

Lake City and 25° at *Coalville. *Nevada*: 24° at Winnemucca and 18° at *Otego. *Arizona*: 38° at Wickenburg, 29° at Apache and 27° at Prescott. *Idaho*: 34° at Boise City and 14° at *Fort Hall. *Montana*: 27° at *Helena and 23° at Virginia City. *California*: 40° at Red Bluff and Visalia, 39° at Sacramento, 32° at *Tehachapi, 24° at Campo and 18° at *Summit. *Oregon*: 35° at Portland and 33° at Roseburg. *Washington Territory*: 34° at Olympia.

Those marked with a star (*) are reported by U. S. Army Post Surgeons or Voluntary Observers.

Ranges of Temperature at Signal Service Stations.—The monthly ranges will appear from the maxima and minima just given. The greatest daily ranges vary in New England from 21° at Wood's Holl and 37° at Springfield to 46° at Boston; Middle Atlantic States, 18° at Cape May to 35° at Lynchburg; South Atlantic States, 15° at Cape Lookout, 20° at Savannah to 30° at Wilmington; Eastern Gulf States, 16° at Key West and New Orleans to 26° at Montgomery; Western Gulf States, 15° at Galveston to 28° at Corsicana; Tennessee and the Ohio valley, 24° at Memphis to 34° at Pittsburg; Lower Lake region, 26° at Erie and Buffalo to 37° at Rochester; Upper Lake region, 27° at Grand Haven to 44° at Port Huron and 47° at Duluth and Marquette; Upper Mississippi valley, 27° at Davenport to 41° at St. Paul; Red River of the North valley, 44° at Pembina to 45° at Breckenridge; Missouri valley, 30° at Leavenworth to 43° at Yankton and 47° at North Platte; Texas, 28° at Decatur, Uvalde and San Antonio to 47° at Fort Elliott; Eastern Rocky Mountain slope, 39° at Fort Custer to 41° at Deakwood and 42° at Dodge City; Rocky Mountains, 23° on summit of Pikes Peak to 46° at Helena and Socorro to 49° at Denver; Middle Plateau, 34° at Boise City and Salt Lake City to 40° at Winnemucca; California, 23° at San Francisco to 34° at Red Bluff and 41° at Visalia.

Frost was reported from nearly every State and territory north of the 35th parallel. East of Mississippi it occurred on the following dates: 1st, 2nd, 7th, 8th, 13th, 14th, 15th, 16th, 19th, 21st and 29th, and west of the Mississippi on the 1st, 2nd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 18th, 20th, 21st, 24th, 25th, 27th and 31st. In many localities severe injury resulted to fruit and vegetables as follows: Fort Collins, Col., 9th, corn and garden crops seriously injured. Southington, Conn., 15th, tender vines blighted. Nile, N. Y., 15th early fruit severely injured. Weldon, N. C., 14th, potato vines injured. Westerville, Ohio, 1st, early fruit damaged. Jacksonburg and Ringgold, Ohio, 1st, fruit injured. Bloominggrove, Pa., 15th, fruit buds and blossoms injured. Litchfield, Pa., 15th, considerable damage to gardens. Windsor, Vt., 15th, early vegetables damaged. Charlotte, N. C., 1st, injuring potato vines. Yamhill County, Or., 11th, garden vegetables generally and wheat in some localities injured.

