OKLAHOMA.

Temperature.—Maximum, 80, at Mangum, 10th; minimum, 10, at Fort Supply, 8th; greatest monthly range, 62, at Fort Supply; least monthly range, 46, at Guthrie.

Precipitation.—Greatest monthly, 5.14, at Keokuk Falls; least monthly, 0.24, at Mangum.

Wind.—Prevailing direction, north.—*Louis Dorman, Observer, Weather Bureau, Oklahoma City, director.*

PENNSYLVANIA.

Temperature.—The mean was 3.0 above the normal; maximum, 62, at Pittsburg, 25th; minimum, —18, at Saegerstown, 13th; greatest monthly range, 71, at Saegerstown; least monthly range, 37, at Swarthmore.

Precipitation.—Greatest monthly, 4.48, at Blue Knob; least monthly, 0.43, at Swarthmore.

Wind.—Prevailing direction, northwest.—*Under direction of the Franklin Institute, Philadelphia; H. L. Ball, Observer, Weather Bureau, assistant.*

SOUTH CAROLINA.

Temperature.—Maximum, 73, at Charleston, 15th; minimum, 18, at Winnsborough, 12th.

Precipitation.—Greatest monthly, 6.04, at Evergreen.

Wind.—Prevailing directions, northwest and southwest.—*A. P. Butler, Observer, Weather Bureau, Columbia, director.*

SOUTH DAKOTA.

Temperature.—The mean was 1.3 above the normal; maximum, 61, at Cross, 21st; minimum, —26, at Webster, 15th; greatest monthly range, 73, at Clark, Watertown, and Webster; least monthly range, 54, at Parkston.

Precipitation.—The average was 0.06 above the normal; greatest monthly, 1.52, at Mitchell; least monthly, 0.03, at Aberdeen.

Wind.—Prevailing direction, northwest.—*S. W. Glenn, Local Forecast Official, Weather Bureau, Huron, director.*

TENNESSEE WEATHER CROP SERVICE.

Temperature.—The mean was 2.0 below the normal; maximum, 71, at Memphis, 24th; minimum, 16, at Johnson City, 7th; greatest monthly range, 50, at Dunlap; least monthly range, 29, at Missionary Ridge.

Precipitation.—The average was 2.08 below the normal; greatest monthly, 5.44, at Sharp; least monthly, 1.51, at Andersonville.—*J. B. Marbury, Local Forecast Official, Weather Bureau, Nashville, director.*

TEXAS.

Temperature.—The mean was 9.1 above the normal; maximum, 89, at Brownsville, 11th; minimum, 13, at Dallas, 12th; greatest monthly range, 70, at Dallas; least monthly range, 28, at Galveston.

Precipitation.—The average was 0.46 below the normal; greatest monthly, 5.05, at Palestine; least monthly, 0.00, at Sugar Land.—*D. D. Bryan, Galveston, director; I. M. Cline, Local Forecast Official, Weather Bureau, assistant.*

UTAH.

Temperature.—Maximum, 73, at Moab, 20th; minimum, —13, at Loa, 9th; least monthly range, 33, at Snowville.

Precipitation.—Greatest monthly, 1.52, at Ogden; least monthly, 0.20, at Soldiers Summit.—*G. N. Salisbury, Observer, Weather Bureau, Salt Lake City, director.*

VIRGINIA.

Temperature.—Maximum, 74, at Richmond, 2d and 3d; minimum, —8, at Dale Enterprise, 6th; greatest monthly range, 71, at Dale Enterprise; least monthly range, 38, at Birdsnest.

Precipitation.—Greatest monthly, 5.32, at Norfolk; least monthly, 1.32, at Blacksburgh.

Wind.—Prevailing direction, northeast.—*Dr. E. A. Craighill, Lynchburgh, director; J. N. Ryker, Observer, Weather Bureau, assistant.*

WASHINGTON.

Temperature.—The mean was 3.7 above the normal; maximum, 65, at Seattle, 27th, and at Vancouver, 24th; minimum, 4, at Waterville, 5th and 6th; greatest monthly range, 46, at Coulee City and Fort Spokane; least monthly range, 16, at Tatoosh Island.

