 in Colorado Springs, Colorado of nephritis and is buried in Evergreen Cemetery in Colorado Springs, Colorado. He was described as "a man of wide education, deeply religious and with a keen interest in all things pertaining to the civic life of the country (The Idaho Statesman 1919)."

Closure of the U.S. Signal Service Station in Boise 1890

An article in the Oregonian in February 1889 had been speculated that the U.S. Signal Service station in Boise would be moved to a town in Eastern Oregon (The Idaho Statesman 1889b). The Capital Journal in Salem, Oregon on 07 March 1889 printed a letter from Chief Signal Officer Adolphus W. Greely to J. N. Dolph on the establishment of a U.S. Signal Service station in Salem, Oregon (Capital Journal 1889). The letter said that a station in Baker City, Oregon was of much higher priority and he has thought about moving the Boise Station to Baker City in the interest of Eastern Oregon despite the sentiment against this from his weather forecasters. The Boise Board of Trade had a special meeting on 18 April 1889 to discuss the almost certain closure of the U.S. Signal Service station in Boise (The Idaho Statesman 1889a). The board sent a telegraph statement to the Chief Greely in Washington to protest against the station closure. They also contacted Idaho Senator Fred T. Dubois by telegraph to lend his influence. On 20 April 1889, Chief Greely responded to the telegram by saying:

"The Chief Signal Officer has but one desire in view to meet with his limited appropriations, the demands for climatic data from points best suited to be of value in general and the largest number of citizens."

Chief Greely also stated in the telegram that he planned to close the station in Boise on 31 December 1889 (The Idaho Statesman 1889c). This was later confirmed in a letter from the U.S. Signal Service to Joseph Perrault, owner of the Perrault Building (Idaho Statesman 1889b). On July 10, 1889, the U.S. Signal Service opened the station in the Walker Building in Baker City, Oregon. Senator Fred T. Dubois received a letter in mid-December 1889 from Chief Greely stating that he decided to continue the U.S. Signal Service Station in Boise until 30 June 1890 in the hopes that extra appropriations from Congress could keep the station open (The Idaho Statesman 1889d). However, the U.S. Congress didn't approve additional appropriations for the station and it was closed on 01 July 1890. Second Lieutenant John P. Finley stationed in San Francisco, California, closed the station removing all government equipment on 04 July 1890 (The Idaho Statesman 1890b).

From 01 July 1890 to 30 November 1898 the only weather observations in Boise were taken by the U.S. Army Post Surgeon at the Boise Barrack. Weather observations had continued uninterrupted at the Boise Barracks since February 1864 (U.S. Army 1891).

Idaho State Weather Service in Idaho Falls 1892-1898

The closure of the U.S. Signal Service station in 1890 and an underfunded U.S. Weather Bureau left Idaho without an official weather reporting station (Bonebright 1893). This was a big concern for the state's growing agricultural interests as the need for weather services and area climatological data had also grown. The University of Idaho, which had two experimental agricultural sites that recorded weather observations, worked with the U.S. Weather Bureau to create the Idaho State Weather Service in July of 1892 (Bonebright 1893; Fassig 1895). The establishment of the state weather services would aid in routine collection of weather data from voluntary observers (Whitnah 1961). Senator Fred T. Dubois help secure funding and equipment from the U.S. Weather Bureau to setup the states weather

service headquarters in Idaho Falls, Idaho (The Idaho Statesman 1892). The Idaho Falls location was chosen by the U. S. Weather Bureau over Boise and Lewiston because of their close proximity to the Baker City, Oregon and Walla Walla, Washington stations respectively. James H. Smith⁷⁹, who had been assigned to the Columbia, Oregon station, became the director of the State Weather Service (Bonebright 1893). He was described as one of the most able meteorologist in the country helping to establish the meteorological department at the University of Idaho. The first weather reports were published in April 1893 by the U.S. Weather Bureau and the first weather-crop bulletin was published on 02 May 1893 (Fassig 1895). In 1895, Daniel P. McCallum⁸⁰ became the director of the state weather service which by 01 July 1895 had 31 weather observing stations. The state weather service remained in operations until October of 1898 when the U.S. Weather Bureau opened an office in Boise.

The Return of U.S. Weather Bureau to Boise, Idaho

In August 1897, Senator George L. Shoup, the first Governor and Senator of Idaho, began discussions with the Chief of the U.S. Weather Bureau Willis L. Moore on establishing an office in Boise, Idaho (The Idaho Statesman 1897a). Senator Shoup explained the growing agricultural and stock interest in Idaho and the advantages of having two offices (Boise and Idaho Falls) in Idaho. Chief Moore agreed that adding an office in Boise, Idaho would be beneficial and promised the Senator that he would “get it done”. On 18 December 1897, Senator Shoup was informed by Chief Moore that a provision for the establishment of an office in Boise, Idaho with support from the Secretary of Agriculture James Wilson had been made in the budget for fiscal year ending on 30 June 1899 (The Idaho Statesman 1897b). The budget was passed and the Boise, Idaho office was scheduled to be established in August 1898 (The Idaho Statesman 1898a). However, this was delayed due to the extension of the U.S. Weather Bureau in the West Indies (Slauson 1898). Senator Shoup was assured by Secretary Wilson and Chief Moore that the Boise office would be opened by 01 October 1898. On 29 September 1898, Chief Moore sent the following order:

“Mr. Samuel M. Blandford will proceed from Salt Lake City, Utah to Boise, Idaho, to establish and assume charge of a Weather Bureau station at the latter point (Blandford 1898a).”

He arrived a day later and began looking for an office location in the city. The office equipment and supplies which filled two carts according to the Idaho Statesman (1898c) arrived before the U.S. Weather Bureau Headquarters in Washington D.C. authorization a location for the office. On 08 November 1898, Blandford received authorization to establish a station at the Sonna Building in Boise (The Idaho Statesman 1898d). The office staff would be appointed through the civil service commission, except for the position of messenger in which the Senator appointed Charles C. Garrett of Boise with a salary of \$25 a month (The Idaho Statesman 1898b). On 01 October 1898, the State Weather Service headquarters was moved to Boise, Idaho (Blandford 1898b).

⁷⁹ NOAA History, Profiles in Time – NWS Biographies site, Cited 2012: James H. Smith. [Available online at http://www.history.noaa.gov/nwsbios/nwsbios_page68.html]

⁸⁰ NOAA History, Profiles in Time – NWS Biographies site, Cited 2012: Daniel P. McCallum. [Available online at http://www.history.noaa.gov/nwsbios/nwsbios_page50.html]

U.S. Weather Bureau Downtown Boise, Idaho 1898-1939

U.S. Weather Bureau at the Sonna Building 1898-1905

“The weather bureau office in Boise is for the people, by the people and of the people, and residents and strangers are not only welcome but their presence and interests are greatly desired. We would have the people know that this office will be conducted for the benefit of the citizens of the city of Boise and of the state of Idaho as well as for the good of the nation.”

– Samuel M. Blandford, Section Director, 01 December 1898

On 01 December 1898, the first U.S. Weather Bureau office in Idaho was opened on the third floor of the Sonna Building on the corner of 9th and Main Street in Boise (U.S. Department of Agriculture 1898; U.S. Department of Agriculture 1902). The office occupied rooms 18, 19, 20 which were later changed to 340, 341 and 342 (U.S. Weather Bureau 1911). The first observation occurred at 8 A.M. on 01 December 1898 (Wells 1905). In addition to taking weather observations, the Boise office was the state’s weather service headquarters for climate and crop services which was originally headquartered in Idaho Falls, Idaho (Blandford 1898a). Two observations of temperature, precipitation, snowfall and barometric pressure were to be transmitted via telegraph. A meteorological map was posted in public display station every morning with weather conditions over the western portion of the United States and Canada at 5 a.m. Pacific Time plotted for public use along with a forecast (Blandford 1898a; The Idaho Statesman 1899b). The Boise office had a total of three employees when John C. Dabney arrived as an assistant on 05 October and Charles C. Garrett⁸¹ arrived on 07 October (Blandford 1898b).



Figure 18. Sonna Building (brick three story building). cotton region shelter is located on the roof left of the flag pole. Date of photo: 04 July between 1899 and 1904. Date listed by ISHS of 1880. Source: Idaho State Archives 79-66-63.

⁸¹ NOAA History, Profiles in Time – NWS Biographies site, Cited 2013: Charles C. Garrett. [Available online at http://www.history.noaa.gov/nwsbios/nwsbios_page25.html]

Thermometers:

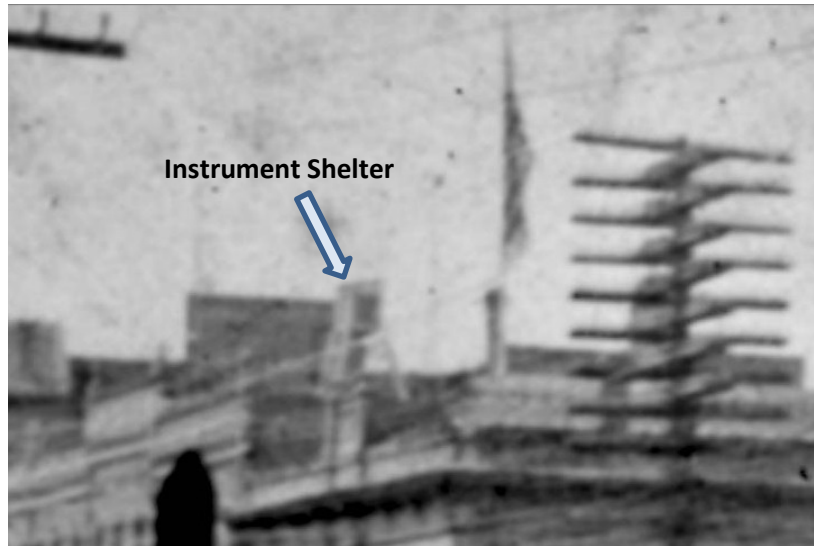


Figure 19. Cotton region shelter on the roof of the Sonna Building. Date of photo: 04 July between 1899 and 1904. Date listed by ISHS of 1880. Source: Idaho State Archives 79-66-63.

The thermometers and psychrometer were in a standard roof shelter with inside measurements of 3.2 feet long, 2.7 feet wide, 3.0 feet high and the floor was 10.4 feet above the roof (U.S. Weather Bureau 1911; Wells 1905). The dry-bulb thermometer was mounted 10.8 feet above the roof or 60.7 feet above ground level. The max and min thermometers and psychrometer were 61 feet above ground (U.S. Weather Bureau 1954). It was noted in U.S. Weather Bureau (1911) that the Sonna building was heated by hot water, so that the chimneys were seldom used and “thought not to affect temperatures by local influences”. The thermometers used at the Sonna Building are listed in Table 12.

Barometer:

Barometer number 583, along with the backup barometer number 2984 where located in one of the rooms on the third floor (Blandford 1898c). In a letter dated 28 November 1898, city engineer Ernst H. Hesse measured the elevation of the barometer near the window on the third floor to be 2738.71 feet above sea level (Hesse 1898).

Table 10: Barometers at the Sonna Building.

No.	In use		Notes
583	01 Dec. 1898	March 1899	Mercurial Barometer
294 (Extra)	01 Dec. 1898	March 1899	Sent to the Central Office for Disposal
2984	March 1899		

Wind Instruments:

Anemometer was on a boom 18.2 feet above the roof or 68.2 feet above ground level (Henry 1906). The wind vane was 0.8 feet higher than the anemometer. It was noted in U.S. Weather Bureau (1911), “at first [the] exposure was ideal but later the record may have been slightly affected by the Idanha hotel” which was completed in January 1901.

Table 11: Anemometer at the Sonna Building.

