In the following table are given, for the various sections of the Climate and Crop Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Summary of temperature and precipitation by sections, December, 1903.

Section.	Temperature—in degrees Fahrenheit.								Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.						Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.			Station.	Amount.	Station.	Amount.
Alabama	40.9	−5.8	Daphne	71	24	Hamilton	11	27	2.93	−1.44	Citronelle	5.28	Anniston	0.69
Arizona	45.7	−0.2	Dragoon	84	3	Fort Defiance	−2	6	0.12	−0.90	Pinal Ranch	0.86	14 stations	0.00
Arkansas	39.8	−3.1	Bee Branch	74	22	Oregon	6	26	3.43	−0.35	Dutton	6.58	Conway	1.08
California	48.0	+0.4	Santa Paula	92	1	Bodie	−9	4	1.44	−2.55	Branscomb	9.75	31 stations	0.00
Colorado	28.3	+2.5	Holly	76	20	Gunnison	−26	29	0.28	−0.54	Breckenridge	2.20	4 stations	0.00
Florida	53.1	−5.6	Orange City Avon Park, Nocatee	85 85	24 25	Stephensville	−19	2	1.86	−1.02	De Funiak Springs	4.63	Miami	T.
Georgia	41.9	−5.2	Waverly	77	25	Diamond	10	27	2.22	−1.72	Oakfield	4.04	Woodbury	0.90
Idaho	27.2	.....	Blue Lakes	64	1	Chesterfield	−16	29	1.21	.....	Murray	2.60	Lost River	0.22
Illinois	24.1	−5.8	New Burnside	59	7	Lanark	−24	13	1.79	−0.56	Cairo	3.85	Martinton, Paris	0.29
Indiana	24.2	−7.7	Connersville	67	23	Hammond	−17	13	2.16	−0.72	Rensselaer	3.71	Indianapolis	0.58
Iowa	19.6	−3.9	Hopeville, Mt. Ayr Osceola, St. Charles	58 58	31 31	Sibley	−27	13	0.41	−0.88	Ridgeway	1.96	Storm Lake	T.
Kansas	33.8	+0.1	Cunningham	73	30	Baker	−3	13	0.43	−0.61	Pleasanton	1.97	Hanover, Lebanon	0.00
Kentucky	30.7	−6.9	Alpha Jackson	58 58	23 31	Beattyville Scott	0 0	27 30	2.88	−0.69	Alpha	4.25	Scott	1.09
Louisiana	48.2	−4.0	State Ex. Station	85	24	Caspiana	17	6	3.92	−0.58	Minden	5.55	Venice	1.52
Maryland and Delaware	30.2	−4.7	Oakland, Md	60	20	Oakland, Md	−9	29	2.46	−0.79	Milford, Del	4.52	Westernport, Md	0.32
Michigan	19.0	−6.8	Mount Pleasant	43	24	Ironwood	−25	13	2.19	0.00	Kalamazoo	5.17	Plymouth	0.45
Minnesota	9.8	−6.0	Winnebago City	50	6	Pokegema Falls	−45	25	0.84	0.00	Mount Iron	2.73	Pipestone	0.13
Mississippi	42.9	−4.9	Natchez	80	24	Ripley	12	6	3.76	−1.05	Austin	6.63	Kosciusko	1.85
Missouri	30.2	−3.0	Arthur, Dean, Gano, Neosho, Protem	65 65	31 31	Montreal	−11	13	1.51	−0.77	New Madrid	4.62	Rockport	0.13
Montana	27.2	+4.7	Chinook	65	1	Cut Bank	−27	14	0.72	−0.27	Lamedeer	2.00	Chinook	0.05
Nebraska	28.4	+1.3	Almar	66	2	Wakefield	−13	13	0.10	−0.52	Agee, Kennedy	0.40	17 stations	0.00
Nevada	30.4	−0.8	Martins Ranch	71	20	McAfee's Ranch	−9	7	0.14	−1.18	Battle Mountain	1.10	7 stations	0.00
New England*	22.3	−5.4	Narragansett Pier, R. I.	57	20	Van Buren, Me Morrisville, Vt	−24 −24	15 15, 19	3.18	−0.33	Cream Hill, Conn	6.65	Cornwall, Vt	0.85
New Jersey	28.6	−5.2	Lakewood Beverly, Pemberton	55 55	13 20	Layton	−13	19	4.08	+0.36	Atlantic City	5.49	Trenton	3.20
New Mexico	34.5	−0.2	Carlsbad	84	2	Mountainair	−11	5	0.07	−0.60	Mountainair	0.52	7 stations	0.00
New York	21.2	−5.8	Oyster Bay	56	20	Indian Lake	−26	27, 29	2.76	−0.52	Number Four	9.56	Penn Yan	0.75
North Carolina	36.7	−5.7	Whiteville Sloan, Wilmington	68 68	14 25	Linville	−7	1	2.16	−1.70	Hatteras	3.27	Marshall	0.60
North Dakota	11.6	−2.2	Jamestown	57	3	3 stations	−33	12-14	0.77	+0.18	Hamilton	1.67	2 stations	0.10
Ohio	23.4	−7.5	Coalton	57	13	Milligan Warsaw	−11 −11	17 28	2.07	−0.65	Milfordton	3.46	Somerset	1.17
Oklahoma and Indian Territories.	40.1	+0.8	Kenton, Okla	73	2	Okeene, Okla	7	13	0.64	−1.18	Webbers Falls, Ind. T	3.06	7 stations	0.00
Oregon	37.0	−0.2	Gold Beach	70	1	Pine	−3	30	3.16	−3.72	Glenora	12.37	Prineville	0.09
Pennsylvania	25.4	−5.5	Franklin	60	12	Dushore Saegerstown	−14 −14	27 29	2.66	−0.58	Girardville	4.83	Davis Island Dam	0.92
Porto Rico	74.8	.....	San German	95	12	Barros, Cidra	51	2	7.49	.....	Cidra	15.75	Coamo	1.01
South Carolina	41.0	−5.2	Bennettsville Gillisonville Walterboro	72 72 72	9 25 25	Spartanburg	10	27	1.95	−0.88	Smiths Mills	3.48	Barksdale	0.57
South Dakota	18.4	−2.4	Ashcroft	65	1	Forestburg	−34	13	0.65	+0.23	Aberdeen	1.86	Pine Ridge	0.09
Tennessee	34.9	−5.2	Waynesboro	67	31	Silver Lake	2	1	3.73	−0.51	Trenton	5.45	Elizabethton	1.56
Texas	50.3	+0.1	Cotulla	92	31	Mount Blanco	10	13	1.28	−0.92	Columbia	6.04	13 stations	0.00
Utah	26.4	−1.3	Tropic	76	1	Plateau	−26	27	0.37	−0.66	Park City	1.45	10 stations	0.00
Virginia	32.8	−5.7	Williamsburg	70	21	Marion	−4	1	1.98	−1.13	Elk Knob	4.21	McDowell	0.42
Washington	35.0	−0.1	3 stations	63	1, 5, 13	Lakeside	4	12	3.00	−2.44	Clearwater	11.21	Sunnyside	0.24
West Virginia	26.5	−8.4	Lillydale	59	25	Marlinton	−11	1	2.00	−1.17	Buckhannon	4.43	Moorefield	0.30
Wisconsin	12.7	−7.2	Prairie du Chien	50	7	Grand Rapids	−32	13	0.87	−0.46	Beloit	2.17	Menasha	0.23
Wyoming	24.4	+2.3	Phillips	67	1	Border	−21	28	0.64	−0.27	Battle	7.60	Fontenelle	T.