Ice formed as follows: Roseburg, Or., 13th; Salt Lake City, 6th; Winnemucca, Nev., 31st; Springfield, Mass., 1st; Eastport, 1st; Burlington, Vt., 1st, (15th, ice in Broad Lake $\frac{1}{2}$ inch thick for a distance of three miles off Essex); New Haven, Conn., 1st; Ft. Collins, Col., 7th, $\frac{1}{2}$ inch; Southington, Conn., 1st; Fallston, Md., 1st, $\frac{1}{2}$ inch; Somerset, Mass., 1st; Fall River, Mass., 1st; Freehold and Linden, N. J., 1st; Ardenia, N. Y., 1st; Waterburg, N. Y., 15th; Palermo, N. Y., 1st, $\frac{1}{2}$ inch; Nile, N. Y., 15th; Bellefontaine and Jacksonburg, Ohio, 1st, Norwalk, Ohio, 1st, three-tenths inch—14th, 15th, one-tenth inch; West Chester, Fallington and Milton, Pa., 1st; Litchfield, Pa., 1st, $\frac{1}{2}$ inch; Coalville, Utah, 15th, 25th; Charlottesville, Vt., 1st, ice along shore of lake.

Ground Frozen.—Rowe, Mass., and North Volney, N. Y., 1st, quite hard.

PRECIPITATION.

The general distribution of the rain-fall, including melted snow, for May 1880, is illustrated upon chart No. III, as accurately as possible from about 500 reports. In a small table on this chart will be found the average precipitation for the month of May, compared with the precipitation during the present month. Throughout the Atlantic States, except Florida, and in the Missouri valley, the rain-fall has been deficient and severe droughts have resulted in these sections. The heaviest rains have fallen in Alabama, Indiana, Michigan, Indian Territory and Texas; damaging floods occurred in Indiana and Georgia on the 21st and in Texas from the 27th to 29th, details of which will be found below.

Special Heavy Rains.—1st, New Ulm, Tex., 2.31 in.; San Antonio, Tex., 2.54 in.; Mason, Tex., 3.64 in. 3rd, Jacksonville, Fla., 2.17 in. Mayport, Fla., 2nd to 4th 5.53 in. 8th, Springfield, Ill., 2.66 in.; Peoria, Ill., 3.94 in.; Mt. Sterling, Ill., 3.20 in. 9th, Louisville, Ill., 2.70 in. 9th to 11th, Litchfield, Mich., 2.30 in. 8th to 10th, Ashley, Mo., 3.17 in. 9th and 10th, Logansport, Ind., 4.28 in. 10th, Niles, Mich., 2.80 in.; Wabash, Ind., 2.15 in. 10th to 11th, Coldwater, Mich., 2.75 in. 11th, Key West, Fla., 3.08 in. 11th to 13th, Gulf Hammock, Fla., 3.55 in. 14th, Ft. Wallace, Kan., 4.00 in. 17th to 18th, Pembina, Dak., 3.18 in. 19th to 21st, Litchfield, Mich., 4.25 in. 20th, Toledo, O., 1.10 in. in 15 minutes; Fort Sill, Ind. Ter., 2.76 in. 20th to 21st, St. Meinrad, Ind., 4.00 in.; Louisville, 1.95 in. 21st, Indianapolis, 2.69 in.; Montgomery, 3.33 in.; Wabash, Ind., 3.20 in.; Lansing, Mich., 2.73 in.; New Harmony, Ind., 3.33 in. 21st to 22nd, Elsworth, N. C., 5.50 in. in 22 hours. 22nd, Niles, Mich., 3.35 in.; Coldwater, Mich., 3.70 in.; Columbus, Ga., 9.92 in., 8.50 in. in 10 hours. 23rd, Elsworth, N. C., 2.75 in. 25th to 26th, Tabor, Ia., 2.11 in.; Manhattan, Kan., 2.81 in.; Breckenridge 4.05 in. 25th to 27th, Mobile, 3.41 in. 26th, Pensacola, Fla., 2.29 in.; Pembina, Dak., 2.64 in.; Ft. Barrancas, Tex., 4.23 in. 26th to 27th, New Orleans, 3.25 in. 27th, Austin, Tex., 3.00 in. 27th to 28th, Ft. Sill, Ind. Ter., 3.59 in.; Nashville, Tenn., 2.25 in. 28th to 29th, Pilot Point, Tex., 3.05 in.; St. Meinrad, Ind., 4.50 in.; Denison, Tex., 3.04 in. 23th, Boerne, Tex., 6.52 in.; Brackettville, Tex., 12.43 in. 29th to 30th, Tabor, Ia., 3.03 in.; Des Moines, 2.91 in.; Cincinnati, 2.23 in. Louisville,