Precipitation.—The average was 2.35 below the normal; greatest monthly, 6.79, at Neah Bay; least monthly, 0.11, at Vashon.

Wind.—Prevailing direction, south.—*E. B. Olney, Observer, Weather Bureau, Olympia, director.*

WEST VIRGINIA.

Temperature.—Maximum, 72, at Elizabeth, 1st; minimum, —12, at Beverly, 6th; greatest monthly range, 73, at Moorefield; least monthly range, 49, at Wheeling.

Precipitation.—Greatest monthly, 3.17, at Parkersburgh; least monthly, 0.98, at Nuttallburgh.

Wind.—Prevailing direction, west.—*W. W. Dent, Observer, Weather Bureau, Parkersburgh, director.*

WISCONSIN.

Temperature.—The mean was about 5.0 above the normal; maximum, 57, at Prairie du Chien, 25th; minimum, —34, at Butternut, 18th, and at Hayward, 16th; greatest monthly range, 82, at Butternut; least monthly range, 36, at Cadiz.

Precipitation.—The average was about normal; greatest monthly, 3.15, at Embarrass; least monthly, 0.75, at Delavan.

Wind.—Prevailing direction, northwest.—*W. L. Moore, Local Forecast Official, Weather Bureau, Milwaukee, director.*

WYOMING.

Temperature.—Maximum, 77, at Casper, 25th; minimum, —34, at La Barge, 8th; greatest monthly range, 92, at La Barge; least monthly range, 44, at Atlantic City.

Precipitation.—Greatest monthly, 1.17, at Cheyenne; least monthly, 0.00, at Bitter Creek.

Wind.—Prevailing direction, west.—*E. M. Ravenscraft, Observer, Weather Bureau, Cheyenne, director.*

CONTRIBUTIONS AND ORIGINAL ARTICLES.

MEAN HEIGHTS AND VELOCITIES OF THE DIFFERENT CLOUD FORMS.

(Measured at Blue Hill Observatory, Mass.)

The following tables show the mean heights and velocities of the different forms of clouds in summer, winter, and for the year. These tables were prepared from records of the Observatory by Mr. H. H. Clayton, local forecast official, Weather Bureau, by permission of Mr. A. Lawrence Rotch, F. R. M. S., proprietor of the Blue Hill Meteorological Observatory.

SUMMER.

Name of cloud.	Number of clouds.	Height in feet.			Velocity in miles.		
		Mean.	Max.	Min.	Mean.	Max.	Min.
Cirrus	42	32,557	48,984	17,691	63.8	136	10
Cirro-stratus	20	26,392	39,810	7,513	55.0	153	4
Cirro-cumulus	29	17,720	39,534	7,513	36.2	87	11
Upper cumulus	12	6,572	10,919	3,638	21.0	37	6
Cumulus	104	4,833	11,752	1,972	19.5	46	5
Cumulo-stratus	12	5,177	9,029	2,051	21.3	60	15
Stratus	20	2,513	6,726	394	.....	.....	.....
Nimbus	27	2,336	5,643	213	.....	.....	.....
Scud	14	2,556	3,983	1,099	15.4	33	4

WINTER.

Cirrus	28	26,414	37,926	12,349	114.3	231	28
Cirro-stratus	7	19,292	27,926	22,386	69.3	127	46
Cirro-cumulus	8	16,280	28,117	14,997	80.1	183	40
Cumulus	26	4,531	8,825	1,745	32.0	57	7
Cumulo-stratus	6	3,763	6,752	984	28.9	47	14
Stratus	14	3,012	9,613	394	.....	.....	.....
Scud	3	1,722	2,434	984	23.9	27	21

Mean heights and velocities of different cloud forms—Continued.

YEAR (mean of summer and winter).

