Texas Weather

Pre - 1880

Monograph Series No. 4

by

John F. Griffiths
Lisa E. Walters
Scott C. Sheridan

Office of the State Climatologist
Department of Meteorology
Texas A&M University
College Station, Texas

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Permission to include articles from the "Texas Almanac" issues of 1860 and 1861 is also much appreciated.

CHAPTER 1

Introduction

This monograph is concerned with Texas weather before 1880. Previous publications of the Texas Office of the State Climatologist have covered the periods 1880-1979; 1980-1989; 1990; 1991; 1992 and 1993. Copies of these can be purchased though the Office. The first monograph began with 1880 because prior to this date insufficient observations are available to give a representative picture of the whole state. In this volume there are not enough data available to present a statewide summary for each year, only details for specific areas. However, it is believed that many people, both within and outside the State, would be interested in seeing weather and climate details of this early period, especially since they have never before been brought together in a single volume.

To put the early records in some historical context, a brief resume of early meteorological observations in the United States is presented. Due to the interest of the Army in the effects of temperature on soldiers and their performance, a meteorological observations system was organized by the Surgeon-General , Joseph Lovell, in 1818. The data, taken by Army surgeons at many forts were then published in 1821 (1820 data), 1822 (1821), 1826 (1822-1825), 1840 (1826-1830), 1851 (1831-1842), 1855 (1843-1854), 1860 (1855-January 1860). The war then led to a cessation of observations at forts in the south and southeast but by about mid-1860 meteorological records began to appear in the Annual Reports of the U.S. Department of Agriculture. The location of forts for which data appear in this monograph are shown in FIG 1.1.

The role of the Smithsonian Institution, under its first Secretary, Joseph Henry, during the early years must not be overlooked. It began collecting data from a corps of observers in 1840 until 1870 when the records, and observers, were placed under the control of the Chief of the Signal Office of the Army, since the Office was responsible for transmitting many of the data. When the service was transferred to the Department of Agriculture in 1890 an inventory showed observations for at least one year had been kept at 3929 localities in the U.S.A., but only 147 had 30 years or more of data.

The daily and monthly mean temperatures for the early years were deduced from observations taken at 7am, 2pm and 9pm; in 1841 observations were taken at sunrise, 2pm and 9pm; in 1842 an observation at sunset was added. In 1843 through 1855 observation times changed to a little before sunrise, 9am, 3pm and 9pm. In 1855 they returned to 7am, 2pm and 9pm but the change-over was not simultaneous at all stations.

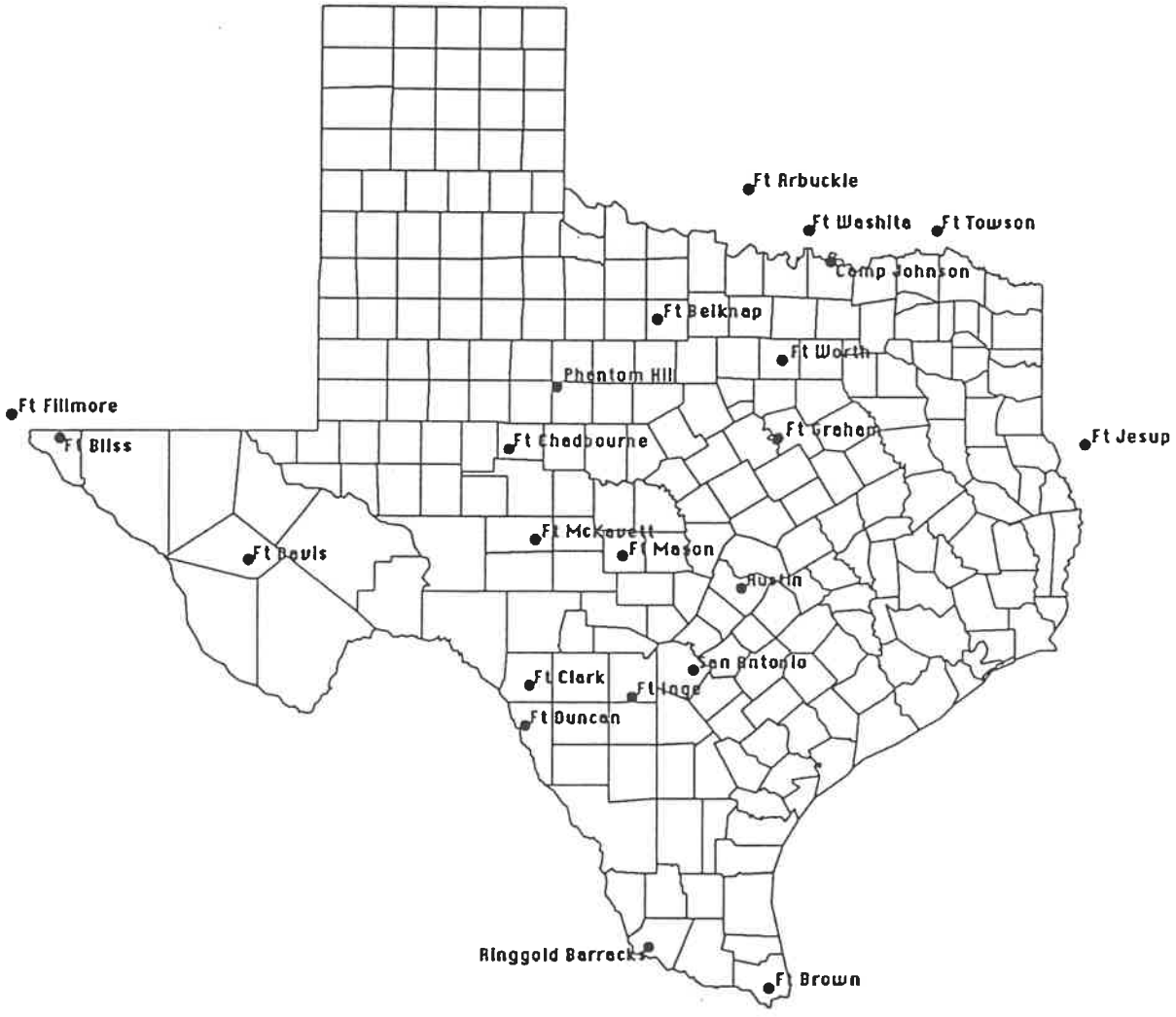

FIG. 1.1

CHAPTER 2

WEATHER PRE-1846

Introduction

During this early period the number of observations from Texas that are still in existence today are very few. They consist of seven consecutive months of temperature at Anahuac (Chambers County) beginning in March ,1831, and a year of temperature records at Fort Houston (Anderson County) in 1842 (Table 2.1). There have been reports of observations taken at Nacogdoches in 1834 or 1835, but these have not yet been found.

However, observations have been taken very close to the state, at Fort Jesup, La., (about 15 miles from the east border) from 1823 to 1845, at Fort Towson, Indian Territory (OK), (about 6 miles from the current Texas border) from 1833 to 1854, and at Fort Washita, Indian Territory (OK.), (about 20 miles from the current Texas border) from 1843 to 1859. The mean monthly temperature records are given in Table 2.2 for these stations for the pre-1846 period, while Table 2.3 contains the monthly extremes, where available, for the three forts. Precipitation data for the forts are contained in Table 2.4, while the number of snow days per month appear in Table 2.5. It must be noted that rain gauges were not supplied to forts until about 1837.

The only other sources of weather phenomena located so far deal with severe storms. In Table 2.6 are details of locations and months which experienced some extreme weather conditions (compared with average conditions at that period) have occurred. It includes notes on some severe storms. In Appendix I an 1861 article on droughts in 1725-1858 is given, while Appendix II gives details of some hurricanes during the period 1818-1886.

Geographical Positions of the Military Posts

Fort Jesup, Louisiana (Latitude 31° 33', Longitude 93° 32')

Southwest of Nachitoches, Louisiana, on a ridge midway between the Red and Sabine rivers, 25 miles distant from each. The country is rolling, but not hilly. Winds from the Gulf are felt through the summer. Position from Graham's and Mitchell's maps, originally known as Camp Jesup.

Fort Towson, Indian Territory (Latitude 34° 00', Longitude 95° 33')

Near the Red river, six miles distant from it and from the Kiamichi, a branch entering it from the north. In part surrounded by hilly and rolling country, and on the south by open marshes or prairies. Position measured from the corrected maps of the Pacific railroad surveys. Whole altitude approximate.

Fort Washita, Indian Territory (Latitude 34° 15', Longitude 96° 55')

Near the Washita river (the Western, or False Washita), thirty miles from its entrance into t he Red river. The location is a mile and a half east of the Washita, one hundred and fifty feet above it, and on the border of high open prairies. Position from the map of Captain Whipple, 1854, compared; approximate.

Table 2.1
MEAN TEMPERATURE

Anahuac, Latitude: **29° 47"**, Longitude: **94°54"**

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1831	--	--	60.4	69.1	75.0	80.4	84.7	80.6	78.8	--	--	--

Fort Houston, Latitude: **31° 42"**, Longitude: **95° 44"**

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1842	65.2	60.5	68.7	72.7	85.5	80.1	84.2	81.4	83.5	72.3	62.3	60.0	73.0

Table 2.2
MEAN TEMPERATURE

Fort Jesup; Sabine County, **Louisiana** State.
Latitude **31°33'**, Longitude **93°32'**, Elevation **80**? feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1823	51.0	43.3	60.7	71.6	77.1	77.9	83.0	83.2	76.0	69.8	58.4	57.4	67.4
1824	59.0	54.2	63.9	64.4	76.6	84.8	85.9	83.9	78.0	66.0	57.9	56.6	69.3
1825	52.7	59.8	64.7	67.0	77.8	81.0	82.8	85.1	77.6	63.8	57.1	45.1	67.9
1826	46.8	57.8	68.5	70.2	77.9	79.8	85.4	84.0	76.1	68.8	60.3	52.8	69.0
1827	51.1	62.8	60.3	69.5	72.2	81.4	83.6	83.0	81.6	67.2	60.3	57.6	69.2
1828	55.6	58.9	61.2	65.0	74.9	82.8	83.3	82.1	73.4	67.8	59.4	54.6	68.2
1829	51.8	45.3	53.1	62.3	74.3	80.6	81.2	79.4	77.3	68.6	55.6	53.1	65.2
1830	50.4	50.6	62.0	64.4	70.8	79.3	82.9	83.1	77.3	70.1	59.3	48.1	66.5
1831	41.4	45.4	59.4	66.1	72.8	80.9	81.1	76.6	73.5	62.7	53.8	38.7	62.7
1832	46.5	55.3	58.3	67.7	73.9	78.8	82.3	81.0	75.7	64.8	53.3	55.3	66.2
1833	55.8	53.8	55.9	67.4	75.7	81.2	84.0	83.8	78.6	61.8	56.7	53.1	67.3
1834	45.0	60.6	62.2	69.8	73.6	82.9	82.1	82.1	73.0	69.1	61.6	50.2	67.7
1835	50.2	43.6	55.3	63.4	70.8	80.5	78.6	80.7	73.7	64.8	53.9	52.4	64.1
1836	50.7	54.1	55.1	67.8	70.6	76.7	80.4	78.6	75.7	59.8	49.6	46.6	63.8
1837	45.2	50.4	55.7	62.6	71.5	79.7	80.4	80.4	74.3	67.6	63.6	51.5	65.2
1838	51.1	42.8	61.3	69.1	68.5	80.9	81.0	80.1	74.3	64.4	52.2	45.8	64.3
1839	52.6	50.4	59.7	70.6	73.3	81.8	81.2	83.5	78.5	73.0	55.5	48.8	67.4
1840	50.5	57.4	64.5	71.3	73.9	80.1	82.1	83.3	76.4	70.1	55.0	50.6	67.9
1841	45.1	51.9	58.1	69.7	70.8	78.2	84.2	80.2	73.5	62.6	56.3	48.7	64.9
1842	53.1	56.1	64.1	70.4	76.9	82.7	78.2	78.6	76.9	64.8	50.7	47.0	66.6
1843	54.2	47.9	41.6	69.6	75.3	77.3	81.8	76.2	78.6	61.8	58.0	48.3	64.2
1844	52.8	53.9	57.5	70.7	76.6	79.2	83.2	80.9	73.7	60.9	56.5	48.4	66.2
1845	51.7	55.6	57.4	68.6	70.5	77.4	81.0	81.4	76.6	65.6	57.9	43.9	65.6
Avg	50.6	52.7	59.2	67.9	73.8	80.3	82.3	81.4	76.1	66.0	56.7	50.2	66.4

Observation Times
1823-1840: 7-14-21
1841: Sunrise-14-21
1842: Sunrise-14-Sunset-21
1843-1845: Sunrise-9-15-21

Table 2.2 (con't)
MEAN TEMPERATURE

Fort Towson, near Choctaw County, Indian Territory
Latitude: 34° 00', Longitude : 95° 33', Elevation: 150? ft.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1832	39.6	--	--	--	--	--	79.4	75.2	70.0	61.2	47.8	47.0	/
1833	51.3	45.3	47.0	63.6	72.2	72.8	85.7	80.6	74.4	57.8	49.8	43.8	62.0
1834	32.3	50.5	55.1	65.9	69.0	79.5	80.9	81.9	67.6	62.5	56.7	42.2	62.0
1835	44.3	34.9	51.1	60.1	72.1	76.9	76.5	76.0	68.1	59.8	43.0	45.1	59.0
1836	41.2	44.8	47.9	61.6	69.7	75.6	78.8	79.4	74.2	58.5	48.2	41.4	60.1
1837	40.5	46.9	52.9	58.7	66.8	77.4	81.8	80.2	72.2	64.3	58.0	45.8	62.1
1838	43.7	34.2	56.9	66.4	63.0	78.8	82.0	81.1	70.5	59.1	44.0	37.1	59.7
1839	46.8	46.3	56.2	68.7	72.5	79.2	82.9	80.0	72.6	66.3	47.4	40.0	63.2
1840	42.2	49.9	57.9	66.0	70.9	76.8	80.1	83.2	71.8	60.3	51.0	44.7	62.9
1841	42.1	49.7	53.0	62.9	69.0	73.8	81.8	76.1	66.7	56.3	47.0	35.4	59.5
1842	43.0	53.7	65.1	67.9	73.6	78.8	81.0	78.6	76.6	63.1	46.3	43.2	64.2
1843	49.4	43.6	39.0	66.5	70.3	75.1	78.8	76.0	76.2	59.1	53.5	45.6	61.1
1844	44.4	49.2	51.7	68.4	72.5	77.9	82.8	80.8	72.0	59.6	53.2	42.3	62.9
1845	46.6	50.7	52.2	67.7	68.5	77.3	81.6	79.7	75.4	60.1	49.5	35.8	62.1
Avg	43.4	46.1	52.8	65.0	70.0	76.9	81.0	79.2	72.0	60.6	49.7	42.1	61.6

Observation Times
1832: 7-14-21
1841: Sunrise-14-21
1842: Sunrise-14-Sunset-21
1843: Sunrise-9-15-21

Fort Washita, Indian Territory
Latitude: 34° 15' Longitude: 96°55' Elevation: 200? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1843	47.5	41.7	36.5	65.3	69.7	76.7	80.3	77.0	75.4	58.9	52.4	47.2	60.7
1844	45.0	51.2	53.4	68.3	73.4	77.3	83.0	82.5	71.2	60.0	55.0	45.9	63.9
1845	47.3	53.6	53.2	69.2	69.3	78.4	84.3	79.2	76.1	60.7	49.5	39.1	63.3

Averages Over Entire Period of Record
January 1843-March 1861

41.6	47.3	54.0	63.3	70.4	76.7	81.2	81.0	74.8	62.6	51.6	41.6	62.2

Observation Times
Sunrise-9-15-21

Table 2.3
MONTHLY EXTREMES OF TEMPERATURE

Fort Jesup; Sabine County, **Louisiana** State.

Latitude **31°33 '** Longitude **93°32'** Elevation **80?** feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1823	76/22	78/7	78/42	84/56	90/60	91/72	94/74	94/72	90/58	84/52	78/32	76/32	91/7
1824	78/32	76/28	79/42	82/48	95/58	96/72	101/76	96/74	91/63	86/46	78/30	75/36	101/28
1825	77/32	78/32	82/44	82/76	90/58	94/64	94/74	97/72	94/56	90/36	82/32	72/20	97/20
1826	78/14	79/28	88/40	88/40	91/56	90/71	97/69	100/60	94/47	88/44	82/30	77/20	100/14
1827	78/24	88/44	82/34	88/48	93/46	95/63	95/72	94/74	94/62	90/40	82/36	78/32	95/24
1828	78/32	86/36	82/42	85/35	92/60	97/60	97/75	96/72	90/62	84/48	80/30	74/34	97/30
1829	74/24	72/18	78/30	87/40	94/58	94/62	94/66	92/68	90/60	86/46	75/26	86/28	94/18
1830	72/26	76/26	78/34	82/34	93/46	97/54	96/72	99/70	96/55	86/38	80/30	72/14	99/14
1831	74/17	78/13	88/34	84/37	88/52	85/70	93/70	92/62	90/50	86/34	80/27	71/22	93/13
1832	75/12	80/22	81/31	87/48	90/51	93/70	95/70	94/69	94/60	84/40	80/21	78/32	95/12
1833	76/28	78/34	74/26	98/46	97/62	94/65	97/70	98/67	88/56	91/32	80/21	73/28	98/21
1834	84/11	74/40	85/32	92/50	90/54	92/72	92/72	90/72	86/56	88/28	84/23	78/30	92/11
1835	80/22	76/8	84/25	81/50	89/50	91/70	94/62	94/68	89/56	86/46	79/30	74/40	94/8
1836	78/32	80/24	83/36	81/50	88/52	90/60	94/70	92/60	88/56	80/39	76/34	66/17	94/17
1837	71/29	68/27	78/37	84/36	92/46	96/58	96/72	96/72	88/57	90/36	88/36	72/35	96/27
1838	73/33	70/7	86/28	85/46	85/44	96/66	95/70	98/71	92/42	88/42	76/32	60/32	98/7
1839	76/34	63/30	80/22	90/60	92/56	96/66	100/69	100/65	94/60	88/50	82/20	64/32	100/20
1840	72/32	82/34	86/35	89/55	94/55	94/60	94/70	100/71	94/66	90/23	72/21	71/32	100/21
1841	71/16	81/18	85/32	92/44	94/48	94/62	100/70	98/62	94/48	90/31	83/17	76/27	100/16
1842	80/26	80/28	90/38	94/49	98/44	98/62	98/50	98/58	98/56	90/36	78/20	78/20	98/20
1843	78/20	72/18	70/16	94/44	96/50	96/56	99/70	94/61	93/61	83/38	74/42	68/32	99/16
1844	71/28	78/31	86/32	86/34	92/58	96/59	100/72	94/64	100/36	88/35	84/24	70/19	100/19
1845	76/26	78/28	84/36	88/38	91/50	90/64	97/64	/	93/56	81/44	78/28	68/17	97/17
Ext	84/11	88/7	90/16	98/34	97/44	98/54	101/50	100/58	100/36	91/23	88/17	86/14	101/7

Table 2.3 (con't)
MONTHLY EXTREMES OF TEMPERATURE

Fort Towson, near Choctaw County, Indian Territory

Latitude: 34° 00' , Longitude: 95° 33' ,Elevation: 150? feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1833	71/22	68/18	75/16	89/44	97/62	88/58	91/68	91/64	88/56	80/24	81/19	65/24	97/16
1834	62/0	72/16	76/28	87/45	88/51	92/65	94/67	92/72	83/52	87/32	82/26	65/21	94/0
1835	69/21	71/0	80/26	82/35	85/50	91/60	97/61	97/64	88/52	82/48	74/18	72/22	97/0
1836	68/26	70/30	76/24	83/55	88/54	90/62	99/70	96/64	86/55	81/32	73/27	70/16	99/16
1837	71/23	68/28	86/34	82/40	85/60	92/60	95/74	98/68	88/54	86/32	82/32	70/32	98/23
1838	72/16	60/0	80/20	84/48	82/48	95/52	97/68	100/68	95/45	87/40	80/16	64/16	100/0
1839	72/18	73/18	82/14	90/42	90/62	92/62	100/72	99/58	90/58	84/50	80/10	64/14	100/14
1840	70/16	78/18	82/34	86/50	87/50	97/60	96/60	99/70	94/50	87/34	75/20	70/16	99/16
1841	70/0	80/29	72/30	78/45	90/60	98/60	98/70	100/64	90/41	90/31	83/17	67/18	100/0
1842	75/20	82/10	80/34	82/49	99/47	95/68	98/54	98/56	99/50	85/32	82/14	70/12	99/10
1843	76/18	70/14	68/10	92/36	84/52	90/56	93/59	89/58	89/60	81/34	74/29	64/22	93/0
1844	73/24	78/23	79/26	85/43	86/50	94/60	97/68	101/60	95/35	86/28	82/26	78/16	101/16
1845	78/22	80/20	80/29	90/34	90/50	92/64	102/58	99/62	96/54	86/30	80/20	60/0	102/0
Ext	78/0	82/0	86/10	92/34	99/47	98/52	102/54	101/56	99/35	90/24	83/10	78/0	102/0

Fort Washita, Indian Territory

Latitude: **34°15'** Longitude: **96°55'** Elevation: **200**? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1843	74/14	68/15	69/14	92/32	86/50	94/52	100/62	95/62	93/56	80/30	74/30	66/25	100/14
1844	72/28	77/26	82/30	84/46	89/54	94/65	101/70	102/66	98/42	86/32	81/28	76/21	101/21
1845	75/26	80/30	80/32	88/40	88/50	94/65	106/62	100/62	99/52	86/34	83/17	66/?	106/17
Ext.	75/14	80/15	82/14	92/32	89/50	94/52	106/62	102/62	99/52	86/30	83/17	76/21	106/14

Table 2.4
PRECIPITATION (inches)