3.54 in.; Indianapolis, 2.19 in. 30th, Columbus, O., 1.85 in.; Chattanooga, Tenn., 1.61 in. in 1 hour, 35 minutes; Vicksburg, Miss., 4.27 in.; Laconia, Ind., 2.78 in.; Bethel, O., 3.00 in. 30th to 31st, Point Pleasant, La., 4.13 in. 31st, Davenport, 1.60 in. in 3 hours.

Largest Monthly Rain-falls.—Brackettsville, Tex., 13.11 inches; Ft. Barrancas, Fla., 10.98 in.; Elsworth, N. C., 10.43 in.; Ft. Sill, 9.74 in.; St. Meinrad, Ind., 9.55 in.; Coldwater, Mich., 9.40 in.; Wabash, Ind., 8.86 in.; Litchfield, Mich., 8.50 in.; Mayport, Fla., 8.40 in.; Boerne, Tex., 8.29; Logansport, Ind., 8.23 in.; Indianapolis, 8.22 in.; Pembina, 7.98 in.; Cresco, Ia., 7.89 in.; Niles, Mich., 7.87 in.; Key West, 7.84 in.; New Harmony, Ind., 7.72 in.; Alpena, 7.36 in.; Anna, Ill., 7.27 in.; Montgomery, 7.07 in.; Mason, Tex., 7.01 in.; Ashley, Mo., 7.00 in.; Griffin, Tex., 6.42 in.; Jacksboro, Tex., 6.09 in.

Smallest Monthly Rain-falls.—Campo, Cal., and along the Visalia and Yuma divisions of the S. P. R. R., from Sumner to Yuma, (except Keene 0.12, Ravenna 0.10 and White Water 0.01;) Phoenix, Burkes, Grant and Apache, Ariz.; La Mesilla and Silver City, N. M., and El Paso, Tex., none. Prescott and Yuma, Ariz., trace; Ft. Monroe, Va., 0.02 in.; Ft. Wingate, N. M., and Los Angeles, Cal., 0.04 in.; San Diego, 0.06 in.; Hermosa, Cal., 0.10 in.; Socorro, N. M., 0.14 in.; Stockton, Tex., 0.15 in.; Weldon, N. C., 0.17 in.; Cape Henry, Va., 0.18 in.; Visalia, Cal., 0.28 in.; Winnemucca, 0.29 in.; Cheyenne, 0.44 in.; Somerville, N. J., 0.45 in.; Linden, N. J., 0.46 in.; Brookhaven, N. Y., 0.50 in.; Fayetteville, N. C., 0.53 in.; Norfolk, Philadelphia and Atlantic City, 0.54 in.; Umatilla, Or., 0.57 in.; White Plains, N. Y., 0.58 in.; Woodstock, Md., 0.60 in.; New York City, 0.82 in.

Rainy Days.—The number of days on which rain or snow has fallen, varies as follows: New England, 9 to 23; Middle Atlantic States, 4 to 8; South Atlantic States, 3 to 11; Eastern Gulf States, 12 to 18; Western Gulf States, 5 to 12; Lower Lake region, 6 to 15; Upper Lake region, 10 to 20; Ohio valley and Tennessee, 7 to 12; Upper Mississippi valley, 8 to 18; Lower Missouri valley, 9 to 15; Red River of the North valley, 16 to 18; Eastern Rocky Mountain Slope, 7 to 15; Texas, 1 to 23; Rocky Mountains, 2 to 17; Middle Plateau, 5 to 14; California, 1 to 8; Oregon, 8 to 21; Washington Territory, 12 to 14.