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

SPECIAL CONTRIBUTIONS.

RECENT PAPERS BEARING ON METEOROLOGY.

Dr. W. F. R. PHILLIPS, Librarian, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——.

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Day, Arthur L. and Van Orstrand, C. E. The Black Body and Measurement of Extreme Temperatures. Pp. 1-40.

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—— Einfluss der Luftkompression auf den Menschen. [Review of article of Kabrhel.] Pp. 56-57.
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ON THE USE OF SOUNDING BALLOONS FOR METEOROLOGICAL OBSERVATIONS AT GREAT HEIGHTS.

Note by Ch. Renard, translated from Comptes Rendus, Paris, 1892, vol. 115, pp. 1049-54.

I have the honor to present to the academy a memoir on the employment of unmanned balloons for making meteorological observations at great heights; this note is a summary of that memoir.

If we could ignore all anxiety on account of the dangers to which the aeronaut is exposed in the upper regions, it would appear very easy for balloons to attain great heights. This facility is, however, only apparent. In reality, the atmosphere presents itself to us like a mountain whose slopes are at first very gentle, but change rapidly into a perpendicular wall.

For the sake of simplicity let us suppose that the temperature of the air is uniform and equal to 0° C., then by neglecting the feeble variations of g, or gravity, with the altitude, this would give:[1]

$$y = 18400 \log n,$$

where y is the altitude in meters above the plane where the pressure is 1 kilogram per square meter. n is the reciprocal of the pressure, or the denominator of the fraction $1/n$, which expresses the pressure in kilograms per square centimeter.

[1] The fundamental differential equation for barometric hypsometry is:

$$dp = -wdh,$$

where w is the weight of a unit volume of the air at the given pressure p, and absolute temperature (T) and under the constant force of gravity, but the weight of a unit volume is as its density ρ and is connected with the pressure and temperature by the relation

$$pv = p\frac{1}{\rho} = \frac{p}{w} = RT,$$

where R is a constant, whence

$$dp = -\frac{p}{RT}dh,$$

assuming with M. Renard that the temperature of the air is constant and equal to 0° C., the T becomes the constant 273° C. and $RT =$ the constant 273 X (29.2713). The intergation of this equation gives us nap. $\log p = -\frac{h}{RT} +$ constant.

When $p = 1$ kilogram per square centimeter the altitude is hh_1, and the arbitrary constant becomes $\frac{h_1}{RT}$, whence

$$\text{nap. log } p = \frac{1}{RT}[h_1 - h]$$

or

$$h - h_1 = RT \text{ nap. log } \frac{1}{p}.$$

If ordinary or Briggs' logarithms are used, this becomes

$$h - h_1 = \frac{RT}{Mod.} \log \frac{1}{p}.$$