	Cirrus.	Cirro-stratus.	Cirro-cumulus.	Cumulus.	Cumulo-stratus.	Stratus.	Nimbus.	Scud.
Number of clouds	70	27	37	130	18	34	27	17
Mean height	29,485	22,841	16,998	4,682	4,472	2,762	2,336	2,139
Maximum height	48,984	39,810	39,534	11,752	9,029	9,613	5,643	3,983
Minimum height	12,394	7,513	7,513	1,745	984	394	213	984
Mean velocity	89.0	62.2	58.2	25.7	25.1	.....	.....	19.6
Maximum velocity	231	153	183	57	60	.....	.....	33
Minimum velocity	10	4	11	5	14	.....	.....	4

NOTE.—The forms of cloud to which the names in this table apply are defined in the General Instructions to Observers of the Weather Bureau.

SOME OBSERVATIONS OF WIND DIRECTION AT DIFFERENT ALTITUDES AROUND WEST INDIA CYCLONES.

Some very interesting observations of the difference in direction of upper and lower air currents in the vicinity of the centers of West India cyclones were made by the Weather Bureau observer, Mr. H. B. Boyer, at Key West, Fla., in 1891. The direction of the current was determined by the motion of clouds, the observations being made with a nephoscope.

The winds at the surface of the earth in the vicinity of a cyclone blow round the center in the Northern Hemisphere in a direction contrary to the direction of motion of the hands of a watch held with the face uppermost. The direction of motion is inclined in toward the center of the cyclone. With increasing height in the air the direction of the air current is not so much

toward the center, the central tendency constantly diminishing with height, and at a great height it is out from the center.

In the case of a cyclone center southeast of an observer, for instance, the wind at the surface of the earth being from the north-northeast, the low cumulus, cumulo-stratus, and stratus clouds will be moving from the northeast; the high cumulus from the east-northeast; the cirro-stratus from the east; the cirro-cumulus from the east-southeast; and the high cirrus from the south.

The relations of the motions of the air for different altitudes have never been very exactly observed and are in fact even partially surmised. Direct observations of these motions are of great practical value in meteorology.

Air pressure observations by means of the barometer are now mainly relied upon as indicating the approach of cyclones.

With exact observations of the differences in direction of air currents at different heights, and the changes in direction as observed in a large number of cases in the vicinity of cyclone centers, it would probably be possible to formulate rules by means of which some idea could be formed from the observed differences in direction and the changes what the probable motion of the center of the cyclone was going to be. This would be of the greatest importance in weather predictions, enabling the predictor to better foretell the direction and force of any coming hurricane winds that might be anticipated. Knowledge of this kind is more especially important in the case of ships at sea. A ship's course can be so regulated as to avoid a cyclone center when the position and direction of motion of the center are known.

The following are the observations of the directions of air currents at Key West, Fla., the approximate distances of cyclone centers from the place at the time, and the estimates of direction of motion of their centers, as shown by the storm-tracks given in the MONTHLY WEATHER REVIEW:

Direction from which air currents moved at Key West, Fla., 1891.

[Lat. 24° 34′ N., Long. 81° 49′ W.]

	Aug. 21, 4 to 6 p. m.	Sept. 19, 4.30 p. m.	Sept. 20, 7.30 a. m.	Oct. 6, 8 a. m.
Wind at surface of earth	nnw.	e.	e.	ne.
Cumulus clouds	n.	.....	.....	.....
Cumulo-stratus clouds	.....	ese.	ese.	ne.
Cirro-stratus clouds	.....	.....	ssw.	.....
Cirrus clouds	e.	sw.	.....	wsw.
Cyclone center from Key West in miles.	e. 800 s. 400	w. 200 s. 200	w. 350 n. or s., zero	w. 100 s. 300
Barometric pressure at cyclone center, inches	29.0	.....	.....	29.7
Motion of center of cyclone	e. to w.	se. to nw.	se. to nw.	sw. to ne.

Direction from which air currents moved at Key West, Fla., 1891—Cont'd.

	Oct. 6, 4.20 p. m.	Oct. 7, 10 a. m.	Oct. 9, 8 a. m.	Oct. 10, 10 a. m.
Wind at surface of earth	ese.	ssw.	sse.	sse.
Cumulus clouds	.....	.....	.....	.....
Cumulo-stratus clouds	se.	sw.	s.	s.
Cirro-stratus clouds	.....	w.	sw.	sw.
Cirrus clouds	wsw.	.....	.....	.....
Cyclone center from Key West in miles.	.....	e. 100 n. 150	w. 100 n. 100	e. 100 n. 400
Barometric pressure at cyclone center, inches	.....	.....	29.9	29.8
Motion of center of cyclone	sw. to ne.	sw. to ne.	sw. to ne.	sw. to ne.

