

U.S. Weather bureau.

SIGNAL OFFICE,  
WAR DEPARTMENT.

---

GENERAL  
SUBJECT INDEXES

TO THE

MONTHLY WEATHER REVIEWS

AND

ANNUAL REPORTS

OF THE

CHIEF SIGNAL OFFICER OF THE ARMY

TO 1887.

---

WASHINGTON, CITY:  
SIGNAL OFFICE,  
1888.

69934

## CONTENTS.

	Page.
MONTHLY WEATHER REVIEW .....	3
CHARTS IN REVIEWS AND REPORTS.....	18
ANNUAL REPORTS.....	23
1861-1887, Military Signalling.	
1870-1887, Meteorological Section.	

*Reference table for Monthly Weather Reviews in Annual Reports.*  
(Reviews for July-December are in Report for following year.)

Review	Report.	Jan.	Feb.	Mar.	Apr.	May.	June.	Report.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
		Page of Report.							Page of Report.					
1872.....	.....							1873.....				981	982	983
1873.....	1873...	983	984	985	987	988	989	1874....	*	*	*	325	328	330
1874.....	1874...	333	336	341	344	349	355	1875....	268	273	277	281	287	292
1875.....	1875...	297	302	309	315	320	326	1876....	384	390	395	402	408	414
1876.....	1876...	421	428	436	445	455	464	1877....	380	388	398	407	417	424
1877.....	1877...	434	442	451	462	475	487	1878....	460	472	485	498	510	523
1878.....	1878...	536	548	561	575	587	603	1879....	541	556	572	589	605	622
1879.....	1879...	636	653	670	688	707	727	1880....	569	587	606	624	641	660
1880.....	1880...	677	696	718	736	754	771	1881....	873	892	910	926	944	962
1881.....	1881...	982	1,004	1,026	1,048	1,070	1,093	1882....	1	30	59	94	123	155
1882.....	1882...	181	217	255	289	329	364	1883....	697	723	755	796	831	857
1883.....	1883...	891	930	978	1,016	1,061	1,108							

\*For July, Aug., Sept., 1873, see Report 1873, pp. 990, 992, 995.

# MONTHLY WEATHER REVIEW.

OCTOBER, 1872, TO DECEMBER, 1887.

(† Indicates that the subject has been continued to date. The paging is that of the quarto edition. The reprint to June, 1883, in the Annual Reports, may be consulted readily with the aid of the table on the preceding page.)

## A.

Alabama weather service, report.....	Mar. '84†
Anemometer observations at sea (Waldo).....	Jan. '87, 81
Annual summary for 1886.....	Jan. '87, 25-27
Aqueous vapor, absorption of radiant heat (Haga).....	Apr. '77, 11
relation to perpetual snow (Croll).....	Oct. '80, 16
Arctic meteorology, results of Sherman's observations at Annanatok.....	Feb. '79, 13
observations of the "Vega," 1878-9.....	Nov. '79, 15
(See, also, Ocean currents: Temperature.)	
Arkansas weather service, report.....	Jan. '87†
Auroras, summary of observations.....	Nov. '78†
description of remarkable.....	Mar. '74, 4; May '77, 7-8; Apr. '80, 15
and magnetic disturbances.....	Apr. '82, 22; Nov. '82, 16-17
theory (Lemström).....	Mar. '87, 91
coincidence with sun spots (Veeder).....	July '87, 206

## B.

Balloon ascensions, Nashville, Apr. 3, June 18 and 19, 1877... June, 11, ch. iv	Apr. '77, 3, ch.; June, 11, ch. iv
Bangkok, Siam, meteorology (Campbell).....	Sept. '79, 15
Barometer, Guthries'.....	May '77, 10
effect of wind and exposure on readings (Abbe).....	Nov. '86, 382-388
comparison of Signal Service with other standards (Waldo) ...	Apr. '87, 119-121
Birds, migration.....	Feb. '74†
Black rain.....	Dec. '78, 8
Botanical phenomena, summary.....	Mar. '74†

## C.

California, six year periods of rainfall.....	Jan. '84, 28
Cautionary signals, summary and verification.....	Nov. '78†
order instituting northwest signals.....	Feb. '81, 12-18
property detained in port by, during October cyclone.....	Oct. '82, 6-7
value, letter of Sec'y N. Y. Maritime Exchange.....	Oct. '85, 249
Cerro de Pasco, Peru, summary for May-Dec. '78 (Ward).....	Mar. '79, 8
Charlotte, Vt., monthly rainfall 1868-'82 (Wing).....	Mar. '88, 64
Charlotte, S. C., daily cloudless precipitation.....	Oct. '87, 287
Charts, tracks of storm centres (low areas).....	Oct. '72†
(Ice limit and N. Atlantic storms, Jan. '84†; fog belts, July, '87.)	
isobars, isotherms, and winds.....	July '78†
distribution of local storms.....	July '78
lines of equal monthly range of temperature.....	July '78
precipitation.....	Aug. '78†
tracks of areas of high barometer.....	Aug. '78
international meteorology, ocean storm tracks.....	Nov. '78-Mar. 81
international chart, mean temperature, pressure, and winds, Sept. '77-Oct. '80.....	May '79-Dec. '82
(Sept. '77 in Review, Apr. '80.)	
international chart, tracks of centre of low barometer, Nov. '77-Jan. '81.....	Jan. '79-Dec. '82
map of cotton-belt stations.....	Apr. '82, vi
ice limit.....	Apr.-July '82
(Included in Ocean storm tracks, Feb. '83†)	
West India hurricane tracks, 1878-'81.....	May '82, viii
No. Atlantic storm charts, suppl. to ch. i.....	Oct. '82-Dec. 88;
(Included in ch. i, Jan. '84†)	
frost limit.....	Sept. '88, v; Aug. '84, iv

Charts, departures from normal pressure and temperature.....	Aug. '84†
curves of meteorological elements at Pekin, Ill., Mar. '86...	Mar. '86
curves of electrometer readings.....	Apr. '86-Apr. '87
tornado tracks .....	July-Sept. '86
thunder-storm distribution.....	Aug.-Sept. '86
Charleston earthquake area .....	Aug. '86, vii
annual mean temperature, 1886, and departure from normal..	Jan. '87, vii
annual precipitation, 1886 .....	Jan. '87, viii
average storm tracks for March, 1878-'85 .....	Mar. '87, vii
rain frequency and wind rose for April.....	Apr. '87, vii
wind rose for April .....	Apr. '87, viii
soil temperature and moisture, June '86, '87.....	June '87, v
normal and mean temperatures for month.....	July, Nov., Dec. '87
meteorological and health chart of Ohio, Aug. '87.....	Aug. '87, v
Cincinnati, Ohio, lowest temperatures, 1856-'84 (Harper).....	Jan. '84, 18
Climate of British colonies (Symons) .....	Oct. '77, 11
Bangkok, Siam (Campbell).....	Sept. '79, 15
Europe.....	Feb. '81, 18-19
Palestine (Merrill).....	Aug. '83, 193-194
Fiji Islands, 1875-'85 (Vaughan).....	Oct. '87, 298
Cloudbursts, special notices.....	Aug. '76, 6; Feb. '78, 7; July, 8;
June '81, 22; Aug., 25; Mar. '84, 81; June, 150, 151; July, 178; May '85, 180	
report and remarks on (Strieby) .....	July '85, 181-182
Cloudiness, annual mean at Lawrence, Kans., 1868-'82 (Snow)..	Dec. '82, 16
Clouds, peculiar arrangement.....	July '74, 5; Nov. '83, 264
photography (Hildebrandsson).....	Nov. '78, 11
study of movements (Abbe) .....	Nov. '78, 11-12
as weather signs (Ley) .....	Jan. '79, 14-15
and cyclones (Ley) .....	Nov. '79, 16
luminous, description, with cut (Munson).....	Apr. '85, 103-104
Cloudy days, summary .....	May '74†
Cold wave, remarkable .....	Jan. '86, 2-4, 8 ch.
Cold-wave signals, circular introducing system.....	Nov. '84, 282
verifications .....	Nov. '84†
value, extracts from reports .....	Oct. '85, 260
Colorado meteorological association, extract from bulletin.....	Apr. '86†
Colorado Springs and Denver, temperature and rainfall, July	
1872-'86; Mar. 1872-'87 .....	July '86, 208; Mar. '87, 87
Comfort, Tex., monthly and annual rainfall, 1877-'83 (Pettersen)..	Dec. '88, 281
Cotton region, climate.....	Apr. '76, 8
list and map of districts and stations.....	Apr. '82, 17-18, ch. vi
reports.....	Apr.-Oct. '82; May-Oct. '83, '84†
Texas, rainfall, 1882-6 .....	Sept. '86, 260
rainfall and temperature for 1882-6, with average acreage	
and yield (Dodge).....	Oct. '86, 289
Cumberland, Md., temperature and precipitation for Jan. Mar.-	
May, 1878-'87.....	Jan. Mar.-May. '87
Cumberland river flood, special report.....	May '86, 146
Cyclones, origin (Hann) .....	Sept. '77, 12
characteristics of Asiatic and Indian (Wagner).....	Nov. '78, 13
direction of motion (Eliot).....	Jan. '79, 15
gyratory movement (Forel).....	May '79, 15
Mauritius, Mar. 20, 1879 .....	June '79, 13
and clouds (Ley) .....	Nov. '79, 16
generation (Eliot) .....	Jan. '80, 15-16
log of U. S. S. Ranger, Nov. 28, 1879 .....	Feb. '80, 7-8
Manzanilla, Mex .....	Oct. '81, 8

