

## OPTICAL PHENOMENA.

*Solar Halos*.—2nd, Miss., Ohio. 3rd, Ind., Ohio, Conn. 4th, Me., N. C. 5th, Conn., N. Y. 6th, Fla. 8th, N. Y., Conn. 9th, Ohio, R. I., Conn. 10th and 11th, Conn. 12th, Miss., Ala., Conn. 13th, Ind., R. I. 14th, Ohio. 15th, Ind., Me., Ohio, Fla. 16th, Me., Miss., Ohio, Vt. 17th, Fla., Miss., Ala., Vt. 18th and 19th, Ala. 21st, N. J. 23rd, Ga. 24th, N. Y., Ohio, Ky., Vt. 25th, Conn. 28th, Tex. 29th, N. J., N. Y., Ohio, Conn. 30th, Ky., Ohio. 31st, Conn., N. Y., Dak., R. I.

*Lunar Halos*.—2d, Va.. 3d, Texas, Ia., Minn. 4th, Va., Tex., Minn., 5th, Va., Minn., 6th, Neb., Minn. 7th, Md., Dak., Neb., Ohio, S. C., Utah, Tex., Fla., Minn., N. C., N. J. 8th, N. J., Pa., Ill., Ky. 9th, Md., N. J., Va., Tex., Iowa. 10th, Va., Ill., Iowa, Minn., Ohio, N. Y. 11th, Ohio, Tex., Minn. 12th, Va., Minn., Miss., Tex., Ala., Fla. 13th, Neb., Fla., Conn., R. I. 14th, Neb.; Tenn., Va., Iowa, Minn. 15th, Ind., N. J., Tenn., Ga., Va. 16th, W. Va., Ga., S. C. 17th, Wis., Me. 18th, Md., Me. 21st, Me. 22d, Me.

*Mirage*.—New London, Conn., 26th, 27th.