METEOROLOGICAL TABLES.

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, February, 1892.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean.	Precip'n.
Alabama.	°	°	°	Ins.
Bermuda *†[5]	71	31	51.6	1.12
Bessemer	69	24	46.2	1.88
Brewton†	76	27	57.3	4.40
Carrollton †[1]	70	32	51.6	1.91
Childersburgh†	.....	.....	.....	2.65
Citronelle†	71	37	57.6	1.82
Claiborne Landing†	.....	.....	.....	2.15
Cordova†	.....	.....	.....	2.50
Daphne†	83	31	61.2	1.21
Decatur *a†	.....	.....	.....	5.31
Double Springs *†[1]	62[e]	29[e]	46.6[e]	5.04[e]
Florence a†	.....	.....	.....	5.58
Gadsden†	.....	.....	.....	3.22
Geneva†	77	30	57.3	1.97
Greensborough †[1]	75	34	55.7	2.86
Healing Springs†	79	26	57.6	2.70
Jasper†	68	22	47.8	2.55
Jemison†	68	32	54.2	3.90
Livingston a†[1]	75	31	52.0	2.43
Lynn†	.....	.....	.....	4.44
Maysville†	64	26	47.3	5.91
Mt. Vernon B'ks	76	33	57.4	2.71
Mount Willing†	71	30	55.1	1.63
Newburgh†	72	27	51.0	5.48
Newton†	76	28	57.0	3.70
Oxanna†	68	26	50.4	2.45
Pittsborough†	78	36	57.8	.....
Pushmataha†	74	30	54.0	4.20
Selma a†	.....	.....	.....	5.02
Scottsboro†	70	22	46.6	4.29
Sturdevant†	.....	.....	.....	4.75
Talladega†	.....	.....	.....	3.85
Tallassee Falls†	.....	.....	.....	4.14
Tuscaloosa†	72	28	49.8	2.50
Tuscumbia a[1]	69	29	48.4	2.82
Union Springs†	76	28	50.7	2.73
Uniontown	72	30	54.0	3.94
Valley Head †[1]	66	18	44.4	2.62
Wiggins†	74[m]	25[m]	56.4[m]	2.41
Alaska.				
Killisnoo †[1]	41	10	29.9	7.30
Metlakahtla†	52	21	36.9	6.44
Arizona.				
Antelope Valley†	.....	.....	.....	3.76
Ariz. Can. Co. Dam.†	83	33	57.2	2.27
Benson *[1]	72	31	49.1	1.30
Bisbee †[1]	70	22	45.4	2.39
Buckeye†	.....	.....	.....	0.03
Calabasas *†[1]	70	32	49.9	1.73
Casa Grande *[1]	73	30	54.8	2.35
Crittenden†	74[1]	33[1]	.....	5.00
Dos Cabezos †	.....	.....	.....	2.27
Dragoon†	.....	.....	.....	2.67
Dragoon Summit *[1]	65	45	48.1	1.83
Dudleyville *†[1]	78	32	52.2	2.69
Farleys Camp	74	30	50.3	5.34