## D.

Dakota weather service, report .....	June '87†
Dale Enterprise, Va., temperature and precipitation for 1880-6..	Dec. '86,
	844, 846
Darkness, sudden .....	Mar. '86, 79
Denver and Colorado Springs, temperature and rainfall, July	
1872-'86; Mar. 1872-'87 .....	July '86, 208; Mar. '87, '87
Dewpoint, table, with rainy and cloudy days and relative	
humidity.....	Mar. '88-Sept. '84

Droughts, summary.....	May '74†
special.....	Aug. '77, 6; Apr. '79, 9; Oct., 12; July '81, 21-22; Aug., 20-22; Sept., 22-23; Nov. '87, 807-809
Iowa, belt of continuous (Hinrichs).....	July '86, 199
Dakota and Minnesota, 1886 (Brandenburg).....	Nov. '86, 826
Kansas and Texas (Hazen).....	Apr. '87, 119
May-Sept. 1882, with precipitation tables.....	Oct. '87, 282-288

## E.

Earthquakes, summary.....	Feb. 74†
and sea wave over the Pacific Ocean, May 9.....	May '77, 9-10
Sitka, Alaska, 1880.....	Jan. '81, 17-18
Island of Ischia.....	July '83, 169
Constantinople.....	Oct. '83, 287-288
eastern United States, reports.....	Aug. '84, 201-204
Vévy, Ind., connection with meteorological phenomena (Boerner).....	Sept. '84, 286
Charleston, special report (Mendenhall).....	Aug. '86, 283-285, ch. vii
Earth temperatures, variation with coverings (Becquerel).....	Jan. '83, 23
and moisture (Whitney).....	June '87, 177-178, ch. v
Eclipse, solar, observations of duration of totality.....	Aug. '78, 14
Electrical observations, summary, with chart.....	Apr. '86-Apr. '87
simultaneous readings at Smithsonian and Signal Office..	May-June '86, ch
simultaneous readings at Washington Monument and Signal Office.....	June '86-Apr. '87, ch
thunder-storm at summit of Washington Monument.....	June '86, 167
mean values for Washington, Boston, and New Haven...	Aug. '86, ch. vi
Electrical phenomena, summary.....	Feb. Apr. '74†
on Pike's Peak.....	Aug. 76, 8
telegraphic.....	Apr. 78†
with sand storm.....	Mar. '80, 18
remarkable luminous cloud, with cut (Munson).....	Apr. '85, 103-104
Electricity, atmospheric, origin (Edlund).....	Nov. '78, 12-13
memoir on (Everett).....	Feb. '79, 18-14
variations in potential (Mascart).....	Nov. '79, 15-16
theory and law (Exner).....	Apr. '87, 121-122

## F.

Fiji Islands, monthly pressure, temperature, and rainfall, 1875-'85 (Vaughan).....	Oct. '87, 298
Fires, prairie and forest.....	Dec. '78; Apr. '74†
Fishes, appearance in rivers.....	Apr. '74†
Floods, summary of observations.....	Apr. '74†
Mississippi and Ohio valleys.....	May '74, 6; June '80, 9-10; June '81, 20-22; Oct., 18-20; Feb. '82, 18-21; Mar., 18-19; Feb. '83, 42-46; Feb. '84, 51-55; Mar., 80-81; Mar. '86, 74-75; Apr., 102-108; May, 182-184
Sacramento valley.....	Feb. '78, 6-7
Tucson, Ariz.....	July '78, 8
Chicago, Ill.....	July '78, 4
Savannah river.....	Sept. '78, 9
Pacific coast.....	Jan. '81, 14-15
United States, general.....	Feb. '81, 14-16
Nashville, Tenn.....	Jan. '82, 18-20
Saint Louis, Mo.....	Apr. '82, 21
Deadwood, Dak.....	May '83, 119
Yuma, Ariz.....	Mar. '84, 81
Texas.....	May '84, 181; May '85, 129-180
Mexico.....	June '85, 157
New England.....	Feb. '86, 47-48
Cumberland river.....	May '86, 146
Fog, cause in United States.....	Dec. '73, 8
annual wave at New Westminster, B. C.....	Nov. '78, 10-18; Oct. '81, 28
North Atlantic.....	Oct. '86†

(On ch. i, Low areas, July '87)

Fog, predictions for Newfoundland banks and U. S. coasts (Garriott).....	Mar. '87, 91; Apr., 122; May, 150; June, 176-177; Dec., 336-337
Fogbows.....	Jan. July '74†
Foggy days.....	Dec. '75†
Forests, influence on rainfall (Pousset).....	May '77, 11
(Fautrat) ..	May '80, 15-16
temperature (Nature).....	Apr. '79, 16
Fort Gibson, Ind. T., monthly and annual precipitation, 1836-'86..	Dec. '87, 387
Fort McPherson, Nebr., results of observations, 1870-8 .....	Feb. '87, 64
Frosts, summary of observations .....	Oct. '78†
specially destructive.....	Apr. '75, 5, 8; May '84, 123-125
table of first, reported at 7.35 a. m. at U. S. stations .....	Sept. '79, 8
chart of limits .....	Sept. '83, v; Aug. '84, iv
first and last, at Lawrence, Kans., Oct.-June, 1868-'84... Oct. '83-June '84	Dec. '83, 277
Wauseon, Ohio, 1870-'83 .....	Dec. '83, 284
New Orleans, 1870-'84 .....	Apr. '84, 118
Signal Service stations, 1875-'84.....	Oct. '85, 254
remarkable phenomena .....	Mar. '87, 91; June, 177
Frost warning signals in Northwest.....	Mar. '87, 91

## G.

Galveston, Tex., monthly rainfall and mean max. and min. temperature, Apr.-Oct., 1882-6.....	Oct. '86, 289
Georgia weather service, report .....	Apr. '84-Sept. '86
Gravity correction.....	Feb. '85, 31
Greenwich observations for 1854-'73 (Buchan).....	Oct. '79, 16
Ground currents, summary of observations.....	Feb. Apr. '74†

## H.

Hail, remarkable.....	May '74, 4; Sept. '75, 6; August '76, 6; Apr. '77, 6, cut.; May, 5; July, 5; Aug., 6; Sept. '79, 16; July, 12; Apr. '80, 10; May, 8; July, 9-10; June '81, 16-17; July, 16-17; Sept., 18; May '82, 15; June, 14; May '83, 112-118; July '84, 168-169
from clear sky .....	July '88, 158
Hail-storms, summary .....	Apr. '74†
origin (Viguier).....	May '77, 11
report for the month (Finley).....	July '86, 187
special report (Pendleton).....	June '87, 166
Halos, summary .....	Nov. '78†
remarkable solar.....	Dec. '76, 8, cut.; July '79, 15; Nov. '80, 15
indicating coming rain or snow (Laughlin) .....	Dec. 85, 320
Hampshire natural history society, temperature observations.....	Mar. '87, 88
Health (see Medical meteorology).	
Helvetia, W. Va., monthly mean temperatures, 1876-'85 (Stucky)..	Dec. '85, 801
Hoar frost, theory (Nouel).....	May '79, 15-16
Hopkinton, Iowa, monthly and annual mean temperatures, 1852-'87 (Marks) .....	Nov. '87, 315
Hudson river, years in which closed at Albany during November, 1796-1880 .....	Nov. '88, 260
dates of closing at Albany, 1867-'87 .....	Dec. '87, 331
Humidity, summary .....	May '74†
table of relative, for districts .....	May '82-Sept. '84
annual percentage at Lawrence, Kans., 1869-'82 (Snow).....	Dec. '82, 16
Hygrometer, Edison's tasimeter as .....	Nov. '78, 12
(See, also, Psychrometer).	

## I.

Ice, river and lake .....	Oct. '78†
first formed.....	Oct. '74†
(See, also, River reports.)	
ocean, summary of observations.....	Apr. '75†
table of icebergs for Feb.-June, '80 .....	June '80, 12-18
chart of limit in No. Atlantic.....	Apr.-July '82
(On chart, Ocean storm tracks, Feb. '83-1)	

Ice, table of southern and eastern limit for month compared with preceding years.....	Feb. '85†
connection with sun-spots (Archibald).....	June '82, 8-9
Illinois, precipitation and temperature tables, by districts... Apr. '83, 98; June, 148; Apr. '84, 118; Apr. '85, 110; Jan. '86, 26; Apr. '87, 116	Apr. '88†
Illinois weather service, report.....	Aug. '88†
Indiana weather service, report.....	May '74†
Indications, verifications.....	Mar. '74†
Insects, appearance and injury to vegetation.....	June '80, 15
Intercolonial meteorological conference.....	May '79-Dec. '82
International charts, mean temperature, pressure and winds, Sept. '77-Oct. '80.....	(Sept. '77 in Review, Apr. '80.)
tracks of low barometer, Nov. '77-Jan. '81.....	June '79-Dec. '82
plan.....	July '79, 5-9
value (Nature).....	Apr. '80, 16
review for Aug. '78 (Nature).....	May '80, 15
International meteorology, summary.....	Nov. '77†
chart of ocean storm tracks..... Nov. '78-Mar. '81; Oct. '82-Dec. '83	(Included in chart, Tracks of low areas, Jan. 84†)
Iowa weather service, report.....	Apr. '88†