Fort Jesup, Sabine County, **Louisiana** State.
Latitude **31° 33'**, Longitude **93° 32'**, Elevation **80**? feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1836	7.05	3.32	5.78	5.53	3.93	5.10	3.09	4.29	4.43	2.50	1.40	3.43	49.85
1837	1.75	2.08	8.69	1.62	2.55	2.81	4.20	4.27	9.11	7.32	0.30	4.84	49.54
1838	5.82	2.60	4.60	10.80	5.32	1.50	0.67	3.55	0.51	3.85	2.40	5.60	47.22
1839	3.72	7.40	3.71	2.50	4.10	2.60	6.23	1.40	0.20	5.10	4.20	4.20	45.36
1840	3.40	1.96	2.41	3.25	2.90	6.95	5.18	0.85	1.67	1.44	3.18	3.93	37.12
1841	7.83	0.06	5.89	2.98	5.93	15.70	0.45	5.60	2.54	6.11	0.67	2.19	55.95
1842	2.86	5.79	4.03	5.59	1.40	1.64	3.90	3.17	4.41	2.52	2.86	3.71	41.88
1843	2.20	1.41	3.25	5.60	4.42	3.30	7.66	1.34	2.64	5.79	8.30	7.08	52.99
1844	4.10	1.20	5.30	6.60	3.05	5.11	1.77	2.24	2.83	2.81	3.87	2.54	41.42
1845	8.32	1.80	3.55	4.12	4.43	1.43	0.50	2.97	1.90	0.60	2.50	2.80	31.95
Avg	4.70	2.76	4.72	4.86	3.80	4.61	3.36	2.97	3.02	3.80	2.97	4.03	45.60
Max	8.32	7.40	8.69	10.80	5.93	15.70	7.66	5.60	9.11	7.32	8.30	7.08	55.95

Fort Towson, Choctaw County, **Indian** Territory.
Latitude **34° 00'**, Longitude **95° 33'**, Elevation **150**? feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1836	--	--	--	--	--	5.90	1.30	2.30	3.70	6.20	2.80	1.40	/
1837	1.00	1.60	6.00	2.50	6.30	6.10	7.00	1.10	5.40	3.10	2.10	1.60	43.80
1838	4.20	2.10	1.60	1.90	6.70	0.70	2.10	3.70	0.30	2.80	5.40	2.90	34.40
1839	7.10	1.35	5.20	1.60	7.50	17.50	6.40	5.10	2.10	3.90	7.00	1.30	66.05
1840	4.40	3.00	3.70	13.60	2.30	1.60	4.80	3.00	6.20	8.60	3.00	1.50	55.70
1841	3.60	0.20	7.30	3.20	3.30	7.00	/	3.50	6.50	9.90	9.20	8.30	/
1842	2.70	7.50	7.40	10.30	8.80	14.20	4.70	4.00	4.00	1.85	2.06	5.85	73.36
1843	2.78	0.25	3.35	7.10	9.26	1.91	4.40	5.72	4.40	6.56	9.37	0.80	55.90
1844	3.45	2.08	4.56	10.38	3.25	2.66	5.35	7.96	1.30	2.77	1.73	1.05	46.54
1845	3.00	0.70	5.73	3.49	5.17	6.35	0.00	3.26	2.48	4.90	1.19	1.81	38.08
Max	7.10	7.50	7.40	13.60	9.26	17.50	6.40	7.96	6.50	9.90	9.37	8.30	73.36

Averages Over Entire Period of Record (June 1836-April 1854)

3.13	2.97	4.38	5.33	5.84	5.78	4.62	3.96	3.41	4.59	4.23	2.84	51.08

Fort Washita, Indian Territory
Latitude: **34°11'**, Longitude: **96°38'**, Elevation: **200**? feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1843	--	--	--	--	--	--	--	0.60	8.61	3.80	7.56	1.85	/
1844	1.77	2.87	4.35	5.05	4.59	4.43	2.76	1.67	2.25	3.80	2.29	0.17	36.00
1845	1.35	0.66	5.48	5.04	4.50	2.62	0.33	4.12	2.65	3.65	2.40	1.90	34.70

Averages Over Entire Period of Record (August 1843-December 1860)

1.77	2.72	2.53	3.40	5.31	4.33	3.24	2.80	3.55	2.94	3.52	1.86	51.97

Table 2.5
NUMBER OF SNOW DAYS

Fort Jesup

Latitude: 31°33', Longitude: 93°32', Elevation: 80? feet.

Year	Jan	Feb	Mar	Apr	Nov	Dec	Ann
1823							–
1824		1					1
1825						1	1
1826	1					1	2
1827	1						1
1828							0
1829							0
1830		1					1
1831		1					1
1832							0
1833							0
1834	2						2
1835				1			1
1836						1	1
1837	2						2
1838		3					3
1839	1	1					2
1840						1	1
1841	1					1	1
1842							1
1843		1	2				3
1844							0
1845	1				1		2
Ave							1.0

Fort Towson

Latitude: 34°00', Longitude: 95°33', Elevation: 150? feet.

Year	Jan	Feb	Mar	Apr	Nov	Dec	Ann
1833		1	1		1		3
1834	2						2
1835	1	1		5			7
1836			1				1
1837	2						2
1838							0
1839							0
1840					2	5	7
1841	2						2
1842	1						1
1843		1	2		1		4
1844	1					2	3
1845	1				2	1	4
Ave							3.9

Fort Washita

Latitude: 34°15', Longitude: 96°55', Elevation: 200? feet.

Year	Jan	Feb	Mar	Nov	Dec	Ann
1843			4			4
1844	1		1		2	4
1845				1	7	8

Table 2.6
TABLE OF MONTHS EXHIBITING EXTREME WEATHER

From the data in the previous tables, some deductions may be made. During 1823 to 1831 only Fort Jesup observations are available. These deductions are given here, together with notes on Texas hurricanes of the period, taken from Geiser's article (Appendix II).

Year		
1766	September	Sept. 4, 1766. Hurricane. Galveston Bay. A mission destroyed.
1818	September	Sept. 12, 1818: Hurricane. Galveston Island. Salt water flowed four feet deep. Only six buildings remained habitable. Of the six vessels and two barges in the harbor, even the two not seriously damaged were reduced to dismasted hulks. Pirate Jean Lafitte moved to one hulk so that his Red House might serve as a hospital (from Tx. Almanac 1988-1989).
1823	February	very **cold**, 9.4F below average
	April	**warm**, 4.3F above average
	December	very **warm**, 7.2F above average
1824	January	very **warm**, 8.4F above average
	June	very **warm**, 4.5F above average
1826	March	very **warm**, 7.3F above average
1827	February	extremely **warm**, 10.1F above average
	September	very **warm**, 5.7F above average
	December	very **warm**, 7.4F above average
1829	April	**cold**, 5.6F below average
	September	Sept 10? Bonsignes' dates are to be accepted with reservation [v. infra.]. He does not date the storm exactly; Tannehill gives date with query. An inundation at the mouth of the Rio Grande; Bosignes lists it as "one of the worst" (Geiser).
1831	January	extremely **cold**, 9.2F below average
	August	**cold**, 4.8F below average; Aug. 10-18 "The Barbadoes Hurricane." Very destructive at the mouth of the Rio Grande (Bosignes); unloaded-goods at Brazos Santiago dispersed by waves to a great distance, and a schooner there was beached high and dry. Entered Texas Aug. 18 (Geiser).
	December	extremely **cold**, 12.5F below average
	Year	**coldest in record**, 3.7F below average
1832	December	**warm** at Ft Jesup (+7.2F) and Ft Towson (+4.9F)
1833	January	**warm** at Ft Jesup (+5.2F) and Ft Towson (+7.9F)
1834	January	**cold** at Ft Jesup (- 5.0F) and Ft Towson (- 11.1F)
	September	Sept.? South Texas, esp. mouth of the Rio Grande. Considered by Bosignes as one of the destructive storms (Geiser).
	November	**warm** at Ft Jesup (+4.9F) and Ft Towson (+7.0F)

1835	February	very **cold** at Ft Jesup (-9.1F) and Ft Towson (-11.9F)
	April	**cold** at Ft Jesup (-5.3F) and Ft Towson (-7.3F)
	August	Aug. 12-18. "Antigua-Texas Hurricane." At Matamoras and present site of Corpus Christi on Aug. 18; at Brazos Santiago, storm drove vessels-unloading completely out of the water, and one was driven by waves three miles inland from the place where anchored. This hurricane failed to turn eastward after striking the coast (Geiser).
	September	Sept. 18. The "Nautical Magazine" for 1848, p.528, gives the following, which I reprint since it seems to be lacking from more available accounts: "On the 18th of September, [1835] during the night, Matamoras...was damaged by a dreadful hurricane. Many houses fell, three hundred damaged. The violence of the storm was tremendous; nothing could resist it: Trees were twisted and torn out of the ground, and carried away. the rain was heavy; the river rose to a fearful height. Four lives only were lost; but more dreadful was the destruction of both lives and property in the Brass[o]s de San jago, and in the B[oca] del Rio. Many vessels [were] stranded and dismasted. There was not a house standing in the Bonita or the [Boca Chica]." (Geiser)
	November	**cold** at Ft Towson (-6.7F)
1836	November	**cold** at Ft Jesup (-7.3F)
1837	September	Sept. 27-Oct. 10. Oct. 2/3 at Matamoras; destroyed town of Brazos Zantiago, and inundated coast for many miles inland; Oct. 5/6 at Galveston. Five vessels beached at Velasco, and many at Galveston (Geiser).
	November	**warm** at Ft Jesup (+6.9F) and Ft Towson (+8.3F)
1838	February	very **cold** at Ft Jesup (-9.9F) and Ft Towson (-11.9F)
	May	very **cold** at Ft Jesup (- 5.3F) and Ft Towson (-7.0F)
	June	very wet at Ft Jesup, 10.8" Listed, without date, by Bosignes as flooding the lower Texas coast at Brazos Santiago. Is it possible that we have here another error of recall of Bosignes - that he is confusing "Racer's" Storm with the year 1838? [in his report to Lt. Webster, Bosignes does not ignore Racer's Storm.] Blodget and Tannehill have included this 1838 hurricane only on Bosignes report. The "Nautical Magazine" for 1848, p. 529, notes what may have been Bosignes'hurricane: one of Nov. 1, very severe at Vera Cruz, in which 3 U.S. vessels were lost (two of them with their crews.)(Geiser)
1839	June	very wet at Ft Towson, 17.5"
	October	**warm** at Ft Jesup (+7.0F) and Ft Towson (+5.7F)
	November	Nov. 5. Tannehill lists at Galveston; Blodget does not include. A mislaid datum also locates disturbances at this date on San Luis Island, and in the Gulf of Mexico (Geiser).
1840	April	very wet at Ft Towson, 13.6" Another dateless record of Bosignes, not corroborated by Lopez or Berlandier [the latter a most careful and trustworthy observer.] Ascribed to lower Texas, with villages destroyed at the mouth of the Rio Grande. It is not stated whether it extended elsewhere in Texas. Can Bosignes be confusing this with "Antje's" Storm? [Bosignes has ignored that storm.] (Geiser)

1841	January	**cold** at Ft Jesup (-5.5F)
	June	very wet at Ft Jesup, 15.7"
	September	**cold** at Ft Towson (-5.3F)
1842	February	**warm** at Ft Towson (+7.6F)
	March	extremely **warm** at Ft Towson (+12.3F)
	April-June	very wet at Ft Towson, 10.3" and 14.2", respectively
	Aug/Sept	Aug. 30-Sept. 9. "Antje's Hurricane." Struck the Mexican coast about halfway between Tampico and Brownsville (Sept. 8), and on Sept. 9 was "wasting" 60 miles inland from Tampico. The coast of the mouth of the Rio Grande (and from Tampico to Corpus Christi) was inundated (Geiser).
	October	Oct. 5. Blodget and Redfield believed this to be the same as the Oct. 2-10 hurricane (the "Gulf of Mexico - Bermuda Storm") but Tannehill believes the two distinct. At Galveston the wind was not so high as in the Racer Storm, although there was considerable damage to buildings and shipping (Geiser).
1843	March	phenomenally **cold** at Ft Jesup (-17.6F), Ft Towson (-13.8F), and Ft Washita (-17.5F). This was an outstandingly cold month across Eastern U.S.A. A region including parts of Minnesota and Wisconsin was 25F below average, while mean temperatures were at least 10F cooler than average in all of Eastern U.S.A., except coastal areas, Maine and Florida. Plants and animals similarly suffered with their human counterparts during March 1843. As **The Morning Star** of Houston, Texas, reported following a heavy sleet on March 15th, "nearly all the corn, potatoes, and culinary vegetables that were planted, have been destroyed, not only in this vicinity, but throughout all the counties above that have been heard from, and it is feared that many cattle have also perished from the severity of the weather." **The Morning Star** in its collaboration with its fellow Texan newspaper, **The Galveston Times**, mentions that following a "severe frost" on March 22nd, "the bay shore was litterally[sic.] strewn with frozen fish, great quantities of which have no doubt been taken and salted down." It was 22.5F and 26.1F cooler than previous March at Ft Jesup and Ft Towson, respectively.
1844	April	very wet at Ft Towson, 10.4"
	August	Aug. 4-6. (Mouth of the Rio Grande; "very little rainfall, the most terrible and destructive storm. Some 40 lives lost. The sea was forced three leagues over the beach, and the Mexican government ordered the customhouse to be removed to Point Isabel. Not a single house remained at Brazos Santiago or at the mouth of the river." (Geiser) Another report cites 70 lives lost.
1845	April	By 1845, the government group had returned, but farmers felt the damage from frost and freeze of April 16, which completely killed crops, then the grasshoppers did damage, followed by the locusts, and a devastating drought. (**History of Travis County and Austin 1839-1899**, by Mary Starr Barkley; copyright 1963, Mary Starr Barkley, printed by Texian Press, Waco, Texas; page 257, para. 3)
	December	**cold** at Ft Jesup (-6.3F), Ft Towson (-6.3F), and Ft Washita (-2.5F)

CHAPTER 3
WEATHER 1846-1861

Introduction

During this 16 years most climatological data were obtained at the Army forts. The Mexican War (1846-1847) focussed attention on the state and in the early 1850's some 20 to 25% of all Army forts were located in Texas.

Data for stations having observations covering at least five years are consolidated in Table 3.1 (Temperature) and Table 3.2 (Precipitation), and it is seen that all of the 15 locations (which includes four just outside state boundaries) are at military installations. Data for stations having only short periods of observations appear in Table 3.3. A few months of data exist for Austin (Jennings), Bonham (Fannin County), Burkeville, Crossroads, Dallas, Gilmer (Upshur), Gonzalez, Helena, Pin Oak, Port La Vaca, Preston, Springfield, Tarrant, Texana, Weberville, and Wheelock.

Geographical Positions of the Military Posts

Austin, Texas (Latitude: 30°20', Longitude: 97°46')

At the city of Austin, on the Colorado. The locality at which the observations were taken not known. This point is at the head of navigation of the Colorado, and differs much in altitude and climate from the chain of posts westward. Position from Johnston's map.

Camp J.E. Johnston, Texas

On the Concho river, a branch of the Colorado from the south, near forty miles southwest of Fort Chadbourne. The locality is in a valley, five miles wide, surrounded by hills and mountains in the distance.

Fort Arbuckle, Indian Territory (Latitude: 33°08', Longitude: 98°48', Elevation: 1600 Ft)

Near the Washita river, "four miles southward at the nearest point, and seventy-six miles north of west of the junction of this with Red river." (Assistant Surgeon Glisan, 1852) The country generally open, though woody at the post. Hills at the southward. Position measured from the general Pacific railroad map, 1855. Altitude derived from comparison with points on Captain Whipple's line of survey; approximate. The position given previous to 1854 was from the best Topographical Bureau's maps, but the great discrepancies previously existing in the positions of this part of our territory are mainly removed by the recent Pacific railroad surveys. The final position is taken from these.

Fort Belknap, Texas

"On the north bank of the Red fork of the Brazos, 110 miles northwest of Fort Graham. The locality is on the edge of a rolling prairie extending back many miles." South of the river there are hills. Position from Captain Popes map, 1855. Altitude estimated from altitudes taken near it on the line of Pope's survey.

Fort Bliss, Texas

Nearly opposite El Paso, on the north bank of the Rio Grande. The locality is in the immediate river valley, opening southward. Table land borders the river here.

Fort Brown, Texas (Latitude: 25°54', Longitude: 97°26', Elevation: 50 Feet)

At Brownsville, opposite Matamoros, and on the north side of the Rio Grande, about twenty miles from the coast of the Gulf. Position from the Boundary Survey.

Fort Chadbourne, Texas (Latitude: 31°38', Longitude: 100°40', Elevation: 2120 Feet)

On Oak creek, a tributary of the Colorado river from the north. The surrounding country is hilly and mountainous, but the particular features of the locality are not known.

Fort Clark, Texas (Latitude: 2917', Longitude: 10025', Elevation: 1000? Feet)

On the Las Moras, a small tributary of the Rio Grande, and about thirty miles north of Fort Duncan. At the west bank of the river, on a local elevation of fifty feet above it. Exposure free, and the vicinity is wooded. Position from general railroad map, 1855. Altitude approximate.

Fort Davis, Texas (Latitude: 30°38', Longitude: 103°56', Elevation: 4928 Feet)

In the mountains between the Pecos river and El Paso, near Wild Rose Pass, at the sources of the Limpia River. The location of the post is in a deep canon of the mountains, selected for the purpose of protection against the severity of the winters.

Fort Duncan, Texas (Latitude: 28°42', Longitude: 100°30', Elevation: 800? Feet)

At Eagle Pass of the Rio Grande, on a dry elevated plateau, much above the river bed. The locality is overlooked by a range of sand hills of moderate elevation. Position from Boundary Survey. Altitude estimated: approximate.

Fort Fillmore, New Mexico (Latitude: 32°13', Longitude: 106°42', Elevation: 3937 Feet)

Near Mesilla, on the east side of the Rio Grande, near forty miles above El Paso. The locality is a wide valley, with high mountains at ten to fifteen miles distance eastward. Position from Boundary Commission, through Captain Thom, Topographical Engineers. Altitude by Lieutenant Parke, Topographical Engineers.

Fort Graham, Texas

On the east bank of the Brazos, Jose' Maria village. The valley of the Brazos, though wide, is bounded by bluff banks, which give a somewhat local character to the exposure. Position from Colonel Johnston's map, 1849. Altitude estimated.

Fort Inge, Texas (Latitude: 29°09', Longitude: 99°07', Elevation: 845 Feet)

On the Leona river, forty-five miles northeast of Fort Duncan. The district is moderately hilly and generally wooded.

Fort Mason, Texas (Latitude: 30°40', Longitude: 99°15', Elevation: 1200 Feet)

On the Llano river, a tributary of the Colorado. A hilly district, though not locally confined to exposure. Position from combined railroad map, 1855.

Fort McKavett, Texas (Latitude: 30°50', Longitude: 100°20', Elevation: 1200 Feet)

On the San Saba river, a branch of the Colorado. The locality is on the south bank, at an elevation of 100 feet above the river, and with generally open exposure. position by Assistant Surgeon Crawford, from Johnston's surveys, corrected by comparison with recent surveys. Altitude by Assistant Surgeon Crawford.

Fort Worth, Texas

On the west fork of the Trinity river, Upper Texas. The locality is a high , open prairie, fully exposed, and intermediate between the two belts of woodland called the Cross Timbers. Elevation above the stream, 150 feet. Position from Colonel Johnston's map, Topographical Engineers, 1849. Altitude estimated by comparison with that of the Red river and other points.

Post Phantom Hill, Texas

Clear fork of the Brazos river. This post is about seventy-five miles southwest of Fort Belknap, in a similarly high and open country. position derived from points of the surveys of Johnston, Pope, and others. Altitude similarly obtained.

Ringgold Barracks, Texas (Latitude: 26°23', Longitude: 99°02', Elevation: 200? Feet)

Near the town of Rio Grande, and nearly opposite Camargo, Mexico, on the Rio Grande, sixty miles above Fort Brown. The locality is on the low banks of the river, with a level background. Position from the Mexican Boundary Survey, through the medical officer.

San Antonio, Texas (Latitude: 29°25', Longitude: 98°25', Elevation: 600 Feet)

At the town of San Antonio, on the San Antonio river. The precise position of the buildings for military occupation is not known. The station compares very well with Austin, and is a little more elevated. Position from Johnston's and others maps. Altitude by Major Graham, Topographical Engineers.