No.	In use	
381	01 Dec. 1898	01 June 1905
577 (Extra)	01 Dec. 1898	11 April 1911

Rain and Snow Gauge:

The standard rain gauge was placed 3.1 feet above the roof or 51.4 feet above ground level. The exposure was open (Wells 1905). No information on the snow gauge was found however, snowfall observations were taken regularly at the office.

U.S. Weather Bureau at the U.S. Federal Building 1905-1939

“The Weather Bureau is particularly interested in nourishing agriculture and commerce, having received special powers from congress which enables it to protect those interests through forecasts.” – Idaho Statesman, 1899

Construction began on the U.S. Federal Building⁸² shown in Figure 20 at 8th and Bannock streets on 24 September 1901 where several federal agencies would be located (The Idaho Statesman 1901). The Weather Bureau office moved on 16 March 1905 to rooms 40, 41 and 42 on the southwest corner of the fourth floor which has direct access to the roof, for signal flags and weather instruments (U.S. Weather Bureau 1911; The Idaho Statesman 1901). The remainder of the fourth floor would be occupied by the Surveyor General. The first room in the office contained various interior instruments and replacement instruments for the outside instruments as well as a desk of the clerical force (The Idaho Statesman 1909). Off this room was the private office of the section director. The next room was the work room where maps, forecast cards, circulars letters, etc., are printed and mailed. The last room held supplies and extra instruments for the hundred or so substations. The first weather observation occurred at 8 P.M. on 16 March 1905 Local Time (Wells 1905). The U.S. Federal Building was expanded shown in Figure 21 to accommodate more federal agencies and was completed in 1930 (City of Boise Department of Planning and Development Services 2010). The office moved to rooms 433⁸³, 435, 435A, 435B, 435C and 437A on the four floor in the new annex on 13 November 1930 (U.S. Weather Bureau 1911). A Weather Bureau expenditure report for fiscal year ending 30 June 1918 states the Boise, Idaho station costs \$6,111.92 to operate (U.S. Department of Agriculture 1919).

⁸² Also known as the U.S. Post Office Building and U.S. Public Building.

⁸³ Entrance to Suite.



Figure 20. The U.S. Federal Building with weather instruments on the roof. Date of Photo: Circa 1920s. Source: National Weather Service Boise, Idaho Archives.



Figure 21. U.S. Federal Building with upper air observation deck and cotton region shelter on roof. Date of Photo: Circa 1930. Source: National Weather Service Boise, Idaho Archives.

No funding for the U.S. Weather Bureau Weather Observation Building

The U.S. Weather Bureau had planned to build a specifically designed building for making weather observations in Boise (U.S. Department of Agriculture 1903). Stations where the U.S. Weather Bureau was paying rent and the local population was under 25,000 people were the highest priority to

get a weather observatory building as it was difficult to find suitable accommodations with good roof access. The city of Boise met these criteria and was listed to get a weather observatory in U.S. Department of Agriculture (1903). Appropriations for new weather observatory buildings had dwindled by 1912 except to replace damaged or destroyed buildings (U.S. Department of Agriculture 1912). This prompted Edward Wells, U.S. Weather Bureau Section Director in Boise and the Boise Commercial Club to try and get appropriations for a weather observatory building with an estimated cost of \$15,000 (The Idaho Statesman 1912). They were unsuccessful in secure funds for a new building. The last observation building built was in Cincinnati, Ohio in 1915 (Doty 2008).

Instruments:

The sheltered thermometers, rain gauge, photographic sunshine recorder, wind vane and anemometer were placed on the roof (Wells 1905). Figure 20 is a photo postcard which shows the instruments on the roof in the 1920s. The instruments were later moved to the roof of the new addition shown in the photo postcard in Figure 21.

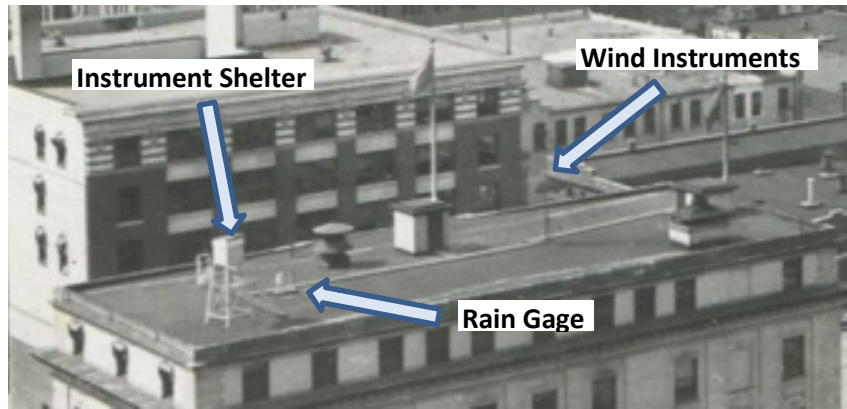


Figure 22. Instruments on the roof of the U.S. Federal Building. Date: Circa 1920s. Source: National Weather Service Boise, Idaho Archives.

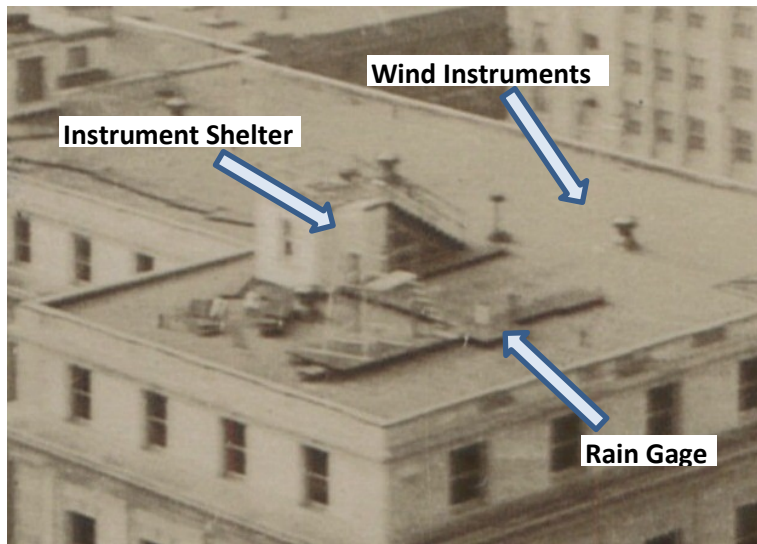


Figure 23. Instruments on the roof the annex of the U.S. Federal Building. Date: Circa 1930s. Source: National Weather Service Boise, Idaho Archives.

Thermometers:

The thermometers and psychrometer were placed in the same shelter mounted on a steel support used in the Sonna building (U.S. Weather Bureau 1911). The shelter was placed at the opposite end of the building away from the furnace flue shown in Figure 22. The dry-bulb thermometer was 10.5 feet above the roof and 78.2 feet above ground (Wells 1915). The shelter was replaced on 01 November 1915 with a new shelter but used the same supports. The thermometers and cotton region shelter were moved on 13 November 1930 to the roof of the new annex shown in Figure 21 and Figure 23 (U.S. Weather Bureau 1911). The dry-bulb thermometer was 11.74 feet above the roof or 79.39 feet above the ground (Norquest 1930a).

Table 12: Thermometers at the U.S. Federal Building							
Dry		Wet		Maximum		Minimum	
No.	Date Installed	No.	Date Installed	No.		No.	Date Installed
4214	01 Dec. 1898	4155	01 Dec. 1898	5967	01 Dec. 1898	5075	01 Dec. 1898
4151		4200		6013		5099	
		4230		5988		4899	
		4151		11025			
		1985		10890			
4164	1904 or 1905	6967	27 April 1915	11035	10 Oct. 1932	5099	1901-1902
4941						5075	
4946							
4230							
4946	1906 or 1907	5356	04 Sept. 1927	35837	22 March 1936	12480	12 June 1915
5358						5099	
6016							
3843	23 Nov. 1912	8754	08 June 1930	39598	02 Feb. 1937	5099	10 July 1915
		10809		40635			
		8542					
4230	14 May 1913	10809	Mar. 1936			12480	26 Feb. 1916
5350						5099	
6016	08 Aug. 1913	15482	April 1936			5669	05 April 1916
6969						13021	
						13048	
						5098	
						4399	
7549	08 Feb. 1918						
7864	25 Feb. 1922						
8542							
8563							
8453	18 May 1930						
8526	08 June 1930						
10811	08 Oct. 1930						
10839	26 Oct. 1930						

Beals and Wells (1912) assess how representative the temperature readings on the roof of the U.S. Federal Building compared to the near surface temperatures. A cotton region shelter with thermometers was installed on the lawn in the rear (east) of the U.S. Federal Building. From September 1910 to December 1911, the minimum temperatures and dew points from the roof corresponded

closely to the temperatures near the ground. The thermometers were moved from the lawn of the U.S. Federal Building to the residence of Mr. Charles A. Donnel⁸⁴, at 1711 Washington Street Boise, Idaho or about ¼ of a mile northwest of the U.S. Federal building shown in Figure 24. Another set of thermometers were also installed with the same exposure 10 miles west of Boise in the city of Meridian. Observations were compared from 01 January 1911 to 15 June 1911 at all three sites. The results showed that during the winter months the mean temperatures were nearly identical at Meridian and Boise to the official temperatures taken on the roof of the U.S. Federal Building. During this study, data from both Meridian and Boise sites were supplemented in the daily observation reports along with the official observations from the U.S. Federal Building to the Portland, Oregon forecast office.



FIG. 1.—“Key” station, Boise, Idaho.

Figure 24. A cotton region shelter at the residence of Charles A. Donnel (1711 Washington Street). Date: Circa 1911. Source: Beals and Wells (1912).

Barometer:

The barometer was originally located in the “west room” (Wells 1915). Assistant Engineers John L. Savage and Chas. B. Smith from the U.S. Reclamation Services made a detailed survey of points around the U.S. Federal Building to establish the elevation above sea level for the barometer (Savage and Smith 1905). In order to get the most accurate elevation of the U.S. Federal Building, they used a fixed point, the railroad depot in Nampa and a granite post on the corner of 8th Street and Bannock Street as reference points. They determined the elevation of the barometer to be 2770.20 feet. The barometer was moved to Room 40 on 26 April 1915 and then to Room 435 in the new annex on 13 November 1930 (Wells 1915; Norquest 1930a).

Table 13: Barometer at the U.S. Federal Building		
No.	Date Installed	Comments
583	01 December 1898	Mercurial Barometer
298 (Extra)		Extra (December 1898 – March 1899)
2984 (Extra)		Extra (March 1899 – June 1939)
2984	07 June 1939	
583	08 June 1939	Mercurial Barometer

⁸⁴ Assistant observer with the U.S. Weather Bureau in Boise at the time.

Wind Instruments:

Anemometer was on a boom 18.2 feet above the roof or 86.5 feet above ground level in 1915 (Wells 1915). The wind vane was 0.8 feet higher than the anemometer. A 3-cup anemometer was used starting on 01 January 1928 shown in Figure 25 but was switched back to a 4-cup anemometer on 01 January 1932 (U.S. Weather Bureau 1931). In 1930, the anemometer was moved to the roof of the new annex and installed on a boom 18.9 feet above the roof or 86.7 feet above ground level (Norquest 1930a). The wind vane was 19.2 feet above the roof or 86.7 feet above ground level.