## K.

Kansas droughts (Hazen).....	Apr. '87, 119
Kansas weather observer, extract.....	Mar. May July '84
Kansas weather service, report.....	Sept. '88†
Kirkwood, S. C., monthly and annual rainfall and no. of rainy days, 1866-'85 (Macrae).....	June '85, 151
Krakatoa smoke and the red skies (Kiessling).....	Sept. '86, 271-272
(Hazen).....	Feb. '87, 64

## L.

Laconia, Ind., monthly, annual, and seasonal rainfall, 1866-'82 (Crozier).....	Dec. '82, 15-16
Lafayette, Ind., max., min., and mean temperatures for Jan. 1880-4.....	Jan. '84, 28
Lawrence, Kans., annual mean and extreme temperatures, 1868-'82 (Snow).....	Dec. '82, 18
annual rainfall, snowfall, rainy days, humidity, and mean cloudiness, 1868-'82 (Snow).....	Dec. '82, 16
weather of winters 1867-'84 (Snow).....	Feb. '84, 62
comparative temperature of Dec. 1868-'86 (Snow).....	Dec. '86, 844
means of observations for Oct.-June, 1868-'84 (Snow)...	Oct. '83-June '84
Leavenworth, Kans., five-year means of precipitation, 1837-1886.....	April '87, 119
Lightning, summary.....	May '74†
remarkable ball..... July '74, 7; Oct. '84, 256; Apr. '85, 86; Mar. '87, 84	Dec. '86, 862
frequency of strokes (Hellmann).....	July '80, 16
Lightning conductors, efficiency (Holtz).....	July '80, 16
Lima, Ohio, monthly mean temperature, Jan. 1865-Oct. '87, and precipitation from Jan. '81 (Davis).....	Oct. '87, 298
Little Rock, Ark., monthly rainfall and mean max. and min. temperatures Apr.-Oct. 1882-6.....	Oct. '86, 289
Local weather signals, verifications.....	July '80†
Louisiana weather service, report.....	June '84-May '85; Nov. '87†

## M.

Macon, Ga., monthly max. and min. temperatures, 1871-'82 (Boardman).....	Aug. '82, 10
monthly and annual rainfall, 1871-'82 (Boardman).....	Aug. '82, 12
Magnetic declination, average diurnal range (Hinrichs).....	Jan.-June '78
San Juan valley, Colo. (Hess).....	July '79, 15
and thunder-storms (Hazen).....	Sept. '84, 288
and sun spots (Hazen).....	Jan. '87, 29-31, ch.
Magnetic storm at Zi-Ka-Wei (Dechevrens).....	Dec. '80, 17-19
Kew Observatory (Whipple).....	Apr. '82, 22
Greenwich (Christie).....	Nov. '82, 16-17

Marine agencies, circular relative to establishment .....	Jan. '86, 7
Medical meteorology, temperature and mortality.....	Apr. '79, 16
value of study (Baker).....	Dec. '82, 25
causes of pneumonia (Baker) .....	Nov. '86, 384
meteorological and health chart for Ohio, Aug. '87 (Eggleston).....	Aug. '87, 284, ch. v
Memphis, Tenn., monthly rainfall and mean max. and min. temperature, Apr.-Oct. 1882-6 .....	Oct. '86, 289
Mercury, observations of transit.....	May '78, 18
Merritt's Island, Fla., monthly rainfall, 1878-'85 (White).....	Dec. '85, 304
Meteors, summary .....	Feb. Apr. '74†
special study .....	Dec. '76, 9-10
height (Köhl).....	Nov. '78, 11
description of remarkable (Hagen) .....	Jan. '86, 23; Mar., 85-86
Michigan weather service, report.....	July '84†
Migration of birds.....	Feb. '74†
Minnesota weather service, report.....	Jan. '85†
Mirage, summary of observations.....	June '74†
Mississippi river, highest stages at Saint Louis, 1872-'83 .....	June '88, 142
Mississippi weather service, report .....	June '84†
Missouri river, change in channel at Yankton.....	Apr. '79, 12
Missouri weather service, report .....	Apr. '88†
Moisture and temperature of soil (Whitney).....	June '87, 177-178, ch. v
Myer, A. J., order announcing death .....	Aug. '80, 1

## N.

Navigation, inland .....	Mar. '74†
opening of harbors .....	May '74†
Nebraska, temperature and rainfall for Apr. July-Nov. 1878-1886.....	Apr. July-Nov. '86
temperature for March, 1878-'87.....	Mar. '87, 89
Nebraska weather service, report.....	Feb. '83†
Newark, N. J., monthly and annual precipitation, 1843-'87 (Ricord).....	Nov. '87, 315
New Bedford, Mass., coldest winters since 1812.....	Apr. '75, 5
New England meteorological society, report .....	Dec. '84†
New Jersey weather service, report.....	Apr. '83†
New Orleans, first and last frosts and snowfalls, 1870-'84 .....	Apr. '84, 18
monthly rainfall and mean max. and min. temperatures, Apr.-Oct. 1882-6 .....	Oct. '86, 289
New Ulm, Tex., greatest, least, and mean precipitation, 1872-'87..	June '87, 164
monthly and annual mean temperatures and precipitation, 1872-'87 (Runge) .....	Dec. '87, 387
New Westminster, B. C., means of observations for 1884 .....	Jan. '85, 28
New York City, total and annual average precipitation for each five years, 1837-'81.....	Sept. '82, 19
heavy rainfalls, 1869-'87, with discussion of rate (Draper)..	Dec. '87, 328-329
North Atlantic (see Charts: Fog: Ice: International meteorology: Storms: Weather charts).	
North Carolina weather service, report .....	Jan. '87†
North Lewisburg, Ohio, temperature for 53 years (Gowey).....	Sept. '85, 226
Notes and extracts .....	Apr. '77†

## O.

Observations, summary for stations of Signal Service .....	Aug. '84†
record of voluntary observers and army surgeons.....	Aug. '84†
Ocean currents, caused by wind, on coast of Chili .....	Aug. '78, 8
Greenland and Iceland (Hoffmeyer) .....	Feb. '81, 19-20
Ocean fluctuations at Nagasaki (Coffin) .....	Oct. '77, 11
Ocean temperature (see Temperature of water).	
Ohio, comparative summary of observations, 1883-6.....	Jan. '86, 29
Ohio meteorological bureau, report.....	Apr. '83†
Ohio river, highest stages at Pittsburg, 1810-'81 .....	June '81, 21
Cincinnati, 1832-'82.....	Apr. '82, 21-22
Optical phenomena, summary .....	Nov. '78†
Oregon weather service, report .....	Mar. '87†



Oswego, Ill., monthly and annual precipitation, 1880-7 (Seely) .. Nov. '87, 816  
 Ozone, average from 13 stations in Tennessee, Oct. '85..... Oct. '85, 270

## P.

Palestine, climate, (Merrill) .....	Aug. '88, 193-194
Paramaribo, summary of observations, July 1878-Feb. '79 .....	May '79, 7
Parkersburg, W. Va., annual mean and max. temperatures, 1880-5 (Farrow) .....	Dec. '85, 301
Pekin, Ill., curves of meteorological elements for March, 1886 .....	Mar. '86, ch.
Pennsylvania weather service, report .....	Sept. '87†
Phenological phenomena, summary .....	Feb. '74†
Philadelphia, Pa., abstract of observations, 1851-'81 (Kirk- patrick) .....	Jan. '82, sh.
Pike's Peak, summary of observations, Jan. '74 .....	Jan. '74, 4
Polar bands, summary of observations .....	Nov. '78†
Pollen showers.....	May '77, 11; Mar. '79, 16; July, 16
Portsmouth, Ohio, monthly precipitation, 1859-'84 (Cotton).....	Dec. '84, 803
Pottstown, Pa., max. temperature for July Aug. and Sept. 1850-'81 (Moore) .....	Aug. '82, 10
Precipitation, summary .....	Oct. '72†
chart .....	Aug. '73†
average for districts and departures from normal.....	Aug. '78†
(On ch. iii, Aug. '73-Dec. '82.)	
special heavy .....	Nov. '78†
cloudless, summary.....	Jan. '74†
cloudless, remarkable.....	June '77, 5; Jan. '79, 8; Mar., 10; July '81, 13; Jan. '82, 16; Oct. '86, 287
lists of special heavy, largest, and smallest monthly .....	Sept. '76†
cotton districts .....	Apr.-Oct. '82; May-Oct. '83, '84†
table of rainy and cloudy days, relative humidity, and (from Mar. '83) dew-point for districts .....	May '82-Sept. '84
districts of maximum departures for Mar.-Feb. 1878-'84... Mar. '88-Feb. 84	Mar. '88-Feb. 84
departures from normal, Aug.-Nov. '84.....	Nov. '84, 228
table of average for voluntary stations, with departures .....	July '85†
mean for '85, with normals for Signal Service stations... Dec. '85, 815-816	Dec. '85, 815-816
total for '86 compared with normals .....	Jan. '87, 26, ch. viii
total for districts, Jan.-June 1887 .....	June '87, 168
table showing occurrence in Oct. Nov. Dec. of 10 in. monthly, 2.50 in. daily, and 1 in. hourly, 1870-'87 .....	Oct. '87, 281-282; Nov., 306-307; Dec., 329-330.
average for Jan.-Oct. 1887, for districts, and percentage of normal .....	Oct. '87, 282
table of distribution during drought of 1887 .....	Oct. '87, 288
Precipitation tables for long periods,	
central Pacific stations, July 1880-June '81 .....	Jan. '82, 28
cotton region, 1882-6, Apr.-Oct. ....	Oct. '86, 289
Arkansas: Little Rock, 1882-6, Apr.-Oct. ....	Oct. '86, 289
California: Sacramento, 1858-'82, monthly and seasonal....	Jan. '88, 14
San Francisco, 1849-'77, monthly.....	Sept. '82, 19
San Luis Obispo, 1869-'82, monthly .....	May '82, 18
Santa Barbara, 1870-'85, total winter ....	Apr. '84, 102; Dec. '85, 817
Colorado: Colorado Springs, 1872-'86, July; 1872-'87, Mar. ....	July '86, 208; Mar. '87, 87
Denver, 1872-'86, July; 1872-'87, Mar .....	July '86, 208; Mar. '87, 87
Connecticut: Wallingford, 1856-'87, monthly.....	Oct. '87, 292
District of Columbia, 1871-'87, heaviest.....	Nov. '87, 307
Florida: Merritt's Island, 1878-'85, monthly .....	Dec. '85, 304
Georgia: Macon, 1871-'82, monthly .....	Aug. '82, 12
Illinois: districts, 1878-'88, Apr., June, average monthly... Apr. '88, 98; June, 148	Apr. '88, 98; June, 148
1878-'84, Apr .....	Apr. '84, 118
1878-'85, Jan.-Apr.....	Apr. '85, 110
1875-'86, Jan .....	Jan. '86, 26
1878-'87, Apr.....	Apr. '87, 116
Oswego, 1880-7, monthly.....	Nov. '87, 315