Table 3.1
MEAN TEMPERATURE
Austin, Texas
Latitude: 30°20', Longitude: 97°46'

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1851	--	--	--	64.3	76.2	--	81.5	84.6	78.8	70.3	59.0	47.4	--
1852	42.4	58.6	--	--	--	--	--	--	--	--	--	--	--
1854	47.5	54.5	65.4	66.9	72.9	78.5	80.6	81.9	77.8	70.8	57.2	46.7	66.7
1855	49.4	47.9	56.8	71.1	77.2	78.1	80.1	80.8	78.1	63.7	58.9	47.8	65.8
1856	36.6	46.6	56.6	71.0	72.9	71.4	84.1	87.1	75.7	66.2	54.0	47.6	64.2
1857	43.9	60.2	59.9	59.2	71.4	79.4	--	83.5	76.6	66.2	56.8	--	--
1858	53.2	51.0	62.4	69.9	75.0	79.9	85.0	84.7	77.1	72.0	51.9	51.2	67.8
1859	49.2	59.9	61.5	66.9	77.3	83.7	84.9	86.0	76.9	64.3	61.6	40.9	67.8
1860	49.7	53.4	60.5	70.0	77.5	85.5	89.1	82.2	77.0	68.2	55.1	49.7	68.2
1861	49.6	54.9	62.8	68.8	73.3	82.2	84.4	83.0	77.3	63.9	64.1	57.6	68.5
Avg	44.0	53.6	59.7	66.5	74.1	76.9	81.6	83.6	77.4	67.4	57.2	47.4	67.0

Fort Arbuckle, Indian Territory
Latitude: 33°08', Longitude: 98°48', Elevation: 1600? Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1850	--	--	--	--	--	--	--	--	--	60.7	52.9	34.2	--
1851	39.3	43.1	54.6	57.0	69.1	78.0	81.8	84.6	77.1	62.8	45.6	39.5	61.0
1852	36.8	47.1	53.8	59.8	70.3	78.7	78.3	78.0	69.1	68.1	45.1	38.8	60.3
1853	41.3	40.7	51.2	64.3	66.3	77.4	79.5	81.8	74.5	60.8	52.9	42.4	61.1
1854	36.2	47.8	57.9	60.8	68.6	75.0	83.3	84.0	77.3	66.4	49.9	42.9	62.5
1855	41.9	39.9	49.1	67.4	75.4	77.6	85.7	81.9	79.2	62.3	50.4	36.9	62.3
1856	26.5	35.1	47.1	66.7	70.4	82.0	86.1	82.6	60.1	62.5	45.3	35.9	58.4
1857	27.2	49.1	52.8	53.8	65.3	76.3	81.2	77.0	72.9	59.1	46.2	45.6	58.9
1858	44.2	--	--	--	--	--	--	83.0	78.4	61.7	41.8	41.1	--
1859	41.7	51.1	56.8	60.1	73.2	77.9	83.9	83.1	71.9	62.7	57.9	32.4	62.7
Avg	39.1	43.7	53.2	61.9	69.9	72.3	81.7	82.1	74.5	62.7	49.3	39.6	60.9

Fort Brown, Texas
Latitude: 25° 54', Longitude: 97° 26', Elevation: 50 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1846	--	--	--	--	--	--	--	--	--	--	75.9	72.8	--
1847	58.5	64.1	67.7	77.3	82.4	84.8	85.4	84.6	80.9	76.8	70.3	61.4	74.5
1848	65.4	66.2	69.6	72.0	81.2	--	--	--	--	--	--	--	--
1849	--	--	--	--	--	--	--	--	79.0	71.0	69.0	62.2	--
1850	62.5	66.0	70.6	73.2	74.3	80.4	84.9	84.8	84.7	76.3	67.3	58.2	73.6
1851	60.5	65.2	66.7	75.2	81.6	83.1	82.4	85.8	79.9	73.2	61.9	57.9	72.8
1852	55.5	69.8	71.0	75.8	80.4	81.1	82.5	83.1	80.3	77.1	69.7	65.6	74.3
1853	56.4	59.8	69.9	78.7	79.0	82.1	84.5	82.8	78.9	71.1	69.9	62.3	73.0
1854	59.3	62.5	71.9	73.9	81.0	83.7	84.1	82.0	81.1	76.4	70.4	60.7	73.9
1855	60.2	61.6	66.2	75.0	81.8	81.1	83.1	84.9	82.9	72.3	71.2	62.2	73.5
1856	51.6	60.6	66.5	75.6	80.4	83.2	83.1	85.0	72.8	74.9	66.9	60.0	71.7
1857	58.5	67.8	67.5	68.3	75.4	82.1	83.4	85.0	81.2	75.3	68.5	62.3	72.9
1858	62.0	60.1	69.7	75.5	79.8	82.8	84.6	84.8	80.1	77.7	62.9	63.6	73.6
1859	61.3	68.2	--	--	--	--	--	--	--	--	--	--	--
1860	--	--	--	--	78.8	84.7	87.3	84.3	80.9	76.6	67.0	62.9	--
1861	62.4	--	--	--	--	--	--	--	--	--	--	--	--
Avg	59.8	64.4	69.2	75.1	80.2	82.3	84.0	83.8	80.7	74.5	69.1	62.6	73.4

Fort Chadbourne, Texas
Latitude: 31° 38', Longitude: 100° 40', Elevation: 2120 feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852	--	--	--	--	67.8	73.6	79.2	77.9	69.4	63.1	50.3	47.6	--
1853	45.3	47.4	53.8	64.9	65.3	70.5	75.9	75.1	70.5	54.7	54.2	46.6	60.4
1854	38.7	46.9	63.6	63.2	70.1	74.0	78.5	82.9	76.0	69.6	55.1	45.7	63.7
1855	48.9	45.9	56.7	68.5	74.8	77.1	--	80.2	79.2	62.2	55.2	42.2	--
1856	32.9	42.7	52.4	68.3	72.5	83.8	85.9	83.9	70.7	63.5	47.9	41.9	62.2
1857	36.6	52.8	56.5	55.1	69.7	79.1	82.3	81.5	72.2	61.7	49.6	45.4	61.8
1858	45.6	45.4	58.6	65.1	71.2	77.5	84.9	81.4	76.0	67.7	46.4	44.5	63.7
1859	42.9	55.5	57.5	63.5	75.6	83.2	84.8	85.3	75.6	62.9	58.1	35.9	65.1
Avg	44.3	46.8	58.0	65.5	69.5	73.8	77.9	78.6	72.0	62.5	53.2	46.6	62.8

* These data for the period through about July, 1854, are suspiciously low, especially during the May - September months.

Fort Clark, Texas
Latitude: 29° 17', Longitude: 100° 25', Elevation: 1000? feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852	--	--	--	--	--	--	--	80.5	74.8	68.5	59.4	53.2	--
1853	40.2	50.8	56.9	70.1	73.9	77.2	80.0	78.7	76.5	66.2	62.2	52.9	65.5
1854	48.4	55.0	66.4	68.7	75.0	79.8	82.0	88.9	80.5	73.3	60.3	51.7	62.5
1855	44.1	42.4	61.1	71.7	78.1	80.5	80.6	82.1	79.4	68.5	63.3	52.3	67.0
1856	41.8	54.8	60.3	73.2	78.6	85.2	85.9	88.3	78.0	69.0	57.1	51.7	68.7
1857	48.6	61.5	63.6	63.5	74.8	81.9	--	86.5	78.5	69.3	62.2	54.1	--
1858	54.0	54.9	65.2	73.2	79.3	80.0	87.1	83.5	79.1	75.5	55.2	52.4	70.0
1859	51.3	61.4	66.0	71.8	81.9	86.4	85.8	88.1	79.3	69.7	63.9	41.9	70.6
1860	51.0	55.6	63.5	72.4	80.0	84.5	90.0	83.5	79.2	71.6	57.2	54.0	70.2
1861	54.1	55.2	--	--	--	--	--	--	--	--	--	--	--
Avg	47.2	49.9	61.5	70.2	75.7	79.2	81.0	81.1	77.2	69.3	60.3	52.6	67.8

Fort Davis, Texas
Latitude: 30° 38', Longitude: 103° 56', Elevation: 4928 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1854	--	--	--	--	--	--	--	--	--	--	55.6	45.9	--
1855	49.1	50.9	56.8	66.6	74.8	77.3	75.5	76.4	73.4	64.2	55.2	45.6	63.8
1856	36.8	43.9	53.8	66.7	71.5	79.7	78.0	75.1	67.5	61.1	48.4	43.6	60.5
1857	45.5	51.4	59.5	--	70.2	76.3	75.9	76.1	69.1	60.9	52.1	44.9	--
1858	46.2	48.9	57.9	64.7	73.0	74.7	78.4	75.8	72.9	65.6	49.3	45.0	62.7
1859	43.4	54.8	57.6	62.7	75.9	80.1	75.6	78.0	69.1	60.1	55.8	39.9	62.8
1860	46.6	47.9	59.6	66.2	76.4	79.4	79.9	75.9	71.0	62.8	49.9	47.2	63.6
1861	41.0	49.6	56.2	--	--	--	--	--	--	--	--	--	--
Avg	44.2	50.0	57.1	65.2	73.1	77.6	76.7	75.8	70.4	62.4	52.7	44.2	62.4

Fort Duncan, Texas
Latitude: 28°42', Longitude: 100°30', Elevation: 800? feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1849	--	--	--	--	--	--	--	--	--	68.6	62.7	53.9	--
1850	58.7	58.7	66.2	70.0	75.4	80.8	83.4	86.5	84.4	74.7	63.5	50.2	71.0
1851	55.6	57.9	65.0	74.2	81.3	85.4	86.1	88.3	83.8	74.6	62.2	53.6	72.3
1852	48.0	63.0	66.6	74.4	82.8	84.8	85.7	88.2	80.7	72.6	58.8	54.5	71.7
1853	49.5	53.0	62.9	74.7	79.9	81.2	84.7	81.8	80.7	69.6	63.0	51.8	69.4
1854	50.3	58.2	68.7	72.2	78.9	81.9	83.5	85.0	81.7	75.8	61.0	50.1	70.6
1855	50.5	53.3	61.2	75.3	83.8	82.2	83.3	83.9	79.6	69.0	62.2	53.2	69.8
1856	43.5	54.5	63.5	75.9	81.4	88.3	86.2	90.4	79.5	72.3	58.2	51.3	70.4
1857	48.3	63.1	65.6	66.6	78.6	85.0	87.4	87.3	80.1	70.6	62.1	56.7	71.0
1858	56.5	57.3	69.4	76.8	82.4	81.8	88.8	88.1	81.3	79.0	62.2	57.1	73.4
1859	56.1	61.6	70.3	75.4	84.6	--	--	--	--	--	--	--	--
1860	--	--	--	--	--	91.7	93.6	88.4	82.0	74.4	59.6	53.6	--
1861	52.4	59.5	--	--	--	--	--	--	--	--	--	--	--
Avg	52.1	57.3	65.1	73.4	79.7	82.8	84.7	86.0	82.3	72.6	61.9	52.8	71.1

Fort Fillmore, New Mexico
Latitude: 32° 13', Longitude: 106° 42', Elevation: 3937 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1851	--	--	--	--	--	--	--	--	79.6	63.2	48.2	44.4	--
1852	39.7	49.7	48.4	56.5	68.7	78.1	79.6	76.4	74.3	59.0	46.0	44.1	60.0
1853	41.7	45.0	52.7	65.5	72.5	81.8	85.4	81.4	77.5	65.0	57.5	50.8	58.0
1854	48.6	50.4	59.7	66.1	68.6	80.6	85.1	81.2	77.4	70.4	53.2	46.7	65.7
1855	50.1	50.6	--	69.4	75.4	83.2	83.4	82.5	77.2	65.6	53.4	47.0	--
1856	43.3	46.8	57.4	69.0	75.4	85.1	85.1	83.5	75.5	65.6	53.5	41.3	65.1
1857	46.7	49.9	61.3	63.9	75.4	83.3	84.8	--	73.1	64.1	54.9	41.4	--
1858	40.0	46.4	53.4	66.8	70.7	80.8	82.7	80.8	76.7	66.3	47.5	40.0	62.7
1859	35.1	51.1	52.3	63.1	76.7	85.8	78.1	83.9	74.9	66.2	40.8	33.9	61.8
Avg	40.6	40.5	46.2	53.1	59.4	70.1	75.1	69.9	63.1	53.8	43.6	42.8	62.2

Fort Inge, Texas
Latitude: 29° 09', Longitude: 99° 07', Elevation: 845 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1849	--	--	--	--	--	--	--	--	78.5	66.2	60.2	52.8	--
1850	54.9	55.9	61.9	63.1	71.0	78.4	81.9	83.6	81.9	68.0	61.1	45.8	67.3
1851	--	57.1	62.2	67.3	78.9	81.4	81.7	83.1	78.4	68.0	55.0	53.0	--
1852	44.6	60.3	63.0	68.8	77.0	77.5	79.8	81.7	75.3	68.3	57.6	52.8	67.2
1853	48.9	52.9	60.0	70.4	75.1	77.8	81.3	80.7	77.5	66.8	60.8	54.0	67.1
1854	47.2	56.0	67.5	64.1	74.9	81.9	83.0	84.0	80.7	74.0	60.3	50.3	68.7
1855	52.2	50.6	61.2	74.5	--	--	--	--	--	--	--	--	--
1858	--	--	--	--	--	--	--	82.7	76.5	--	--	--	--
1859	48.9	62.5	65.9	72.0	82.2	86.4	88.2	89.6	80.8	68.9	63.7	44.4	71.1
Avg	49.5	55.9	62.6	68.0	75.9	79.4	81.5	82.6	78.7	68.5	59.2	51.5	68.3

Fort Mason, Texas
Latitude: 30°40', Longitude: 99°15', Elevation: 1200 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852	--	--	--	72.4	77.7	75.7	77.6	80.7	73.2	68.3	54.3	49.4	--
1853	46.6	47.5	56.8	69.4	71.3	77.0	79.5	80.6	76.7	65.6	58.2	--	--
1856	--	--	58.2	--	75.5	83.5	85.2	86.7	74.6	66.1	55.0	47.2	--
1857	41.8	58.1	58.7	58.8	72.3	80.4	81.2	83.3	75.3	65.2	55.5	49.3	65.0
1858	52.0	49.8	62.2	67.1	74.3	78.1	84.6	83.5	78.0	73.2	55.9	58.5	68.1
1859	48.9	58.7	--	--	--	--	--	--	--	--	--	--	--
Avg	47.3	53.5	59.0	66.9	74.2	78.9	81.6	83.0	75.6	67.7	55.8	51.1	55.6

Fort McKavett, Texas
Latitude: 30° 50', Longitude: 100° 20', Elevation: 1200 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852				67.2	76.1	75.7	79.1	79.7	71.2	64.3	53.1	47.8	--
1853	44.6	44.6	56.0	66.8	68.6	73.4	77.6	78.8	--	--	--	--	--
1854	42.9	51.5	62.5	64.0	70.3	76.8	78.7	80.1	75.6	67.5	54.2	43.7	64.0
1855	46.7	44.5	53.7	67.1	73.6	73.8	77.1	77.5	76.8	63.8	57.6	46.2	63.2
1856	35.3	45.9	56.0	71.1	74.3	83.1	85.2	85.3	--	64.6	52.2	48.6	--
1857	42.3	56.7	59.2	58.3	71.4	78.4	80.5	80.8	72.6	63.3	53.2	47.7	63.7
1858	49.8	47.5	59.1	65.1	71.1	76.4	82.0	79.2	73.3	68.3	48.9	48.6	63.3
1859	46.7	57.6	58.4	--	--	--	--	--	--	--	--	--	--
Avg	44.0	49.8	57.8	65.7	72.2	76.8	80.0	80.2	73.9	65.3	53.2	47.1	63.5

Fort Towson, Indian Territory
Latitude: 34° 00', Longitude: 95° 33', Elevation: 150? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1846	43.6	42.1	53.9	61.3	--	--	--	--	--	--	--	--	--
1849	--	--	--	--	--	76.1	78.2	79.2	74.3	59.1	56.5	42.0	--
1850	46.1	47.1	53.5	59.8	67.2	76.1	80.6	82.5	75.3	63.1	57.7	39.3	62.4
1851	44.3	44.9	56.3	60.4	71.9	78.3	82.2	82.5	78.8	63.3	47.6	--	--
1852	--	--	--	--	--	--	--	--	68.2	66.1	48.8	43.7	--
1853	41.8	43.8	51.8	64.2	67.3	78.0	79.7	81.4	73.4	60.3	55.0	42.5	61.6
1854	36.3	49.3	59.6	61.9	--	--	--	--	--	--	--	--	--
Avg	42.4	45.4	55.0	61.5	68.8	77.1	80.2	81.4	74.0	62.4	53.1	41.9	62.0

Fort Washita, Indian Territory
Latitude: 34° 15', Longitude: 96°55', Elevation: 200? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1846	47.8	44.9	55.9	63.5	72.6	74.8	81.8	81.1	76.1	65.1	55.1	48.4	63.9
1847	35.8	45.6	49.2	67.7	66.9	76.3	79.5	78.5	73.5	65.5	51.2	44.0	61.1
1848	47.4	51.7	56.0	58.6	74.8	75.4	79.7	81.1	73.6	63.6	44.9	32.0	61.6
1849	37.0	44.9	58.7	61.9	69.3	76.0	77.8	79.9	73.9	60.7	57.7	41.5	61.6
1850	47.1	46.3	53.0	59.5	66.3	74.6	81.0	83.3	77.0	65.5	53.6	37.2	62.0
1851	43.9	44.2	56.9	60.8	72.4	79.6	82.4	84.7	80.3	61.7	46.7	42.2	63.0
1852	37.7	49.4	55.2	58.1	69.5	73.5	78.6	78.2	69.8	64.9	47.7	41.4	60.3
1853	42.1	42.4	51.4	63.9	65.5	76.9	78.4	81.5	74.1	60.8	54.2	42.6	61.2
1854	36.8	48.9	60.4	61.4	69.8	75.5	83.1	83.4	77.2	66.4	51.6	43.7	63.1
1855	44.2	42.8	51.2	68.4	76.4	77.5	82.7	81.1	79.1	61.3	53.4	39.6	63.1
1856	29.2	39.0	49.7	68.5	69.5	82.2	86.0	83.8	71.0	64.1	48.5	39.0	60.9
1857	30.5	53.1	54.6	55.9	67.7	77.5	81.0	79.4	74.0	61.0	49.0	48.6	61.0
1859	42.9	52.2	58.9	61.8	73.6	--	--	--	--	--	--	--	--
Avg	41.6	47.3	54.0	63.3	70.4	76.7	81.2	81.0	74.8	62.6	51.6	41.6	61.9

Ringgold Barracks, Texas
Latitude: 26° 23', Longitude: 99° 02', Elevation: 200? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1849	--	--	--	--	--	--	--	--	--	73.0	69.9	61.1	--
1850	65.5	65.6	71.0	76.9	77.0	85.2	88.9	89.1	83.1	77.1	66.6	55.6	75.1
1851	59.7	63.0	72.5	77.6	83.8	86.4	84.3	87.1	80.6	75.0	63.2	59.4	74.3
1852	52.8	69.8	73.5	77.7	83.4	83.6	85.7	87.0	81.7	75.5	69.0	62.9	75.2
1853	57.3	60.6	67.4	77.6	82.6	83.8	87.3	84.5	80.6	73.3	69.3	61.0	73.8
1854	55.7	62.4	74.1	76.4	81.7	84.3	82.7	83.0	81.3	76.0	65.4	56.4	73.3
1855	59.4	59.0	65.5	76.2	83.5	--	82.2	82.2	79.8	71.8	66.9	60.4	--
1856	47.9	59.4	67.1	78.0	80.1	85.7	86.2	88.3	79.2	71.8	61.1	56.6	71.7
1857	55.5	68.7	68.7	68.2	77.3	85.2	83.6	87.5	81.4	73.5	65.7	58.9	72.9
1858	57.1	58.2	71.0	78.0	84.7	85.8	87.9	85.7	80.7	79.3	59.4	58.0	73.8
1859	57.5	67.2	--	--	--	--	--	--	--	--	--	--	--
1860	--	--	--	--	--	89.7	89.3	86.1	81.9	75.8	67.6	61.0	--
1861	59.3	--	--	--	--	--	--	--	--	--	--	--	--
Avg	58.4	63.4	70.7	77.1	82.0	84.7	85.2	86.1	81.5	75.0	67.2	59.4	73.8

San Antonio, Texas
Latitude: 29° 25', Longitude: 98° 25', Elevation: 600 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1846	49.9	52.0	58.5	67.8	74.4	78.0	--	--	--	--	--	47.3	--
1849	--	--	--	--	--	--	80.5	79.3	78.9	71.9	65.6	53.7	--
1850	57.3	56.8	62.5	69.4	72.5	80.6	84.8	85.9	83.1	73.3	63.6	47.7	69.7
1851	54.5	53.7	60.8	66.1	74.8	78.9	79.2	84.0	77.9	71.0	56.3	51.5	67.3
1852	48.0	62.2	66.2	72.9	81.9	82.1	83.7	86.4	79.3	72.5	--	--	--
1857	--	--	--	--	--	--	--	86.9	80.3	73.3	61.4	56.0	--
1858	27.0	55.9	66.1	72.8	78.7	81.8	83.3	84.7	78.4	76.8	55.4	51.8	67.7
1859	49.4	63.0	65.4	67.7	77.5	84.0	85.4	85.6	80.0	73.2	66.4	46.3	70.3
1860	53.3	57.4	64.0	74.2	82.9	87.4	89.2	84.5	81.5	74.6	61.2	56.4	--
1861	54.9	60.5	67.4	--	--	--	--	--	--	--	--	--	--
Avg	47.7	57.3	63.3	69.5	76.6	80.9	82.8	84.7	79.7	73.1	61.5	50.6	68.8

Table 3.2
PRECIPITATION (inches)
Austin, Texas

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1851	--	--	--	--	--	--	--	--	--	--	3.5	2.6	--
1852	0.9	2.7	--	--	--	--	--	--	--	--	--	--	--
1856	2.2	2.7	1.4	1.2	2.8	0.6	0.4	1.6	2.7	1.9	2.0	0.2	19.6
1857	2.2	2.8	0.3	1.6	1.7	3.4	0.5	0.7	4.4	3.4	6.1	6.1	33.0
1858	3.0	1.0	7.0	0.5	8.8	1.1	3.8	0.4	5.0	2.9	0.8	2.2	36.4
1859	2.1	0.9	1.7	0.5	2.5	2.1	1.3	1.1	9.7	4.5	0.4	1.4	28.2
1860	2.5	4.4	0.7	2.1	0.1	0.8	0.2	10.9	1.3	0.5	5.9	0.4	29.6
1861	2.8	1.2	0.6	2.0	7.9	1.2	0.1	6.1	2.4	3.5	0.0	1.0	28.7
Avg	2.2	2.2	2.0	1.3	4.0	1.5	1.1	3.5	4.3	2.8	2.7	2.0	29.6