Table 14: Anemometer at the U.S. Federal Building			
No.	In use		Comments
381	01 Dec. 1898	01 June 1905	Sent to C. O.
577 (Extra)	01 Dec. 1898	11 April 1911	Sent to C. O.
801	01 June 1905	11 April 1911	Sent to C. O.
863	11 April 1911	26 April 1912	Sent to C. O.
17 (Extra)	11 April 1911	01 Nov. 1913	Sent to C. O.
860	26 April 1912	01 Nov. 1913	
17	01 Nov. 1913	02 Nov. 1914	
650 (Extra)	02 Nov. 1914	16 Mar. 1925	4-cup
638	02 Nov. 1914	16 Mar. 1925	Returned to C. O.
650	16 Mar. 1925	01 Jan. 1928	4-cup
481	01 Jan. 1928	31 Dec. 1931	3-cup returned to C. O.
650	01 Jan. 1932		4-cup
1230	Extra; E4		

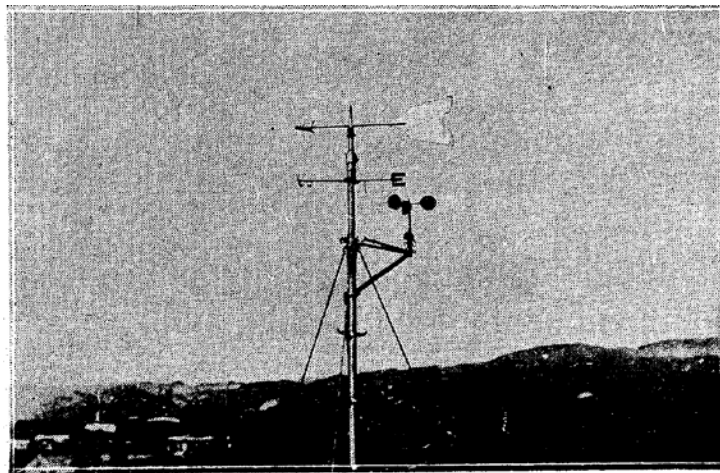


Figure 25. Wind instruments on top of the U.S. Federal Building in 1931. Date of Photograph: May 1931. Photograph Credit: Johnson & Son. Source: The Idaho Statesman (1931).

Rain and Snow Gauge:

The rain gauge was installed on the east side of the roof in 1905 shown in Figure 22. In 1915, the rain gauge was 3.4 feet above the roof or 71.7 feet above ground (Wells 1915). On 13 November 1930, the rain gauge was moved to the roof of the new annex shown in Figure 23 (Norquest 1930a). The

gauge was 3.86 feet above the roof or 72.16 feet above ground. No information on the snow gauge was found however, snowfall observations were taken regularly at the office.

U.S. Weather Bureau Airport Station at the First Boise Municipal Airport 1933-1939

A U.S. Weather Bureau airport station was opened on 11 May 1933 at the first Boise Municipal Airport, now the campus of Boise State University (U.S. Department of Agriculture 1933). The station was located in the airport communications building, the lower left building in Figure 26 (U.S. Weather Bureau 1937; Hart 1991). Weather observations had been taken at the airport since 18 October 1931 by Bureau of Air Commerce⁸⁵ personal but when the airway forecast service was expanded, the U.S. Weather Bureau took responsibility for weather observations including PIBAL flights (U.S. Weather Bureau 1954). Regular hourly observations of temperature, precipitation, barometric pressure and sky conditions were recorded. The U.S. Weather Bureau consolidated airport operations with the city office on 07 May 1935 as it became unnecessary for the U.S. Weather Bureau to have two stations performing similar duties within a mile of each other (U.S. Department of Agriculture 1935). PIBAL operations transferred back to the city office and hourly weather observations were recorded by the Bureau of Air Commerce. From 01 July 1939 to 18 December 1939, while the U.S. Weather Bureau office was moved to its new location at the new city airport at Gowen Field, weather observations and one PIBAL flight a day were taken by U.S. Weather Bureau personal (Jones 1949). The first Radiosonde flight began on 01 September 1939 and continued until 18 December 1939 when the equipment was moved to the new airport (U.S. Weather Bureau 1948a).

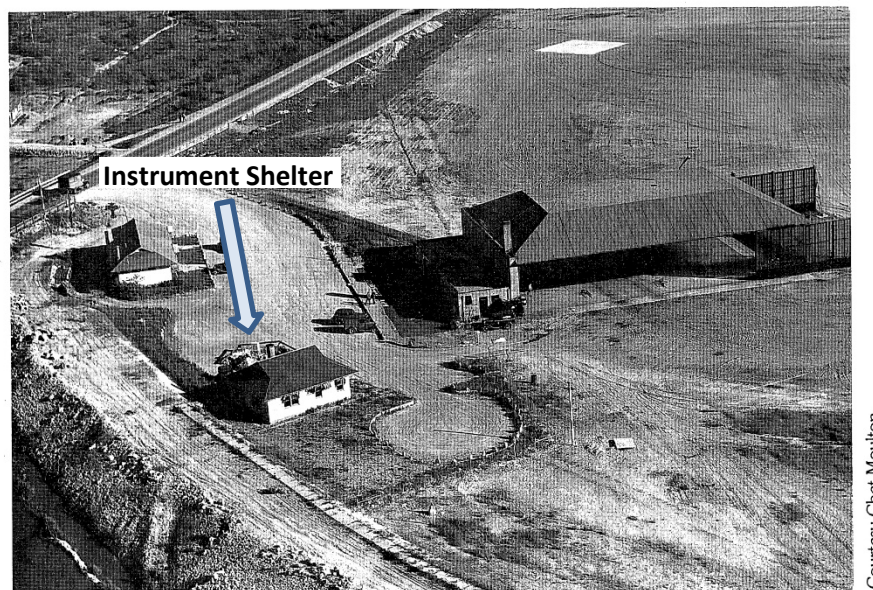


Figure 26. The U.S. Weather Bureau station was in the Communications Building (lower left building) at the Boise Municipal Airport. Date: 1931. Photograph Credit: Chat Moulton. Source: Hart (1991).

⁸⁵ In 1938, non-military aviation was responsibility was transferred to the Civil Aeronautics Authority (CAA).

Table 15: Weather Observations at the First Boise Municipal Airport 1931-1939	
Dates:	Observation made by:
18 October 1931 – 10 May 1933	Bureau of Air Commerce
11 May 1933 – 07 May 1935	U.S. Weather Bureau
08 May 1935 – 30 June 1939	Bureau of Air Commerce
01 July 1939 – 18 December 1939	U.S. Weather Bureau



Figure 27. Close up view of the instruments near the communications building at the first Boise Airport. Date: 1931. Photograph Credit: Chat Moulton. Source: Hart (1991).

Thermometers:

U.S. Weather Bureau Form No. 1001-Met'L reports and U.S. Weather Bureau (1954) were the main source of information along with a photograph from Hart (1991) showing the siting of the cotton region shelter located southeast of the communications building. The extreme thermometers and psychrometer were added in the spring of 1932 (U.S. Weather Bureau 1954). The dry thermometer was 5' 1/3" above ground, the maximum and minimum thermometers along with the psychrometer were 4 feet above ground (U.S. Weather Bureau 1937; U.S. Weather Bureau 1954).

Table 16: Thermometers at the First Boise Municipal Airport Station (WBAS)							
Dry		Wet		Maximum		Minimum	
No.	Date Installed	No.	Date Installed	No.		No.	Date Installed
13808	Mar. 1937	13807	Mar. 1937	39076	Mar. 1837	21383	Mar. 1937
14911	08 Apr. 1938	14796	04 Jan. 1938	40434	Oct. 1937	21383	Dec. 1937
18981	12 June 1938	14922	15 Jan. 1938	39076	Dec. 1937	21231	Jan. 1938
19600	31 Aug. 1938	14919	01 Feb. 1938	40434	Jan. 1938		
		18983	12 June 1938	44116	Mar. 1939		
		15757	14 Aug. 1938				
		19599	31 Aug. 1938				
		18978	12 Sept. 1938				
		14950	18 Nov. 1938				
		15781	25 Jan. 1939				

Barometer:

According to U.S. Weather Bureau (1954), the barometer was installed on 05 May 1933 when the U.S. Weather Bureau took responsibility of weather observations. However, the Monthly Records of Observations Form No. 1001-Met'L from March 1937 through December 1939 state that the surface pressure observations began on 19 June 1933. The Airways Weather Report (Form 1130-AER) for 11 May 1933 is the first hourly weather observations including barometric pressure for the Boise Airport. It's likely the surface pressure measurements came from the U.S. Federal Building until a barometer was installed at the airport on 19 June 1933.

Table 17: Barometers at the First Boise Municipal Airport Station (WBAS)		
No.	Dates in Use	
583*	05 May 1933	11 May 1933
N/A	12 May 1933	18 June 1933
720	19 June 1933	15 June 1939
1176	16 June 1939	18 December 1939

*Used U.S. Federal Building Barometer

Wind Instruments:

The anemometer and wind vane was installed on 13 October 1931 on the United Airlines hangar roof 52 feet above ground (U.S. Weather Bureau 1954). The wind instruments were moved to the roof of the airport communications building (noted as the CAA building) 30 feet above ground on 01 July 1939 shown in Figure 28 as the United Airlines hangar was moved to the new airport.



Figure 28. "Plane Wreck Near Old Boise Airport." Anemometer and Wind Vane on the communications building (behind the plane crash). Date of Photo: 11 November 1938. Photograph Credit: Everett L. "Shorty" Fuller. Source: Idaho State Archives, Everett L. "Shorty" Fuller Papers, 1934-1943 Collection, MS511-539-A.

Rain Gauge:

According to U.S. Weather Bureau (1954), the 8 inch rain gauge was installed in the fall of 1937. However, daily precipitation observations were recorded in the Original Monthly Record of Observations Form 1001A since at least March of 1937. The rain gauge was 3.5 feet above ground. Figure 27 shows the rain gauge close to the cotton region shelter.

U.S. Weather Bureau Meteorologists 1898-1939

“The objective of the weather is to simplify all publications placed before the reading public, that they may be easily comprehended, to the end that the public will see that the work of the weather bureau is not clothed in mystery, and that it is as practicable as any business.” – The Idaho Statesman, 1899

The Boise office opened with only three U.S. Weather Bureau employees in 1898, Section Director Samuel M. Blandford, Assistants John C. Dabney and Charles C. Garrett⁸⁶. By 1918, there were four employees at the office, Section Director Clinton Norquest, Assistants James E. Hutchison and Delbert M. Little, and Apprentice LaVerne Weston (U.S. Department of Agriculture 1918). Two employees, Assistant Clifton L. Ray and Apprentice Errol W. Little were furloughed for military service in World War I and were not listed on the station roster in 1918. Delbert and Errol Little were brothers. The number of U.S. Weather Bureau employees was increased to six in 1939 (U.S. Department of Agriculture 1938). Listed on the 1939 station roster was Section Director Harry G. Carter⁸⁷, Assistants, George F. Von Eschen, John W. Duncan, Raymond E. Duncan, and Urho O. Kiltinen, and minor observer Ezra T. Brumbach.