## Precipitation tables for long periods,

<i>Illinois</i> : Sandwich, 1862-'84, annual.....	Apr. '85, 109
<i>Indiana</i> : Laconia, 1866-'82, monthly .....	Dec. '82, 15-16
Wabash, 1877-'82, monthly .....	Dec. '82, 16
<i>Indian Ty.</i> : 1836-'86, monthly .....	Dec. '87, 837
<i>Kansas</i> : Lawrence, 1868-'82, annual.....	Dec. '82, 16
1868-'84, Oct.-June, mean monthly ...	Oct. '88- June '84
Leavenworth, 1837-'86, five-year means.....	Apr. '87, 119
<i>Louisiana</i> : New Orleans, 1882-6, Apr.-Oct .....	Oct. '86, 289
<i>Maryland</i> : Cumberland, 1873-'87, Jan. Mar.-May ...	Jan. Mar.-May '87
<i>Nebraska</i> : southeastern district, 1878-'86, Apr. July-Nov...	Apr. July- Nov. '86
Fort McPherson, 1870-8, mean monthly, &c .....	Feb. '87, 64
<i>New Jersey</i> : Newark, 1843-'87, monthly .....	Nov. '87, 315
<i>New York</i> : New York City, 1837-'81, five year total and average .....	Sept. '82, 19
1869-'87, heavy rainfalls..Dec. '87, 328-329	
<i>North Carolina</i> : Wilmington, 1882-'86, Apr.-Oct .....	Oct. '86, 289
<i>Ohio</i> : Lima, 1881-7, monthly .....	Oct. '87, 293
Portsmouth, 1859-'84, monthly .....	Dec. '84, 303
Wauseon, 1871-'83, monthly and total snowfall, Oct.- May .....	Dec. '83, 281
<i>Pennsylvania</i> : Philadelphia, 1851-'81, mean monthly.....	Jan. '82, sh.
<i>South Carolina</i> : Kirkwood, 1866-'85, monthly .....	June '85, 151
<i>Tennessee</i> : Memphis, 1882-6, Apr.-Oct.....	Oct. '86, 289
<i>Texas</i> : cotton region, 1882-6, annual .....	Sept. '86, 260
Comfort, 1877-'83, monthly .....	Dec. '83, 281
Galveston, 1882-6, Apr.-Oct .....	Oct. '86, 289
New Ulm, 1872-'87, greatest, least, mean monthly..	June '87, 164
1872-'87, monthly .....	Dec. '87, 337
<i>Vermont</i> : Charlotte, 1868-'82, monthly.....	Mar. '83, 64
<i>Virginia</i> : Dale Enterprise, 1880-6, total for Dec.....	Dec. '86, 346
Snowville, 1869-'82, monthly.....	Dec. '82, 16
Wytheville, 1860-'82, monthly .....	June '82, 18
Wytheville, mean, greatest, and least monthly for 21 years.....	Dec. '85, 304
<i>Washington</i> : Walla Walla, 1873-'82 .....	Apr. '83, 82
<b>Precipitation notes and extracts,</b>	
connection with sun spots (Hunter) .....	July '77, 11
periodicity (Whipple).....	Feb. '80, 16-17
long period inequality (Stewart) .....	May '80, 14-15
six year periods in California .....	Jan. '84, 28
heavy rains before, followed by light after, Jan. 1 (Cooper)..	Apr. '84, 102
rainfall and its sources in southern slope (Cline) .....	Dec. '85, 317
secular variation (Hazen) .....	Nov. '86, 333-334
rain frequency and wind rose for April (Dunwoody)...	Apr. '87, 119
effect of rainfall upon air temperature (Mayer).....	Apr. '87, 118-119, ch. vii-viii
heavy rainfalls at Washington City, 1871-'87, and discussion of rate .....	July '87, 206
rain and snow from cloudless sky (Russell).....	Nov. '87, 307
rain and snow from cloudless sky (Russell).....	Nov. '87, 314-315
<b>Predictions, verifications .....</b>	May 74†
sunset.....	Mar. '77-Nov. '86
Deutsche Seewarte .....	Apr. '77, 12
<b>Pressure, summary .....</b>	Oct. '72†
low areas.....	Oct. '72†
chart of isobars, isotherms, and winds .....	July '73†
movement of high areas.....	Aug. '73, 1, ch.
high areas, summary .....	Nov. '73†
comparison with movements of water in Lake Superior.....	Mar. '74, 4;
Aug., 6; Oct., 8; Jan. '75, 8; Mar., 8; Apr., 8; July, 8; Aug., 8	
ranges .....	Oct. '76†
departures from normal values.....	Nov. '79†
means and departures at foreign isolated stations, May '79- Oct. '80 .....	July '81-Dec. '82
means and departures for European countries, Mar.-Oct. '80	May-Dec. '82

Pressure notes and extracts,	
mean in interior of Asia (Köppen) .....	Feb. '79, 12
third daily maximum (Capello) .....	Apr. '79, 16; May, 15
(Buchan) .....	Oct. '79, 16
remarkable fluctuations during storm .....	Aug. '79, 7
types of low areas, and movement across United States .....	Aug. '82, 8
reduction of barometer readings to lat. 45° .....	Feb. '85, 31
effect of wind and exposure on barometer (Abbe).....	Nov. '86, 382-383
during high winds on Mount Washington (Carr).....	Feb. '87, 68-65
movements of high areas over the North Atlantic (Garriott).....	Oct. '87, 273-274
direction of movement of low areas (Beall) .....	Oct. '87, 291-292
mean hourly variation, Washington, May-Dec. '87 .....	Dec. '87, 337
Psychrometers, accuracy (Marriott and Ward).....	May '77, 11
differences of still and whirled (Russell) .....	Oct. '86, 299-300

## R.

Railway weather signals, verification .....	Jan. '84†
Rain (see Precipitation).	
Rainbows, observations of lunar, summary .....	June '75†
observation of four .....	July '77, 9
double, in a cloudless sky .....	July '78, 10
mid-winter, with sun in centre .....	Dec. '85, 313
Rainy days, summary.....	May '74†
Lawrence, Kans., 1868-'82.....	Dec. '82, 16
Sacramento, Cal., 1863-'82.....	Jan. '83, 14
Rain gauge, marine (Horkens).....	May '77, 11
River reports, summary.....	May '78†
table of heights above low water .....	July '78†
(On ch. iii to Dec. '82.)	
table of average depth of water .....	Apr. '74†
(On ch. ii to Dec. '82.)	
highest stages, Pittsburg, 1810-'81 .....	June '81, 21
Cincinnati, 1832-'82.....	Apr. '82, 21-22
Saint Louis, 1872-'83 .....	June '83, 142
years in which Hudson closed at Albany during Nov. 1796-1880 .....	Nov. '83, 260
dates of closing at Albany, 1867-'87.....	Dec. '87, 381
Rome, mean daily wind-velocity, 1862-'76.....	Apr. '77, 11

## S.

Sacramento, Cal., mean monthly temperatures, 1853-'82 (Barwick)	Jan. '83, 8
monthly, annual, and seasonal rainfall, with number of rainy days, 1853-'82 (Barwick).....	Jan. '83, 14
Saint Johns, New Brunswick, summary for Aug. 1885 .....	Aug. '85, 217
Saint Louis, Mo., monthly mean temperatures, 1837-'80 .....	Jan.-Dec. '81
diagram of mean winter temperatures, 1837-'85.....	Feb. '85, 88
Saint Michael's, Alaska, summary for July 1877-June '78.....	Dec. '78, 5
Sand storms, notes of occurrence.....	June '79†
electrical phenomena accompanying .....	Mar. '80, 13
Sandwich, Ill., summary of observations, 1852-'84 (Ballou) .....	Apr. '85, 109
San Francisco, Cal., monthly and annual rainfall, 1849-'77.....	Sept. '82, 19
San Luis Obispo, Cal., monthly and annual precipitation, 1869-'82 (Hays).....	May '82, 13
Santa Barbara, Cal., total winter precipitation, 1870-'85 (Cooper).....	Apr. '84, 102; Dec. '85, 317
Scintillation of stars (Montigny).....	May '77, 10; Jan. '79, 15
Sea breezes, height, compared with land breezes (Sherman)...	July '80, 15-16
on New England coast .....	Apr. '87, 117
Shelbyville, Ind., lowest temperatures, 1851-'77 (Robins).....	Jan. '84, 11
Showers of dust .....	Dec. '73, 3; Jan. '86, 24
pollen.....	May '77, 11; Mar. '79, 16; July, 16
sand .....	Oct. '83, 238
stones .....	Feb. '77, 9
Siberia, low temperatures in (Woeikof) .....	May '81, 20
Signal Service, remarks of Hon. A. H. Stephens on.....	May '78, 13-14
Sitka, Alaska, description of storm at.....	Feb. '82, 16