## MISCELLANEOUS PHENOMENA.

**BOTANICAL**—*Colorado*—Summit, in bloom, 1st, wild strawberries; ripe, 8th, radishes, 9th, wild strawberries. *Dakota*—Randolph, 3rd, 35 to 50 percent of the wheat crop damaged by rust, blight and storm. Pembina, 15th, wheat and oat harvest completed; 29th, ripe melons and squashes. *Indiana*—Laconia, 31st, corn and potatoes very much injured by drought, apples and peaches are falling off badly. *Illinois*—Marengo, 31st, oats and wheat, fine yield, grass good, except on bottom lands, where it is spoiled by floods; corn, very heavy crop, commenced cutting. *Indian Territory*—Fort Gibson, 22nd, corn ripe, very large crop reported. *Iowa*—Clayton, 3rd, wheat much damaged by hot weather, rust and chinch bugs. Irving, 3rd, late hot weather killed the straw. Greenville, 3rd, harvest delayed by extreme wet weather. Red Oak, 3rd, spring wheat damaged by rain and chinch bugs. Guttenburg, 31st, wheat crop better on timbered land than last year, but very poor on prairies; corn good crop; oats excellent; potatoes rotting considerably; buckwheat very promising. Vail, 31st, some corn ripe; ground so hard and dry that no plowing can be done. *Kansas*—Holton, 31st, early planted corn is hard, late planted doing finely; potatoe crop somewhat injured by dry weather. Cresswell, 17th, chinch bugs injuring corn; 26th, commenced sowing wheat. *Maryland*.—Montgomery Co., 1st, wheat damaged by insects; corn fine; hay good. Fallston, Hartford Co., 31st, farmers plowing in the southern half of county, but with some difficulty; 25th, clover seed harvested. *Massachusetts*.—Mendon, 31st, crops look well, apples in abundance. *Michigan*.—North Port, 31st, corn and potatoes light crop, on account of drought; apples very small crop, some trees liable to die from drought. *Minnesota*.—Utica, 3rd, wheat damaged one third by hot weather. Bellaplain, 3rd, much rain, little sun, wheat badly blighted. Sauk Centre, 3rd, much rust and blight. Brown Co., 9th, wheat badly blighted. *Mississippi*.—Brookhaven, 18th, cotton picking generally begun. *Missouri*.—Oregon, ripe, 3rd, plumes; 2nd, early apples; 7th, alder berries; 8th, grapes; 15th, bartlett pears; 17th, a few strawberries gathered; 31st, lawton blackberries; in bloom, 1st, sumac. Springfield, 31st, all crops enormous. Pierce City, 31st, wheat nearly all threshed, yield about 12 bushels per acre, grain very fine. *Nebraska*.—Sutton, Clay Co., 3rd, harvest greatly delayed by wet weather. Near Howard, 31st, wheat crop injured by wet weather and chinch bug, yield only fair; corn crop excellent. Emerson, in bloom, 3rd, lilacs, and choke cherries second time this season. *New Hampshire*.—Contoocookville, 31st, grapes ripening; 15th, early potatoes harvested. *New York*—Wappingers Falls, 1st, green corn in market; 23d, peaches decaying on the trees, attributed to early frosts; in bloom, 3d, white pond lilies, buckwheat; 12th, 13th, night blooming cereus; ripe, 1st, wild cherries; 2d, lawton blackberries; 9th, plums; 10th, summer squashes; 18th, summer pears; 20th, Concord grapes; 21st, melons and peaches; 27th, Bartlett pears; 13th, Lima beans in market. Starkey, 16th, prospect of potatoes rotting badly because of warm, wet weather; 20th, threshing oats and barley, poor yield; 31st, corn crop best for many years. Waterburg, 25th, wheat somewhat injured by hessian fly; corn good. Vernor Centre, 9th, hops blighting; 11th, green corn fit for table use; ripe, 15th, tomatoes; 25th, summer squashes, cabbage for table use; 31st, hop harvest well advanced, crop only one-third of last year, but quality extra. *Ohio*—Bellefontaine, 30th, wheat crop heaviest and best ever known. North Lewisburg, 31st, wheat, rye, oats, corn and potatoes excellent; all kinds of fruits more abundant than for thirty years. Ringgold, 31st, vegetables of all kinds excellent; corn and tobacco good. *Pennsylvania*—Ephrata, 31st, wheat crop, heavy; oats, poor; rye, tall and good; corn, about half a crop; tobacco, very good; potatoes, suffered from Colorado beetle and drought, crop only moderate; peaches, plenty; apples and pears, scarce; vegetables, very fair. *Texas*—Melissa, 31st, cotton-picking commenced; considerable quantity already on the market; no worms; weather very favorable; corn crop, very fine; Clarksville, 31st, cotton crop promises to be very fair, though somewhat damaged by excessive heat. *Vermont*—West Charlotte, 31st, heaviest hay crop for many years; early potatoes, small and poor. *Virginia*—Wytheville, 10th, wheat crop only fair. Broad Oak, 31st, corn crop, very good; grass, good; vegetables, abundant; no peaches; pear crop, moderate; grapes, only fair; tobacco crop, rather backward, very little planted in the county. *Wisconsin*.—Black River Falls, 3d, wheat, badly injured by rust and chinch bugs. Kenosha, wheat damaged by blight and rust. Tecumseh, 3d, spring wheat slightly damaged by rust. Embarrass, ripe, 30th, corn, beans; crop never better; all crops excellent.

**INSECTS**.—*Locusts*: Summit, Col., 26th, flying SW., during most of forenoon at an elevation of 12,000 feet wind SW. Olivet, Dak., 1st., large numbers from the N.; 5th, a few from the N.; 7th, a few from the S.; 8th,