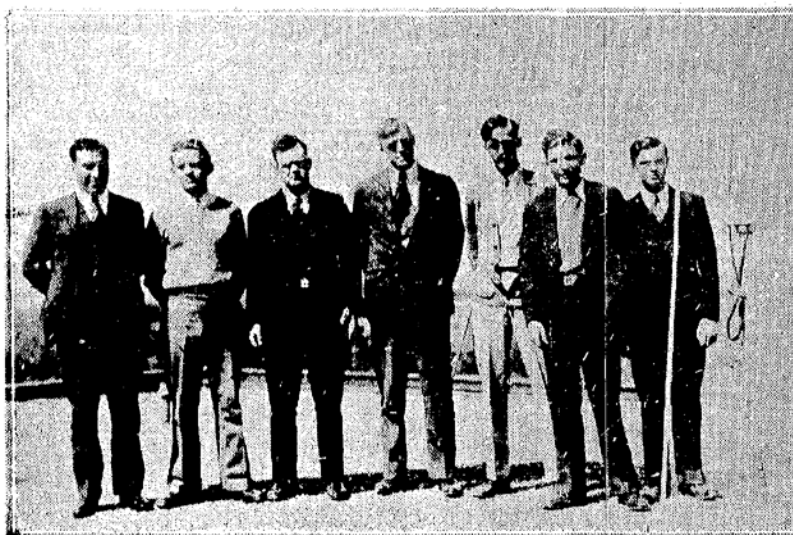
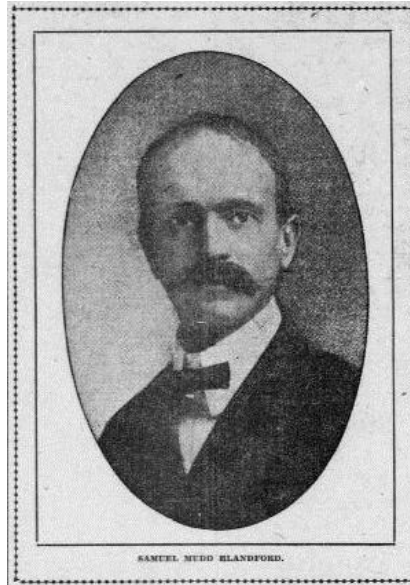


Figure 29. U.S. Weather Bureau Staff in 1931 (left to right): Ralph T. Hanna (Fire Weather), Frank Bryant (Junior Airways Observer), Walter F. Rumbaugh (Assistant Meteorologist), Clinton E. Norquest (Section Director), Lorne H. MacDonell (Senior Airways Observer), Kenneth R. Clark (Minor Observer) and Robert C. Elford (Airways Observer). Not pictured, Raymond E. Duncan (assistant observer), Philip E. Hastings (Junior Observer), Harold R. McBirney (attending University of Idaho) and Kenneth S. Norquest (on assignment in Washington D.C.). Date of Photograph: May 1931. Photograph Credit: Johnson & Son. Source: The Idaho Statesman (1931).

⁸⁶ More information on Charles C. Garrett available at NOAA History web site: http://www.history.noaa.gov/nwsbios/nwsbios_page25.html

⁸⁷ More information on Harry G. Carter in the Weather Bureau Topics, October 1949.

Samuel M. Blandford (1898-1904)



Samuel M. Blandford

Samuel Mudd Blandford was the first Section Director of the U.S. Weather Bureau office in Boise (Monthly Weather Review 1904). He was born in Prince George County, Maryland on 15 June 1866 on his parent's plantation which was one of the first settlements in Maryland. His mother is the sister of Doctor Samuel Mudd who was tried and convicted of conspiracy in the assassination of President Abraham Lincoln (The Morning Oregonian 1904a). Dr. Mudd set the broken leg of John Wilkes Booth a day after Booth assassinated President Lincoln. He was pardon by President Andrew Johnson in 1869.

He was a bookkeeper in Washington D.C. before enlisting in the U.S. Signal Service on 15 October 1887 and was assigned to the New York City, New York U.S. Signal Service station. The obituary in The Morning Oregonian (1904a) stated that "during the great blizzard of 1888 while in the performance of duty he contracted a cold that was the commencement of the disease that finally terminated his life". The Blizzard of 1888 also known as the Great White Hurricane, brought 22 inches of snow to New York City with wind gusts up to 40 mph between 11 March and 14 March. Snow drifts reached 20 to 30 feet high which effectively paralyzed the city. This storm is considered the worst storm in New York City history with an estimated 400 people killed. He worked at the New York City station until he was discharged on 20 June 1891⁸⁸ as a Private 1st Class and joined the U.S. Weather Bureau. He worked as an assistant in Pueblo, Colorado from August 1891 to 22 October 1891, then Santa Fe, New Mexico from 25 October 1891 to September of 1892, then Los Angeles, California from late September to October 1892 and then to Portland, Oregon in November of 1892. In addition to his meteorological work, he practiced law after he was admitted to the Oregon bar in 1892. While in Portland his health didn't improve so in June 1898 he transferred to Salt Lake City, Utah office. A few months later, he was order to establish a U.S. Weather Bureau office in Boise (Blandford 1898a).

⁸⁸ "United States, Registers of Enlistments in the U. S. Army, 1798 - 1914," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/VRQD-YPP> : accessed 29 April 2012), Saml M Blandford (1887).

He married Emma Lou Wells of Portland, Oregon on 26 October 1899 and they had one daughter, Ruth (The Idaho Statesman 1899a). He worked as the Section Director until his death on 03 February 1904 from tuberculosis. He is buried in River View Cemetery in Portland, Oregon.⁸⁹ He was described as one of the most capable and popular officials in the U.S. Weather Bureau and in the city of Boise. His obituary in The Morning Oregonian (1904a) stated he possessed in the highest degree characteristics peculiar to a true southern gentleman; he was modest, frank, honest, polished, intelligent and cultured, a man and a gentleman in every sense of the word. He wrote several papers on the weather in the Northwest and on the climate of Idaho. The photo of Samuel Blandford is from The Morning Oregonian (1904a).

Delbert M. Little (1917-1920, 1920-1925)



Delbert M Little

Delbert Morse Little was born on 12 March 1898 in Boise, Idaho (U.S. Department of Commerce 1958). He began his U.S. Weather Bureau career in Boise with his brother Errol⁹⁰ where they worked as Apprentices together from 1917 to 1920. Delbert transferred to Portland, Oregon office on 19 January 1920 but resigned after 5 months to work in the private sector (The Idaho Statesman 1920a). He returned to the U.S. Weather Bureau in Boise four months later on 02 September 1920 as an assistant (The Idaho Statesman 1920b). He transferred to Ithaca, New York office in April of 1925 as a Junior Meteorologist than in 1926 became Section Director at the Medford, Oregon office (The Idaho Statesman 1928). Not long after he transferred to Los Angeles, California to work in the fruit-frost program. In August of 1928, he was placed in charge of the Oakland, California Airport Station where he developed the Pacific Coast Airways Services between San Francisco and Los Angeles (The Idaho Statesman 1928; U.S. Department of Commerce 1958). He was selected to fill the post of Chief of the Aerological Division in 1934 where he developed and organized the National Aviation Weather Service

⁸⁹ Find a Grave, Cited 2015: Samuel Mudd Blandford. [Available online at <http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GRid=119923417>]

⁹⁰ "United States Census, 1910," index and images, FamilySearch (<https://familysearch.org/pal:/MM9.1.1/MLHX-68V> : accessed 08 Mar 2013), Delbert M Little in household of Chas B Little, Boise, Ada, Idaho; citing sheet 5B, family 132, NARA microfilm publication T624, FHL microfilm 1374234.

program. In 1940, he was appointed Chief of Station Operations Division and in 1945 he was selected as Assistant Chief of Bureau for Operations. He became the Deputy Chief of the U.S. Weather Bureau in 1955. During his 30 year career, he was prominent in the establishment of domestic and international weather services. He was a leader in the improvement in upper-air instruments, development of radar, and improving weather instruments for aviation such as continuous wind and gust recorders, cloud height indicators and automatic visibility recorders. In recognition of his contributions to the success of the Ronne Antarctic Research Expedition⁹¹, Cape Little, Antarctic was named after him in 1953. Cape Little forms the southern entrance to Wrights Inlet at Mount Tricorn. He retired with more than 40 years of public service on 31 July 1958 and moved back to Idaho where he split time between Boise and McCall. He died 06 September 1991⁹² and is buried at Morris Hill Cemetery in Boise, Idaho. The photo of Delbert Little is from U.S. Department of Commerce (1958).

Clinton E. Norquest (1918-1932)



Clinton E. Norquest

Clinton Emile Norquest became the Section Director in Boise, Idaho on 01 February 1918 (The Idaho Statesman 1918). He was born in Williamsport, Indiana on 02 November 1877⁹³. He graduated Williamsport High School as the valedictorian in 1895 and later attended Wabash College in Indiana for two years (Hawley 1920b; Conner 2005b). He worked as school teacher in Indianapolis, Indiana until 06 May 1904 when he joined the U.S. Weather Bureau as an assistant at Portland, Oregon office (The Morning Oregonian 1904b). A few months later he transferred to the Spokane, Washington office where he worked as an assistant for two years then transferred to the Cleveland, Ohio office. He was placed in

⁹¹ An expedition from 1947-1948 which researched the area surrounding the head of the Weddell Sea in Antarctica.

⁹² Find a Grave, Cited 2013: Delbert M Little. [Available online at

⁹³ "United States, World War II Draft Registration Cards, 1942," index and images, *FamilySearch* (<https://familysearch.org/pal:MM9.1.1/XPGJ-1Q9> : accessed 19 Aug 2012), Clinton Emile Norquest, 1942; citing NARA microfilm publications M1939, M1936, and M1937; FHL microfilm 4151010.

charge of the Devils Lake, North Dakota office from 22 September 1908⁹⁴ to 17 April 1911 then transferred to the Indianapolis, Indiana as the chief clerk in May of 1911 (U.S. Department of Commerce 1948; Hawley 1920b). He was the Section Director of the Boise office until September 1932, the Houston, Texas office until December of 1943 and the San Francisco, California office until retirement (U.S. Department of Commerce 1948; Conner 2005c). He retired with 43 years of U.S. Weather Bureau service on 30 November 1947 (U.S. Department of Commerce 1948).

He married Judith H. Smith, a native of Indiana, on 19 April 1904 in Boswell, Indiana and they later had two Children, Kenneth and Mamie Elouise (Hawley 1920b). Kenneth became a forecaster for the U.S. Weather Bureau in Washington D.C.. Clinton died in Los Angeles, California on 14 June 1964⁹⁵.

He was the first forecaster in the State of Idaho to provide fire specific weather information to the forest service as early as 1920. In 1926, Guy B. Mains, Forest Supervisor in Boise, Idaho, thanked Mr. Norquest for his "untiring efforts to assist the forestry interests in the face of inadequate assistance" at a conference on the *Organization of a Fire-Weather Warning Service* (Summers 1926). This effort help Boise get its first fire weather forecaster, Ralph T. Hanna, in May of 1930. He wrote several papers about fire and weather in Idaho and California. Photograph from the Airmass Analysis Section in Washington D.C. in September 1939.

Wilbert R. Krumm (1941-1943)



Wilbert R. Krumm

Wilbert Robert "Bill" Krumm was the second fire- weather forecaster in Boise, Idaho after Ralph T. Hanna. He was born in St. Joseph, Missouri on 26 August 1910 (Salt Lake Tribune 1972). He began his

⁹⁴ Original Monthly Record of Observation Form 1001-Met'L for Devil's Lake, ND. Hawley (1920b) states incorrectly September 1909.

⁹⁵ "California, Death Index, 1940-1997," index, *FamilySearch* (<https://familysearch.org/pal:/MM9.1.1/VGRV-J9D> : accessed 19 Aug 2012), Clinton E Norquest, 1964; citing California Department of Health Services, Vital Statistics Section, Sacramento, California.

career as a minor observer at the U.S. Weather Bureau in St. Joseph, Missouri in 1928 (U.S. Department of Commerce 1972). This was a temporary assignment while he attended the University of Missouri (Salt Lake Tribune 1972). After he graduated in 1932, he was hired as an observer at U.S. Weather Bureau office in Medford, Oregon and then later became a chartman in the Central Office map room in Washington D.C. (U.S. Department of Commerce 1965). On 11 May 1938, he became a fire-weather forecaster at the Mount Shasta, California office during the summer and in the winter worked at the San Francisco, California office until 1941. He transferred to the Boise, Idaho office becoming the Supervising Fire Weather Meteorologist and starting the U.S. Weather Bureau Fire Weather Warning Service at the office (Salt Lake Tribune 1965). Since 1934, fire-weather forecasting for Idaho was handled by regional office. In 1943, he became the Meteorologist in Charge at the Missoula, Montana office. On 13 June 1960, he became the Western Fire-Weather Coordinator in charge of the U.S. Weather Bureau's fire weather program in the Western United States. He retired in 1970 after 48 years of government service.