Sleet, summary of observations .....	Jan. '78†
remarkable storm .....	Jan. '86, 14, 28-29
Smoke, revolving column .....	July '86, 201
Smoky atmosphere .....	Nov. '78, 4; Sept. '81, 27-29
Snow, early .....	Oct. '78†
depth on ground at end of month.....	Mar. '77†
colored.....	May '77, 11; Mar. '79, 16
aqueous vapor in relation to perpetual (Croll) .....	Oct. '80, 16
on June 12 at Lynchburg, Va.....	June '87, 164
(See also Precipitation).	
Snow balls, natural (Hart) .....	Feb. '83, 89-90
Snowfalls, first and last at New Orleans, 1870-'84.....	Apr. '84, 118
in May 1866-'84, Dannemora, N. Y.....	May '84, 127
at stations east of the Rocky Mountains, tables of first, 1873-'85; last, 1873-'86.....	Sept. '86, 254-255; Apr. '87, 122-123
Snow slides.....	Mar. '84, 87; Jan. '86, 18
Snowville, Va., monthly and annual temperature and precipita- tion, 1869-'82 (Moore).....	Dec. '82, 13, 16
Solar heat, variations at earth's surface (Crova).....	Apr. '77, 10
law of intensity (Crova).....	May '77, 12
importance of observations (Jevons).....	Nov. '78, 12
and temperature curves, Pekin, Ill., Mar. '86 .....	Mar. '86, ch.
Solar phenomena, summary .....	June '77†
South Carolina weather service, report .....	Jan. '87†
State weather services, extracts from reports.....	Feb. '88†
Alabama.....	Mar. '84†
Arkansas.....	Jan. '87†
Colorado.....	Apr. '86†
Dakota.....	June '87†
Georgia.....	Apr. '84-Sept. '86
Illinois.....	Apr. '83†
Indiana.....	Aug. '83†
Iowa.....	Apr. '83†
Kansas.....	Sept. '88†
Louisiana.....	June '84-May '85; Nov. '87†
Michigan.....	July '84†
Minnesota.....	Jan. '85†
Mississippi.....	June '84†
Missouri.....	Apr. '88†
Nebraska.....	Feb. '83†
New Jersey.....	Apr. '88†
North Carolina.....	Jan. '87†
Ohio.....	Apr. '83†
Oregon.....	Mar. '87†
Pennsylvania.....	Sept. '87†
South Carolina.....	Jan. '87†
Tennessee.....	Feb. '83†
Stateburg, S. C., extract from record for winter months 1885, 1851-7, and comparative temperatures of Jan. '57 and '86 (Anderson).....	Jan. '86, 29-30
Storms, summary, with chart of tracks.....	Oct. '72†
local, distribution.....	July '78, 1, ch.
local, summary.....	Apr. '74†
North Atlantic.....	Oct. '78†
chart of ocean tracks .....	Nov. '78-Mar. '81; Oct. '82-Dec. '88
(On ch. i, Jan. '84.†)	
international chart, tracks of low centres Nov. '77-Jan. '81..	June '79- Dec. '82
chart of West India hurricane tracks, 1873-'81.....	May '82, 4, ch. viii
Storms, special,	
West Indies and Atlantic coast.....	Nov. '73, 2; Sept. '75, 3-4; Sept. '76, 3-4; Oct., 3-4; Sept. '78, 3-4; Oct., 5-6; Aug. '79, 4-7; Aug. '80, 4-6, 7; Nov., 7-8; Aug. '81, 3-6; July '82, 6; Sept., 3-10; Oct., 3-7; Aug. '83, 178-180; Sept., 199-202; Aug. '85, 195-196; Oct., 247-248; June '86, 150-151

## Storms, special,

Gulf states and eastern United States.....	Sept. '74, 4; Dec., 4; Sept. '77, 2-4; Jan. '78, 5-6; Aug. '79, 7-8; Sept., 8-4; Feb. '80, 8-4; Jan. '86, 4-5; Aug., 210-211; Sept. '87, 242-244; Oct., 270-271
Lake region.....	Oct. '74, 8-4; Oct. '79, 6-7; Oct. '80, 4; Nov., 4; Oct. '87, 268-269, 271-278
trans-continental.....	Nov. '74, 8-5; Dec. '85, 295-296; Feb. '86, 84
Pacific coast.....	Jan. '80, 4-5; Dec. '87, 330
Sitka, Alaska.....	Feb. '82, 16
North Atlantic.....	Nov. '83, 248-251; Feb. '84, 35-37; Apr., 94-96; Aug. '87, 214-216

## Storms, notes and extracts,

West Indies hurricane (de Tejada).....	Apr. '77, 11
theory (Loomis).....	June '77, 12; July, 11-12
Atlantic (Loomis).....	Dec. '78, 11-12
course of Californian (Cooper).....	Dec. '85, 317
North Atlantic during 1885 (Garriott).....	July '87, 207
movement of American (Loomis).....	Feb. '80, 17-18; Jan. '81, 19-20
diagram of observations on s. s. "Assyria," New York to Bristol, May '83.....	June '83, 180
tracks of s. s. "Polynesian" during cyclone, Nov. 23, '81.....	Nov. '81, 5; Jan. '82, 22
West India hurricane tracks, 1878-'81.....	May '82, ch. viii
tracks for March, 1878-'85 (Greene).....	Mar. '87, 90-91, ch. vii
(see, also, Cyclones: Pressure: Thunder-storms.)	
Storm signals (see Cautionary signals).	
Sunset predictions.....	Mar. '77-Nov. '86
Sunsets, red, observations.....	Nov. '83-Mar. '84; Aug.-Dec. '84
connection with Krakatoa smoke (Kiessling).....	Sept. '86, 271-272
(Hazen).....	Feb. '87, 64
Sunshine record at Raleigh, N. C.....	Feb. '87, 68; Apr., 117
Sun spots, record of Prof. D. P. Todd.....	June '77-Nov. '86
records of various observers.....	Oct. '77†
numbers (Wolf).....	June '77, 12
connection with rain (Hunter).....	July '77, 11
temperature (Lancaster).....	July '77, 11
meteorology (Brown).....	Nov. '76, 12
ocean ice (Archibald).....	June '82, 8-9
atmospheric disturbances (Veeder).....	Oct. '86, 296-297
meteorological phenomena (Hazen).....	Jan. '87, 29-31, diag.
thunder-storms and auroras (Veeder).....	July '87, 206

## T.

Temperature, summary.....	Oct. '72†
mean for six stations, Apr.-June, 1871-'78.....	June '73, 2
chart of isobars, isotherms, and wind.....	July '73†
chart of equal monthly range.....	July '73
average for districts compared with normal.....	Aug. '73†
(On ch. ii to Dec. '82)	
remarkably low.....	Apr. '74, 8; Jan. '75, 4-6; Dec. '79, 10; Nov. '87, 304
ranges.....	Oct. '74†
maximum and minimum.....	Aug. '75†
(Tabulated Mar. '81†)	
remarkably high.....	July '81, 12-15
mean, with normals and departures.....	July '85†
table of mean and max. for Oct. '79 at 40 stations, compared with normal monthly and highest max.....	Oct. '79, 9
deviations from normal.....	Jan. '81†
table of comparative maximum.....	July-Oct. '81, Apr.-Oct. '82, '83†
table of comparative minimum.....	Nov. '81-Mar. '82, '83†
table of comparative maximum and minimum.....	July '85†
comparative means and departures at foreign stations, May '79-Oct. '80.....	July '81-Dec. '82
data for the cotton districts.....	Apr.-Oct. '82; May-Oct. '83, '84†