disappeared; 13th, flying S., some alighted; 14th, large numbers from NW., many came down; 15th, an immense flight from NW. damaging corn and vegetables; 17th, eating corn &c., rapidly; 27th, nearly disappeared to the southward; 31st, late crops somewhat damaged by locusts. Norfolk, Neb., 15th, from the N., first of the season; 25th, flying S.; 26th, NE; 27th, SE; 28th, S. Genoa, Neb., 15th, flying S.; 18th, E; 20th, SW.; 28th, SW. Yankton, Dak., 15th, 17th, from N. few alighting; 20th, flying N.; 22nd, flying N., and alighting; 23rd became plentiful; 25th, numerous; 31st, plentiful; locusts appeared about the 15th and were seen almost daily during the remainder of month, considerable alighted and did some damage to gardens and corn; appeared not so numerous towards the end of the month. Morrystown, Dak., 1st, small numbers from NW., none alighted; 5th, flying SE., very few alighted; 13th, came down from 11 a. m., to 3 p. m.; 18th, disappearing, some damage done; 28th, flying S. Virginia City, Mon., 1st, 11 a. m., small hordes flying NW. against wind 2nd; flying NW., against wind, some alighting; 3rd, continued flying NW., 4th, disappeared. Coalville, Utah, 31st, all grain destroyed on north side of Chalk creek by locusts. Cheyenne, Wyoming Ter. 30th, reported flying over city to the SE. Bismarck, Dak., 3rd, 1:30 p. m., numerous, flying E., about  $\frac{1}{2}$  miles high, evening some alighted; 4th, flying and alighting; 5th, abundant, flying E. and alighting, doing much damage at Fort Lincoln, and is reported they have destroyed all crops yet in ground; 6th, few flying E., others alighted and made great havoc with crops in city and vicinity: swarms flying E., in vicinity of Jamestown, 100 miles east of station; 7th, abundant on ground and in the air to a height of twenty-five feet, unfledged locusts noticed; devouring everything on ground; 8th, still on ground mating, destroying and preparing to hatch; 10th, hatching; 11th, hatching, many took wing towards the E.; 12th, few in air or on ground; 13th, flying SE., a few yet remain on ground, but not hatching; 14th, on ground and flying SE.; 15th, flying southerly; 19th, a few on ground, and those in the air flying southerly; 20th, abundant on ground, few in the air; 22nd, unfledged seen in city and vicinity, still numerous without city; 23rd, flying S., unfledged on ground; 24th, flying S. in large numbers, some unfledged on ground; 25th, on ground and flying southerly; 26th to 30th, disappearing, flying southerly; 31st, but few on ground, none in the air. *Cotton worm*: Green Spring, Hale Co., Ala., 20th, began its work in lower part of this county later than last year, it has stripped the stalks of their leaves and stopped the growth and blooming; there will result only about two-thirds of a crop. Brookhaven, Miss., 18th, very bad on many plantations throughout the state, but none as yet in this vicinity. *Tobacco worm*: Ringgold, Ohio, 31st, most destructive since 1853. Bismarck, Dak., 6th, observed feeding on potato-vines and tomato-vines and cotton trees. *Katydid*s: Somerset, Mass., 20th; Oregon, Mo., 6th; Flushing, N. Y., 2nd; Bellefontaine, Ohio, 4th; Logansport, Ind., 12th. *Potato Bugs*: Broad Oak, Va., 24th. *Fire Flies*: Pembina, Dak., 31st.

**BIRDS.**—*Swallows*: Cornish, Me., 1st, S; Oregon, Mo., 25th; Corning Mo., 22nd; Waterbury, N. Y., 25th, disappeared; Flushing, N. Y., 20th; West Charlotte, Vt., 22nd, disappeared; Daytona, Fla., 19th, 21st, S; Pembina, Dak., 5th, previously numerous, have entirely disappeared; New London, Conn., 4th. *Cranes*: Cresswell, Kan., 28th, S. *Black birds*: Ephrata, Pa., 31st, in large flocks. *Ducks*: Indianola, Tex., 15th, S, SW.; Pembina, 15th, numerous. *Geese*: Broad Oak, Va., 26th, S. *Orioles*: Cornish, Me., 4th, S. *Bobolinks*: Cornish, Me., 8th, S. *Martins*: Cornish, Me., 1st, S.; Genoa, Neb., 15th, disappearing; Bellefontaine, Ohio, 27th, S.; Jacksonburg, Ohio, 28th, disappearing. *Humming birds*: Cornish, Me., 11th, S.; Coalsville, Utah, 16th. *Field Plovers*: Cornish, Me., 13th, S. *Night Hawks*: Cornish, Me., 26th; Bellefontaine, Ohio, 20th.