He was known as 'Mr. Fire-Weather' for his numerous contributions to the National Weather Service Fire Weather program (Salt Lake Tribune 1965). He was awarded the Department of Commerce Silver Medal for outstanding competence and achievement in developing a fire-weather program in the west in 1967. He accepted the Golden Smokey Bear Award on behalf of the U.S. Weather Bureau Fire Weather Program in 1968 for outstanding work in wildfire prevention from the U.S. Forest Service which is the U.S. Forest Service's highest national honor (U.S. Department of Commerce 1968).

He married Margaret Ellen Childers, born in Kalispell, Montana, on 21 February 1935⁹⁶ in Medford, Oregon and they later had three children, Richard Childers, Donald Mark, and Mary (Gully). He died of cancer in Salt Lake City, Utah on 25 November 1972 and was buried in Salt Lake City Cemetery⁹⁷ on 28 November 1972 (Salt Lake Tribune 1972). The photo of Wilbert Krum is from U.S. Department of Commerce (1968).

U.S. Weather Bureau at the Boise Airport 1939-1969

Boise Air Terminal at Gowen Field 1939-1969

The city of Boise began construction on a new municipal airport in 1933 at Whitney Field, now known as Gowen Field, about 3 miles south of the city center (Smith 1952). The cost of the new airport construction exceeded the cities funding so the city of Boise negotiated a contract with United Airlines in 1939 to surrender the United Airlines Hangar and ticket office and to assist financially in moving it from the old downtown airport to the new airport. A Works Progress Administration (WPA) project was sponsored shortly thereafter to enlarge and convert the hanger into an administration and terminal building. On 19 December 1939, the U.S. Weather Bureau moved to the 2nd floor of Boise Air Terminal Building (U.S. Weather Bureau 1956a). The transfer of all operations, 24-hour teletype, airway, and general weather services as well as radiosonde observations, from the city office in the U.S. Federal Building and airport station at the Old Boise Airport was completed on 20 February 1940 (U.S. Department of Agriculture 1940). The airport was renamed the Boise Air Terminal at Gowen Field on 21 July 1941. It's now known as the Boise Airport at Gowen Field.

⁹⁶ Jackson County Genealogy Library Cited 2012: Jackson County Marriage Book #17 Index for 1932-1935 Alphabetized by the Bride's Name. [Available online at <http://www.rvgslibrary.org/Marriages/Bride17.html>]

⁹⁷ Utah State Historical Society. Utah Cemetery Inventory. Salt Lake City, UT, USA: 2000.



Figure 30. North end of observation room. Radiosonde recorder, PIBAL plotting table, fire weather radio in the back ground. Pictured are Pat Renig and Jim Miller. Date: 27 September 1950. Source: National Weather Service Boise, Idaho Archives SL-125.



Figure 31. Observatory at U.S. Weather Bureau in Boise. Robert Lord (left) and Hal Harvey (right). Date: March 1953. Source: National Weather Service Boise, Idaho Archives, SL-748.



Figure 32. Instruments and the pilot balloon building at the Boise Air Terminal. Date: 27 September 1950. Source: National Weather Service Boise, Idaho Archives.

*Station (Hydrologic): <u>Boise</u> County: <u>Ada</u> State: <u>Idaho</u> Region No.: <u>9</u>	
Established: <u>November 10, 1940</u> Instructions No.: <u>1, 1941, Par. 28</u> Discontinued:	
Class: <u>0</u> Standard time used: <u>120th Mer.</u> Elevation, feet, MSL: <u>2814</u> Date: <u>December 1940</u>	
Latitude: <u>43° 34' N.</u> Longitude: <u>116° 13' W.</u> Section: <u>20</u> Township: <u>3N</u> Range: <u>2 E</u>	
Boise B. & M.	
<p style="text-align: center;"><u>OBSERVER</u></p> <p>Name: <u>Weather Bureau Office</u> Date appointed: <u>November 10, 1940</u> Compensation: <u>None</u> Address (mail): <u>Boise, Idaho</u> Address (telegraphic): <u>Boise, Idaho</u> Legal residence: <u>" "</u> Occupation: <u>Weather Bureau Office</u></p> <p style="text-align: center;"><u>SUBSTITUTE OBSERVER</u></p> <p>Name: Address (mail):</p> <p style="text-align: center;"><u>DIRECTIONS FOR REACHING STATION, AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN</u></p> <p>Gage <u>1/4</u> miles S. W. of P. O. in Boise, Idaho Gage located at W.B.O., Municipal Airport, Boise, Idaho.</p> <p style="text-align: left;">Go back of form.</p>	<p style="text-align: center;"><u>INSTRUMENT LOCATION</u></p> <p>(Give brief description and sketch, showing all obstructions and their distances from instrument.)</p>

Figure 33. U.S. Weather Bureau office in Boise, Idaho weather instrument location. Date: December 1940. Source: National Weather Service Boise, Idaho COOP Site Archives.

Thermometer:

Two cotton region shelters were placed in an un-watered grassy field about 150 feet northwest of the Boise Air Terminal building on 18 December 1939 (U.S. Weather Bureau 1961a). The large shelter on the right in Figure 32 held the standard thermometers (U.S. Weather Bureau 1951). It is not known what instruments if any were in the medium sized shelter closest to the balloon inflation building. It's possible it held the Friez 7-day thermograph or a backup set of thermometers (U.S. Weather Bureau 1948b). The extreme thermometers were 6.4 feet and a Friez whirling psychrometer was 4.5 feet above ground. The maximum and minimum thermometers were raised to 6.8 feet above ground to make room for the Telepsychrometer type WB H051 installed on 17 July 1954 (U.S. Weather Bureau 1961a). The telepsychrometer was 5.8 feet above ground.

The extreme thermometers were replaced with a hygrothermometer (Type H060) on 01 October 1959 (U.S. Weather Bureau 1961b). The hygrothermometer was 5 feet above ground in standard shelter above a dirt surface located 1375 feet west of the air terminal building in the tetrahedron near the airport runway. The extreme thermometers were returned to service in a large shelter at their previously location (in grassy field 150 feet northwest of the air terminal building) on 01 July 1960 and used to compare temperature readings with hygrothermometer (U.S. Weather Bureau 1961b). The extreme thermometers and medium standard shelter were relocated on 21 August 1964 175 feet north of the terminal building in a grass covered plot over concrete slabs surrounded by parking lot shown in Figure 38 (U.S. Weather Bureau 1964). The thermometers were taken out of service on 18 April 1968 (U.S. Weather Bureau 1968a).

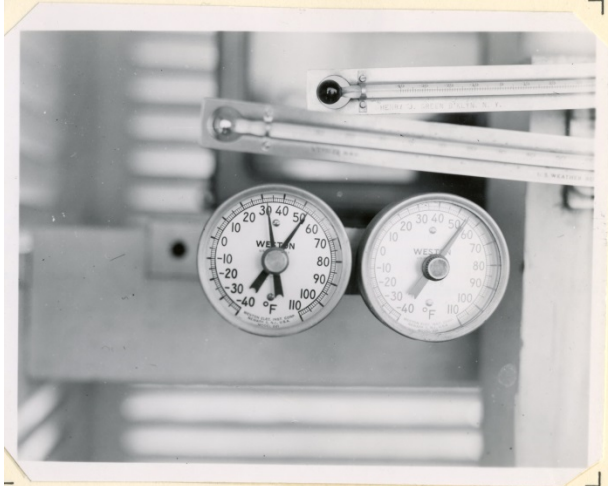


Figure 34. Thermometers in the large shelter 150 feet northwest of the Boise Terminal Building. Date: March 1953. Source: National Weather Service Boise, Idaho Archives, SL-749.



Figure 35. Southeast corner of the observation room at the Boise Airport office. In the photo left to right, the instrument panel, barometer case and sequence table (next to David Stevlingson). Date: 27 September 1950. Source: National Weather Service Boise, Idaho Archives, SL-124.

Barometer:

A Friez barograph was installed on the 2nd floor of the administration building (17.8 feet above ground) on 19 December 1939 (U.S. Weather Bureau 1948b). A precision aneroid barometer type Kollsman was installed on 05 December 1949 near the barograph (U.S. Weather Bureau 1951). The precision aneroid barometer was 17.3 feet above ground with the barograph height lowered to 16.3 feet above ground. Both instruments were relocated on the 2nd floor of the administration building on 05 December 1953 shown in Figure 35 (U.S. Weather Bureau 1954b; U.S. Weather Bureau 1961b). Barograph and aneroid barometer were 17.2 feet and 15.4 feet above ground respectively. They were moved again on the 2nd floor on 18 February 1960. According to U.S. Weather Bureau (1961b), the changes in the height above ground was due to the non-correlated reference planes. Since 1939, the barometers actual elevations change did not exceed 5 inches.

Wind Instruments:

The 3-cup anemometer was installed on the roof of the United Airlines hangar, 49 feet above the ground, on 19 December 1939 shown in Figure 36 (U.S. Weather Bureau 1948b; U.S. Weather Bureau 1961a). The anemometer pole, in use since 1905, was replaced on 26 January 1940 (The Idaho Statesman 1940). On 10 October 1951, the anemometer was moved to the center of the terminal building roof to right of the new control tower shown in Figure 37 (U.S. Weather Bureau 1961a; U.S. Weather Bureau 1951). The anemometer height was increased by 7 feet to 56 feet above ground to avoid any obstruction by the new airport control tower. In 1956, the 3-Cup anemometer with wind vane was replaced by the F420A model (magneto, direct reading type) (U.S. Weather Bureau 1956b). There was no change in the equipment's height above ground. The F420C model (magneto, direct reading type) was installed about 1375 feet west of the administration building in the field near Tetrahedron on 05 August 1958 (U.S. Weather Bureau 1959). The F420C's wind vane and anemometer were 20 feet and 19 feet above ground respectively. The F420A model on the roof was removed. The F420C models anemometer was changed from F101 to an F102 in 1961 (U.S. Weather Bureau 1961b). The F420C models wind vane was changed from type F012 to type F005 in May 1967 (U.S. Weather Bureau 1967).

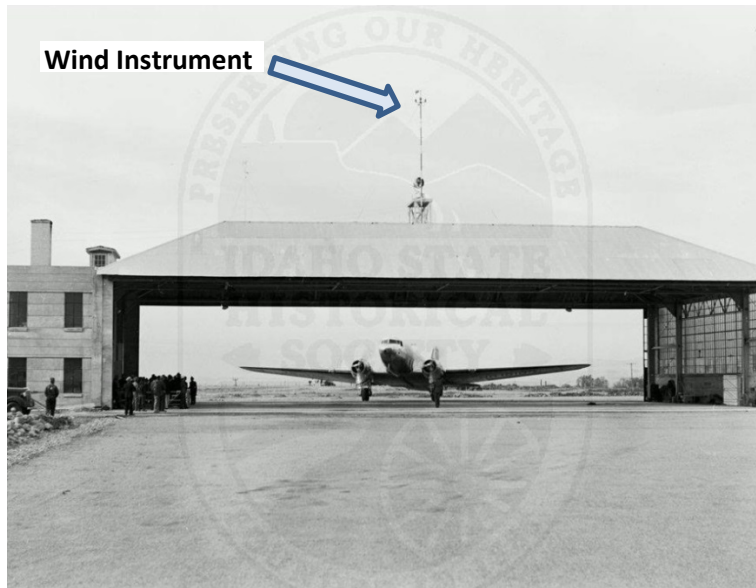


Figure 36. "New Hangar at Old Airport." Anemometer and Wind Vane on the top the United Airlines Hangar at the Boise Air Terminal. Date: 14 December 1939. Source: Idaho State Historical Society, Everett L. "Shorty" Fuller Papers, 1934-1943 Collection, MS511-545-a.



Figure 37. Boise Airport Terminal Building with wind instruments on the roof. Date: 01 October 1952. Source: National Weather Service Boise, Idaho Archives, SL-749.