Cloudy Days.—The number varies in New England from 5 to 13; Middle Atlantic States, 1 to 6; South Atlantic States, 1 to 13; Eastern Gulf States, 7 to 13; Western Gulf States, 1 to 7; Lower Lake region, 4 to 7; Upper Lake region, 3 to 11; Ohio valley and Tennessee, 2 to 7; Upper Mississippi valley, 5 to 11; Lower Missouri valley, 5 to 8; Red River of the North valley, 6 to 11; Eastern Rocky Mountain Slope, 4 to 8; Texas, 3 to 10; Rocky Mountains, 0 to 9; Middle Plateau, 0 to 8; California 2 to 7.

Hail was reported from the following States and Territories on the dates named: *Oregon*, 12th. *Washington Ter.*, 5th, 7th. *California*, 12th, two miles north of Red Bluff storm extended over narrow strip $\frac{1}{2}$ mile wide and about two miles long, damaging fruit trees and beating the grain level with the ground. *Idaho*, 5th, 24th. *Nevada*, 12th, 13th. *New Mexico*, 15th, 28th. *Colorado*, 13th, 27th, 28th. *Nebraska*, 4th, 12th, 23rd, 24th. *Kansas*, 8th, 9th, 25th, 30th. *Indian Ter.*, 26th. *Dakota*, 4th, 8th, 14th, 16th. *Wisconsin*, 7th, at Neillsville stones 3 inches in circumference causing considerable damage, 22nd. *Texas*, 15th, 18th, (28th, 30 miles west of Coleman City violent hail storm destroyed 50 acres of corn.) *Iowa*, 6th, 7th, 8th, 18th, 23rd, 30th. *Minnesota*, 9th, 22nd, 25th, 30th. *Ohio*, 9th 10th 11th, 19th, 20th, 21st, 27th, 29th, 31st. *Illinois*, 8th, 9th. *Indiana*, 10th, 19th. *Louisiana*, 25th. *Maryland*, 11th. *Massachusetts*, 6th, 14th. *Missouri*, 26th. *New Hampshire*, 20th, 26th. *New Jersey*, 14th. *New York*, 27th. *Pennsylvania*, 26th. *Vermont*, 6th, 20th. *Virginia*, 14th. Silver City, Iowa, 30th, 5:30 p. m., fearfully black clouds came from the S. NW. and SE., forming a junction west of the town, when the most violent action took place between them, followed by a fall of hail over a strip of country 3 to 4 miles wide and about 12 miles in length. Hundreds of stones fell, measuring $1\frac{1}{2}$ in circumference; some that were picked up one hour after the storm, and at 10 a. m. the next day, were the size of hen eggs. Many were rough, jagged blocks of ice, and two were found that, together, weighed 20 ounces.

Snow.—Snow squalls occurred on the 1st, in *Michigan*, *Pennsylvania*, *New York*, *Connecticut*, *Massachusetts*, *Vermont*, and *New Hampshire*. On the summit of Mt. Washington it fell on the 1st, 2nd, 6th, 12th, 13th, 14th. In *Dakota*, 9th, 16th, 30th. *Montana*, 6th to 9th, 14th, 15th, 24th, 25th. *Wyoming*, 6th, 9th, 30th. *Colorado*, 7th, 9th, 27th, 28th, 31st. On the summit of Pike's Peak, 1st, 3rd, 7th, 8th, 9th, 16th, 19th, 20th, 22nd, 25th, 26th, 28th, 29th, 31st. *Utah*, 6th, 8th, 9th, 10th, 14th, 23rd, 24th, 25th, 26th, 30th. *Nevada*, 5th, 7th, 12th, 13th, 14th. *California*, 12th, on the coast range, 31st visible on the coast and Sierra Nevada ranges, *Idaho*, 7th, 9th, 14th. *Washington Ter.*, 12th.