Fort Arbuckle, Indian Territory
Latitude: 33° 08', Longitude: 98° 48', Elevation: 1600? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1850	--	--	--	--	--	--	--	--	--	1.7	5.4	1.3	--
1851	0.0	5.4	0.2	2.7	2.6	2.2	1.6	1.2	1.6	1.1	3.4	2.4	24.4
1852	1.9	4.2	1.2	1.4	7.3	5.3	5.1	4.8	5.0	7.2	2.5	0.1	46.1
1853	0.5	1.9	0.3	1.0	5.3	4.6	3.3	1.3	3.2	3.3	1.1	1.0	26.8
1854	0.0	2.3	3.3	3.0	6.6	4.3	0.0	2.1	2.1	0.6	3.5	0.4	28.2
1855	0.2	1.3	0.4	2.3	3.1	3.4	3.5	6.8	1.7	0.4	5.1	1.4	29.6
1956	0.7	4.1	2.5	4.2	4.0	1.5	1.8	10.8	6.8	1.2	1.6	3.0	42.2
1857	1.1	5.1	0.6	1.7	5.8	3.2	8.6	5.2	1.0	3.7	5.2	5.2	46.4
1858	1.6	--	--	--	--	--	--	0.5	0.6	7.5	1.8	0.6	--
1859	0.7	0.5	0.9	1.6	4.5	4.5	1.1	2.2	8.9	0.8	1.1	1.3	28.1
Avg	0.7	3.1	1.2	2.2	4.9	3.6	3.1	3.9	3.4	2.8	3.1	1.7	33.7

Fort Brown, Texas
Latitude: 25° 54', Longitude: 97° 26', Elevation: 50 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1849	--	--	--	--	--	--	--	--	8.9	2.3	3.1	0.7	--
1850	4.3	3.8	2.3	0.1	2.2	0.1	1.2	0.0	0.3	5.8	0.7	0.2	18.7
1851	1.0	1.2	0.4	1.2	1.8	2.4	3.7	1.8	5.6	4.1	3.0	4.7	30.1
1852	0.5	0.6	0.4	0.0	4.1	5.1	0.7	4.0	8.5	5.0	1.0	0.0	29.9
1853	0.0	1.6	0.0	2.2	0.1	1.7	0.0	3.1	8.0	7.8	1.3	0.7	26.5
1854	0.5	1.5	1.2	0.1	4.1	7.7	4.3	5.0	11.3	5.8	7.5	1.9	50.9
1855	3.5	4.8	3.0	0.0	1.9	10.5	7.6	9.5	9.4	5.8	3.9	0.9	60.8
1856	3.2	1.8	1.5	0.9	2.1	3.3	1.9	0.6	3.3	5.8	1.5	0.6	26.5
1857	0.1	0.4	2.3	1.2	0.0	0.5	3.3	0.7	4.7	4.7	0.6	2.6	21.1
1858	1.5	0.8	0.1	0.0	1.0	5.2	0.7	2.5	5.8	2.8	0.5	3.7	24.6
1859	1.8	1.6	--	--	--	--	--	--	--	--	--	--	--
1860	--	--	--	--	0.1	0.0	0.2	8.0	0.1	0.6	0.2	2.2	--
1861	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Avg	1.4	1.8	1.2	0.6	1.7	2.1	2.4	2.5	6.0	4.6	2.1	1.7	28.1

Fort Chadbourne, Texas
Latitude: 31°38', Longitude: 100° 40',Elevation: 2120 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852	--	--	--	--	6.3	5.0	6.0	2.3	4.0	3.6	0.8	0.0	--
1853	0.7	1.3	1.6	0.8	6.5	5.5	2.8	0.9	1.8	2.9	0.2	2.7	27.7
1854	0.0	0.9	0.5	0.6	5.8	4.7	1.3	4.3	4.1	3.3	6.3	2.6	34.4
1855	1.1	2.5	0.2	3.4	6.3	3.3	--	2.4	1.3	1.3	3.7	0.0	--
1856	1.2	2.0	2.3	0.2	1.0	0.6	0.3	3.4	5.9	2.2	0.9	0.1	20.1
1857	0.6	1.3	1.1	1.1	0.7	1.5	0.9	2.0	3.8	2.9	1.1	3.0	20.0
1858	1.6	0.5	0.9	0.4	1.7	0.5	0.9	0.4	1.7	0.7	0.8	0.3	10.4
1859	1.1	0.2	0.3	3.9	2.2	1.7	1.5	1.4	7.2	1.2	0.2	1.2	22.1
Avg	0.9	1.2	0.9	1.5	3.8	2.9	2.0	2.1	3.7	2.3	1.8	1.2	24.3

Fort Clark,Texas
Latitude: 29°17', Longitude: 100°25', Elevation: 1000? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852	--	--	--	--	--	--	--	0.9	3.5	2.1	1.9	0.0	--
1853	0.6	1.2	0.7	2.5	1.2	10.2	8.9	2.8	0.2	4.0	0.2	1.6	34.1
1854	0.0	0.9	1.5	0.6	2.7	0.1	0.1	1.0	3.5	0.6	3.3	0.4	14.7
1855	0.0	2.0	0.5	0.3	4.3	4.8	0.6	3.8	4.4	1.0	0.6	0.0	22.3
1856	0.7	4.0	2.0	2.2	0.8	0.8	0.1	0.0	2.7	1.8	0.6	0.0	15.7
1857	0.6	4.0	0.3	0.3	0.6	1.2	--	0.7	7.9	1.6	0.5	23.0	--
1858	0.6	0.3	2.4	1.6	1.5	5.0	0.1	3.2	2.7	0.1	0.9	1.6	20.0
1859	0.8	0.1	0.3	0.4	0.6	0.8	1.1	1.4	9.9	2.8	0.0	0.6	18.8
1860	1.3	0.7	0.5	3.3	0.4	1.6	T	7.2	4.9	0.1	0.2	0.2	20.4
1861	0.4	0.0	--	--	--	--	--	--	--	--	--	--	--
Avg	0.6	1.5	1.0	1.4	1.5	3.1	1.8	2.3	4.4	1.6	0.9	3.0	23.1

Fort Davis, Texas
Latitude: 30°38', Longitude: 103°56', Elevation: 4928 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1854	--	--	--	--	--	--	--	--	--	--	--	0.0	--
1855	0.0	0.0	0.2	3.4	1.2	0.4	4.2	3.3	5.9	0.6	1.8	0.0	21.0
1856	0.7	1.9	2.3	0.3	2.6	1.2	3.5	8.2	4.6	0.5	0.1	0.0	25.9
1857	0.0	0.2	0.0	--	0.5	1.7	6.4	2.6	4.3	2.3	0.0	0.8	--
1858	3.0	1.5	0.0	0.0	0.5	2.2	2.1	2.4	2.1	0.0	0.2	0.8	14.8
1859	0.3	1.1	0.0	1.7	0.3	1.9	2.9	3.8	8.5	1.9	0.0	0.1	22.5
1860	0.1	0.3	T	0.1	0.2	0.7	1.2	2.2	1.4	0.1	0.4	1.9	--
1861	0.2	0.1	T	--	--	--	--	--	--	--	--	--	--
Avg	0.6	0.7	0.5	1.1	0.9	1.4	3.4	3.8	4.5	0.9	0.4	0.5	18.7

Fort Duncan, Texas
Latitude: 28°42', Longitude: 100°30', Elevation: 800? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1849	--	--	--	--	--	--	--	--	--	--	1.2	0.4	--
1850	0.4	0.1	0.0	1.0	1.0	5.5	2.9	0.6	0.1	1.3	3.7	1.4	18.0
1851	0.7	2.3	0.2	0.9	1.2	2.3	1.1	0.7	1.4	1.5	1.2	0.7	14.2
1852	0.3	2.3	6.3	0.0	2.1	2.8	6.7	0.3	6.1	1.2	0.2	0.0	28.3
1853	0.1	1.3	0.0	2.1	0.8	10.7	5.3	2.2	4.1	4.1	0.1	2.7	33.5
1854	0.1	0.7	1.5	0.0	2.5	6.8	0.8	0.9	4.8	0.4	3.3	0.2	22.0
1855	0.0	0.9	0.0	0.3	1.4	4.5	3.8	3.0	2.2	0.6	0.5	0.2	17.4
1856	0.2	2.8	1.9	1.4	1.9	2.6	1.0	0.9	2.8	2.4	0.2	0.0	18.1
1857	0.0	1.9	0.1	0.1	0.7	1.9	0.4	3.7	9.5	2.5	1.9	5.6	28.2
1858	0.5	0.3	1.8	0.0	2.7	4.1	0.2	1.9	2.9	0.4	0.8	0.5	16.1
1859	0.7	0.5	0.0	0.1	1.4	--	--	--	--	--	--	--	--
Avg	0.3	1.3	1.2	0.6	1.6	4.6	2.5	1.6	3.8	1.6	1.3	1.2	21.6

Fort Fillmore, New Mexico
Latitude: 32°13',Longitude:106°42',Elevation:3937 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1851	--	--	--	--	--	--	--	--	1.4	0.1	2.1	1.7	--
1852	--	0.3	0.0	0.2	0.4	1.7	3.8	1.0	1.5	0.8	2.6	0.0	--
1853	0.0	0.1	0.0	0.0	0.1	0.3	2.8	1.8	1.2	0.9	1.2	0.6	9.0
1854	0.0	0.0	0.7	0.1	0.9	0.1	0.9	1.4	1.0	0.4	0.7	0.2	6.4
1855	0.0	0.0	--	0.5	0.1	0.1	2.6	1.3	2.3	0.1	0.5	0.0	--
1856	0.0	1.9	0.3	0.0	0.0	0.8	0.9	2.5	2.6	0.0	0.3	0.0	9.3
1857	0.3	0.9	0.0	1.0	0.0	0.0	0.4	--	2.2	2.4	0.0	0.2	--
1858	0.0	0.0	0.2	0.0	0.0	0.8	2.5	1.6	0.0	0.0	0.0	0.0	5.1
1859	0.0	0.1	0.0	0.0	0.0	0.0	1.2	1.2	1.6	0.3	1.2	0.0	5.6
Avg	0.04	0.4	0.2	0.2	0.2	0.5	1.9	1.5	1.5	0.6	1.0	0.3	8.34

Fort Inge, Texas
Latitude: 29°09', Longitude: 99°07', Elevation: 845 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1849	--	--	--	--	--	--	--	--	--	--	2.1	2.3	--
1850	0.4	0.7	1.4	1.1	1.1	7.0	2.7	3.2	1.5	1.7	3.6	2.1	26.5
1851	--	3.5	1.5	3.0	1.1	0.7	2.8	3.5	0.7	1.5	1.4	0.3	--
1852	0.3	1.4	2.67	0.2	5.8	8.1	6.8	0.1	2.8	3.2	1.5	0.0	32.8
1853	2.2	3.6	1.5	2.4	3.3	9.0	5.0	1.6	1.2	6.8	0.2	1.0	37.8
1854	0.2	2.2	3.0	0.8	3.9	2.1	1.0	1.7	4.8	0.3	3.7	0.5	24.2
1855	0.1	1.9	0.8	0.2	--	--	--	--	--	--	--	--	--
1858	--	--	--	--	--	--	--	1.5	1.4	--	--	--	--
1859	0.7	0.7	0.1	0.9	1.4	2.8	0.3	2.4	5.1	3.2	0.1	0.6	18.3
Avg	0.7	1.6	1.6	.12	2.8	5.0	3.1	2.0	2.5	2.8	1.8	1.0	26.1

Fort Mason, Texas
Latitude: 30°40', Longitude: 99°15', Elevation: 1200 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852	--	--	--	1.9	8.9	3.5	6.6	1.5	4.7	2.5	1.5	0.0	--
1853	1.0	2.0	1.5	2.9	1.2	7.6	6.5	1.7	1.1	3.1	0.1	--	--
1856	--	--	--	--	1.8	0.3	0.7	2.0	9.2	0.9	0.3	0.0	--
1857	0.7	2.0	0.8	0.8	0.8	1.5	2.4	3.3	8.7	4.5	3.9	6.7	35.4
1858	0.5	1.7	2.0	1.2	4.3	0.1	3.3	2.6	2.7	1.0	0.0	0.4	19.8
1859	1.5	0.2	--	--	--	--	--	--	--	--	--	--	--
Avg	0.9	1.5	1.4	1.7	3.2	2.6	3.9	4.4	5.3	2.4	1.2	1.8	30.3

Fort McKavett, Texas
Latitude: 30° 50', Longitude: 100° 20', Elevation:12000 feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1852	--	--	--	0.6	4.8	4.8	1.8	0.9	3.4	5.3	1.6	0.0	--
1853	1.8	2.9	1.5	2.0	2.3	5.5	4.0	1.7	--	--	--	--	--
1854	0.0	0.8	2.1	0.3	3.7	0.2	2.9	0.0	3.9	0.8	1.2	1.0	16.9
1855	0.1	1.0	0.1	2.3	2.6	1.2	2.1	2.6	0.1	3.4	0.7	0.0	16.9
1856	2.7	5.6	2.0	0.2	1.0	0.4	1.8	0.4	--	3.1	0.6	0.3	--
1857	0.3	1.6	0.7	0.6	0.4	0.9	1.0	3.6	3.8	3.6	1.4	4.3	22.2
1858	1.5	1.1	3.6	1.8	0.9	1.3	2.7	1.7	4.4	0.7	0.5	1.6	21.8
1859	0.6	0.2	0.2	--	--	--	--	--	--	--	--	--	--
Avg	1.0	1.9	1.5	1.1	2.2	2.0	2.3	1.6	3.1	2.8	1.0	1.2	21.7

Fort Towson, Indian Territory
Latitude: 34° 00', Longitude: 95° 33',Elevation: 150? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1846	3.2	2.8	2.0	6.0	--	--	--	--	--	--	--	--	--
1849	--	--	--	--	--	6.2	10.8	3.6	2.5	3.7	2.9	6.2	--
1850	4.0	4.1	2.9	4.8	2.0	5.1	3.3	4.4	2.7	5.2	6.2	5.1	49.8
1851	1.7	0.1	2.7	2.5	6.3	5.0	--	7.3	0.0	1.1	3.7	--	--
1852	--	--	--	--	--	--	--	--	--	4.9	4.8	0.8	--
1853	1.7	2.9	3.9	5.0	9.1	0.9	5.4	0.5	6.1	3.4	2.0	1.3	42.2
1854	1.0	2.0	5.1	2.2	--	--	--	--	--	--	--	--	--
Avg	2.3	2.4	3.3	4.1	5.8	4.3	6.3	4.0	2.8	3.7	3.9	3.4	46.3

Fort Washita, Indian Territory
Latitude:34°15', Longitude: 96°55',Elevation:200? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1846	4.4	2.7	2.5	3.2	4.7	10.2	1.1	2.3	9.6	2.4	3.6	3.0	49.7
1847	1.3	4.1	3.6	1.6	3.1	3.1	6.6	5.9	2.4	0.4	4.7	0.9	37.7
1848	1.4	1.5	1.7	7.9	2.0	4.3	3.7	0.4	2.5	2.6	4.9	2.5	35.4
1849	2.7	2.7	2.7	7.0	14.6	4.0	13.4	4.0	3.7	4.4	2.5	2.7	64.4
1850	3.1	0.7	2.5	3.3	4.2	5.7	3.3	4.8	2.3	2.6	5.1	3.8	41.4
1851	0.2	5.7	1.4	3.0	4.5	4.2	0.1	1.4	0.6	2.6	5.2	2.8	31.7
1852	1.4	4.8	5.4	1.6	4.6	5.5	2.9	4.5	6.4	6.0	3.8	0.3	47.2
1853	0.6	2.7	0.8	1.4	7.3	2.3	4.5	1.0	4.3	3.5	0.8	1.4	30.6
1854	0.0	3.3	5.5	4.2	11.7	9.2	0.6	1.4	1.2	1.2	3.6	1.4	43.3
1855	1.2	0.5	0.1	3.5	2.1	2.1	2.4	3.6	1.0	0.7	3.6	1.1	24.0
1856	2.2	3.4	2.2	2.4	2.6	0.3	0.8	2.9	4.2	4.9	1.8	2.1	29.8
1857	1.2	4.2	0.4	0.4	4.4	2.7	3.0	4.6	1.6	2.4	4.6	3.7	33.2
1859	1.2	1.9	0.6	1.5	4.8	--	--	--	--	--	1.4	0.6	--
Avg	1.6	2.9	2.3	5.4	5.4	4.5	3.5	3.1	3.3	2.8	3.5	2.0	40.3

Ringgold Barracks, Texas
Latitude: 26°23', Longitude: 99°02', Elevation: 200? feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1849	--	--	--	--	--	--	--	--	4.5	3.0	0.3	0.9	--
1850	3.1	0.6	1.9	0.8	4.6	2.8	0.2	0.1	0.1	0.6	2.9	0.0	17.7
1851	0.8	0.7	0.0	1.2	0.2	1.2	2.2	0.0	5.2	1.2	0.1	1.2	14.0
1852	1.0	0.9	0.7	0.7	2.3	1.0	0.8	1.4	4.2	4.8	0.0	0.1	17.9
1853	0.7	2.3	0.1	3.8	3.9	1.5	0.2	4.3	2.3	2.4	0.2	0.9	22.6
1854	0.7	1.7	0.2	0.0	2.8	11.0	4.1	1.9	3.0	0.9	2.1	0.7	29.1
1855	1.1	0.7	1.4	0.0	2.4	--	5.4	6.8	1.6	2.5	0.4	0.1	--
1856	1.3	1.6	1.8	2.8	1.4	3.1	1.0	1.9	1.5	6.6	1.2	0.4	24.6
1857	0.3	0.0	0.6	1.5	0.3	0.2	1.7	1.1	3.4	1.8	0.9	0.9	12.7
1858	1.7	0.7	0.0	0.0	0.7	7.3	2.4	2.9	2.0	0.8	0.5	1.0	32.7
1859	1.0	1.8	--	--	--	--	--	--	--	--	--	--	--
Avg	1.2	1.1	0.7	1.2	2.1	3.5	2.0	2.3	2.8	2.5	0.9	0.6	20.9

Table 3.3
Austin (Palm), Texas
Latitude: 30°15', Longitude: 97°47'
TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1857	--	--	--	--	--	--	--	--	--	--	--	51.1	--
1858	--	--	--	--	--	--	--	--	--	72.2	52.0	51.2	--
1859	49.2	59.8	61.0	66.7	77.5	83.8	84.8	85.8	--	63.4	60.9	39.7	--

PRECIPITATION

1859	--	0.7	1.7	0.4	2.5	2.4	0.9	0.8	9.0	4.5	0.3	1.0	--

Austin (Van Nost), Texas
TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1858	53.2	50.6	61.6	69.2	74.7	79.1	84.9	84.8	77.4	--	--	--	--
1859	49.1	60.0	62.1	67.2	77.1	83.7	--	--	--	65.2	62.4	42.1	--

PRECIPITATION

1858	3.0	1.0	7.0	0.5	8.8	1.1	3.8	0.4	*	2.9	0.8	2.2	--
1859	2.1	1.1	1.8	0.6	2.5	1.9	1.7	1.4	10.4	4.5	0.5	1.8	30.3

Goliad, Texas
Latitude: 28°30', Longitude: 97°15'
TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1857	--	--	--	--	--	--	--	--	--	--	--	57.4	--
1858	57.1	54.6	64.5	69.7	75.5	79.0	83.1	83.4	78.2	68.1	58.4	56.9	69.0

PRECIPITATION

1858	3.0	0.5	1.4	0.0	6.5	2.0	*	0.4	1.3	4.2	*	2.8	--

Huntsville, Texas
Latitude: 30°41', Longitude: 95°29'
PRECIPITATION

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1859	2.2	0.5	2.4	0.8	1.2	4.2	2.4	0.7	4.4	1.7	0.5	2.9	23.9

Larissa, Texas
TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1858	53.3	47.7	60.2	66.0	72.6	80.4	83.6	83.2	--	69.2	48.6	49.3	--
1859	48.8	58.1	60.1	64.5	75.1	80.4	82.6	85.3	76.2	65.5	63.4	41.4	66.8

New Braunfels, Texas
Latitude: 29°42',Longitude: 96°15'

TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1856	39.7	50.0	60.0	74.6	77.1	87.3	89.6	--	80.8	69.3	56.5	50.2
1857	48.3	62.1	63.0	63.2	75.3	86.2	88.1	90.0	78.6	68.0	58.6	--
1858	--	--	--	--	73.9	77.4	83.5	85.8	78.7	72.7	52.4	51.5
1859	48.6	60.1	62.9	70.7	79.5	85.0	86.7	--	80.3	68.6	64.9	45.6

PRECIPITATION

1856	--	--	1.7	4.9	*	*	*	*	4.5	*	*	--
1857	--	3.5	0.1	*	*	*	*	*	--	*	*	--
1858	--	--	--	--	*	*	--	--	*	*	*	*
1859	*	*	*	--	*	*	*	1.3	7.4	*	0.0	*

New Wied, Texas (As New Braunfels)

TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1854	48.4	54.9	68.3	69.3	75.1	82.5	84.4	85.7	80.9	73,6	59.8	49.1
1855	52.0	50.6	59.8	73.3	81.5	81.2	83.6	83.8	81.0	67.2	62.8	51.2

PRECIPITATION

1854	0.3	2.0	0.8	1.1	7.2	3.3	2.0	0.3	4.3	1.6	2.0	0.9
1855	0.0	2.2	0.9	0.5	1.2	4.0	3.5	5.5	1.8	4.7	1.0	0.2
1856	4.4	1.9	--	--	--	--	--	--	--	--	--	--

Roundtop, Texas

TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1859	55.0	64.3	64.3	68.0	78.0	82.0	85.0	87.5	79.3	68.3	65.8	44.5	70.2

PRECIPITATION

1859	5.3	0.6	1.3	1.2	1.3	2.6	0.9	1.2	6.9	4.4	0.1	0.5	26.3

Sisterdale, Texas
Latitude: 29°54', Longitude: 98°35'

TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1859	45.1	57.3	59.9	66.7	77.7	83.5	84.9	86.1	76.3	63.1	59.0	39.0	66.6

PRECIPITATION

1859	1.0	0.5	1.1	0.2	1.7	4.4	1.2	1.7	7.1	1.5	*	3.1	--

Union Hill, Texas
Latitude: 30°30', Longitude: 96°31'

TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1857	44.7	60.7	59.4	--	--	--	--	--	--	--	--	--
1858	54.9	50.6	57.9	63.3	67.0	71.8	76.1	76.7	78.1	72.9	50.4	51.0
1859	49.6	59.7	60.9	65.0	74.2	78.2	80.3	82.9	76.6	67.4	64.2	43.0

PRECIPITATION

1858	--	--	*	*	--	*	--	*	*	*	*	*
1859	4.3	0.6	*	*	--	3.9	1.7	--	4.2	1.5	0.1	--

Washington, Texas
Latitude: 30°26', Longitude: 96°15'

TEMPERATURE

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1856	--	--	--	--	--	--	--	--	--	--	--	46.7
1857	43.3	60.5	62.4	61.0	73.1	81.0	83.5	83.8	78.2	68.0	58.7	52.5
1858	55.1	50.7	--	68.1	75.5	79.4	--	--	--	74.4	--	53.1
1859	50.5	61.3	62.1	64.0	78.3	80.0	81.9	84.2	77.6	65.3	62.7	40.8

PRECIPITATION

1857	--	1.5	0.0	--	1.2	--	1.0	2.9	2.2	*	--	7.7
1858	4.1	--	--	--	--	--	--	--	--	--	1.7	5.6
1859	4.2	0.0	2.8	0.4	1.3	5.2	2.0	1.9	7.2	1.7	0.0	0.7

* indicates values exist for these months, but they appear to be incorrect

Table 3.4
MONTHS EXHIBITING EXTREME WEATHER

From the data in the preceding tables, some deductions may be made. The percentages given are calculated using the mean as 100%.