Rain Gauges:

On 18 December 1939, the three rain gauges were installed in a field about 150 feet northwest of the Boise Air Terminal building shown in Figure 32 and Figure 33 (U.S. Weather Bureau 1961a). The weighting rain gauge was a Friez Dual Traverse Gauge, Friez No. 1545-40, Clock 265609, W. B. No. 1268 which was 4.5 feet above ground (U.S. Weather Bureau 1940). The tipping bucket gauge was a Friez 12-inch universal which was 3 feet above ground (U.S. Weather Bureau 1961a). The standard 8-inch non-

recording rain gauge was 3 feet above ground. All gauges were anchored to cement blocks and no obstructions were noted. A “new improved Alter-type” windshield was installed on the weighting rain gauge on 17 December 1957 (U.S. Weather Bureau 1958). On 21 August 1964, the weighing and tipping bucket rain gauges were relocated 175 feet north of the office in a grass covered plot shown in Figure 38 (U.S. Weather Bureau 1964). The 8-inch rain gauge was taken out of service. On 18 April 1968, the weighting rain gauge was moved to the top of the administration building and the tipping bucket rain gauge was taken out of service (U.S. Weather Bureau 1968a). The weighting rain gauge was moved again on 20 August 1968 35 feet west and one floor below the 10 May 1968 location shown in Figure 39 (U.S. Weather Bureau 1968b). The closest obstruction was chimney which was 6 feet from the gauge.

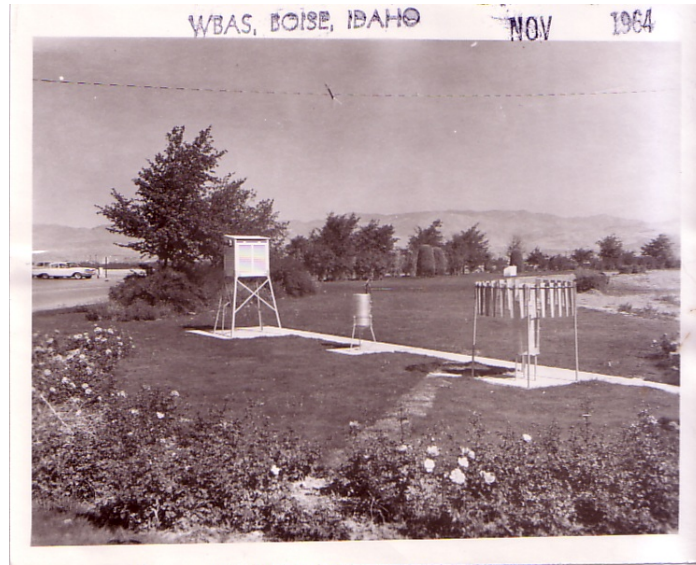


Figure 38. Instruments at the Boise Airport (175 feet north of the airport terminal building) looking northeast. Date: November 1964. Source: National Weather Service Boise, Idaho Archives.

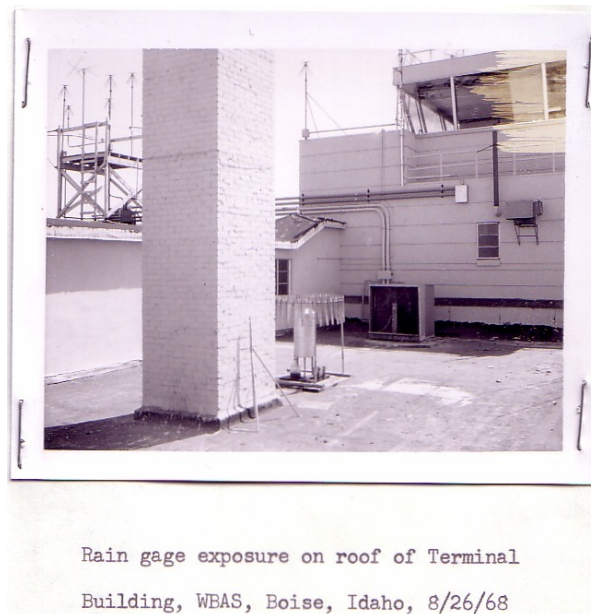


Figure 39. Weighing rain gauge with improved alter-type windshield on the roof of the Administration Building at the Boise Air Terminal. Date: 26 August 1968. Source: National Weather Service Boise, Idaho Archives.

National Weather Service Boise at the National Interagency Fire Center 1969-Present

“The Weather Bureau, by making Boise its hub of fire-weather activities in the west, will greatly strengthen the decision-making process by fire control personnel at the center (Cressman 1970).” – George P. Cressman, Director of the Weather Bureau, 1970

Old Administration Building at Boise Interagency Fire Center 1969-1993

The Boise Interagency Fire Center (BIFC), now known as the National Interagency Fire Center (NIFC), was created in 1965 as a way for the U.S. Forest Service, Bureau of Land Management (BLM), and the U.S. Weather Bureau to work together, reduce the duplication of services, and coordinate national fire planning and operations (National Interagency Fire Center 2012). The U.S. Weather Bureau moved to the old administration building on 05 June 1969. The office was on the second floor in the southeast corner of the building rented for \$50 (U.S. Weather Bureau 1970). The U.S. Weather Bureau made the Boise office its “hub of fire weather activities” in the west where fire weather specialists are able to make face to face contact with the Forest Service and Bureau of Land Management fire dispatchers (U.S. Department of Commerce 1970). U.S. Congress approved the ESSA requested for \$316,000 in additional funds in the fiscal year 1970 budget in July 1969 for the Boise, Idaho, Indianapolis, Indiana, and Philadelphia, Pennsylvania; and for bringing Oklahoma City up to full Weather Service Forecast Office (WSFO) status (U.S. Department of Commerce 1969). On 22 June 1970, the Boise Forecast Office began issuing official weather forecasts for Idaho south of the Salmon River (U.S. Department of Commerce 1970). The U.S. Weather Bureau changed their name to the National Weather Service on 01 October 1970.



Figure 40. Carl Keith (Back) and Ed Reimann (front) working in the forecast Office. Date: 07 June 1972. Source: National Weather Service Boise, Idaho Archives.



Figure 41. Patricia Goble in Observer's working area. Date: 07 June 1972. Source: National Weather Service Boise, Idaho Archives.

Thermometer:

The temperatures shelter, shown in Figure 42 and Figure 43, with max (WB number C102) and min (WB number C122) thermometers were installed 175 feet northeast of the admiration building on

10 June 1969 (National Weather Service 1975). The thermometers were about 5 feet off the ground. The hygrothermometer was changed to the Type H061 but remained 1375 feet west of the terminal building about 4 feet off the ground. The hygrothermometer was changed to type WS number H083 on 08 August 1985 (National Weather Service 1985).

Barometer:

Barograph (WB number G210A) and Precision aneroid (WB number G122A) were installed on the second floor, 2875 feet above sea level, on 05 June 1969 (U.S. Weather Bureau 1969). The precision aneroid barometer was raised a foot on 20 June 1975 (National Weather Service 1975).

Wind Instruments:

The direct reading wind instrument type F420C with wind vane type F005 and anemometer type F0102 remained in the same location, 1375 feet west of the terminal building, about 20 feet and 19 feet above ground respectively.

Rain gauges:

The standard 8-inch rain gauge (D100), Freiz Universal Rain Gauge (Alter D110B), and tipping bucket rain gauge (D120) were mounted to concrete slabs, 3 feet 5 inches, 4 feet 8 inches and 3 feet 1 and half inches above ground respectively (U.S. Weather Bureau 1970). Rain gauges are shown in Figure 42.



Figure 42. Weather Instruments at the BIFC administration building looking southwest. Date: 07 June 1972. Source: National Weather Service Boise, Idaho Archives.

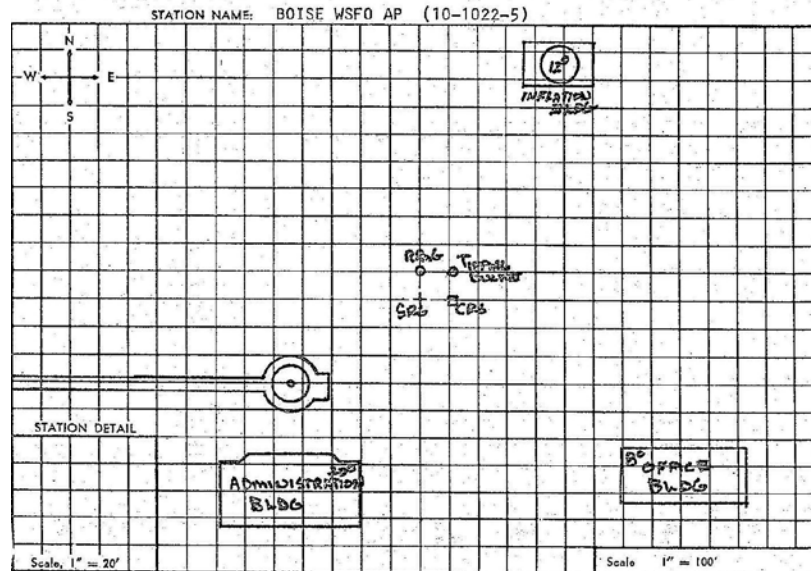


Figure 43. Sketch of the layout of weather instrument at the National interagency Fire Center. Date: 31 January 1980. Source: National Climatic Data Center EDADS.

National Weather Service Office at National Interagency Fire Center 1993-Present

As part of the modernization plan, new weather forecast offices were built, computer systems upgraded and weather radars were installed across the country. The Boise office, which was already a forecast office for the state of Idaho, and Pocatello, Idaho were selected for modernization. On 20 May 1992, the National Weather Service broke ground on the first weather service specific building in Idaho. Construction on the building was completed on 24 June 1993 and the office was officially opened on 21 July 1993. The National Weather Service continues to operate from this building today.



Figure 44. National Weather Service Office in Boise, Idaho looking north-northeast. Date of Photo: 2008. Source: National Weather Service Boise, Idaho Archives.

The first weather radar in Idaho, Weather Surveillance Radar 1988 Doppler (WSR-88D), was installed in Boise, just south of the airport shown in Figure 45, on 23 September 1993 and officially

commissioned on 11 January 1995. This was the 47th Doppler radar installed nationwide. Idaho has two Doppler radars, one in Boise, Idaho (KCBX) and Pocatello, Idaho (KSFY). Doppler radars in Spokane, Washington (KOTX) and Missoula, Montana (KMSX) cover Northern Idaho. The Next-Generation Radar (NEXRAD) network has 160 radars across the United States and its territories. The Doppler radar was upgraded to dual polarization on 30 August 2012 improving the accuracy and identification of precipitation types and precipitation estimates.

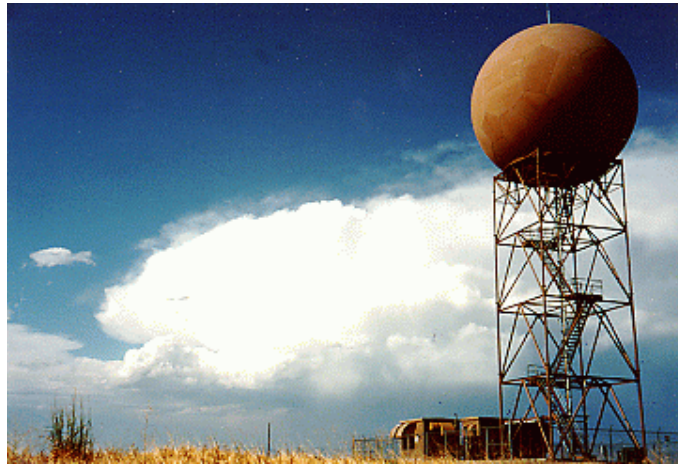


Figure 45. Boise's WSR-88D Doppler Radar (KCBX). Date: Unknown. Source: National Weather Service Boise, Idaho Archives.