Total Monthly Snow-falls.—The following total monthly snow-falls are reported by the C. P. and S. P. R. R. for *May*, 1880:—in the Sierra Nevadas, at Alta, 18.00 inches, Cisco 23.00, Summit, 24.00, Truckee, 6.50, and Boca, 1.00; in Nevada, at Humboldt, 2.50, Battle Mountain, 3.58, and at Beowame and Ivano, 2.00 inches. The observer at Coalville, Utah, reports 14.50 inches.

Floods.—La Crosse, 24th, very heavy rain, rivers and creeks overflowed, trains delayed and considerable damage to property. Castroville, Tex., 29th, rivers and streams overflowed carrying away fences and bridges. Pilot Point, Texas, 27th to 29th, great damage to farming interests. Coleman City, Tex., 28th, 29th, 30 miles west of station unusually heavy rains and destructive floods; Colorado river rose 30 feet during the storm. San Saba, Tex., 27th, very heavy rains, two persons drowned and much property flooded and swept away. Calvert, Tex., 27th, heavy rains, damaging corn, cotton and oats. Brackettsville, Tex., 28th, 1:30 a. m., heaviest and most disastrous rain-storm ever known in this section; all of the

city except portions upon two hills inundated. The water on Main street rose to the height of eight feet; the first floor of every business house from one to five feet under water; many buildings washed away and over twenty persons reported drowned. Lampasas, Tex., heaviest rain for many years; mail stage washed away and driver drowned; much other damage. Vincennes, Ind., 21st, creeks "terribly" swollen; great damage to growing wheat. Fences, bridges, and railroad embankments washed away. A brick-yard near town was submerged and a quarter of a million bricks were washed away. Sullivan, Ind., 21st, severe washouts and much other damage. Huntington, Ind., 21st, Flint Creek overflowed, causing considerable damage, railroad tracks submerged and culverts washed away. Wabash, Ind., 21st, great damage to fences, bridges and crops; stream everywhere overflowed, bottom lands 2 to 10 feet under water; trains delayed. Columbus, Ga., 21st, all railroads broken, no trains running, 67 bridges washed away throughout the county, low lands submerged and all crops damaged; river rose 15 feet in two hours; streets converted into rushing rivers; houses flooded several feet deep; calves, goats, hogs, dogs, and fowl drowned by the score.

Drought.—The following will serve to show the extent of drought in the various sections. Cheyenne, driest month in the past 9 years. Independence, Kan., 28th, first rain in 6 weeks; wheat and oats suffered severely. Bowling Green, Ky., 1st to 20th, exceedingly dry; all crops suffering, oat crop a failure, market gardens seriously damaged. Fallston, Md., 31st, grass and wheat seriously injured; no rain from April 29th to May 22d. Sandy Springs, Md., month unusually dry; all crops suffering. South Lee, Mass., month very dry; "mills on the Housatonic river used all the water on the 24th, an event which has not happened before in 70 years, notwithstanding that the streams have been higher this year than usual." Clear Creek, Neb., 26th, first good rain since last fall; crops suffering. Auburn, N. H., 18th to 30th; very dry; vegetation suffering severely. Freehold, N. J., month unusually dry. Atco, N. J., 31st, strawberry and hay crops seriously damaged. Somerville, N. J., drought very severe throughout the month. White Plains, N. Y., smallest monthly rain-fall in the past 7 years. Catawissa, Pa., throughout month, seriously damaging grain and grass crops. Fallsington, Pa., 22nd, first rain in 23 days; month unusually dry. Litchfield, Pa., 20th, much damage to grain and vegetables. Snowville, Va., 1st to 21st, severe drought. Walnut Grove, Va., no rain from 1st to 21st; crops suffering severely. Norfolk, Va., 28th, unprecedented drought in neighboring country; first and early vegetables damaged to a large extent. Helvetia, W. Va., 1st to 19th, unusually dry; rivers and streams lowest for many years. Omaha, Neb., drought in eastern part of state unprecedented: six months without rain enough to wet the ground: the air is filled with dust.