Year		
1846	June	very wet at Ft Washita, 10.2" (227%)
	September	wet at Ft Washita,9.6" (291%)
	December	**warm** at Ft Brown (+10.2F)
1849	May	very wet at Ft Washita,14.6" (270%)
	July	very wet at Ft Towson,10.8" (171%),and Ft Washita,13.4 (382%)
1848	November	**cold** at Ft Washita (-6.7F)
1849	August	**cool** at San Antonio (-5.4F)
	November	**warm** at Ft Washita (+6.1F)
1850	January	**warm** at Ringgold Barracks (+7.1F)
	May	**cool** at Ft Brown (-5.9F) and San Antonio (-4.1F)
1851	June	**hot** at Ft Arbuckle (+5.7F)
	September	**warm** at Ft Washita (+5.5F)
	November	**cold** at Ft Washita (-4.9F)
1852	February	**warm** at Ft Duncan (+5.7F) and Ringgold Barracks (+6.4F)
	March	**cool** at Ft Fillmore (-6.6F);
		wet at Ft Duncan, 6.3" (525%)
	May	wet at Ft Mason, 8.9" (278%);
		warm at San Antonio (+5.3F)
	June	**hot** at Ft Arbuckle (+5.7F) and **cool** at Ft Fillmore (-4.2F)
	August	**cool** at Ft Fillmore (-5.0F)
	September	**cool** at Ft Washita (-5.0F)
	December	dry at Ft Fillmore, 0.0"
1853	January	**cold** at Ft Clark (-7.0F);
		dry at Ft Fillmore, 0.0"
	March	dry at Ft Fillmore, 0.0"
	April	dry at Ft Fillmore, 0.0"
	June	very wet at Ft Clark, 10.2" (329%) and Ft Duncan, 10.7" (232%)
	July	very wet at Ft Clark, 8.9" (494%)
	October	**cold** at Ft Chadbourne (-7.8F)
	December	dry at Ft Brown, 0.0"

1854	January	**cold** at Ft Towson (-6.1F); dry at Ft Brown, 0.0", and Ft Fillmore, 0.0"
	February	dry at Ft Fillmore, 0.0"
	March	**warm** at Austin (+5.7F), Ft Arbuckle (+4.7F), Ft Chadbourne (+5.6F), Ft Clark (+4.9F), Ft Fillmore (+4.7F), Ft Inge (+4.9F), Ft Mckavett (+4.7F), and Ft Towson (+4.6F)
	May	very wet at Ft Washita, 11.7" (217%)
	June	wet at Ft Brown, 7.7" (367%) and very wet at Ringgold Barracks, 11.0" (314%)
	August	**hot** at Ft Clark (+7.8F)
	September	very wet at Ft Brown, 11.3" (188%); Sept. 15-19 (Stuart, Frazier, Tannehill.) "The Great September Hurricane of 1854." Matagorda, Galveston, and upper Texas coast. Greatest damage at Matagorda (Sept. 18); no inundation of the town, but nearly all houses destroyed by the wind, two persons killed. Saluria was destroyed. The steamer "Kate Ward," with her crew, was lost in Matagorda Bay. Little damage was done to Galveston.
	October	**warm** at Ft Chadbourne (+7.1F), Ft Fillmore (+5.4F), and Ft Inge (+5.5F)
	November	wet at Ft Brown, 7.5" (357%); at Ft Chadbourne, 6.3" (350%); and at Ft Clark, 3.3" (367%)
	December	dry at Ft Davis, 0.0"
1855	January	**warm** at Ft Fillmore (+4.7F); dry at Ft Davis, 0.0", and at Ft Fillmore, 0.0"
	February	dry at Ft Davis, 0.0", and at Ft Fillmore, 0.0"
	March	**warm** at Ringgold Barracks (+5.2F)
	May	**warm** at Ft Chadbourne (+5.3F)
	June	very wet at Ft Brown, 10.5" (500%)
	July	wet at Ft Brown, 7.6" (317%)
	August	wet at Ft Brown, 9.5" (380%); **cool** at Ringgold Barracks (-3.9F); **warm** at Ft Chadbourne (+7.2F)
	December	dry at Ft Fillmore, 0.0"
1856	January	**cold** at Austin (-7.4F), Ft Arbuckle (-12.6F), Ft Brown (-8.2F), Ft Chadbourne (-11.4F), Ft Clark (-5.4F),Ft Davis (-7.4F), Ft Duncan (-8.6F), Ft McKavett (-8.7F), Ft Washita (-12.4F), and Ringgold Barracks (-10.5); dry at Ft Fillmore, 0.0"
	February	**cold** at Austin (-7.0F), Ft Arbuckle (-8.6F), Ft Brown (-3.8F), Ft Chadbourne (-4.1F), Ft Davis (-6.1F), Ft McKavett (-3.9F), Ft Washita (-8.3F), and Ringgold Barracks (-4.0F)
	April	**warm** at Ft Arbuckle (+4.8F), Ft McKavett (+5.4F), and Ft Washita (+5.1F) dry at Ft Fillmore,0.0"
	May	dry at Ft Fillmore, 0.0"
	June	**hot** at Ft Arbuckle (+9.7F), Ft Chadbourne (+10.0F), Ft Duncan (+5.5F), Ft Mason (+4.6F), Ft McKavett (+6.3F), and Ft Washita (+5.5F)
	July	**hot** at Ft Arbuckle (+4.4F), Ft Chadbourne (+8.0F), Ft Mason (+3.6F), Ft McKavett (+5.2F), and Ft Washita (+4.8F)

1856(cont'd)		
	August	very wet at Ft Arbuckle, 10.8" (277%), and wet at Ft Davis (8.2"); **warm** at Ft Clark (+7.2F), Ft Duncan (+4.4F), and Ft McKavett (+5.1F)
	September	**cool** at Ft Brown (-7.9F)
	December	dry at Ft Davis, 0.0", and at Ft Duncan, 0.0"
1857	January	**cold** at Ft Arbuckle (-11.9F), Ft Chadbourne (-7.7F), and Ft Mason (5.5F); dry at Ft Davis, 0.0", and at Ft Duncan, 0.0"; The panic of 1857 seemed to penetrate to Travis County; there were no crops, little feed, cattle were thin. and the winter of 1856-57 was their worst, with a fierce freeze leaving ice several inches thick. One man, George Paschal, was resourceful. He had the ice cut and buried for summer use. The fall of 1856, preceding this freeze had brought the grasshoppers, who gorged on everything growing and green, devastating Travis County. In 1857, the black tongue killed many deer, and there was little feed, or food. The summer drought of 1857 was followed by six inches of rain in September. The good years were going , and fate was frowning. (**History of Travis County and Austin 1839-1899** by Mary Starr Barkley; copyright 1963, Mary Starr Barkley; printed by Texian Press, Waco, Texas; page 257-8, para. 8,1)
	February	**warm** at Ft Clark (+11.6F), Ft Duncan (+5.8F), and Ringgold Barracks (+5.3F)
	April	**cool** at Austin (-7.3F), Ft Arbuckle (-8.1F), Ft Brown (-6.8F), Ft Chadbourne (-10.4F), Ft Clark (-6.7F), Ft Duncan (-6.8F), Ft Mason (-8.1F), Ft McKavett (-7.4F), Ft Washita (-7.4F), and Ringgold Barracks (-8.9F)
	March	**warm** at Ft Fillmore (+6.3F)
	May	dry at Ft Fillmore, 0.0"
	June	dry at Ft Fillmore, 0.0"
	July	wet at Ft Arbuckle,8.6" (277%)
	September	wet at Ft Duncan, 9.5" (250%); Editors News - (Millican, Brazos County)I feel it is my duty to give you a small sketch in relation to the crops in this county. Crops have suffered badly from the long continued drought; corn is now being gathered. Some are making bread, while others will not make seed. Some of our farmers made only ten bushels to the hand, cultivating Brazos Bottom. We see from your paper that tolerable good crops of corn are being made in portions of Texas, which gives us some hopes of having bread another year. The varments seem to have a spite at us; coons and squirrels must have come from all parts. They have damaged our cotton crop to a considerable extent, as well as corn. Cotton on the bottom lands seems to be doing well; upland is nearly an average crop raised in this county. We have had two light showers within the past two days, and the prospect is good for more. There is here an entire failure of the post oak mast, but we have some pecans, pin oak, acorns, etc. Subscriber.(From "The Galveston County News", a biweekly newspaper, September 15, 1857; page 1, Column 7.)
	December	extremely wet at Ft Clark, 23.0" (767%) and wet at Austin, 6.1" (305%), wet at Ft Duncan, 5.6" (467%), and wet at Ft Mason, 6.7" (372%) **warm** at Ft Arbuckle (+6.0F), Ft Washita (+7.0F), and San Antonio (+5.4F)

1858	January	**cold** in San Antonio (-20.7F); wet at Ft Davis, 3.0 (500%); dry at Ft Fillmore, 0.0"; (From "Galveston Weekly News") We left Boonville with a clap of thunder, and in one of the largest showers I ever saw anywhere. Our stage was tight, and we were as comfortable as possible. The road is over a moderately rolling country, crossing at intervals of about a mile what in summer are no doubt dry branches. The rain continued pouring for about an hour, and the whole country was a sheet of water. The first stream was low, but they began gradually to get higher, until a few miles out we came to one that was clear across from bank to bank, and not less than ten feet deep in the channel. Our horses could not swim, nor the driver either, for that matter, and there was nothing for us but to hold up and wait till the water ran out. (This account is a lengthy narrative of travelling from Washington to Robertson County and contains a very funny account of attempting to ford a swollen creek. It is worth reading.) January 26, 1858. Page 3, column 3.
	February	**cold** at Ringgold Barracks (-5.2F); dry at Ft Fillmore, 0.0"
	March	wet at Austin, 7.0" (350%) dry at Ringgold Barracks, 0.0"
	April	dry at Ringgold Barracks, 0.0"
	May	wet at Austin, 8.8" (220%)
	July	**hot** at Ft Clark (+6.1F) and Ft Chadbourne (+7.0F)
	October	**warm** at Austin (+4.6F) and Ft Duncan (+6.4F)
	November	**cold** at Ft Arbuckle (-7.5F), Ft Brown (-6.2F), Ft Chadbourne (-6.8F), and San Antonio (-6.1F)
	December	**warm** at Ft Mason (+7.4F); dry at Ft Fillmore, 0.0"
1859	January	**cold** at Ft Fillmore (-9.3F); dry at Ft Fillmore, 0.0"
	February	**warm** at Ft Chadbourne (+8.7F), Ft Clark (+11.5F), Ft Inge (+6.6F), Ft McKavett (+7.8F), Ft Mason (+5.2F), and San Antonio (+5.7F)
	March	**warm** at Ft Duncan (+5.2F); dry at Ft Fillmore, 0.0"
	April	dry at Ft Fillmore, 0.0"
	May	**hot** at Ft Chadbourne (+6.1F), Ft Clark (+6.2F), and Ft Inge (+6.3F)
	June	**hot** at Austin (+6.8F), Ft Arbuckle (+5.6F), Ft Chadbourne (+9.4F), Ft Clark (+7.2F), and Ft Inge (+7.0F); dry at Ft Fillmore, 0.0"
	July	**hot** at Ft Chadbourne (+6.9F), Ft Clark (+4.8F), and Ft Inge (+6.7F)
	August	**hot** at Ft Chadbourne (+6.7F), Ft Clark (+7.0F), and Ft Inge (+7.0F)
	September	wet at Austin, 9.7" (226%), Ft Arbuckle, 8.9" (261%), and Ft Clark, 9.9" (225%)
	November	**cold** at ft Arbuckle (-7.5F)
	December	**cold** at Austin (-6.5F), Ft Arbuckle (-7.2F), Ft Chadbourne (-10.7F), Ft Clark (-10.7F), Ft Davis (-4.3F), Ft Fillmore (-9.3F), Ft Inge (-7.1F), and San Antonio (-4.3F)

1860	April	**warm** at San Antonio (+4.7F)
	May	**hot** at Ft Clark (+6.3F) and San Antonio (+6.3F)
	June	**hot** at Austin (+8.6F), Ft Clark (+5.3F), Ft Duncan (+8.9F), Ringgold Barracks (+5.0F), and San Antonio (+6.5F)
	July	**hot** at Austin (+7.5F), Ft Clark (+9.0F), Ft Duncan (+8.9F), Ringgold Barracks (+4.1F), and San Antonio (+6.4F)
	August	wet at Austin,10.9" (311%); Ft Brown, 8.0" (320%);and at Ft Clark,7.2" (313%)
	September	dry at Ft Brown, 0.1" (1.7%)
	October	dry at Ft Brown, 0.6" (13%)
	December	**warm** at San Antonio (+5.8F)
1861	May	wet at Austin, 7.9" (198%)

CHAPTER 4
WEATHER 1862-1868

Introduction

This was a very unsettled time in the nation's history, especially so in the southern states. Very few observations have been found that pertain to Texas. The Army Register contains no relevant data, and it is not until the U.S. Department of Agriculture's Yearbook of 1866 that any Texas observations appear in the weather section.

Temperature data for Austin, Columbia, Gilmer, Houston, and Waco are given in Tables 4.1 and 4.2; no measurements for 1861-1864 have been unearthed. Precipitation data for Austin, Columbia and Waco are given in Table 4.3. Few meaningful deductions can be made from these sparse data, but it appears that December, 1867, was extremely warm.

Some stations have temperature and precipitation data for very short periods, including Chapel Hill (Jan-Feb, 1867, May-Aug, 1868) and Long Point (Aug 1867).

Table 4.1
MEAN MONTHLY TEMPERATURE

Austin

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1865	45.0	53.8	62.2	66.9	75.4	80.6	84.0	85.1	82.2	66.9	58.1	48.0	67.4
1866	53.3	50.2	63.0	67.6	73.9	81.3	81.3	80.6	75.4	69.2	62.3	51.8	67.5
1867	51.1	58.4	--	67.9	73.9	81.2	83.6	82.6	78.4	71.6	59.4	61.2	--
1868	46.2	54.6	64.7	68.2	75.2	82.5	82.2	81.7	77.4	69.0	55.7	48.4	67.2

Columbia

1867	--	--	60.7	71.3	76.3	81.6	83.1	81.7	73.8	72.2	62.1	65.7	--
1868	52.0	55.2	67.1	71.4	71.6	81.0	82.5	82.2	78.5	71.2	58.1	51.9	68.6

Gilmer

1867	--	--	--	--	--	--	--	--	--	65.0	58.5	58.9	--
1868	41.2	49.5	61.3	66.3	73.8	80.4	82.8	84.1	74.6	66.9	51.5	46.8	65.0

Houston

1867	--	--	--	--	75.6	82.0	84.6	--	--	--	--	--	--
1868	52.0	55.6	67.8	71.9	74.1	77.3	76.2	76.6	73.6	70.2	64.6	--	--

Waco

1867	--	--	--	60.6	73.0	83.6	85.7	84.3	79.6	70.5	58.2	61.7	--
1868	42.4	47.6	63.7	67.8	76.8	--	87.1	83.4	77.0	67.3	54.4	45.7	--

Table 4.2
MONTHLY TEMPERATURE EXTREMES

Austin

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1865	73/20	80/32	96/72	90/42	103/51	96/68	91/75	106/75	96/72	90/42	83/36	82/18
1866	78/21	84/19	83/44	89/41	93/57	95/62	96/71	96/68	91/55	87/47	83/36	78/30
1867	78/17	84/25	--	92/46	92/58	97/66	97/71	98/72	94/65	96/45	83/28	86/28
1868	87/15	83/26	83/40	89/50	90/60	95/72	96/72	96/71	94/53	93/45	83/34	74/21

Columbia

1867	--	--	93/24	93/40	93/52	97/72	96/75	96/73	94/76	92/48	86/29	87/31
1868	84/16	85/27	88/40	91/50	94/57	96/71	95/73	98/72	97/59	93/47	88/35	81/24

Gilmer

1867	--	--	--	--	--	--	--	--	--	87/31	83/24	85/30
1868	81/10	80/16	84/34	85/47	98/60	98/65	100/74	100/73	98/48	88/38	80/20	78/18

Houston

1867	--	--	--	--	94/56	100/68	98/73	--	--	--	--	--
1868	84/19	82/31	80/41	81/62	83/66	85/74	84/73	84/66	82/65	79/60	76/55	--

Waco

1867	--	--	--	83/42	92/51	101/66	99/74	97/71	98/62	94/43	82/24	85/20
1868	89/15	76/22	83/38	88/34	95/56	--	100/73	100/69	96/53	88/47	83/32	72/18

Table 4.3
MONTHLY PRECIPITATION (inches)

Austin

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1865	3.12	6.00	8.62	3.52	0.17	5.29	0.23	0.00	8.62	3.52	1.49	0.95	3.5
1866	0.38	1.18	3.43	6.07	5.46	2.15	4.34	7.51	4.84	0.88	4.81	1.50	3.5
1867	0.00	0.72	--	1.45	1.30	5.05	--	3.27	6.41	2.08	2.98	1.80	--
1868	0.36	3.48	4.55	3.63	2.33	0.69	2.55	7.00	1.72	4.65	4.17	4.96	3.3

Austin (Elevation 593 Ft)

1862	0.19	1.63	1.24	4.12	4.63	0.02	0.72	3.32	2.08	3.01	0.35	0.87	22.18
1863	6.30	6.92	1.70	1.96	2.51	2.92	2.37	1.29	7.02	1.04	0.10	0.57	34.70
1864	0.17	3.36	2.43	3.03	0.99	5.16	0.67	0.98	1.34	2.75	2.41	1.87	25.16
1865	2.90	6.19	6.77	2.26	0.17	5.73	0.11	0.00	8.57	3.37	1.22	0.50	37.79
1866	0.32	0.93	3.64	5.30	5.21	1.86	4.34	7.51	4.82	0.42	4.41	1.76	40.52
1867	0.01	0.72	1.02	1.88	1.79	3.30	2.02*	3.27	6.42	2.08	2.98	1.80	27.26
1868	0.36	3.48	4.55	3.63	2.23	0.69	2.55	7.00	1.72	6.65	4.17	4.96	40.09

*estimated

Columbia

1867	--	--	3.08	2.70	8.18	6.55	5.33	8.23	5.64	9.06	3.19	2.36	--
1868	1.38	1.87	1.70	5.96	2.31	2.40	3.29	7.83	2.50	3.63	5.97	8.84	4.0

Gilmer

1867	--	--	--	--	--	--	--	--	--	--	--	--	--
1868	--	--	--	--	1.78	4.63	3.00	0.38	5.51	2.14	6.68	5.18	--

Waco

1867	--	--	--	5.60	6.50	2.80	2.30	4.00	1.80	2.10	1.10	2.30	--
1868	0.70	2.20	10.6	5.40	3.70	--	1.40	2.30	2.80	4.80	3.05	4.95	--

CHAPTER 5
WEATHER 1869-1879

Introduction

There were still numerous forts reporting during this period and more civilian stations came into operation. Many of these latter had originated through the Smithsonian Institution's cooperative observers system noted in the Introduction. A number began during 1859 but there was an understandable hiatus during much of the 1860's. Data for stations that have measurements for most of the period are given in Tables 5.1 (Temperature) and 5.2 (Precipitation). In Table 5.3, the extremes are noted. Of these the most eye-catching is the very wet September, 1874. Stations with only a few years of data during this period are listed in Table 5.4.