Temperature, mean monthly for European countries, Mar.-Oct. '80, and comparison with mean for 1877-9 .....	May-Dec. '82
extreme monthly means for foreign isolated stations Jan.-Oct. '80 .....	Feb.-Dec. '82
table of extreme monthly means .....	Jan. '83-Sept. '84
districts of maximum for Apr.-Feb. 1873-'83.....	Apr. '83-Feb. '84
greatest daily ranges.....	Aug. '88†
daily extremes and mean at coldest stations in NW., Dec. '84..	Dec. '84, 301
annual mean for 1885, with normals, for S. S. stations..	Dec. '85, 315-316
extreme, and comparison of mean with normal, for 1886.....	Jan. '87, 26, ch. vii
chart of normal and mean for month, at special stations.....	July Nov. Dec. '87
mean autumnal .....	Nov. '87, 804
Temperature tables for long periods at special stations, cotton-belt, 1882-6, Apr.-Oct. mean max. and min .....	Oct. '86, 289
<i>Arkansas</i> : Little Rock, 1882-6, Apr.-Oct. mean max. and min.....	Oct. '86, 289
<i>California</i> : Sacramento, 1853-'82. monthly, annual, and seasonal means.....	Jan. '83, 8
<i>Colorado</i> : Colorado Springs, 1872-'86, July; 1872-'87, Mar .....	July '86, 203; Mar. '87, 87
Denver, 1872-'86, July; 1872-'87, Mar....	July '86, 203; Mar. '87, 87
<i>Connecticut</i> : Wallingford, 1858-'73, monthly means.....	Oct. '87, 292
1864-'73, monthly max. and min..	Oct. '87, 292
<i>Georgia</i> : Macon, 1871-'82, monthly max. and min .....	Aug. '82, 10
<i>Illinois</i> : districts, 1878-'83, Apr. June, mean..	Apr. '83, 98; June, 147-148
1878-'84, Apr .....	Apr. '84, 113
1875-'86. Jan.....	Jan. '86, 26
<i>Indiana</i> : Lafayette, 1880-'84, Jan. max., min., and mean..	Jan. '84, 28
Shelbyville, 1842-'83, lowest recorded .....	Jan. '84, 11
Vevay, 1865-'84, lowest for each year.....	Dec. '88, 279
Wabash, 1877-'82, monthly means .....	Dec. '82, 13
<i>Iowa</i> : Hopkinton, 1852-'87, monthly means.....	Nov. '87, 815
<i>Kansas</i> : Lawrence, 1868-'82, annual means and extremes..	Dec. '82, 13
1867-'84, monthly means and extremes for winters.....	Feb. '84, 62
1868-'84, monthly means, max. and min. Oct.-June .....	Oct. '83-June '84
1868-'86, Dec.....	Dec. '86, 344
<i>Louisiana</i> : New Orleans, 1882-6, Apr.-Oct. mean max. and min .....	Oct. '86, 289
<i>Maryland</i> : Cumberland, 1873-'87, monthly means Jan. Mar.- May.....	Jan. Mar.-May '87
<i>Massachusetts</i> : New Bedford, 1812-'75, coldest winters.....	Apr. '75, 5
Worcester, 1839-'83, means for winter months.....	Mar. '83, 59
<i>Missouri</i> : Saint Louis, 1837-'80, monthly means .....	Jan.-Dec. '81
1837-'85, diagram of mean winter... ..	Jan. '85, 38
<i>Nebraska</i> : Fort McPherson, 1870-8, mean monthly, max., min., &c.....	Feb. '87, 64
southeastern, 1878-'86, mean, noon, highest, low- est, &c., for Apr. July-Nov .....	Apr. July-Nov. '86
<i>North Carolina</i> : Wilmington, 1882-'86, Apr. Oct., mean, max., and min.....	Oct. '86, 289
<i>Ohio</i> : Cincinnati, 1856-'84, lowest recorded .....	Jan. '84, 13
Lima, 1865-'87, monthly mean .....	Oct. '87, 298
North Lewisburg, 53 years' monthly normal, highest and lowest mean, max., min., &c.....	Sept. '85, 226
Wauseon, 1870-'83, monthly means .....	Dec. 83, 277
<i>Pennsylvania</i> : Philadelphia, 1851-'81, mean monthly max. min., &c .....	Jan. '82, sh
Pottstown, 1850-'81, max. for July Aug. Sept. of each year .....	Aug. '82, 10
<i>South Carolina</i> : Stateburg, 1835, 1851-7, cold days.....	Jan. '86, 29-30
<i>Tennessee</i> : Memphis, 1882-6, Apr.-Oct., mean max. and min..	Oct. '86, 289

Temperature tables for long periods at special stations,	
<i>Texas</i> : Galveston, 1882-6, Apr.-Oct. mean max. and min....	Oct. '86, 289
New Ulm, 1872-'87, monthly mean.....	Dec. '87, 337
<i>Virginia</i> : Dale Enterprise, 1880-6, annual max., min., and mean .....	Dec. '86, 344
Wytheville, 1861-'82, monthly means, max., and min .....	June '82, 10
21 years, monthly normals, highest and lowest means, max., and min..	Dec. '85, 301
<i>Washington</i> : Walla Walla, 1872-'82, monthly means and extremes .....	Apr. '83, 82
<i>West Virginia</i> : Helvetia, 1876-'85, monthly means.....	Dec. '85, 301
Parkersburg, 1880-5, annual means and max .....	Dec. '85, 301
Temperature notes and extracts,	
belt of thermal contrasts on side of high area .....	Feb. '74, 5-6
connection with sun spots (Lancaster) .....	July '77, 11
increase with altitude (Alluard) .....	Nov. '78, 12
methods of observing at distant places.....	Feb. '79, 12-13
observations of the "Vega," 1878-9.....	Nov. '79, 15
inversion at Puy de Dome (Alluard) .....	May '80, 16; Dec. '82, 25-26
cold winter of 1880 at Saint Michael's.....	Sept. '80, 14-15
low Siberian (Woeikof).....	May '81, 20
cold of October, 1880, at Saint Petersburg (Wild).....	Dec. '82, 25
thermal belts of North Carolina (Chickering).....	Feb. '83, 52
(Blake) .....	July '87, 234
dipping of freezing point plane before thunder storms (Pro- haska and Hazen) .....	Dec. '86, 860-361
Hampshire natural history society, observations .....	Mar. '87, 88
inversion in White Mountains.....	Mar. '87, 88
effect of rainfall on (Mayer) .....	July '87, 206
daily mean from max. and min. thermometers .....	July '87, 207
Temperature of water, summary.....	July-Aug '73; Feb. '74†
table.....	July '73†
(On ch. II to Dec. '82.)	
observations from San Francisco to Yokohama by s. s. "Alaska" .....	Apr. '77, 8
deep sea, and oceanic circulation (Carpenter).....	Dec. '78, 12
observations on the "Gulfare" (Sherman).....	Feb. '81, 19
(See, also, Earth temperature.)	
Tennessee, comparative table of observations, 1883-5.....	Dec. '85, 320
Tennessee meteorological department, report.....	Feb. '83†
Texas, rainfall in cotton region, 1882-6 .....	Sept. '86, 260
droughts (Hazen).....	Apr. '87, 119
Thermal belts of North Carolina (Chickering) .....	Feb. '83, 52
(Blake).....	July '87, 234
Thermometers, Moritz's .....	May '77, 11
quartz (Joubert) .....	Nov. '78, 12
direction for setting up minimum, and uniting column of mercury.....	Mar. '86, 86
Thunder-storms, summary.....	July '73; Feb. Apr. '74†
distribution in United States.....	July '73, 1, ch.; June '76, 6
Haute Savoie, France.....	Apr. '77, 12
New England, Aug. '78.....	Aug. '78, 4-5
notes on storm in western Ontario .....	July '83, 172-173
notes (Hazen) .....	Aug. '84†
mean number per station in all districts for Sept. and Oct. 1851-'73, with table of magnetic declination (Hazen).....	Sept. Oct. '84
comparison of mean number in Sept. and Oct. '84, by dis- tricts, with mean for 1854-'73 (Hazen) .....	Sept. Oct. '84
connection with tides (Hazen) .....	Oct. '85, 264
report (Hazen).....	Apr. '86†
origin and distribution (Davis).....	July '86, 195-196
frequency at Roseburg, Oregon .....	July '86, 196-197
charts showing number in each state, Aug. 16, Sept. 19, (Hazen) .....	Aug. Sept. '86, ch. viii

Thunder-storms, dipping of the freezing-point plane before (Prohaska and Hazen).....	Dec. '86, 860-861
coincidence with sun spots (Veeder).....	July '87, 206
Tidal wave, Lake Erie.....	July '74, 7
Callao, Peru.....	Feb. '78, 12
Sonoma Co., Cal.....	Aug. '79, 14
Lake Michigan.....	June '79, 10; July '83, 165
Lakes Erie and Superior.....	June '82, 19-20
Lake Ontario.....	May '84, 135
Tides, high and low.....	Apr. '78†
connection with thunder-storms (Hazen).....	Oct. '85, 264
Tornadoes, summary.....	June '75†
map of pressure, temperature, and wind-direction for tornado region of June 12.....	June '81, 18
frequency in Minnesota.....	Apr. '86, 118
report (Finley).....	May '86†
chart showing track (Finley).....	July-Sept. '86
studies (Finley).....	Aug. '86, 224-225; Sept., 257-259, ch.
relation to areas of low barometer (Finley).....	Jan. '87, 16
Tornadoes, special,	
Canton, China.....	June '78, 6
Alabama: southern counties.....	Mar. '82, 16-17
Leeds.....	Feb. '84, 48
Arkansas: Ozark.....	Apr. '83, 89
Silver City.....	May '82, 16
Connecticut: Suffield.....	May '80, 11
Wallingford.....	Aug. '78, 5
Georgia: Smithville.....	Mar. '82, 16-17
Illinois: Cairo.....	Feb. '84, 49
Chicago.....	May '76, 4
Hillsborough.....	May '88, 115
Mount Carmel.....	June '77, 7
Indiana: Elkhart.....	July '77, 6
Indianapolis.....	Mar. '80, 12
Iowa: Grinnell.....	June '82, 16
Maryland: Sandy Springs.....	Sept. '79, 12
Michigan: Detroit.....	July '75, 4
Minnesota: Rochester.....	Aug. '83, 187
Sauk Rapids.....	Apr. '86, 100-101
Mississippi: Starkville.....	Apr. '88, 90
Missouri: Brownsville.....	Apr. '82, 19-20
Marshfield.....	Apr. '80, 12-18
Richmond.....	June '78, 8
Missouri valley, with map.....	June '81, 17-20
New York: Albany.....	July '78, 4
Ohio: Glendale.....	June '80, 11
Toledo.....	Mar. '80, 12
Washington Court House.....	Sept. '85, 281
Pennsylvania: Philadelphia.....	Aug. '85, 205
Tennessee: Nashville.....	Feb. '80, 18
Texas: Dallas.....	Apr. '79, 10, 14
New Ulm.....	July 81, 18
Wisconsin: Mineral Point.....	May '78, 8-9
Typhoon, observations of s. s. "Coptic" and "Palos".....	Aug. '82, 3-4
China Sea, July Aug. Nov. '80 (Dechevrens)..	June '82, 7; July, 8, Oct., 14
Japan.....	Sept. '82, 14-15