The cotton region shelter and rain gauges were moved behind the office building closer to the inflation building on 07 July 1993 (National Weather Service 1993). Information on the inflation building and upper air program is available in Appendix 2. The second Automated Surface Observing System (ASOS) in Idaho was installed at the Boise Airport on 10 November 1994 and was officially accepted on 01 December 1995. The ASOS, shown in Figure 46, takes the official surface weather observations for Boise including temperature, pressure and wind direction and speed. The official rain, snowfall and snow depth measurements are taken at the Weather Forecast Office on the NIFC campus about 1.5 miles to the east of the ASOS. The ASOS does report precipitation amount but is not used in the official record.



Figure 46. Automated Surface Observing System (ASOS) at the Boise Airport. Date: Unknown. Source: National Weather Service Boise, Idaho Archives.

Thermometer:

The temperatures shelter, shown in Figure 42, with max (WB number C102) and min (WB number C122) thermometers were installed about 75 feet northeast of the National Weather Service building on 07 July 1993 (National Weather Service 1993). The thermometers were about 5 feet off the ground. As of 01 December 1995, the thermometers are only used as a backup to the ASOS.

Wind Instruments:

The direct reading wind instrument type F420C with wind vane type F005 and anemometer type F0102 remained in the same location, 1375 feet west of the terminal building, about 20 feet and 19 feet above ground respectively. The wind instruments were replaced by the ASOS system on 10 November 1994.

Rain and Snow gauges:

The standard 8-inch rain gauge (D100), Freiz Universal Rain Gauge (Alter D110B), and tipping bucket rain gauge (D120) were mounted to concrete slabs, 3 feet 5 inches, 4 feet 8 inches and 3 feet 1 and half inches above ground respectively (U.S. Weather Bureau 1970). The Freiz Universal Rain Gauge (Alter D110B) has been decommissioned. The 8-inch rain gauge is used for the official measurement every 6 hours (07z, 13z, 19z, 01z). Rain gauges are shown in Figure 42. The official snow amount and snow depth observations are taken near the rain gauges.

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Appendix

Appendix 1: Data Sources and Location of records

The National Weather Service office in Boise, Idaho has several historical documents and photographs archived most of which have been digitized. A partial list of the NWS Boise Historical Collections is shared below.

- Letter to Mr. Samuel Blandford listing the forms to be produced by the U.S. Weather Bureau office.
- Boise Barracks Monthly Meteorological Record (Form 1009) March 1893 – November 1898
- Original Monthly Record of Observations (Form 1001-Met'L) December 1898
- Annual Meteorological Summary (Form 1002-Met'L) 1898-1904
- Climate Record (2 books): 1898-1910 and 1911-1930
- Report of Elevation and Position of Instruments (Form 1058-Met'L) (4 documents): 1898, 1905, 1915 and 1930.
- Levels run for U.S. Weather Bureau when transferring recording instruments from Sonna Building to Federal Building. March 1905.
- Station Location Document (Hand written)
- Over 500 photographs dating back to the 1950s.

National Climate Data Center's newly digitized records system, Environmental Document Access and Display System (EDADS), part of the Climate Database Modernization Program (CDMP) contained the most documentation on the weather observations. A list of the surface observation available is share below.

- U.S. Signal Service (Form 113a): 01 July 1877 – 01 June 1890
- U.S. Signal Service Inspection Reports (Form 1; Form 14; Form 131) 1877 - 1888
- Meteorological Register (Form 34) from Boise Barracks: 01 January 1888 – 30 April 1894
- U.S. Weather Bureau Monthly Observations (Form 1001): December 1898 – December 1948
- U.S. Weather Bureau Hourly Observation (Form 1130-AER): 03 July 1929 – Present

Additional observation records from the U.S. Signal Service Station are available at Boise State University's Albertson Library. Below is a list of documents found in the Special collection (MSS 021).

1. Box 1: Original Record of Observation (Form 101) Bounded 1881-1882
2. Box 2: Original Record of Observation (Form 101) Bounded 1883-1884
3. Box 3: Original Record of Observation (Form 101) Bounded 1885-1886
4. Box 4: Original Record of Observation (Form 101) Bounded January 1887 – June 1889
5. Box 5: Weekly Meteorological Reports (Form 4) Bounded
 - a. 01 July 1877 – 29 December 1877
 - b. 20 December 1877 – 28 December 1878
 - c. 29 December 1878 – 27 December 1879
 - d. 29 September 1878 - 28 December 1879 (Copy from the Division of Telegrams and Reports for the Benefit of Commerce and Agriculture)
6. Box 6: Anemometer Record Sheets (Form 102) Bounded
 - a. 30 June 1877 – 31 December 1877 (Vol. 520)

- b. 01 January 1878 – 31 December 1878 (Vol. 521)
 - c. 01 January 1879 – 31 December 1879 (Vol. 522)
 - d. 01 January 1880 – 31 December 1880 (Vol. 523)
- 7. Box 7: Anemometer Record Sheets (Form 102) Bounded
 - a. 01 January 1881 – 31 December 1881 (Vol. 524)
 - b. 01 January 1882 – 31 December 1882 (Vol. 525)
 - c. 01 January 1883 – 31 December 1883 (Vol. 526)
 - d. 01 January 1884 – 31 December 1884 (Vol. 527)
 - e. 01 January 1885 – 31 December 1885 (Vol. 528)
 - f. 01 January 1886 – 31 December 1886 (Vol. 529)
 - g. 01 January 1888 – 31 December 1888 (Vol. 531)
 - h. 01 January 1889 – 31 December 1889 (Vol. 532)
 - i. 01 January 1890 – 01 July 1890 (Vol. 533)
- 8. Box 8: Miscellaneous
 - a. Climate and Crop Books
 - i. 1906-1910
 - ii. January 1902 – December 1905
 - b. Voluntary Observer Meteorological Records Bounded
 - i. American Falls (1890-1902)
 - ii. Idaho Falls (2 Books) (1905-1924, 1925-1931)
 - iii. Burnside (1890-1902)
- 9. Box 9: Annual Climatological Summaries (1917-1945)

None of the original record of observation forms from the Boise Barracks prior to January 1888 has been found. The earliest record of observations form was obtained through the Environmental Document Access and Display System (EDADS) system from the U.S. Signal Service Station starting in July 1877.

Appendix 2: Radiosonde and PIBAL Station History

Boise, Idaho was selected as an upper air site in October 1926 (Jones 1949). The first 30 gram Pilot Balloon observation (PIBAL) was released at 9 A.M local time on 17 November 1926 from the roof of the U.S. Federal Building. The observation platform was moved to the new annex of the U.S. Federal Building on 01 December 1930, shown in Figure 21, with the first flight run that morning (Norquest 1930b). PIBAL observations were moved to the U.S. Weather Bureau airport station on 11 May 1933 at the first Boise Municipal Airport (U.S. Department of Agriculture 1933). The U.S. Weather Bureau consolidated airport operations with the city office on 07 May 1935 and PIBAL operations were transferred back to the city. In addition to the PIBAL flights, radiosonde flights began at the old city airport on 01 September 1939 before being moved to the new airport office on 18 December 1939 (U.S. Weather Bureau 1949; Schwartz and Govett 1992). The first radiosonde flight used a shortwave receiver operating at 72.2 MHz to receive the signals sent from the radiosonde instrument (U.S. Department of Commerce 1964). Both flights were done daily from the inflation building which was 150 feet north of the Boise Air Terminal building shown in Figure 32. According to U.S. Weather Bureau (1956b) and Idaho Statesman (1954), radiosonde flights were moved to a new inflation building on 03 November 1954 about 680 feet to the east-northeast of the terminal building shown in Figure 51 and Figure 52. The inflation building was relocated to its current location on the NIFC campus, shown in Figure 53, in August 1969 with flights resuming on 13 August 1969. The PIBAL program was ended on 15 January 1975 (Warner 1975).

A timeline of radiosonde and PIBAL observation times is given in Table 18 and Table 19. The Boise upper station history is given in Table 20 assembled from multiple sources.

Table 18: Radiosonde Observations Times at Boise, Idaho

Date		No. of Obs. Daily	Observations Times (UTC)
From	To		
01 September 1939	13 July 1940	1	0300
14 July 1940	22 April 1941	0	Runs Discontinued
23 April 1941	25 April 1943	2	0300, 1500
26 April 1943	09 May 1943	0	Equipment Failure
10 May 1943	27 July 1949	2	0300, 1500
28 July 1949	06 February 1955	2	0300, 1500
07 February 1955	16 May 1955	3	0300, 1500, 2100
17 May 1955	31 May 1957	2	0300, 1500
01 June 1957	Present	2	0000, 1200 ⁹⁸

Table 19: PIBAL Observations Times at Boise, Idaho

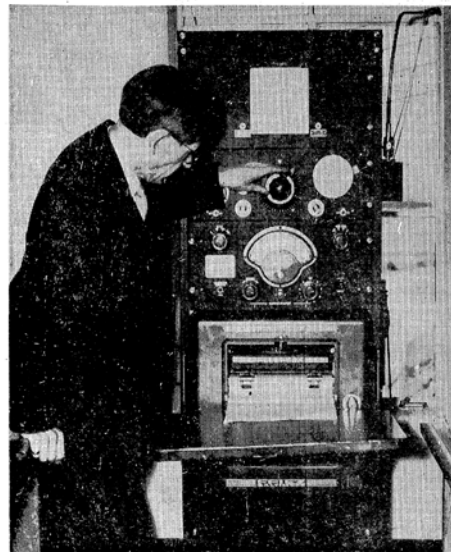
Date		No. of Obs. Daily	Observations Times (UTC)
From	To		
17 November 1926	March 1927	2	1500, 2000
April 1927	June 1928	2	1200, 2000
July 1928	October 1929	2	1200, 2300

⁹⁸ International agreement of observation times.

November 1929	May 1930	2	1100, 2300
June 1930	March 1931	3	1100, 1900, 2300
April 1931	April 1931	3	1100, 1700, 2300
May 1931	June 1933	4	0500, 1100, 1700, 2300
July 1933	October 1933	3	0500, 1100, 2300
November 1933	April 1935	4	0500, 1100, 1600, 2300
May 1935	July 1935	4	0400, 1000, 1600, 2200
August 1935	January 1936	4	0300, 1000, 1500, 2200
February 1936	March 1938	4	0400, 1000, 1500, 2200
April 1938	June 1939	4	0400, 1000, 1600, 2200
July 1939	October 1939	4	0300, 0900, 1500, 2100
November 1939	March 1948	4	0400, 1000, 1600, 2200
April 1948	27 July 1949	4	0300, 0900, 1500, 2100
28 July 1949	06 February 1955	2	0900, 2100
07 February 1955	16 May 1955	1	0900
17 May 1955	31 May 1957	2	0900, 2100
01 June 1957	09 October 1957	2	0600, 1800
10 October 1957	31 January 1961	1	1800
01 February 1961	31 December 1968	2	0600, 1800
01 January 1969	15 January 1975	1	1800

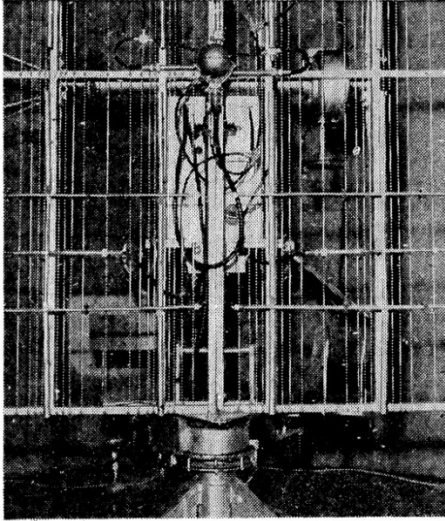


Figure 47. PIBAL Launch at the U.S. Federal Building. Date: May 1931. Photograph Credit: Johnson & Son. Source: The Idaho Statesman (1931).