Rain from a Cloudless Sky.—Burlington, Vt., 10th, 26th.

Precipitation during April, received after the issue of April Review.—*Arizona:* Whipple Barracks, 0.14 inch.; Fort Lowell, 0.16; Fort Bowie, 0.15; Fort Verde, 0.27; Fort McDowell, 0.28; Fort Apache, 0.46; Fort Grant, 0.04; Fort Mojave, 0.00; Fort Thomas, 0.06. *California:* Benicia Barracks, 8.15; Salinas City, 3.90; Oakland, 8.46; Poway, 3.10; Angel Island, 10.17; Presidio, S. F. Cal., 7.55; Fort Gaston, 13.95; Mount St. Helena, 27.87; San Geronimo, 6.94; San Buenaventura, 1.87. *Dakota:* Fort Stevenson, 5.66; Fort Sully, 1.71; Fort Meade, 0.75. *Idaho:* Fort Lapwai, 0.23. *Montana:* Fort Benton, 1.80; Fort Shaw, 1.51; Fort Ellis, 4.24; Fort Keogh, 1.10; Fort Logan, 1.45; Fort Assiniboine, 1.29; Blackfeet Agency, 0.91. *Oregon:* Albany, 2.62; Fort Stevens, 4.83; Fort Klamath, 2.77; Eola, 2.21; Fort Harney, 1.70. *Texas:* Fort Ringgold, 0.70; Fort Brown and Fort Davis, 0.00; Fort Elliot, trace; Laredo, 1.20. *Virginia:* Dover Mines, 1.30. *Washington, Ter.:* Fort Canby, 4.03; Fort Townsend, 1.30; Neah Bay, 3.52; Bainbridge Island, 2.15; Dayton, 3.81. *Florida:* Okahumpka, 2.12; Daytona, 2.28. *Massachusetts:* Williamstown, 4.77. *Michigan:* Grand Rapids, 6.00. *Nevada:* Wadsworth, 0.87; Brown's, 0.94. *New Jersey:* South Orange, 3.02. *New York:* Troy, 2.07. *Pennsylvania:* Chambersburg, 3.07. *Tennessee:* McMinnville, 7.50; Austin, 5.38; Clarkville, 5.65; *Utah:* Promontory, 2.03; Terrace, 0.30.

RELATIVE HUMIDITY.

The percentages of mean relative humidity for the month range as follows: New England, from 59.6 to 77.3; Middle Atlantic States, 53.9 to 77.4; South Atlantic States, 58.2 to 77.5; Eastern Gulf States, 71.0 to 77.5; Western Gulf States, 68.9 to 78.3; Ohio valley and Tennessee, 55.1 to 67.9; Lower Lake region, 55.4 to 66.5; Upper Lake region, 59.8 to 75.5; Upper Mississippi valley, 54.3 to 61.6; Missouri valley, 51.1 to 56.4; Red River of the North valley, 65.2 to 67.6; Eastern Rocky Mountain Slope, 41.0 to 85.0; Western Plateau, 10.0 to 49.7; California, 50.6 to 72.0; Oregon, 65.0 to 73.0. *High stations* report the following averages not corrected for altitude: Pike's Peak, 63.5; Mt. Washington, 83.3 per cent.

WINDS.

The *prevailing direction of the winds* for the month of *May*, 1880, is shown, by arrows flying with the wind, on chart No. II. The prevailing winds over the eastern half of the United States were *southerly*, and along the Pacific coast, over the Plateau districts, and in the Upper Missouri valley *northwesterly* or *westerly*. Exceptions to the above generalization are to be found in the northwest winds on the summit of Mt. Washington, at New York, Pittsburg and Marquette; in the northeast winds at Duluth and Jacksonville; in the east winds at Brackettville, McKavett, Indianola, New Orleans, Atlanta, Montgomery, Cedar Keys, Punta Rasa and Key West; and in the southerly winds at Los Angeles and Olympia.