## U.

Unalaska Island, summary of observations, Nov. 1878-Feb. '79..	May '79, 6
--	------------

## V.

Verifications, cautionary signals.....	Nov. '78†
predictions.....	May '74†
method.....	July '86, 201
change in method, rules, and percentages July-Oct. '87..	Oct. '87, 287-288
rules for cautionary signals.....	Oct. '87, 289,
Vevay, Ind., low temperatures 1865-'84 (Boerner).....	Dec. '88, 279



Volcanoes, eruptions .....	July '77†
during 1878 (Fuchs) .....	Aug. '79, 16
Krakatoa .....	Aug. '83, 191-192
description of eruption at Java.....	Dec. '83, 298-294

## W.

Wabash, Ind., monthly and annual temperature and rainfall 1877-'82 (Hunter) .....	Dec. '82, 13, 16
Walla Walla, Wash., monthly and annual temperature and rain- fall, 1872-'82 (Straight) .....	Apr. '83, 82, 86
Wallington, Conn., monthly mean temperature, 1858-'78, and total precipitation, 1858-'87 .....	Oct. '87, 292
monthly max. and min. temperatures.....	Oct. '87, 292
Washington City, heavy rainfalls, 1871-'87 .....	Nov. '87, 807
Water discharge of Clear Creek, Colo., 1880-'81 (Berthoud) .....	May '81, 19
Water-spouts, summary of observations .....	Oct. '74†
description of remarkable.....	Sept. '75, 6; Sept. '76, 8; June '77, 7; July '78, 9; Mar. '79, 11; May '80, 11; June, 11; July, 12; June '81, 22; July, 22; Sept. 24; Nov., 28; June '83, 145; May '84, 135; June, 156; July, 177; Sept., 238; Nov. 271; May '85, 137; Oct., '86, 297; Oct. '87, 284-285
Wauseon, Ohio, monthly and annual mean temperature, and first and last frosts, 1870-'83 (Mikesell) .....	Dec. '83, 277
monthly and annual precipitation and total snowfalls, 1871-83 (Mikesell).....	Dec. '83, 281
Weather charts of the North Atlantic, Meteorological council.....	Oct. '87, 293
Weather lights .....	Mar. '84, '85
West India hurricanes, chart of tracks, 1873-'81 .....	May '82, viii
West India storm warnings, establishment.....	May '82, 4
Wilmington, N. C., monthly rainfall and mean max. and min. temperature, Apr.-Oct. 1882-6 .....	Oct. '86, 289
Wind, verification of Dove's law .....	July '74, 7
roses at Zi-Ka-Wei, 1875-6 .....	Apr. '77, 12
mean daily velocity at Rome, 1862-'76 .....	Apr. '77, 11
charts for South Atlantic (Brault) .....	Aug. '77, 12
on Mount Washington (Loomis).....	June '79, 13-14
height of land and sea breezes (Sherman) .....	July '80, 15-16
observations at different heights (Stevenson).....	Sept. '80, 15
anemometer observations at sea (Waldo).....	Jan. '87, 31
relation to pressure on Mount Washington (Carr).....	Feb. '87, 68-65
rain frequency and wind rose for April (Dunwoody).....	Apr. '87, 118-119, ch. vii-viii
Winds, summary .....	Aug. '73, Jan. '74†
high .....	May. '74†
total movement of the air .....	June '74†
table of largest and smallest total movements.....	Feb. '88†
Worcester, Mass., mean temperature of winter months, 1889-88 (Hall) .....	Mar. '83, 59
Wrecks, special aid rendered by Signal Service,	
Mary Rice.....	Dec. '73, 3
Huron .....	Nov. '77, 4-5
Metropolis .....	Jan. '78, 6
Guiseppe Massano.....	Feb. '78, 4
Nipoli .....	Mar. '78, 12
Dos Cunados .....	July '78, 14
James M. Vance .....	Apr. '79, 15
Wytheville, Va., monthly max., min., and mean temperatures, 1860-'82 (Shriver) .....	June '82, 10
monthly and annual precipitation, 1860-'82 (Shriver).....	June '82, 13
temperature and rainfall tables for 21 years (Shriver)....	Dec. '85, 301, 304

## Y.

York Factory, summary of observations, June '78-Feb. '79 .....	May '79, 7
--	------------

## Z.

Zi-Ka-Wei, meteorological summary, 1873-6, and wind roses, 1875-6.....	Apr. '77, 11-12
Zodiacal light, summary of observations .....	Feb. '75†
deductions from observations (Hasselbrink) .....	Apr. '80, 15
memoir on (Dechevrens) .....	Aug. '80, 15-16
Zoological phenomena, summary.....	Apr. '74†

## INDEX OF CHARTS.

### ANNUAL REPORTS AND MONTHLY WEATHER REVIEWS.

(Report charts are cited by their consecutive numbers or letters, and by page when bound in text. Review charts are cited by months, the Roman numerals being added when possible. To June, 1883, the Review charts are republished in the Reports, unless indicated otherwise. For reference table of Reviews in Reports, see page 2.)

#### A.

Alleghany river, profile .....	1874, 54
oscillations, Jan. '75-June '88.....	1875, 74; 1876, 77; 1877, 17; 1878, 56; 1879, 69; 1880, 107; 1881, 68; 1882, 81; 1883, p. 262
1874, 54	
Arkansas river, profile.....	1875, 72; 1879, 78; 1880, 108; 1881, 67; 1882, 32; 1888, p. 262
oscillations, Oct. '74-June '75; July '78-June '82.....	
Auroras, map of stations, Apr. 7, '74, with lines of magnetic declination and inclination.....	1876, 2, p. 311
frequency, and range of air pressure, at Paris, Vienna, and London, 1750-1850.....	1882, p. 141

#### B.

Balloon ascension, Rochester, N. Y., Sept. 8, '72, path, with temperature observations .....	1872, p. 262
Nashville, Apr. 8, '77, path and observations .....	Apr. '77
(Not in Annual Report.)	
Nashville, June 18 and 19, '77, path .....	June '77, iv
(Not in Annual Report.)	
Chicago, Oct. 18, '81, pressure along path.....	1882, 20, p. 879
path .....	1882, 21-22, p. 880
Barometric reduction (see Pressure).	

#### C.

Canal regions, map .....	1876, 80; 1888, 2, p. 19
Charleston earthquake area, map.....	Aug. '86, vii
Cloudiness, seasonal means, 1882, for United States .....	1884, 1-4, p. 182
Clouds, direction of motion, Apr. 28, '77.....	1882, 9, p. 138
Columbia River, oscillations, July '78-June '83.....	1879, 74; 1880, 109; 1881, 68; 1882, 86; 1888, p. 262
1882, 51; 1884, p. 154	
Cotton region, map .....	1888, 2, p. 19
Cranberry districts, map.....	1874, 54
Cumberland river, profile .....	1878, 9, p. 964; 1874, 61; 1875, 76; 1876, 79; 1877, 18; 1878, 57; 1879, 70; 1880, 110; 1881, 64; 1882, 35; 1888, p. 262
oscillations, Oct. '72-June '83.....	

Cyclones (see Storms).