Table 5.1
MEAN TEMPERATURE
Fort Brown, Texas
Latitude: 25°54', Longitude: 97°26', Elevation: 50 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	--	--	--	--	78.9	82.7	85.8	84.5	79.0	68.7	73.1	--	--
1870	59.9	61.1	66.4	72.0	78.7	82.8	84.4	83.8	81.3	74.6	68.0	56.2	72.4
1871	59.0	65.5	69.1	74.1	77.2	82.3	84.2	83.8	79.0	71.7	67.6	58.4	72.7
1872	54.7	62.4	68.4	76.2	80.0	82.6	84.1	82.6	79.4	72.2	62.0	59.4	72.0
1873	55.4	67.8	69.9	71.1	79.4	82.5	83.4	82.1	80.6	71.4	65.3	63.1	72.6
1874	59.7	64.3	72.4	68.3	74.4	80.7	81.4	83.9	74.2	72.9	69.9	61.1	72.3
1875	51.6	62.2	68.9	69.7	77.7	80.9	81.8	83.6	76.9	73.3	67.6	65.1	71.6
1876	62.8	62.4	66.5	69.2	74.8	81.6	81.8	80.8	75.9	71.3	61.2	53.6	70.2
1877	53.4	54.6	64.6	73.3	77.6	81.3	84.4	85.1	81.6	77.4	63.7	62.2	71.8
1878	57.5	62.0	68.8	74.7	79.9	84.2	82.8	83.2	79.8	73.9	67.1	56.2	72.5
1879	59.6	60.5	72.2	75.8	80.5	83.1	80.9	81.7	78.8	72.9	68.8	64.9	73.2
Avg	57.0	62.3	68.7	72.4	78.1	82.2	83.5	83.2	78.8	72.8	66.8	60.0	72.2

Fort Clark, Texas
Latitude: 29°17', Longitude: 100°25', Elevation: 1000? Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	--	--	--	--	74.6	78.3	79.3	82.5	75.0	63.6	62.0	--	--
1870	52.3	57.2	61.6	69.2	76.9	78.8	82.9	81.4	79.8	68.3	62.5	47.9	68.2
1871	52.9	59.4	66.1	72.2	79.9	86.4	90.5	89.2	81.1	69.3	59.0	52.5	69.9
1872	48.3	54.6	60.9	70.2	76.4	83.1	83.3	83.8	79.9	70.2	52.4	46.7	67.5
1873	45.6	55.3	64.1	68.6	78.5	80.5	81.4	--	--	--	--	--	--
1874	--	--	--	--	--	--	--	87.0	77.3	71.4	61.6	53.8	--
1875	49.8	58.8	64.2	69.5	81.7	86.4	89.5	84.6	79.1	70.9	61.9	57.5	70.9
1876	54.5	56.8	60.4	71.1	76.8	83.2	81.2	87.4	79.4	69.9	60.1	46.2	68.9
1877	48.1	58.8	64.5	70.7	75.8	82.0	83.7	84.2	83.4	67.0	54.6	49.6	68.5
1878	48.9	56.6	63.4	71.8	76.1	82.5	83.9	83.3	77.6	71.0	62.6	50.6	69.0
1879	52.6	55.2	70.1	71.7	80.7	82.2	88.5	81.2	77.0	69.9	62.7	56.2	70.7
Avg.	50.3	57.0	63.9	70.6	77.7	82.3	84.4	84.5	79.0	69.2	59.9	51.2	69.2

Fort Davis, Texas
Latitude: 30°38', Longitude: 103°56', Elevation: 4928 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	--	--	--	--	--	69.7	71.9	72.0	65.4	54.3	59.0	43.0	--
1870	43.3	50.0	53.6	66.9	74.4	72.9	73.5	70.7	69.3	61.1	69.6	45.3	62.6
1871	43.5	50.4	52.1	65.1	75.4	76.6	73.5	--	--	--	--	--	--
1872	--	--	--	--	--	76.9	--	74.4	72.7	60.1	47.3	48.1	--
1873	45.3	53.8	58.4	61.9	72.8	--	73.9	73.0	71.5	63.2	--	47.3	--
1874	--	--	--	--	--	--	--	--	--	63.7	--	--	--
1875	46.9	--	--	--	--	--	--	--	--	--	--	--	--
1877	--	--	--	--	--	--	--	77.8	71.8	59.5	48.9	44.4	--
1878	43.9	42.6	56.3	62.9	70.8	75.7	75.9	--	70.3	65.3	--	38.4	--
1879	48.6	51.6	62.5	65.3	--	--	--	--	69.8	61.1	50.7	50.6	--
Avg	45.3	49.7	56.6	64.4	73.4	74.4	73.7	73.6	70.1	61.0	55.1	45.3	

Fort McKavett, Texas
Latitude: 30°50', Longitude: 100°20', Elevation: 1200 Feet

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	--	--	--	--	--	--	--	--	--	--	--	46.4	--
1870	47.9	53.2	56.0	67.7	77.6	77.7	80.2	78.5	--	--	--	--	--
1871	--	--	--	--	--	--	--	--	--	--	--	--	--
1872	--	--	--	--	--	--	--	84.8	80.1	65.3	49.0	43.4	--
1873	44.4	53.4	61.1	65.3	74.8	74.5	84.4	81.8	77.0	64.7	54.8	50.8	65.6
1874	47.2	49.5	60.8	61.1	74.7	79.9	81.7	86.6	72.9	68.2	56.8	47.6	65.6
1875	37.0	49.4	58.0	62.7	74.6	79.5	81.9	80.9	73.9	68.2	57.0	54.4	64.8
1876	51.0	53.4	56.3	69.4	73.7	78.5	84.5	81.8	74.3	66.0	51.6	41.5	65.2
1877	44.0	47.9	59.1	63.9	71.8	79.0	82.1	82.6	74.5	65.1	49.2	49.0	64.0
1878	44.3	49.0	60.5	67.4	72.8	78.9	80.6	81.2	74.1	67.5	56.0	42.2	64.5
1879	46.9	50.1	65.1	67.1	77.0	80.6	86.4	77.9	75.4	67.0	59.0	52.4	67.1
Avg	45.3	50.7	59.6	65.6	74.6	78.6	82.7	81.8	75.3	66.5	54.2	47.5	65.3

Indianola, Texas
Latitude: 28°32', Longitude: 96°38', Elevation:

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1872	--	--	--	--	77.1	83.0	84.8	81.5	--	--	--	--	--
1873	51.5	60.3	65.3	67.6	75.5	82.3	82.2	82.1	79.8	70.1	63.0	58.3	69.8
1874	55.5	58.4	67.3	66.1	74.9	81.2	82.3	84.3	79.2	73.2	66.4	59.1	70.7
1875	46.0	56.4	63.4	66.4	76.3	82.2	84.0	83.2	76.6	71.8	65.0	62.0	69.4
1876	61.5	60.0	62.9	69.4	75.5	82.5	84.3	83.3	79.4	71.6	59.0	49.7	69.9
1877	49.6	57.0	63.6	70.1	75.3	81.0	84.9	85.6	81.2	70.2	60.3	56.5	69.6
1878	52.9	58.7	68.0	73.0	77.7	83.6	84.5	84.3	80.1	73.9	63.2	51.4	70.9
1879	52.6	56.2	68.6	72.1	78.6	81.8	85.2	82.2	79.7	73.2	66.9	59.8	71.4
Avg	52.8	58.1	65.6	69.2	76.4	82.2	84.0	83.6	79.7	72.0	63.4	56.7	70.2

San Antonio, Texas
Latitude: 29°28', Longitude: 98°22', Elevation:

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1870	52.0	53.6	60.2	67.4	77.0	81.2	83.8	82.5	80.7	69.7	61.5	47.6	68.4
1871	53.2	58.7	63.1	69.7	76.8	83.4	88.8	88.4	79.5	65.6	58.4	51.0	70.0
1872	47.2	55.5	60.0	73.0	77.9	82.6	85.0	84.9	84.3	70.3	55.5	48.8	68.7
1873	49.0	55.5	68.1	68.2	77.8	80.2	83.8	--	--	--	--	--	--
Avg	50.4	55.8	62.9	69.6	77.4	81.9	85.4	85.3	81.5	68.5	58.5	49.1	69.0

Table 5.2
PRECIPITATION (inches)
Austin, Texas
Latitude: 30°17', Longitude: 97°44', Elevation: 650 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	5.06	0.61	3.51	3.09	3.85	2.34	9.20	1.14	4.16	2.72	1.54	1.32	38.54
1870	0.69	0.59	2.21	2.72	7.58	2.73	2.55	4.30	1.96	12.54	3.48	1.14	42.49
1871	1.73	1.60	2.10	1.23	4.82	0.46	0.00	2.08	3.13	7.64	4.89	0.44	30.12
1872	2.17	1.06	3.73	3.11	3.45	7.61	2.00	1.34	0.00	1.64	2.17	4.97	33.25
1873	2.23	0.45	3.34	1.81	4.55	8.41	4.48	2.20	10.54	2.23	2.70	0.45	43.39
1874	0.87	1.42	5.60	1.34	1.10	1.88	5.14	0.75	12.78	0.40	7.52	7.72	46.52
1875	0.00	1.85	1.02	2.22	2.56	0.44	1.30	2.75	4.00	0.92	7.33	4.90	29.29
1876	2.04	1.46	5.60	0.56	5.66	4.48	2.33	0.56	2.69	2.46	2.83	1.87	32.56
1877	1.26	6.94	3.61	4.69	4.81	5.01	2.44	T	0.55	5.76	2.35	4.36	41.78
1878	1.88	1.82	0.66	3.19	3.58	4.09	0.32	2.51	0.18	0.12	2.29	0.92	21.56
1879	0.55	1.10	1.25	5.43	0.92	1.28	0.50	0.98	2.15	2.15	1.25	1.78	18.34
Avg	1.68	1.72	2.97	2.67	3.90	3.52	2.75	1.69	3.90	3.51	3.49	2.72	34.52

Eagle Pass, Maverick County, Texas
Latitude: 28°40', Longitude: 100°15', Elevation: 800 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1871	--	--	1.68	0.14	0.54	0.32	0.00	3.21	1.10	4.75	0.00	0.00	--
1872	0.00	1.40	1.60	1.60	1.20	5.16	1.40	0.60	0.10	0.50	1.90	2.60	18.06
1873	0.00	0.00	0.84	0.20	6.19	6.61	2.84	4.05	4.10	0.44	1.40	1.00	27.67
1874	0.30	0.20	4.00	0.00	1.50	0.68	0.30	0.16	6.26	0.04	3.17	1.98	18.59
1875	0.21	2.15	0.00	0.06	1.05	0.05	0.56	2.92	0.52	2.60	0.96	0.67	11.74
1876	0.47	1.40	0.30	1.12	3.06	0.90	0.10	1.95	4.58	1.27	0.05	1.27	16.47
1877	0.54	4.48	0.62	3.65	0.63	1.17	5.26	0.13	1.98	0.81	0.52	6.61	26.42
1878	0.34	2.03	0.93	0.87	4.43	4.39	3.17	4.30	4.18	0.41	0.47	0.35	25.87
1879	0.10	0.95	2.05	2.47	0.63	5.12	0.14	3.10	3.08	0.69	0.03	0.29	18.65
Avg	0.25	1.58	1.34	1.12	2.14	2.71	1.53	2.27	2.88	1.28	0.94	1.64	18.68

Ft Brown, Texas
Latitude: 25°50', Longitude: 97°27', Elevation: 50 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	--	--	--	--	--	--	--	2.46	10.50	1.20	0.10	--	--
1870	1.60	T	T	0.90	0.00	1.00	0.75	0.10	2.53	1.00	0.78	0.30	8.88
1871	0.90	T	0.30	0.10	3.40	0.78	0.40	1.40	2.80	8.50	1.82	T	20.40
1872	T	0.00	1.64	0.82	0.27	1.78	1.92	4.19	3.86	3.61	1.60	1.98	22.49
1873	0.00	0.15	0.47	0.59	0.96	0.43	1.10	0.99	15.35	2.81	1.71	2.10	27.65
1874	0.86	1.48	1.90	0.30	1.34	1.50	2.81	0.30	10.96	0.48	4.76	0.16	26.85
1875	0.56	3.72	1.62	0.05	1.45	0.16	0.40	2.25	4.20	0.50	2.35	1.10	18.36
1876	0.60	0.45	0.10	0.00	6.05	T	4.33	0.25	7.04	0.15	1.30	1.00	21.27
1877	1.00	7.10	0.60	0.10	1.60	0.70	0.77	1.49	0.80	2.07	0.59	3.93	20.75
1878	2.70	T	3.38	1.10	2.33	0.41	5.71	3.89	4.84	0.26	1.04	0.44	26.10
1879	0.49	0.95	T	1.40	1.00	0.59	1.28	8.38	9.97	5.38	0.40	0.30	30.14
Avg	0.87	1.39	1.00	0.54	1.84	0.74	1.95	2.34	6.62	2.36	1.50	1.13	22.28

Ft Clark, Texas
Latitude: 29°17', Longitude: 100°25', Elevation: 1000 Feet.

Year	Jan	Feb	MAr	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	--	--	--	--	2.89	4.53	3.07	1.34	2.57	1.14	0.68	--	--
1870	0.40	0.06	1.78	1.70	4.40	5.00	1.92	10.10	2.22	4.58	1.86	0.30	34.32
1871	1.21	0.23	0.07	0.12	2.07	0.13	0.00	2.46	3.69	3.26	0.32	T	13.56
1872	0.03	0.45	0.06	0.56	1.12	3.90	3.70	0.52	1.76	0.25	1.64	4.32	18.31
1873	0.32	0.24	1.56	0.44	3.74	7.68	1.70	--	--	--	--	--	--
1874	--	--	--	--	--	--	--	0.00	11.06	0.40	6.67	2.22	--
1875	0.00	0.84	0.00	1.52	1.26	0.34	0.00	3.10	0.30	0.00	4.15	2.25	13.76
1876	3.14	2.27	1.90	0.76	6.88	2.48	1.05	0.40	3.80	0.70	0.10	0.00	23.48
1877	0.35	1.76	0.00	0.00	1.74	6.80	1.90	0.00	2.20	0.00	0.64	2.62	18.01
1878	0.18	0.47	2.11	1.50	6.24	5.15	2.66	3.56	2.56	0.58	0.41	0.24	25.66
1879	0.08	0.90	2.84	4.56	1.86	0.96	T	3.17	1.29	0.21	0.05	0.60	16.52
Avg	0.63	0.80	1.15	1.24	3.22	3.70	1.60	2.47	3.15	1.11	1.65	1.26	21.98

Ft Davis, Texas
Latitude: 30°30', Longitude: 103°45', Elevation:

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	--	--	--	--	--	1.37	1.62	1.77	0.96	1.56	1.00	0.00	--
1870	0.00	T	0.20	0.00	0.04	0.12	0.86	6.33	5.12	0.00	0.00	T	12.67
1871	T	0.00	T	0.00	T	T	4.35	0.21	0.09	1.95	0.00	--	--
1872	--	T	0.00	T	0.05	1.71	3.86	0.90	0.20	1.00	0.24	1.86	--
1873	1.12	T	0.22	0.00	0.76	6.82	--	3.12	0.45	1.80	--	0.00	--
1874	0.40	0.00	0.70	0.00	1.90	1.70	4.18	1.76	2.16	1.60	1.74	3.96	20.10
1875	0.00	0.80	0.00	0.50	0.56	1.34	15.36	3.66	4.14	0.00	0.00	1.32	27.68
1876	1.36	0.50	0.56	0.56	1.10	0.92	2.64	10.42	5.52	0.00	T	0.34	23.92
1877	0.42	3.54	0.20	0.20	3.04	0.74	1.54	1.10	3.26	1.58	0.00	0.64	16.26
1878	0.00	1.48	1.86	0.46	1.38	2.78	2.90	--	1.02	1.24	--	0.06	--
1879	0.40	0.80	0.00	0.00	--	--	--	--	2.72	7.98	0.00	0.00	--
Avg	0.41	0.71	0.37	0.17	0.98	1.75	4.15	3.25	2.33	1.70	0.33	0.82	16.97

Ft McKavett, Menard County, Texas
Latitude: 30°50', Longitude: 100°20', Elevation: 1200 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1870	--	--	1.44	0.78	1.38	7.51	0.19	5.33	--	--	--	--	--
1872	--	--	--	--	--	--	--	0.42	0.60	1.09	2.70	1.96	--
1873	0.08	0.40	2.16	0.18	6.30	3.22	3.93	2.74	5.03	0.64	0.52	0.28	25.48
1874	1.82	0.28	2.00	0.68	3.50	1.11	2.61	0.60	10.97	1.24	2.70	6.24	33.75
1875	0.12	0.66	0.78	0.50	2.39	0.65	3.30	1.55	0.30	0.00	1.04	4.12	15.41
1876	1.02	1.42	1.14	0.46	2.82	0.62	3.28	4.10	3.58	0.65	1.16	0.42	20.67
1877	0.00	2.95	0.84	1.14	1.71	0.55	1.76	0.51	4.91	2.03	1.49	4.26	22.15
1878	0.05	2.21	0.33	0.32	0.88	5.72	3.16	0.54	2.98	2.95	2.87	0.00	21.88
1879	1.40	0.63	0.17	2.47	0.97	1.07	T	7.54	0.52	0.83	0.55	0.50	16.65
Avg	0.69	1.22	1.11	0.82	2.49	2.56	2.28	2.59	3.61	1.18	1.63	2.22	22.35

Indianola, Calhoun County, Texas
Latitude: 28°32', Longitude: 96°38', Elevation:

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1872	--	--	--	--	1.08	0.86	1.49	2.83	0.81	1.31	1.74	6.55	--
1873	1.81	1.12	2.34	0.36	6.96	3.74	3.49	5.00	9.18	2.42	3.35	3.53	43.30
1874	1.18	2.92	4.30	0.74	0.18	7.20	5.76	1.25	12.89	0.62	2.61	4.86	44.51
1875	1.17	2.23	1.02	2.51	1.45	0.35	2.34	2.03	10.65	2.26	2.42	6.96	35.39
1876	1.30	1.89	5.86	0.32	1.19	0.85	3.17	4.60	3.51	4.64	2.76	2.48	32.57
1877	0.91	1.58	2.74	1.64	2.20	4.81	2.02	1.98	2.29	11.75	4.83	5.02	42.67
1878	3.71	4.17	2.51	3.52	5.39	2.70	2.72	4.49	0.88	1.12	6.04	2.49	39.74
1879	0.70	0.37	0.18	0.87	1.40	0.63	0.79	7.14	7.27	6.54	0.13	0.76	26.78
Avg	1.54	2.04	2.71	1.42	2.48	2.64	2.72	3.67	5.94	3.83	2.99	4.08	36.06

Jacksboro, Jack County, Texas
Latitude: 33°10', Longitude: 98°00', Elevation: 1074 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1869	2.00	1.60	1.63	0.20	20.22	9.10	2.03	3.93	2.05	0.10	1.16	0.50	44.52
1870	3.06	0.13	0.14	0.67	0.70	3.48	--	--	--	--	--	--	--
1872	--	--	--	--	--	--	4.32	0.38	2.08	0.91	1.30	1.02	--
1873	0.16	0.84	0.96	2.00	9.88	4.12	0.64	1.96	2.38	0.18	1.94	1.54	26.60
1874	1.34	2.14	1.04	2.80	1.30	1.65	0.37	0.00	8.16	0.61	1.08	4.76	26.25
1875	0.24	1.03	0.52	2.19	4.63	1.08	1.82	2.00	1.24	0.44	0.58	4.46	20.23
1876	0.82	1.81	3.48	2.56	2.26	4.86	1.38	2.56	2.90	0.34	1.60	0.68	25.25
1877	0.00	4.58	0.04	5.72	3.50	1.76	3.73	2.29	4.80	9.86	2.86	3.29	42.43
1878	0.19	1.35	0.15	0.68	3.88	10.91	4.42	2.17	1.43	0.85	4.40	0.91	31.34
1879	0.63	0.00	0.57	3.26	1.29	4.96	4.47	3.60	1.21	1.46	0.45	1.82	23.72
Avg	0.94	1.50	0.95	2.23	5.30	4.66	2.58	2.10	2.92	1.64	1.71	2.11	28.64

Rio Grande, Starr County, Texas
Latitude: 26°22', Longitude: 98°45', Elevation: 230 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1871	0.86	0.00	0.05	0.00	1.28	1.81	0.00	0.70	1.14	3.42	0.22	0.00	9.48
1872	0.36	0.00	0.76	0.66	0.00	0.52	1.66	4.38	0.94	1.22	3.10	1.16	14.76
1873	0.00	0.16	0.28	2.56	2.42	1.66	1.72	0.88	7.26	0.85	1.58	0.26	19.63
1873	0.00	0.16	0.28	2.56	2.42	1.66	1.72	0.88	7.26	0.85	1.58	0.26	19.63
1874	1.16	0.28	2.64	0.00	1.44	3.22	1.70	T	9.35	0.60	0.65	0.65	21.69
1875	1.36	0.80	0.00	0.48	0.60	1.68	0.37	1.15	1.90	0.52	1.83	1.25	11.94
1876	1.30	0.25	0.45	0.00	1.52	1.62	0.76	0.36	3.34	0.94	1.18	1.54	13.26
1877	0.53	2.74	1.04	0.00	0.83	0.66	0.51	2.40	0.00	0.21	0.07	3.54	12.53
1878	0.53	0.25	4.75	0.00	4.75	0.50	5.37	2.30	0.48	1.25	2.00	0.45	22.53
1879	0.00	1.90	0.15	0.40	0.80	0.25	0.00	10.82	4.18	1.18	0.00	0.26	19.94
Avg	0.68	0.71	1.12	0.46	1.51	1.32	1.34	2.55	3.18	1.13	1.18	1.01	16.19

San Antonio, Bexar County, Texas
Latitude: 29°28', Longitude: 98°22', Elevation: 701 Feet.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Ann
1871	1.38	0.60	1.10	0.76	3.44	0.18	0.00	0.95	5.81	6.65	1.92	0.00	22.79
1872	0.40	1.56	1.14	0.70	4.58	8.30	1.84	1.62	0.05	2.49	2.80	3.61	29.09
1873	0.50	0.62	2.43	0.58	4.34	9.37	2.56	1.89	5.94	3.86	1.56	0.37	34.02
1874	0.44	1.27	3.64	0.55	1.32	2.26	2.74	1.02	11.71	0.52	9.16	6.92	41.55
1875	0.19	3.21	0.639	3.09	0.48	0.30	1.54	3.11	2.19	0.50	5.62	2.03	21.95
1876	1.19	1.20	2.61	0.69	2.78	2.59	1.93	0.15	--	--	--	0.78	--
1877	0.37	1.64	1.01	2.47	0.56	3.59	2.87	0.56	2.67	5.61	1.67	7.27	30.29
1878	1.70	2.32	0.94	2.25	6.71	4.53	6.09	3.93	3.98	0.56	4.68	1.91	39.60
1879	0.98	1.07	0.28	5.71	0.61	2.32	0.12	4.07	5.91	1.26	0.00	0.47	22.80
Avg	0.79	1.50	1.54	1.87	2.76	3.72	2.19	1.92	4.78	2.68	3.30	2.60	29.65