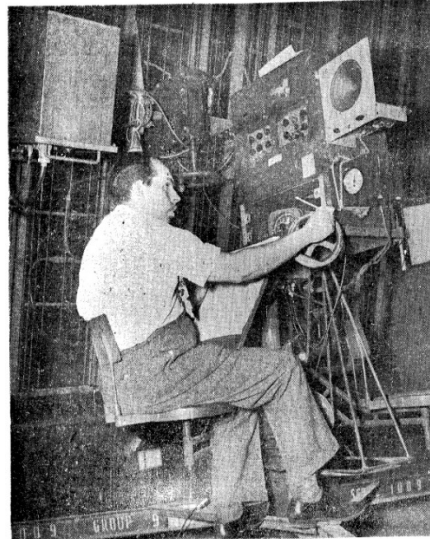
H. G. CARTER, Meteorologist in charge of the Boise Weather Bureau, adjusts the equipment which receives radio messages from the transmitter-equipped radio-sonde balloons sent up at regular intervals from the new Boise weather station at the airport. The radio-sonde sends back data on weather thousands of feet above Boise.

Figure 48. Harry G. Carter with the radiosonde receiver equipment at the Boise Airport. Date: March 1940. Credit: E. L. Fuller. Source: The Idaho Statesman, 18 March 1940.



THE DIRECTIONAL ANTENNA, looking more like a bed-spring than anything else, housed in the plastic "bubble" atop the new balloon inflation building of the Boise Weather bureau, picks up radio impulses from balloon-carried equipment to give a true picture of pressure, wind velocity, wind direction and temperature for use in weather forecasts for the area.

Figure 49. Signal Corps Radio-Direction Finder (SCR 658 and Canadian METOX) Antenna (Shortwave receiver operating at 72.2 MHz) which is manually operated. Date: 18 November 1954. Source: The Idaho Statesman, 19 November 1954.



BOISE'S WEATHER BUREAU under the direction of E. H. Jones is steadily acquiring the latest type equipment for charting and recording the movement of the elements. In this picture, technician Charles Wilcox operates the Howland set, which applies radar to tracking the winds aloft despite cloud conditions. Previously a pilot balloon was followed visually with a theodolite, but when the cloud base was low, results were not satisfactory to the needs of today's pilots. Now the balloon, carrying a small radio, transmits a signal which is recorded on the scope of this radar instrument, and it can be followed virtually to infinity as it rises through the skies. The system of vertical wiring behind Wilcox is the antenna of the radar set. The entire apparatus can be turned through 360 degrees to follow the movements of the balloon.

Figure 50. Charles Wilcox operating the Signal Corps Radio-Direction Finder (SCR 658 and Canadian METOX) Antenna. Date: 23 June 1946. Source: The Idaho Statesman, 24 June 1946.



Figure 51. Balloon inflation building at the Boise Airport. It was built in September of 1954. Date: 1956. Source: National Weather Service Boise, Idaho Archives.



Figure 52. Balloon Inflation building east of Boise Air Terminal. Date: Late 1950s. Source: Idaho State Archives 72-190-49-A.



Figure 53. Current balloon inflation building at the National Interagency Fire Center. Date: Circa 1970s. Source: National Weather Service Boise, Idaho Archives.

Table 20: Radiosonde Station History at Boise, Idaho (72681).

Date	Latitude	Longitude	Elevation (meters)	Description
01 September 1939	43.603	-116.195	825	Station Opened Short wave receiver operating at 72.2 MHz Audio modulated signals were recorded on a chart roll. Latitude and Longitude estimated.

19 December 1939	43.566	-116.216	868	Station Moved	Short wave receiver operating at 72.2 MHz	From old airport to the new Gowen Field Airport.
17 July 1940				Station Closed		Equipment sent Point Barrow, Alaska (<i>The Idaho Statesman</i> , 08 August 1940).
23 April 1941	43.566	-116.216	868	Station Opened	Short wave receiver operating at 72.2 MHz	Flights resumed
25 April 1943	43.566	-116.216	868	Failure of equipment	Short wave receiver operating at 72.2 MHz	Only PIBAL flights made
10 May 1943	43.566	-116.216	868	Repaired Equipment	Short wave receiver operating at 72.2 MHz	Flights resumed
05 March 1946	43.566	-116.216	868	Change Ground Equipment	Signal Corps Radio-direction finder (SCR 658-T1 and Canadian METOX)	Manually operated electronic tracking device.
10 September 1946	43.566	-116.216	868	Change Ground Equipment	Short wave receiver operating at 72.2 MHz	Audio modulated signals were recorded on a chart roll.
29 July 1949	43.566	-116.216	868	Ground Equipment Change	Signal Corps Radio-direction finder (SCR 658 and Canadian METOX)	Manually operated electronic tracking device.
03 November 1954	43.566	-116.216	868	Station Moved	Signal Corps Radio-direction finder (SCR 658 and Canadian METOX)	Moved to 680 feet east of the Boise Office (U.S. Weather Bureau 1956b).
1958	43.566	-116.216	868	Change Sonde	Sippican VIZ Type "A"	
16 December 1959	43.566	-116.216	868	Change Ground Equipment	Weather Bureau radiotheodolite (WBRT-57) based on the GMD technology.	
03 December 1965	43.566	-116.216	868	Change RH Sensor	Carbon Hygristor	From LiCl Hygristor
02 June 1966	43.566	-116.216	868	Using Sonde	Transponder Type	Station History Form
13 August 1969	43.567	116.21	871	Station Moved	Station moved to the NIFC Campus.	NOAA NCDC/WB Form 500-10
10 February 1972	43.567	116.21	871	Change RH Duct	Re-designed Duct	
April 1974	43.567	116.21	871	Change Computer	Mini-Computer	From Time Share Computer

01 April 1981	43.567	116.21	871	Change RH Sensor	New Carbon hygristor	
26 June 1981	43.567	116.21	871	Change Sonde	Sippican VIZ accu-lock Radiosonde	
1982	43.567	116.21	871	Using Sonde	Model I1 VIZ Mark I Microsonde OMEGA	UK Met. O. (pers. comm.),"Derived from WMO (1982)
1982	43.567	116.21	871	Using Radiation Correction	R1 No Rad. Correction	UK Met. O. (pers. comm.),"Derived from WMO (1982)
1986	43.567	116.21	871	Using Sonde	Model I1 VIZ Mark I Microsonde OMEGA	UK Met. O. (pers. comm.),"Derived from D MET O 1/6/1/15"
09 April 1986	43.567	116.21	871	Change Computer	Mini-Art 2 System	
16 October 1988	43.567	116.21	871	Change Sonde	Sippican VIZ "B" Sonde 1492-520 NWS 1680 MHZ	
November 1989	43.567	116.21	871	Change Computer	Micro-ART system	
01 April 1990	43.567	116.21	871	Change Sonde	Space Data Sonde	
December 1992	43.567	116.21	871	Using Sonde	Space Data Sonde	Oakley (1993)
01 July 1995	43.567	116.21	871	Change Sonde	VIZ "B" RADIOSONDE AS SONDE TYPE "11"	
01 November 1995	43.567	116.21	871	Change Sonde	VAISALA RS80-56H Sonde	NWS Solar/IR Corr
27 October 2006	43.567	116.21	871	Change Ground Equipment	Radiosonde replacement system (RRS)	
27 October 2006	43.567	116.21	871	Change Sonde	Sippican Microsonde Mark IIA	GPS Radiosonde
17 December 2013	43.567	116.21	871	Change Sonde	LMS-6 Radiosonde	GPS Radiosonde

Boise, Idaho (72681) Upper Air Station History (Schwartz and Govett 1992; NCDC 1996, U.S Weather Bureau 1948a, The Idaho Statesman 1941).

Appendix 3: Officer in Charge, Section Directors and Meteorologist in Charge

Since 1877, there have been 21 officials in charge of the Boise office. The title of Section Director was changed by the U.S. Weather Bureau in the late 1950s to Meteorologist in Charge. The U.S. Signal Service office had five Officers in Charge from 1877 to the closure of the office in 1890. From 1898 to present, there have been 16 Meteorologists in Charge.

Table 21: Officer in Charge, Section Directors and Meteorologist in Charge at Boise, Idaho Office since 1877

Officer in Charge:	Period in Charge:
Sergeant Barnet E. Light	01 July 1877 – 30 January 1884
<i>Private 1st Class John T. Cahill</i>	<i>06 October 1883 – December 1883⁹⁹</i>
Sergeant James Kenealy	31 January 1884 – 05 January 1887
Private 2 nd Class Henry R. Boynton	06 January 1887 – 19 November 1888
Sergeant William A. Korts	20 November 1888 – 01 July 1890
Section Directors:	
Samuel M. Blandford	28 September 1898 – 09 February 1904 [”]
Edward L. Wells	01 March 1904 ¹⁰⁰ – 31 December 1917 [^]
Clinton E. Norquest	01 February 1918 – 11 October 1932 [^]
Harry G. Carter	07 October 1932 – 17 December 1941 [^]
Harry M. Hightman	December 1941 – 31 December 1943 [*]
George F. Von Eschen	October 1943 – May 1944 [^]
Edwin H. Jones ¹⁰¹	June 1944 – 31 August 1951 [*]
Archer B. Carpenter	01 October 1951 – 31 December 1959 [*]
Meteorologists in Charge:	
Kenneth A. Rice	May 1960 – June 1970 [^]
Arthur H. Hosick	June 1970 – September 1974 [*]
Harry L. Elser	1975 – January 1979 [*]
H. Carl Keith	April 1979 – February 1981 [*]
Albert Drumont	1982 – 1987 [^]
Robert J. McLeod	1987 – 1991 [^]
John Jannuzzi	1992 – 02 June 2011 [*]
Robert Diaz	03 June 2011 – 03 January 2016 [*]
Michael Cantin	07 August 2016 - Present

*** Retired from the U.S. Weather Bureau/National Weather Service.**

^ Transferred from the Boise, Idaho Office.

” Died while in charge of the office.

⁹⁹ Cahill was unable to take charge of the station due to his illness. However, he was assigned to the station from October to December of 1883.

¹⁰⁰ *The Idaho Statesman*, 23 February 1904, p. 5.

¹⁰¹ Started Weather Bureau Career at Boise as a Junior Observer in 1913. Worked at 23 Stations.

Appendix 4: Letter from 2nd LT Greene to Chief Hazen

Boise City, Idaho Terr.

July 6. 1854.

The Chief Signal Officer.
Washington.

Sir:

Referring to the exposure of ^{and} ~~Vain Van~~ - Anemometer ^{and} ~~and~~ Thermometer at this station. I have the honor to say that the two former are exposed upon a flat roof, which is as high as any in the immediate vicinity, ^{and} that no deviation from the velocity or direction of the wind in the neighborhood will occur owing to any immediate local causes. The prevailing winds appear to be from the N.W. ^{and} the S.E. which directions are directly up ^{and} down the valley in which the town is located.

It is possible that a South wind would draw down the valley so as to be a S.E. wind, ^{and} in like manner a West wind might become a N.W. wind owing to the conformation of the land: this I advance only as a possibility or probability which may explain the non conformity of the winds, mentioned in your letter of the 14th inst.

The thermometers are exposed facing the N.E.; the shelter is

large ^{and} there is a good air circulation. The presence of an unpainted tin roof, about four feet under the thermometer is perhaps objectional on account of radiation.

There is no high tower here in which the shelter could be placed - There is a grassy yard surrounding a church near the office, where a few comparative readings could be taken if the instruments were watched, but the shelter could not be placed there

I am very respectfully,
your obedient servant

Hans Tappin
Lieut. Colonel & Capt. R. Army.
Inspector.