**METEORS.**—Near Woodstock, Md., 2d, 3d, 4th, 12th, 18th, 19th, 20th; Gainesville, Ga., 10th; Titusville, Pa., 11th, 10:30 p. m., meteor from W. to N., color greenish, brilliancy outshining full-moon, dividing into three fragments, two of which were reddish, distance calculated from the report on exploding, 25 miles; Dodge City, Kan., 20th; Davenport, Iowa, 3d, 10th, 23d; Detroit, Mich., 19th; Indianapolis, Ind., 22nd, 23d; Savannah, Ga., 11th; New Haven, Conn., 10th; Eastport, Me., 11th; Green Springs, Ala., 6th, 9th, 10th; Anna, Ill., 19th; Lyndon, Ill., 5th; Vevay, Ind., 17th; Monticello, Iowa, 31st; Tarbor, Iowa, 23d; Creswell, Kan., 31st; Fall River, Mass., 12th; Springfield, Mass., 2d, 20th; Rowe, Mass., 2d, 23d, 29th, 31st; Brookhaven, Miss., 19th; Fayette, Miss., 6th, 22d, 23d, 25th, 28th, 30th; Corning, Mo., 17th, 21st; Oregon, Mo., 17th, 18th, 20th, 22d, 23d, 26th; Lebanon, Mo., 19th, 22d; Emerson, Neb., 23d, 29th; Clear Creek, Neb., 4th, 5th, 20th to 25th, 26th; Freehold, N. J., 5th; Waterburg, N. Y., 1st, 2d, 3d, 10th, 20th, 22d; Hector, N. Y., 8th; Starkey, N. Y., 1st; Flushing, N. Y., 18th 21st; Vernon Centre, N. Y. 3d; Jacksonburg, Ohio, 11th, 12th, 13th, 14th to 28th; Limestone Springs, S. C., 3d; McMinnville, Tenn. 19th; Melissa, Tex., 22d, 29th; Boise City, Idaho, 25th; Bismarck, Dak., 14th; Pembina, Dak., 1st; St. Louis, Mo., 4th. Chicago, Ill., 12th, 10:15 p. m. to midnight, meteoric showers in every quarter of the horizon, the number, even for a fraction of a second, could not be computed; the display is considered one of the most remarkable ever seen here. Dubuque, Iowa, 23rd 10:50 p. m., brilliant meteor, from W. to N., with fan-shaped tail; head small, greenish-blue; tail yellowish-white; small cloud floated in track of meteor from W. to E. Sacramento, Cal., 10th, 11 p. m., brilliant meteor, size and brightness of full moon, moved from N. to S; 11th, 8 p. m., brilliant meteor from NE. to SW., with zizzag motion. Indianola, Tex., 13th, 9:10 p. m., meteor nearly due W., altitude 30 to 40°; train bright-red, about 5° long; path downward nearly perpendicular; exploded into several fragments of various and brilliant colors; duration 4 to 6 seconds; no cloud visible. Fort Davis, Texas, 1st, 2nd, 3rd; 27th, 8:30 p. m., brilliant meteor passed NE. and exploded. Portland, Or., 19th.

**Polar Bands.**—Portland, Or., 7th; New Corydon, Ind., 7th, 22nd, 27th; Gardiner, Me., 12th, 24th, 26th Clear Creek, Neb., 9th, 10th, 13th; Auburn, N. H., 24th, 31st; Freehold, N. J., 8th, 11th, 24th; Wytheville, Va., 14th, 28th.

*Zodiacal Light*.—Daytona, Fla., 6th, 7th, 10th, 11th, 14th to 18th, 20th, 23rd to 25th, 27th to 31st; Ephrata, Pa., 21st, 23rd, 25th; Newbury, Vt., 25th, 26th.

*Prairie and Forest Fires*.—Roseburg, Or., large fires in mountains; Portland, Or., 14th, 28th, 31st; Umatilla, Or., 3rd; Cresswell, Kan., 1st, 17th, 27th; Independence, Kan., 23rd, 28th; Oregon, Mo., 3rd; Boise City, Idaho, 3rd, on mountains; Bismarck, Dak., 9th, E., 10th, ESE., 11th, SE., 12th, ESE., 15th, SE., SW., 16th, SW.; Yreka, Cal., 8th, 9th, 10th.