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Arizona—Cont'd.	°	°	°	Ins.
Florence†	79	31	55.0	2.29
Fort Apache	65	11	40.9	2.29
Fort Bowie	72	26	46.8	3.36
Fort Grant	72	21	47.6	1.59
Fort Huachuca	67	21	46.3	1.59
Fort Mohave†	89	32	57.7	1.74
Gila Bend a *†[1]	76	46	58.6	2.30
Gila Bend b *[1]	86	42	60.4	2.46
Grand Central Mill	.....	.....	.....	0.67
Holbrook†	63	17	39.0	0.90
Lochiel†	67[i]	30[i]	49.2[i]	2.90
Maricopa *[1]	98	40	64.3	2.44
Mount Huachuca†	67	19	44.8	2.64
Natural Bridge†	.....	.....	.....	4.19
Navajo Springs†	.....	.....	.....	0.78
New River†	77	33	53.5	3.95
Oracle †[1]	67	20	45.7	.....
Oro	.....	.....	.....	1.16
Pantano *[1]	83	29	53.3	2.75
Payson *[1]	66	7	39.5	4.10
Peoria	79	35	55.6	2.77
Phœnix b†	80	32	55.4	2.34
Red Rock	80	40	61.3	2.76
Reymert†	75	31	51.8	4.14
Saint Johns†	.....	.....	.....	0.28
San Carlos	82	27	51.2	3.51
San Simon *[1]	84	30	54.5	1.09
Signal†	77	33	53.4	2.97
Strawberry†	.....	.....	.....	3.63
Teviston	.....	.....	.....	0.50
Texas Hill *[1]	85	41	50.9	.....
Tucson a†	76	32	53.0	2.54
Tucson b *[1]	74	30	49.8	3.50
Walnut Grove†	.....	.....	.....	3.10
Walnut Ranch *†[1]	70	17	44.0	2.19
Whipple Barracks	70	0	36.6	1.64
Willcox *[1]	80	34	54.7	1.45
Wilgus†	.....	.....	.....	1.75
Winslow *†[5]	70	20	42.1	1.20
Woodruff†	.....	.....	.....	1.30
Yuma *[1]	83	40	61.9	0.87
Arkansas.				
Arkadelphia†	.....	.....	.....	3.95
Arkansas City†	.....	.....	.....	5.14
Black Rock *†[1]	70	20	46.6	2.72
Brinkley†	70	30	51.7	2.90
Camden †[1]	73	31	52.0	4.79
Conway *[1]	66	29	49.0	2.46
Corner Stone *[1]	70[g]	32[g]	50.3[g]	4.75[g]
Dallas †[1]	70	27	48.1	4.33
Dardanelle†	.....	.....	.....	2.25
El Dorado†	77	30	52.0	4.59
Fayetteville †[1]	66	21	43.1	2.38
Forrest City†	71	31	53.7	4.51
Fulton†	.....	.....	.....	3.65
Gaines Landing†	.....	.....	.....	4.12

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Arkansas—Cont'd.	°	°	°	Ins.
Harrisburgh †[1]	68	28	44.8	2.95
Harrison†	68	20	45.2	2.00
Helena a†	.....	.....	.....	5.00
Helena b†	70	31	52.6	4.55
Hot Springs	70	25	50.2	3.65
Lead Hill *	74	21	.....	1.24
Lonoke *[1]	76	31	53.0	2.68
Luna Landing	72	34	53.0	3.55
Madding *[5]	68	32	51.6	6.50
Malvern †	71	25	49.9	3.31
Marshall†	68	21	46.6	2.28
Mount Nebo †	65	24	45.2	2.80
Newport a†	.....	.....	.....	2.83
Newport b †	62	30	48.0	2.67
Osceola †[1]	68	23	46.3	4.46
Ozark†	66[g]	25[g]	50.3[g]	2.45[g]
Ozone †[1]	62	23	43.8	4.64
Paragould †	68	23	48.4	2.38
Pine Bluff†	72	30	53.2	5.32
Rogers †	66	18	42.2	1.36
Stuttgart†	71	28	51.6	5.06
Texarkana†	78	29	54.2	.....
Washington *[1]	70	35	53.0	.....
Winslow *†[1]	65	21	40.8	2.81
California.				
Agnew[1]	69	31	50.6	0.89
Alcalde *[1]	72	38	53.5	0.94
Alcatraz Island	66	42	51.1	2.81
Almaden *[1]	67	33	52.7	1.75
Alvarado†	73	30	54.8	0.81
Anaheim *[1]	74	40	55.1	2.35
Angel Island	72	36	52.4	3.07
Antioch *[1]	67	37	51.3	1.63
Aptos *[1]	65	30	52.8	4.90
Arcata	.....	.....	.....	2.86
Athlone *[1]	78	31	53.8	1.10
Auburn *[1]	70	35	52.2	4.91
Bakersfield a *[1]	70	40	53.8	0.45
Bakersfield b†	75	28	53.9	0.48
Ballast Point L. H	.....	.....	.....	2.25
Beaumont *[1]	80	30	48.4	3.53
Belmont *[1]	67	40	53.0	.....
Benicia Barracks	65	34	50.4	1.98
Berendo *[1]	68	38	53.4	1.67
Berkeley[1]	66	38	50.9	4.20
Bishop Creek *[1]	71	21	46.4	0.70
Boca *[1]	50	−20	22.2	3.35
Borden *[1]	70	34	52.1	1.12
Boulder Creek *[1]	71	28	50.8	9.51
Brentwood *[1]	70	33	51.9	1.12
Brighton *[1]	69	28	52.0	2.06
Byron *[1]	70	34	51.0	1.13
Caliente *[1]	78	40	52.8	1.00
Calistoga *[1]	77	32	56.0	5.52
Cape Mendocino L. H	.....	.....	.....	2.03
Castroville *[1]	73	39	55.1	2.00
Centreville *[1]	72	.....	55.8	1.41