Table 5.3
MONTHS EXHIBITING EXTREME WEATHER

Year		
1869	January	wet at Austin (301%)
	April	dry at Jacksboro (9%)
	May	wet at Jacksboro (381% - 20.22")
	June	**cool** at Ft Davis (-4.7F), Ft Clark (-4.0F) wet at Jacksboro (195%)
	July	**cool** at Ft Clark (-5.1F) wet at Austin (335%)
	September	**cool** at Ft Clark (-4.0F), Ft Davis (-4.7F) wet at Ft Brown (159% - 10.50")
	October	**cool** at Ft. Brown (-4.1F), Ft Clark (-5.6F), Ft Davis (-5.7F) dry at Jacksboro (6%)
	November	**warm** at Ft Brown (+6.3F) dry at Ft Brown (6%)
1870	May	dry at Jacksboro (13%), Ft Davis (4%), Ft Brown (0)
	June	wet at Ft McKavett (293%)
	August	wet at Ft Clark (409% - 10.10"); dry at Ft Brown (4%)
	October	dry at Ft Davis (0); wet at Ft Clark (413%), Austin (357% - 12.54")
1871	March	**cold** at Ft Davis (-4.5F)
	May	dry at Ft Davis (T)
	June	**hot** at Ft Clark (+4.1F); dry at Ft Clark (4%), Ft Davis (T),Austin (13%), San Antonio (5%)
	July	**hot** at Ft Clark (+6.1F); dry at Rio Grande (0), Ft Clark (0), San Angelo (0), Austin (0), Eagle Pass (0)
	August	**hot** at Ft Clark (+4.7F); dry at Ft Davis (7%)
	September	dry at Ft Davis (4%)
	October	wet at Austin (218%), Ft Brown (360%), San Antonio (248%)
	November	dry at Eagle Pass (0), Ft Davis (0)
	December	dry at Rio Grande (0), Eagle Pass (0), Ft Brown (T), San Antonio (0), Ft Clark (T)
1872	May	dry at Rio Grande (0), Ft Davis (5%)
	June	wet at San Antonio (223%), Austin (216%)
	September	**hot** at Ft McKavett (+4.8F); dry at San Antonio (1%), Ft Davis (9%), Austin (0), Eagle Pass (3%)
	November	**cool** at Ft Brown (-4.8F), Ft Clark (-7.5F)
	December	**cold** at Ft McKavett (-4.1F), Ft Clark (-4.5F)

1873	January	**cold** at Ft Clark (-4.7F)
	February	**warm** at Ft Brown (+5.5F), Ft Davis (+4.1F); dry at Eagle Pass (0), Ft Davis (T)
	March	**warm** at San Antonio (+5.2F)
	April	wet at Rio Grande (557%)
	May	wet at Indianola (280%), Jacksboro (186%), Ft McKavett (253%), Eagle Pass (289%)
	June	**cool** at Ft McKavett (-4.1F); wet at Austin (239%), Eagle Pass (244%), San Antonio (252%), Ft Clark (208%), Ft Davis (390%)
	September	wet at Rio Grande (228%), Austin (270% - 10.54"), Ft Brown (232% - 15.35")
	November	**cool** at Ft McKavett (-5.2F)
1874	April	dry at Eagle Pass (0), Ft Davis (0)
	May	dry at Indianola (7%)
	June	wet at Indianola (273%)
	August	**hot** at Ft McKavett (+4.8F); dry at Ft Clark (0), Jacksboro (0), Rio Grande (T), Eagle Pass (7%)
	September	**cool** at Ft Brown (-4.6F); wet at San Antonio (245% - 11.71"), Indianola (217% - 12.89"), Ft McKavett (304% - 10.97"), Jacksboro (279%), Rio Grande (294%), Austin (328% - 12.78"), Eagle Pass (217%), Ft Brown (165% - 10.96"), Ft Clark (351% - 11.06")
	October	dry at Eagle Pass (3%)
	November	wet at Ft Clark (404%), San Antonio (278%), Austin (215%), Eagle Pass (337%), Ft Brown (317%)
	December	wet at Austin (284%), San Antonio (266%), Ft Davis (483%), Ft McKavett (281%)
1875	January	**cold** at Ft Brown (-5.4F), Ft McKavett (-8.3F), Indianola (-6.8F); dry at Austin (0), Ft Clark (0), Ft Davis (0)
	March	dry at Eagle Pass (0), Ft Davis (T)
	May	**warm** at Ft Clark (+4.0F)
	June	**hot** at Ft Clark (+4.1F); dry at Eagle Pass (2%), Austin (13%), San Antonio (8%)
	July	**hot** at Ft Clark (+5.1F); wet at Ft Davis (370% - 15.36"); dry at Ft Clark (0)
	September	wet at Indianola (179% - 10.65")
	October	dry at Ft Clark (0), Ft Davis (0), Ft McKavett (0)
	November	wet at Austin (210%)
	December	**warm** at Ft McKavett (+6.9F), Indianola (+5.3F), Ft Brown (+5.3F), Ft Clark (+5.3F)
1876	January	**warm** at Ft Brown (+5.8F), Ft Clark (+4.2F), Ft McKavett (+5.7F), Indianola (+8.7F)
	May	wet at Ft Brown (329%)
	June	dry at Ft Brown (T)
	August	wet at Ft Davis (321% - 10.42"); dry at San Antonio (8%)
	October	dry at Ft Davis (0), Ft Brown (6%)
	November	**cool** at Ft Brown (-5.6F), Indianola (-4.4F) dry at Eagle Pass (5%), Ft Clark (6%), Ft Davis (T)
	December	**cold** at Ft McKavett (-6.0F), Indianola (-7.0F), Ft Clark (-5.0F), Ft Brown (-6.4F); dry at Ft Clark (0)

1877	January	dry at Jacksboro (0), Ft McKavett (0)
	February	**cold** at Ft Brown (-7.7F); wet at Ft Brown (511%), Austin (403%), Eagle Pass (248%), Ft Davis (499%), Jacksboro (305%), Rio Grande (386%)
	April	dry at Ft Clark (0); wet at Jacksboro (257%), Eagle Pass (326%)
	July	wet at Eagle Pass (344%)
	August	**hot** at Ft Davis (+4.2F) dry at Ft Clark (0), Austin (T), Eagle Pass (6%)
	September	**hot** at Ft Clark (+4.4F); dry at Rio Grande (0)
	October	**warm** at Ft Brown (+4.6F) dry at Ft Clark (0); wet at Indianola (307% - 11.75"), Jacksboro (601%)
	November	**cool** at Ft Clark (-5.3F), Ft McKavett (-5.0F) dry at Rio Grande (6%), Ft Davis (0)
	December	wet at Eagle Pass (403%), Ft Brown (348%), San Antonio (280%), Rio Grande (350%)
1878	February	**cold** at Ft Davis (-7.1F)
	March	**cold** at Ft Brown (-4.1F); wet at Rio Grande (424%), Ft Brown (338%)
	June	wet at Jacksboro (234% - 10.91")
	July	wet at Rio Grande (401%), San Antonio (278%), Ft Brown (293%)
	September	dry at Austin (4%)
	October	dry at Austin (3%)
	November	wet at Indianola (202%), Jacksboro (257%)
	December	**cold** at Ft McKavett (-4.1F), Indianola (-5.3F), Ft Davis (-6.9F); dry at Ft McKavett (0), Ft Davis (7%)
1879	February	dry at Jacksboro (0)
	March	**warm** at Ft Clark (+6.2F), Ft Davis (+5.9F), Ft McKavett (+5.5F); dry at Indianola (7%)
	April	wet at Ft Clark (368%), San Antonio (305%)
	July	dry at Rio Grande (0), Ft Clark (T), Ft McKavett (T), San Antonio (5%), Eagle Pass (9%)
	August	wet at Indianola (195%), Rio Grande (424% - 10.82"), Ft Brown (358%), Ft McKavett (291%)
	October	wet at Ft Davis (469%)
	November	**warm** at Ft McKavett (+4.8F); dry at Eagle Pass (3%), Ft Clark (3%), Ft Davis (0), San Antonio (0), Indianola (3%), Rio Grande (0)
	December	**warm** at Ft McKavett (+4.1F), Ft Brown (+4.9F), Ft Clark (+5.0F), Ft Davis (+5.3F)

Table 5.4
STATIONS WITH FIRST FULL YEAR OF DATA 1874 OR LATER

Station	Latitude	Longitude	Established
Boerne	29°48'	98°39'	Aug 27, 1876
Brackettville	29°17'	100°51'	May 2, 1876
Brownsville	26°00'	97°30'	Sept 14, 1875
Cambridge	33°42'	98°00'	Jan 22,1876-Jan 5, 1878
Castroville	29°25'	98°50'	Jan 22, 1876
Coleman City	31°55'	99°10'	July 1, 1877
Fort Concho	31°22'	100°20'	Mar 19, 1877
Corsicana	32°05'	96°30'	Sept 15, 1874
Ft Davis	30°30'	103°45	Apr 3, 1878
Decatur	33°10'	97°30'	Apr 1, 1877
Denison	33°50'	96°40'	Sept 1, 1875
El Paso	31°46'	106°32'	Apr 13, 1878
Edinburg	26°03'	98°03'	May 27, 1877
Fredericksburg	30°20'	98°40'	Apr 1, 1877
Graham	33°01'	98°27'	Mar 4, 1877
Ft Griffin	32°53'	99°21'	Jan 22, 1876
Henrietta	33°42'	98°00'	Feb-May 1878, Feb 1879
Laredo	27°32'	99°26'	Aug 6, 1876
Mason	30°42'	99°02'	Feb 8, 1876
Pilot Point	33°20'	96°50'	Aug 5, 1877
Ft Sill	34°40'	98°30'	Sept 9, 1875
Ft Stockton	30°50'	102°50'	Nov 1, 1876
Uvalde	29°13'	99°40'	Apr 13, 1878

APPENDIX I

Texas Almanac, 1861, The Droughts of Western Texas

The four or five past years have been attended with disastrous droughts, from which crops have suffered greatly in most parts of Western Texas. These dry seasons having followed each other in succession, without a single favorable season intervening, many of the farmers, particularly those who have more recently immigrated to our State, have become discouraged, thinking, naturally enough, that these four or five years must be a pretty fair criterion for the seasons of Western Texas generally. The truth we believe, however, is that these four or five years have been an exception. We have consulted with many of the oldest farmers in the West, who all inform us that they] have never before known any such continued drought for the past twenty-five or thirty years of their residence. We are not, however, prepared to say, from any evidence before us, that Western Texas is not more liable to droughts than other portions of our State, or other countries of a higher latitude. The interesting article on the Climatology of Texas by Professor Forshey, in the TEXAS ALMANAC for 1860, furnishes some striking facts and strong evidence deduced from prevailing winds, etc., that, west of longitude 97°, Western Texas is liable to suffer from dry seasons. There are, nevertheless, many of the oldest farmers who will maintain that, with proper cultivation, especially with early planting and deep plowing, fair average crops can be secured throughout the West. And, indeed, it is admitted on all hands, that, for all the small cereals, such as wheat, rye, barley, etc., Western Texas is exceedingly favorable, as these crops are secured before the dry weather usually sets in, while for stock-raising, cattle, horses, mules, sheep, etc., Western Texas is unrivaled by any other country in the world.

While on this subject we should not omit to notice an article on the climate of Texas, published some year or two since, and written by a scientific German, named Mr. J. Kuechler, of Gillespie county. Mr. Kuechler has compiled a table giving the seasons of Western Texas for one hundred and thirty years past. He makes up his table from an examination of the rings in the growth of aged trees. By long and careful study of the subject, he believes these rings or annual growths furnish unmistakable indications whether the year of the growth was wet or dry. By examining the rings in post-oaks reaching the age of two hundred years, his table has been formed, extending over one hundred and thirty years back, during which long period he finds but nineteen dry years, eleven very dry, and twelve extremely dry; while there were, during the same period, twenty-two average years, eleven wet years, and fifty-nine very wet years. The exceedingly dry years, like those we have recently has, were in succession from 1806 to 1811, and from 1770 to 1776. Mr. Kuechler concludes that the recent dry years should be no discouragement to farmers, for that, taking the average, Western Texas is favored with seasons as favorable to agriculture as

other countries, without irrigation. Mr. Affleck, speaking on this subject, (we deem him good authority,) remarks that even during our extremely dry seasons, the crops would have suffered but little, and would have been nearly an average, but for the late spring frosts of those years. It has often been remarked, and we believe with truth, that the soil of Western Texas is better suited to withstand protracted droughts than that of almost any other country. In fact, we have often heard it remarked that fair crops of corn have been made by early planting on the river lands, without a drop of rain. We conclude with the following abstract from Mr. Kuechler's interesting table:

1725-27,	very wet.	1806-11,	extra dry.
1728-29,	dry.	1812-18,	very wet.
1730,	very wet.	1819,	average.
1731-32,	dry.	1820,	very dry.
1733-38,	very good.	1821,	very wet.
1739-41,	dry.	1822-24,	very dry.
1742-57,	very wet.	1825-26,	average.
1758,	average.	1827-31,	very wet.
1759-61,	very dry.	1832,	average.
1762-63,	wet.	1833-35,	very wet.
1764,	very dry.	1836*,	very wet.
1765-70,	very wet.	1837,	dry.
1771-76,	extremely dry.	1838,	average.
1777-78,	average.	1839-40,	very wet.
1779-80,	wet.	1841,	dry.
1781-83,	average.	1842,.	average.
1784-87,	wet.	1843-44,	dry.
1788-90,	dry.	1845-46,	very dry.
1791-92,	average.	1847,	dry.
1793-98,	very wet.	1848,	very wet.
1799,	very dry.	1849-50,	wet.
1800-5,	very wet.	1851-54,	average.
		1855-58,	dry.

*from "Legendary Texas" program of May 4 or 11, 1993.

APPENDIX II

Racer's Storm (1837), With Notes On Other Texas Hurricanes In The Period 1818-1886. [pp. 59-67.]

by S.W. Geiser
Southern Methodist University, Dallas.

HURRICANES IN TEXAS, 1818-1886

1818, date? (Hall, Stuart, Tannehill.) Galveston Island, probably Sept. or Oct. Col. W.C.D. Hall (1820) saw wrecks of four ships of Jean Lafitte, beached on the island by the hurricane two years before.

1829, Sept. 10? (Bonsignes, Blodget, Tannehill.) Bonsignes' dates are to be accepted with reservation [v. infra.] He does not date the storm exactly; Tannehill gives date with query. An inundation at the mouth of the Rio Grande; Bonsignes lists it as "one of the worst."

1831, Aug. 10-18. (Redfield, Berlandier, Blodget, Tannehill.) "The Barbadoes Hurricane." Very destructive at the mouth of the Rio Grande (Bonsignes); unloaded-goods at Brazos Santiago dispersed by waves to a great distance, and a schooner there was beached high and dry. Entered Texas Aug. 18. (Berlandier.)

1834, Sept.? (Bonsignes, Lopez, Blodget, Tannehill.) South Texas, esp. mouth of the Rio Grande. Considered by Bonsignes as one of the destructive storms.

1835, Aug. 12-18. (Berlandier, Redfield, Blodget, Tannehill.) "Antigua-Texas Hurricane." At Matamoras and present site of Corpus Christi on Aug. 18; at Brazos Santiago, storm drove vessels-unloading completely out of the water, and one was driven by waves three miles inland from the place where anchored. This hurricane failed to turn eastward after striking the coast.

1835, Sept. 18. Tannehill lists without further data. The "Nautical Magazine" for 1848, p.528, gives the following, which I reprint since it seems to be lacking from more available accounts: "On the 18th of September, [1835] during the night, Matamoras...was damaged by a dreadful hurricane. Many houses fell, three hundred damaged. The violence of the storm was tremendous; nothing could resist it: Trees were twisted and torn out of the ground, and carried away. The rain

was heavy; the river rose to a fearful height. Four lives only were lost; but more dreadful was the destruction of both lives and property in the Brass[o]s de San Jago, and in the B[oca] del Rio. Many vessels [were] stranded and dismasted. There was not a house standing in the Bonita or the [Boca Chica]."

1837, Sept. 27-Oct. 10. (Berlandier, Lopez, Redfield, Blodget, Stuart, Frazier, Tannehill.) "Racer's Storm". All of the east coast of Texas form Brazos Santiago to (present) Sabine Pass. On Oct. 2/3 at Matamoras; destroyed town of Brazos Santiago, and inundated coast for many miles inland; Oct. 5/6 at Galveston. Five vessels beached at Velasco, and many at Galveston. [See main body of this article.]

1838, date? (Bonsignes, Blodget, Tannehill.) Listed, without date, by Bonsignes as flooding the lower Texas coast at Brazos Santiago. Is it possible that we have here another error of recall of Bonsignes - that he is confusing the "Racer" Storm with the year 1838? [In his report to Lt. Webster, Bonsignes does not ignore the Racer Storm.] Blodget and Tannehill have included this 1838 hurricane only on Bonsignes report. The "Nautical Magazine" for 1848, p. 529, notes what may be Bonsignes' hurricane: one of Nov. 1, very severe at Vera Cruz, in which 3 U.S. vessels were lost (two of them with their crews.)

1839, Nov. 5. Tannehill lists at Galveston; Blodget does not include. A mislaid datum also locates disturbances at this date on San Luis Island, and in the Gulf of Mexico.

1840, date? Another dateless record of Bonsignes, nor corroborated by Lopez or Berlandier [the latter a most careful and trustworthy observer.] Ascribed to lower Texas, with villages destroyed at the mouth of the Rio Grande. It is not stated whether it extended elsewhere in Texas. Can Bonsignes be confusing this with "Antje's" Storm? [Bonsignes has ignored that storm.]

1842, Aug. 30-Sept. 9. (Redfield, Lopez, Blodget, Stuart, Frazier, Tannehill.) "Antje's Hurricane." Struck the Mexican coast about halfway between Tampico and Brownsville (Sept. 8), and on Sept. 9 was "wasting" 60 miles inland from Tampico. The coast of the mouth of the Rio Grande (and from Tampico to Corpus Christi)was inundated.

1842, Oct. 5. (Blodget?, Redfield?, Stuart, Frazier, Tannehill.) Blodget and Redfield believed this to be the same as the Oct. 2-10 hurricane (the "Gulf of Mexico - Bermuda Storm") but Tannehill believes the two distinct. At Galveston the wind was not so high as in the Racer Storm, although there was considerable damage to buildings and shipping.

1844, Aug. 4-6. (Bonsignes, Lopez, Berlandier, Blodget, Tannehill.) Mouth of the Rio Grande; "very little rainfall, the most terrible and destructive storm. Some 40 lives lost. The sea was forced three leagues over the beach, and the Mexican government ordered the customhouse to be removed to Point Isabel. Not a single house remained at Brazos Santiago or at the mouth of the river." (Berlandier)

1854, Sept. 15-19. (Stuart, Frazier, Tannehill.) "The Great September Hurricane of 1854." Matagorda, Galveston, and upper Texas coast. Greatest damage at Matagorda (Sept. 18); no inundation of the town, but nearly all houses destroyed by the wind, two persons killed. Saluria was destroyed. The steamer "Kate Ward," with her crew, was lost in Matagorda Bay. Little damage was done at Galveston.

1866, ? Oct. Tannehill lists one at Galveston, but gives no data.

1867, Oct. 1-3. (Stuart, Frazier, Tannehill.) Mouth of Rio Grande, and Texas coast to Galveston and beyond. Course of storm much like that of "Racer" hurricane of 1837. Bagdad and Clarksville at mouth of the Rio Grande destroyed (Oct. 1); Galveston flooded (Oct. 2/3), with several lives lost and property and shipping losses of a million dollars.

1871, June 1-4. (Frazier, Tannehill.) Texas coast, not specified by Tannehill; low barometer and very heavy sea, with rainfall, at Galveston. (Frazier, p.457.)

1871, June 9/10. (Frazier, Tannehill.) Galveston. Considerable property damage, but no loss of life.

1871, Oct. 2/3. (Stuart, Frazier, Tannehill.) Galveston extensively flooded, with heavy wind from the east, and severe losses in shipping.

1874, July 2-4. Gulf of Mexico, Indianola. [Not the disastrous 1875S16 Indianola hurricane, q.v.] Tannehill lists without comment.

1874, Sept. 3-6. (Frazier, Tannehill.) Gulf coast of Texas, moved n.n.w. into Texas. Little or no damage at Galveston.

1875, Sept. 14-19. (Frazier, Tannehill, ch. ii, xiii.) "Cuba-Gulf-Indianola Hurricane." Course passed over Indianola (Sept. 16); three-fourths of the houses at Indianola were wrecked, and 176 lives lost. One of the most destructive hurricanes on the Texan coast. Considerable damage was done at Galveston, and several blocks of land were carried out to sea from the Island. (Frazier, p. 457)

1879, Aug. 20-23. Yucatan, Texas Coast. Tannehill lists without details.

1880, Aug. 7-13. (Tannehill.) Yucatan, Matamoros. Manifested in Texas?

1885, Sept. 17-21. (Tannehill.) Brownsville-southern Louisiana-Georgia.

1885, June 13/14. (Tannehill, ch. xiii.) inundation at Sabine, Texas, for several miles inland.

1886, Aug. 13-20. (Tannehill, ch. ii, xiii.) "The Second Indianola Hurricane." East Caribbean-Cuba-Indianola. Very severe in Cuba; destroyed Indianola (Aug. 19/20.)

1886, Sept. 11-21. (Tannehill.) Brownsville. Passed inland Sept. 21/22. The hurricane path included Dominica, Yucatan, and the Texan coast at Brownsville.