*Earthquakes*.—U. S. Naval Hospital, Yokohama, June 22nd, 12 m., smart shock, lasting 35 seconds; 28th, 6:35 p. m., smart shock. July 5th, 4:39 a. m., light shock, duration 20 seconds; 10th, 12:46 a. m., light shock; 3:45 p. m., smart shock. Salt Lake City, 21st, 5 a. m., slight shock. San José de Costa-Rica, Central America, July 27th, 7:30 p. m., strong shock. August 13th, 7:17 p. m., strong shock, 11:30 p. m., feeble shock; 14th, 3:0 a. m., feeble shock, 12:48 p. m., feeble shock; 22nd, 10:0 p. m., strong shock. At Cartago, twelve miles east of San José, five shocks occurred from 7 p. m. of the 14th to 5 a. m. of the 15th, the first of which was very hard.

*Sunsets*.—The characteristics of the sky at sunset, as indicative of fair or foul weather for the succeeding twenty-four hours, have been obtained at all Signal Service stations. Reports from 124 stations show 3,829 observations to have been made, of which 35 were reported doubtful. Of the remainder, 3,090 or 81.4 per cent., were followed by the expected weather.

*Sunspots*.—A record of observations made by Mr. D. P. Todd, on July 2d, 4th, 21st, 28th and 29th, has been forwarded by Rear Admiral John Rodgers, U. S. Navy, Superintendent U. S. Naval Observatory, Washington, D. C., and which reports no spots seen. Prof. Gustavus Hinrichs, Iowa City, Ia., reports that the sun's disk was observed from August 1st to the 12th, on eight days, also on the 23rd and 24th, and not a spot seen. Observations were also made at Fort Whipple, Va., on the 2nd, 6th, 7th, 8th, 10th, 18th, 19th, 20th, 23rd, 24th, 26th and 27th, and no spots seen.

*The Solar Eclipse of July 29th, 1878*.—About three hundred and twenty letters and reports concerning this eclipse have been received from about two hundred and ninety-five stations, of which, however, only twenty-eight were in the path of totality. The observations relative to temperature and weather, and about twenty-five sketches of the corona, will be published with appropriate diagrams hereafter; those relating to "the duration of totality" are here given as being of immediate astronomical interest.

LOCALITY.	ALTI- TUDE.	OBSERVER.	DURATION OF TOTALITY.
			Seconds.
Colorado.—Colorado Springs, Station 1.....	6038	F. H. Loud.....	180
" " " 2.....	6038	J. H. Kerr.....	180
" " " 3.....	6038	A. H. Wright.....	161
" " " 4.....	6038	L. Kimball.....	162
Manitou.....	6300	W. W. Nichols.....	165
Lake House, on Pike's Peak.....	10230	P. Curtis.....	161.7
Four Mile.....	—	M. Wiley.....	76
Monument, fifteen miles north of Colorado Springs.....	7000	E. P. Bucher.....	161.4
Denver.....	5280	J. A. Barwick?.....	179
Kit Carson.....	—	O. Branham.....	3
Pike's Peak, summit.....	14200	S. P. Langley.....	158
South Pueblo.....	4600	E. S. Nettleton.....	153
Indian Territory.—Fort Sill.....	1100	J. McCann.....	148
Louisiana.—Lake Charles.....	—	W. Meyer.....	15 0
Montana.—Virginia City, Station 1.....	5480	A. B. Knight.....	180
" " " 2.....	5480	D. W. Tilton.....	174
" " " 3.....	5480	R. B. Wassel.....	180
" " " 4.....	5480	H. Schmallhansen.....	176
Baldy Mountain, ten miles southeast of Virginia City.....	10000	H. N. Blake.....	170
Texas.—Belmont Farm, near Melissa.....	720	T. M. Scott.....	60
Corsicana.....	445	J. W. Smith.....	161
Decatur, Court House.....	1160	W. E. Garver.....	149
Graham.....	1040	E. T. Hilliard.....	120
Henrietta, Station 1.....	915	J. I. Mullen.....	167
" " 2.....	915	Dr. Harrold.....	160
Pilot Point.....	800	E. F. Reeves.....	102
Terrell.....	650	F. P. Cline.....	134? 113?
West Indies.—Havana.....	25	C. Hasselbrink.....	114

NOTE.—The duration of totality is not stated at Navassa, West Indies, and Jacksboro, Texas.

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