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
California—Cont'd.	°	°	°	Ins.
Chico *[1]	76	32	49.6	3.28
Cisco *[1]	43	12	32.1	7.61
Citrus[1]	74	23	47.8	T.
Claremont†	88	34	56.6	2.02
Colfax *[1]	66	30	46.0	7.55
Colton *[1]	72	36	54.9	3.36
Corning *[1]	74	33	52.2	1.35
Crescent City	.....	.....	.....	3.44
Crescent City L. H.	.....	.....	.....	3.11
Davisville a *[1]	68	39	53.0	2.05
Davisville b	88	38	58.5	1.86
Delano *[1]	72	38	54.5	0.85
Delta *[1]	74	28	50.1	4.01
Downey *[1]	78	40	60.0	2.42
Drytown	68	31	50.3	3.75
Duarte	76	36	56.0	2.94
Dunnigan *[1]	66	32	48.7	2.25
Dunsmuir *[1]	63	24	43.2	3.31
East Brother L. H	.....	.....	.....	1.52
Edgwood *[1]	58	27	39.5	0.12
El Casco *[1]	72	30	46.0	.....
El Dorado *[1]	70	33	53.5	5.75
Elmira *[1]	74	34	51.8	4.04
El Verano *[1]	68	35	51.6	4.61
Emigrant Gap *[1]	50	21	37.3	7.46
Esparto *[1]	74	34	54.2	2.28
Evergreen	.....	.....	.....	1.36
Farmington *[1]	71	33	54.3	2.20
Felton *[1]	78	29	51.2	11.13
Fernando *[1]	79	32	49.5	2.53
Florence *[1]	76	40	53.9	2.47
Florin *[5]	71	29	52.6	.....
Folsom City a *[1]	75	38	53.5	3.15
Folsom City b	.....	.....	.....	3.03
Forestville†	73	16	46.0	5.19
Fort Bidwell	58	10	35.2	1.20
Fort Gaston	68	27	47.6	1.90
Fort Mason	65	40	52.3	2.51
Fresno *[1]	70	36	55.8	0.68
Fruto *[1]	74	35	53.6	3.53
Galt *[1]	70	33	49.6	1.78
Georgetown†	65	27	46.7	8.44
Gilroy *[1]	66	30	51.4	1.90
Girard *[1]	64	30	45.4	0.30
Glen Ellen *[1]	70	30	50.6	6.27
Goshen *[1]	71	30	48.9	1.70
Grass Valley a	.....	.....	.....	7.15
Grass Valley b	62	23	44.3	5.92
Haywards *[1]	65	30	50.7	1.38
Hollister *[1]	73	32	54.0	1.53
Hornbrook *[1]	63	25	42.6	0.35
Humboldt L. H	.....	.....	.....	2.34
Huron *[1]	79	35	55.4	1.30
Hyde Ranch	.....	.....	.....	2.68
Indio *[1]	80	37	59.5	0.43
Ione *[1]	69	27	50.3	2.85
Iowa Hill *[1]	69	31	48.2	5.36