1886, Oct. 3-18. (Tannehill, ch. xiii.) At Sabine Pass. Inundated Johnson's Bayou and Sabine Pass twenty miles inland, with much property damage and the loss of 150 lives. The hurricane came from western Cuba, and passed into extreme east Texas.

APPENDIX III

Texas Almanac 1860, pages 119 - 125

Climatology of Texas

Geographical Position

The State of Texas is bounded on the north by Red River, nearly on the 34th parallel, from the 94th to the 100th meridian; on the east, by the Sabine, nearly along the 94th meridian; on the south, by the Gulf of Mexico, whose coast has a south-western trend, from latitude 29° 45', long. 93° 55', to the 97th meridian, and thence it bears nearly south, from lat. 28° to 26°, where it reaches the 98th meridian. The Rio Grande is the western boundary, hence to lat. 32°, at long. 106° 30'.

For the purposes of this paper, devoted to Texas Climatology, all that portion of the State lying west of the 100th meridian, will be excluded, except when expressly embraced. Further and more exact information is necessary before that region can be described; and a much denser population must be carried thither, before that description will be needed.

Climatic Divisions

The area of Texas presents two distinct climates, with an intermediate region, sharing, in a marked degree, the peculiarities of both. These are bounded by lines, or belts of longitude, rather than latitude, and are dependent upon hygrometric, rather than thermal considerations.

By pursuing and applying the principles announced in the chapter on Meteorology; and giving due force to geographic causes, we shall best describe and give bounds to the two climates adverted to, and account for the many discordant phenomena, along the neutral area between them.

As shown in the principles of Meteorology, if all water the air can hold at 80°, were suddenly condensed upon the earth, its depth would not much exceed five inches; and as the air never parts with all its vapor, nor indeed much more than half of it, it becomes obvious that the moving atmosphere has to perform the offices of irrigation, by visiting the reservoirs of water, taking up their burden of vapor, and carrying and discharging it over the thirsty earth.

The southerly winds alone, in Texas, have such a direction as to bring us water. The Gulf of Mexico is our reservoir. All west winds and north winds are thirsty, and come to drink up and bear away the water our south winds have pumped up from the Gulf of Mexico, and sprinkled over us.

The South Winds

1. The winds of spring, summer, and autumn, and a due portion of the winter, blow from the south, across the area of Texas. Along the Gulf coast, from the Sabine to the Brazos, the direction of this wind is from a point east of south; from the Brazos to the Lavaca Bay it is from due south; and from all the Gulf and Mexican bounds of Texas, west of Lavaca, it is believed that the wind has a little westing. This last, however, lacks the testimony of systematic observations.

2. This south wind, starting from near the boundary of the regular Trades, and running in a counter direction, has a mean velocity of some five miles per hour at the coast, and diminishes in force as it progresses interior. On the parallel 34°, I found it scarcely perceptible, in August, 1858. The inhabitants say, it is usually more active. It may have a force of two miles per hour. It comes from the Gulf, charged with vapor, so that the vigor it imparts to vegetation, even in the most obstinate drouths, within the first seventy miles of its travel from the coast, is greatly lessened, and at 2 1/2° is nearly inappreciable.

3. These remarks, as to the humidity of the south wind, must of course be confined to that portion of Texas lying northwardly from the Gulf. Both theory and experience prove, that in all those western portions of the State, where the south wind comes not over the Gulf, it can have little or nothing of the humidity that marks the character of the same wind east of long. 97°, or 98° west. For in the travel of such wind as passes from south to north, along meridians west of the Gulf of Mexico, it is obvious they have no opportunity to imbibe humidity, after their passage over the Cordilleras. Those mountains have an average elevation of more than 10,000 feet, or two miles. All winds ascending them from the level of the Pacific, even if saturated in starting, must have their dew-point depressed by near 30° in ascending; and in descending to the plains on this side of the mountains, must be *very dry winds.. Hence the Dry Region of Western Texas.*

4. The south wind is a thin stratum, often not exceeding two or three thousand feet, while the strata above, often two or more, have different directions, and a very different condition, as to the vapor they bear.

5. At times, an especially during winter, in the interval between northers, a stream of north wind blows briskly over the south wind, for some time before it can break through to the earth, and from the real norther. While this is transpiring, rain is quite impossible, however well supplied with vapor the thin stratum of south wind may be; for, whenever it ascends, in a manner to produce rain, by reduction of temperature, it mingles with the north current, which is so very thirsty as to drink up every particle of vapor.

6. And even when the south wind accumulates considerable thickness - for it grows thicker by continuing long - and extends from the earth's surface up to the base of the Cirrous region, the attempts to produce rain are often defeated by the greedy aridity of that great upper current, which has come over the Cordilleras. Still, rain is more abundant under these circumstances than when

there is a north wind interposed, between the regular south wind, and upper south-west stratum of the air.

7. Hence, for these considerations, *the fluctuating character of the seasons, between the meridians 96° and 98° west.*

8. The south winds are the source of comfort and positive luxury to the inhabitants of Texas, during the hot weather of summer.

The nearer the sea-coast, the cooler and more brisk the current. But the entire area of prairie, and a large portion of the timbered country, feel it as a pleasant, healthful breeze, rendering our highest temperature tolerable.

Causes which produce and direct the South Wind

9. The sun heats up the air, over the land more than over the sea; and lands not covered by forests, radiate more heat than those that are shaded. The air over the prairie portion of Texas, then, has a tendency to rise, and the cooler air from the Gulf flows outward to replace it. This, in its turn, heats up, and rises as it travels onward, calling for still other supplies of refreshing air from the Gulf. As the prairie portion of the State lies chiefly west of Galveston Bay, or meridian 95°, the south wind comes from points east of south, up to this meridian.

10. This south wind is doubtless supplied, along the border of Trades, by a *descent* of the upper stratum of *reflux* Trades, which current has a motion northward before its descent, and thus adds considerably to the force with which it flows onward.

11. The retardation, mentioned above as noticeable at a distance from the Gulf, is caused by a large admixture of this south wind above with the south-west reflux Trades. The latter *always* moves slowly, and gradually merges this Texan south wind, and bears it off north-eastwardly, between lat. 34° and 38°.

Table Showing The Amount Of Rain For The Several Longitudes From the Mississippi River To The Rio Grande, Long. 106.

Place of Observation	Lat.	Long.	Inches of Rain Between Long. 101-107	99-101	97-99	95-97	90-95	No. Years Mean.
Fort Gaines, Minn,	46°19'	94°19'	....	....	....	....	29.48	4 years
" Laramie, Neb.,	42°12'	104°47'	19.98	....	....	....	....	2 "
" Des Moines, Io.,	41°32'	98°88'	....	....	....	....	26.56	2 "
" Crawford, Wis.,	40°05'	91°00'	....	....	....	....	31.40	7 "
Jeff. Barracks, Mo.,	38°28'	90°15'	....	....	....	....	41.95	15 "
Fort Mass, N. Mex.,	37°32'	105°23'	20.45	....	....	....	....	
Fort Union, "	35°54'	104°57'	19.24	....	....	....	....	3 "
Santa Fe, "	35°41'	106°02'	19.88	....	....	....	32.35	$2\frac{1}{4}$ "
Fort Gibson, Ark.,	35°47'	95°10'	....	....	....	36.46	....	17 "
" Smith, "	35°28'	94°29'	....	....	....	42.10	....	13 "
" Arbuckle, In. T.,	34°27'	97°09'	....	....	30.57	....	....	4 "
" Towson, "	34°00'	95°23'	....	....	....	51.08	....	10 "
" Belknap, Texas,	33°08'	98°48'	....	....	22.00	....	....	2 "
" Worth, "	32°40'	97°25'	....	....	40.86?	....	....	3? "
" Phantom Hill, Tex.,	32°30'	99°45'	....	17.22	....	....	....	1 "
" Graham, "	31°56'	97°26'	....	....	40.58	....	....	2 "
" Chadbourne, "	31°33'	100°40'	....	31.88	....	....	....	2 "
" Jessup, La.,	31°33'	98°32'	....	....	....	....	45.85	9 "
" McKavitt, Texas,	30°50'	100°00'	....	23.27	....	....	....	4 "
" Croghan, "	30°40'	98°31'	....	....	36.56	....	....	3 "
Baton Rouge,	30°26'	91°18'	....	....	....	....	62.10	6 "
Webberville, Texas,	30°18'	97°25'	....	....	32.59	....	....	3 "
Rutersville, "	29°58'	96°46'	....	....	....	33.12	....	$2\frac{1}{8}$ "
New-Orleans,	29°57'	90°00'	....	....	....	....	60.90	6 "
San Antonio, Texas,	29°25'	98°25'	....	....	33.77	....	....	2 "
Fort Clark, "	29°17'	100°25'	....	21.80	....	....	....	2 "
" Inge, "	29°00'	99°47'	....	27.99	....	....	....	4 "
" Duncan, "	28°42'	100°30'	....	22.20	....	....	....	5 "
" Merill, "	28°17'	98°00'	....	....	30.82	....	....	2 "
" Ewell, "	28°05'	98°57'	....	....	30.82	....	....	2 "
Corpus Christi,"	27°47'	97°27'	....	....	30.82	....	....	2 "
Fort McIntosh, "	27°31'	99°22'	....	18.66	....	....	....	5 "
Ringold Barracks, Tex.,	26°28'	97°02'	....	....	20.95	....	....	5 "
Fort Brown,	25°54'	97°26'	....	....	33.65	....	....	5 "
	Mean rain, in inches	19.90	23.29	31.25	42.11	47.32		

NOTE - Along lat. 30° to 31°, from New Orleans at 9°W., to Fort McKavitt, in Menard Couty, Texas, 100°W, the amount of rain for the four years up to 1855, is reduced from 61 inches to $23\frac{1}{4}$ inches. And from 97°, which is nearly tangent to the Gulf of Mexico, to 100°, the reduction is from 88 inches to 23 inches.

TEXAS NORTHERS

Number and Duration

1. During seven or eight months of every year, Texas is liable to a class of storms, or winds, styled *"northers"*, from the direction from which they come.

2. In the year 1857, there were twenty-six northers experienced at the Texas Military Institute, in Fayette County. Of these some two or three were gentle or baffled northers. They occupied fifty-seven days, having an average of two and one-fifth days in length. The latest in spring, was May 16, and earliest in autumn, was Nov. 7.

3. In the year 1858, there were thirty-seven northers, about thirty-three of which might be classed as *well marked*, the others being either gentle or baffled northers. These occupied seventy-eight days. The latest in spring, was May 9, and the earliest in autumn, was Oct. 7.

4. In the first half of 1859, there have been twenty-four northers, of which four may be described as gentle or baffled northers. They have occupied forty-seven days in their transit, and the latest was May 24.

5. It is proper to remark that nearly all the northers of May and October are mild, and rarely do much damage, or produce so low a temperature as to be severely felt. All the other months, November to April inclusive, are liable to northers of considerable severity.

6. It appears then, that in thirty months last past, of which eighteen months are liable to distinct northers, we have experienced eighty northers, not including the feeble ones of May and October. The same period has seventy-seven weeks, very nearly affirming the hypothesis of *weekly returns* of the norther. An inspection of the table shows a large number of punctual weekly recurrences of this meteor.

7. At this place of observation their duration varies from one to four days.

Area and Boundaries of Norther

8. The region over which this peculiar storm has it's sweep, is not very great, though its precise limits can not be defined. By diligent inquiry from persons of great experience, we submit the following limits:

9. On the north, by the valley of Red river, in the Indian Territory;* on the east, by the second tier of counties‡ from the east-boundary of Texas, near meridian 95°, south to the Trinity and thence south-east to the mouth of the Sabine. On the south they are felt across the Gulf, to the

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* Senator Throckmorton

‡ Senator Lott says, they begin in the west of Titus Co., none in Cass.

coast of South-Mexico and Yucatan. On the west they are bounded by the Sierra-Madre, up to the mouth of the Pecos, and thence by about the 101st meridian to the sources of Red river.

10. Within this area, there are various degrees of violence, having their axis of intensity between meridians 97 and 98§ , and increasing in force and duration, the further south. At Red river, on this line, they are usually limited to a day or two; whereas at Corpus Christi⇓ and Matamoras, one norther often continues till the next supersedes it; and at Vera Cruz, a twenty-days norther is not remarkable.

West of Fort Belknap, to the Pecos, the northers grow feebler and rarer.† North of Red river, on the route from Fort Washita to Fort Smith, they are rarely felt.*

On the east margin, they are much modified by the forests of the timbered region. At all points, an open prairie increases their vigor.

Forces and Phenomena

11. The norther usually commences with a violence nearly equal to its greatest force, if its initial point be near the observer. If it has travelled some distance, it will be warmed up, and moderated in its violence, at first attack. Its greatest force might be marked five, in a scale between a gentle breeze, at one, and a hurricane, at 10. The writer has measured one travelling at about thirty-two miles per hour - but many others at twelve to eighteen miles. The mean progress seemed to be about fifteen miles per hour.

12. Just before a norther, two to six hours, the south wind lulls, and the still air becomes very oppressive. A low black cloud rolls up from the north, and when it comes near the zenith, the wind strikes with vigor. Sometimes we have a sudden dash of rain; but generally northers are intensely dry, and soon drink up all the moisture of the surface earth, and of the objects upon it, capable of yielding their humidity.

Great thirst of man, and all other animals, is experienced; an itching sensation over the skin; a highly electric condition of the skin of horses and cats; a wilting and withering of vegetation, even when the temperatures would not account for it; a reduction of temperature, usually very sudden, sometimes, though rarely, a degree per minute, for twenty minutes; and in winter commonly a reduction from 70° or 75°, to 30° or 40°.

This fall of temperature is more severely felt from the drying power of the north wind - evaporation from the surface of the skin increasing the severity of the temperature.

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§ Senator Taylor, of Fannin

⇓ Senators Maverick and Britton

† Col. M.T. Johnson

13. Nervous, rheumatic, and gouty persons suffer more severely than others. To invalids suffering form other maladies, it has not been found unhealthy; and for persons of weak lungs, if not to be more salubrious than the humid south winds. *Consumptions do not originate over the area of the norther.* On the contrary, many persons afflicted with weak or diseased lungs, resort to this region, and find relief. The western and northern portions of this area are most salubrious, and best adapted to weak lungs.

Theory of Cause, and Mode of Operation

14. *Hypothesis* - Suppose, by any means, a cataract or plunge of air from the great upper current, travelling to the north-east, were poured down upon the earth, about the central or northern portion of the "norther" area, what would be its characteristics, and whither would it tend?

15. It would be cold and dry. One mile of descent would bring a temperature 17° lower, and two miles, a temperature of 33°, provided the air should retain the temperature of that elevation. Its dew-point would be very low, though its descent should be but one mile; for its elevation in crossing the Cordilleras could not be less than two miles, or 10,000 feet. Whatever its temperature, in descending, it must be intensely dry.

16. The barometer must rise during the cataract, for these two reasons: that the whole column, being very dry, would be heavier than if the dew-point were high, and that the downward plunge of air must raise the barometric column.

17. The direction in which this torrent would flow at the earth's surface, is determined by the same physical law that occasions water to run downhill. It is heavier than humid air, and *must flow into the Trades*, to supply the demand that causes them. The direction would be south, until the current should reach the Trades, and be deflected with them to the west.

18. After the cataract fairly commenced, it would widen and deepen; it would rush by gusts along the ground, until its course was fairly established; it would lift up the humid south wind, now saturated, (or nearly so,) and would condense its vapor into a thick, black cloud on its margin, and give a shower at the beginning. Its thirstiness, however, would enable it to drink up nearly all the vapor its could would condense, so as to give but little rain. It would commence later, both in front and in rear of its initial point. It would increase in violence in both directions, but vastly more so in advance, where it would widen, and continue in violence and duration to the tropics.

20. *Application. - All these are marked phenomena of the real norther*, and hence, for the present, we adopt the hypothesis of a plunge or cataract of air form the upper regions, as the theory of this peculiar storm.

21. The unskilled meteorologist will receive this solution with less reluctance, when he is assured that between lat. 23° and 28°, there is a well-established region of high barometer, in which the reflux Trades send down to the surface of the earth, a vast flood of air - by gentle descent - to resupply the Trades, and to flow in the opposite direction, and form the south-west winds which prevail over all the southern half of the temperature zone, on this continent. Our own life-giving south wind is fed by this general descent of air, along the border of the tropics.

Phenomena not readily explicable

22. When a dry norther commences, the whole air, in an hour or two, curdles, and becomes smoky, or rather whitish, and has a distinct smell. Its odor sometimes resembles that which is developed by a flash of lightning, though at other times, it reminds one of fine straw smoke, in its odor. It is highly probable that this turbidness and odor, are due to ozone set free, by the high electrical excitation, in a dry norther. Experiments instituted to test the matter, last April, were too late in the season.

23. *Sirocco* - When the norther has a little westing, it is observed to be more intensely dry, and to be destructive to vegetation, even before the frost which usually follows it. Corn, beans, young foliage, and the grass and weeds of the prairie, bow and wither before it.* A few of these I have called *Sirrocos*. They occur as well in summer as in spring or autumn, and differ, in several respects, from the true norther.

24. It is not a little remarkable, that the central violence, as well as the middle region, or axis of the norther, lies along the boundary between the two climates.

25. By way of aiding the observer to recognize this boundary, without knowing his longitude, we would call attention to certain indexes in the animal and vegetable kingdom, which are entirely reliable, and are peculiar, or belong chiefly, to a dry climate:

Animals - Mule-eared rabbit, civet cat, Mexican hog.
Reptiles† - Coachwhip, joint-snake, spreading-adder, Amphis Benae, or blind-snake, scorpion, and tarantula.
Birds - Mexican buzzards, swallow-tailed fly catcher or scissor-tail, prairie hawk.
Insects - The cutting ant and the devouring grasshopper.

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* The citizens of Galveston, and the southern portions of Texas, will remember the violent northwester in 1856, which preceeded and attended the storm which wrecked the Nautilus. It was, in my judgement, a true Sirocco. In like manner the norht-west wind that withered the corn-fields in Lamar, Fannin, and Grayson, and the counties south of these, on the 17th day of August, 1858, deserves a like name.

† Reptiles of all kinds are vastly more numerous over the dry region.

Vegetation, Trees - All of stunted growth, except on streams. The Mesquite tree, infallible; cactus plants; Agave Americana, or aloes.

These will not be limited along a definite line, but will not be found far or numerous east of long. 97°. The lower Cross Timbers lie nearly along the limit of all these indices.

GENERAL CONSIDERATION

1. This essay will have shown that the climatic divisions of Texas, as alleged in Art. II., are founded upon natural, and therefore permanent, laws. Human interest is best consulted in the tracing out and early announcement of these laws, foe every district of country. Fortunately for the future wealth and independence of the vast Empire State of Texas, she boasts the phases of climate; for they beckon to enterprise and industry of such varied and mutually dependent kinds, as to warrant a large, a prosperous, and a happy population, on each climate.

2. The great staples, the cereals, the flocks, and the vines, these are the departments for investment and industry, which, with a diversified and extremely exuberant soil, shall give an abundant population, and unrivalled prosperity to every district of the State, east of the one hundredth meridian.

3. The development of her resources, and the intelligent appropriation of her various soils and climates, each to its fittest purposes, must, in a very few render her the most powerful and the most enviable of the sisterhood of States, and must enable her, better than any other member of the Union, should separation ever be her misfortune, to sustain herself alone, and to command the respect of mankind, for her empire of fertile acres, and for the diversity of industry and production that shall give her independence.

Closing Remarks - At the Montreal meeting of the American Association for the Advancement of Science, in 1857, I gave utterance, in an extemporaneous address, to the main positions herein elaborated. They were then thrown out as suggestions, for future investigations, by myself and others. The reporters of the various papers gave notes of the lecture, many of them erroneous, some perversions indeed. A subsequent letter, called from me by gentlemen in our capital, corrected in mass these perversions, but did not entirely save me from criticism and censure. In subsequent investigation, I have demonstrated the leading doctrines then announced, and herewith submit them to an intelligent public. The effort to condense and make the paper short, to meet the views and objects of the publishers of the Almanac, has excluded much of the statistical matter on which the conclusions are founded.

Begging the favorable consideration and indulgence of my fellow-citizens of Texas, in a new and very difficult field of investigation, rendered the more difficult from the rareness of systematic observations in the State, I earnestly call upon them for aid in my future labors, in translating the language of nature, in which our future of wealth, greatness, and power is written.

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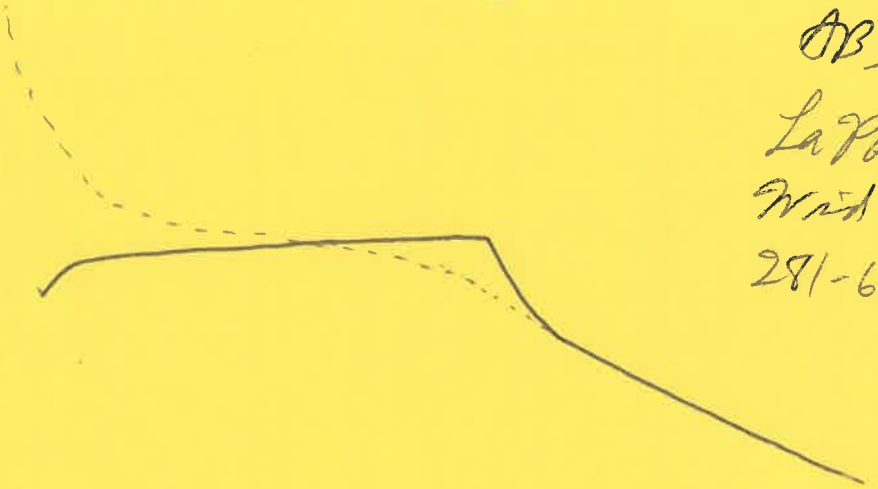

Bernard Dijon
OBS
La Porte windrose
Wind
281-673-2889