#### D.

Districts, indications.....	1878, 47, 1878, 88; 1880, 2, p. 166; 1881, 49; 1888, 7, p. 696
frost warnings .....	1883, 2, p. 19

#### E.

Earthquake area, Charleston .....	Aug. '86, vii
Earth temperature, curves with moisture, for June '86, '87.....	June '87, v
Eclipse of July 29, '78, temperature at Colorado Springs and Lake House..	1880, p. 926
chart of path and weather .....	1880, p. 927
Electrical observations, curves of hourly, monthly and yearly means, Saint Louis, 1861-'71 .....	1871, p. 66
curves of readings .....	Apr. '86-Apr. '87
mean values for Washington, Boston, and New Haven.....	Aug. '86, vi

## F.

- Fog belts ..... July-Dec. '87  
(On ch. 1.)
- Form 16, monthly meteorological chart..... 1871, p. 82; 160; 1876, 48; 1879, 3, p. 486
- Frost limits ..... Sept. '83, v; Aug. '84, iv
- Frost warnings, map of districts..... 1883, 2, p. 19
- Fruit districts, map..... 1883, 2, p. 19

## H.

- Humidity, relative, mean monthly for July '77 ..... 1881, p. 126
- absolute, seasonal means, 1883, for United States ..... 1884, 5-8, p. 182

## I.

- Ice limit in North Atlantic ..... Apr. '82-Dec. '87  
(On Ocean storm tracks from Feb. '83.)
- Indications room maps, A-G..... 1874, 39-41; 1875, 39-42; 1876, 50-54; 1877, 46-52;  
1878, 48-49; 1879, 56-62; 1881, 50-56
- International chart, mean temperature, pressure and winds, Sept. '77-Oct.  
'80 ..... May '79-Dec. '82  
(Sept. '77 is in Review, Apr. '80.)
- tracks of low areas, Nov. '77-Jan. '81..... Jan. '79-Dec. '82
- mean pressure, temperature and winds, Jan. '81 ..... 1882, 18, p. 824
- annual isobars, isotherms, and winds..... 1883, 6; 1884, p. 712
- International meteorology, ocean storm tracks..... Nov. '78-Dec. '87  
(On tracks of low areas, from Jan. '84.)
- International polar stations, map..... 1882, 51
- International stations, map..... 1874, 88, 1876, 47
- International weather map, copy ..... 1875, 59-62; 1879, 4, p. 502; 1882, 17, p. 802

## L.

- Lady Franklin Bay relief expedition, track of "Neptune" ..... 1883, 5, p. 606

## M.

- Magnetic declination and diurnal barometric range at Batavia and Toronto.. 1882, p. 142
- Magnetic declination and inclination..... 1876, 2
- Magnetic intensity, isodynamic lines of the globe, 1837-'40..... 1882, p. 140
- Medical meteorology, meteorological and health chart of Ohio..... Aug. '87, v
- Military telegraph lines, map ..... 1876, 49; 1878, C, p. 180; 1879, 2, p. 214; 1880,  
38, p. 668; 1881, 1, p. 250; 1882, 24
- Missouri river, oscillations, Apr. '78-June '83 ..... 1878, 7, p. 964; 1874, 55-56; 1875,  
67-68; 1876, 71-72; 1877, 18;  
1878, 52; 1879, 65; 1880, 113;  
1881, 59; 1882, 27; 1883, p. 262
- profile ..... 1874, 54
- Mississippi river, oscillations, Oct. '72-June '83... 1878, 1-4, p. 964; 1874, 57-58, 63-64;  
1875, 63-66; 1876, 67-70; 1877, 11-  
12; 1878, 50-51; 1879, 63-64; 1880,  
111-112; 1881, 57-58; 1882, 25-26;  
1883, p. 262
- profile ..... 1874, 54
- Monongahela river, oscillations, Oct. '74-June '83..... 1875, 78; 1876, 76; 1877, 15;  
1878, 54; 1879, 67; 1880, 114; 1881, 61; 1882, 29; 1883, p. 262
- profile ..... 1874, 54
- Monthly meteorological chart, Form 16 ..... 1871, p. 82, 160; 1876, 48; 1879, 3, p. 486

## N.

- North Atlantic (see Fog: Ice: International chart: Storms).
- Northers, map of railroads distributing warnings ..... 1882, 52
- map of districts..... 1883, 2, p. 19

## O.

- Ohio river, oscillations, Oct. '72-June '83..... 1878, 5-6, p. 964; 1874, 59-60; 1875,  
69-70; 1876, 73-74; 1877, 14; 1878, 53;  
1879, 66; 1880, 115; 1881, 60; 1882, 28; 1883, p. 262
- profile ..... 1874, 54

## P.

Pekin, Ill., curves of meteorological elements for month .....	Mar. '86
Pike's Peak, map of U. S. military reservation .....	1880, p. 926
Post-office districts, map .....	1875, p. 186
Precipitation, monthly.....	Aug. '73-Dec. '87
monthly wet and dry winds.....	1875; 46-57
mean annual over United States.....	1882, p. 184
annual for '86.....	Jan. '87, viii
rain frequency and wind rose for April, over United States.....	Apr. '87, vii
Pressure, tracks of low areas .....	Oct. '72-Dec. '87
barograms for Nov. '71.....	1872, p. 257
tracks of low barometer for June '71-'72.....	1872, 17-18, p. 282
monthly isobars, isotherms, and winds.....	July '78-Dec. '87
monthly tracks of high areas.....	Aug. '73-Dec. '87
mean tracks of low barometer for Jan. 1872-4, Feb. 1872-4, Mar. Apr. 1871-4, May-Dec. 1871-3.....	1874, 42-53
telegraphic barometric means for Jan., tri-daily.....	1875, 48-45
difference with elevation at Mount Washington and Mount Mitchell.....	1876, 9, p. 353
reduction to sea-level, isobars for Nov. 28, '74.....	1876, 10, p. 353
mean track of low areas for Jan. 1872-6, Feb.-Dec. 1871-5.....	1876, 55-66
isobars of the globe for Jan. and July.....	1882, p. 128, 129
monthly isobars for Dec. '81 for United States.....	1882, p. 181
annual isobars for 1881 for United States.....	1882, p. 182
range and frequency of auroras at Paris, Vienna, and London, 1750-1850.....	1882, p. 141
diurnal range for Jan. and July.....	1882, p. 142
diurnal range and magnetic declination at Batavia and Toronto.....	1882, p. 142
monthly departures from normal.....	Aug. '84-Dec. '87
mean on days of many and few thunder-storms.....	1886, 2-3, p. 264
sea-level isobars of United States, corrected for gravity, for year, Jan. and July.....	1886, 4-6, p. 282
(See, also, International chart: Storms.)	

## R.

Railroads distributing "norther" warnings, map.....	1882, 52
Railway bulletin service, map.....	1880, 37, p. 568; 1881, 8, p. 752; 1883, 1, p. 18
Red river, oscillations, Oct. '72-June '83.....	1878, 8, p. 964; 1874, 62; 1875, 71; 1876, 75; 1877, 19; 1878, 58; 1879, 71; 1880, 116; 1881, 65; 1882, 33; 1883, p. 262
profile .....	1874, 54
River oscillations.....	1873, 1-9, p. 964; 1874, 55-64; 1875, 68-75; 1876, 67-79; 1877, 11-19; 1878, 50-58; 1879, 68-74; 1880, 107-119; 1881, 57-69; 1882, 25-37; 1883, p. 262
River profiles.....	1874, 54

## S.

Savannah river, oscillations, July '82-June '83 .....	1883, p. 962
Solar heat, sun's power over United States at the summer solstice .....	1877, 2
curves, with temperature, for month, Pekin, Ill.....	Mar. '86
Stations, map.....	1876, 50; 1877, 1; 1878, A, p. 142; 1879, 1, p. 164; 1880, 1, p. 166; 1881, 2, p. 304; 1883, 8, p. 24
Storms, tracks of low areas.....	Oct. '72-Dec. '87
Lake region, Nov. 11-16, '71, barograms.....	1872, 1, p. 257
Sept. 28-29, '72.....	1872, 9-15, p. 260
Apr. 14-18, '73.....	1873, 88-46, p. 1097
Dec. 5, '80.....	1882, p. 136
Atlantic coast, Mar. 1-2, '72.....	1872, 2-8, p. 258
local, distribution.....	July '78
West India cyclone, Sept. 8-24, '76.....	1876, 8, p. 386
Oct. 1, '66.....	1882, p. 187
average tracks for March, 1878-'85.....	Mar. '87, vii
Nova Scotia cyclone, Aug. 24-25, '73.....	1873, 30-37, p. 1028
ocean tracks .....	Nov. '78-Mar. '81; Oct. '82-Dec. '87
(On ch. i from Jan. '84.)	
West India hurricane tracks, 1878-'81 .....	May '82, viii
(See, also, Pressure: Tornadoes.)	

Study room maps (see Indications room maps).

Sugar districts, map ..... 1888, 2  
 Sunset predictions, Form 16, for Milwaukee, Wis., Oct. '79..... 1879, 3, p. 486

## T.

Telegraph service, map showing stations on Signal Service and other lines.. 1876, 50  
 map of Atlantic coast lines ..... 1878, B, p. 171; 1879, 2, p. 214  
 map of lines transmitting reports ..... 1881, 1, p. 250; 1882, 23, p. 42  
 (See, also, Military telegraph lines.)  
 Temperature, lines of equal monthly range ..... July '78  
 monthly isobars, isotherms, and winds ..... July '73-Dec. '87  
 decrease with elevation at Mount Washington, Mount Mitchell, and  
 Pike's Peak ..... 1876, 4-9, p. 352  
 mean annual isotherms of the globe (Dove)..... 1882, p. 122  
 curves of monthly range for United States and Canada ..... 1882, p. 124  
 mean monthly isotherms from local and telegraphic observations..... 1882, p. 126  
 monthly departures from normal ..... Aug. '84-Dec. '87  
 sea-level isotherms of United States for year, Jan. and July ..... 1886, 1-3, p. 232  
 mean on days of many and few thunder-storms..... 1886, 2-3, p. 264  
 fluctuations and thunder-storm frequency ..... 1886, p. 262  
 annual mean and departure for '86 ..... Jan. '87, vii  
 normal and mean for month..... July, Nov. Dec. '87  
 Tennessee river, oscillations, July '77-June '83 ..... 1878, 59; 1879, 72; 1880, 117;  
 1881, 66; 1882, 34; 1883, p. 262  
 Thunder-storms, frequency and temperature fluctuations ..... 1886, p. 262  
 mean pressure and temperature on days of many and few ..... 1886, 2-3, p. 264  
 connection with moon's phases..... 1886, p. 270  
 connection with solar rotation..... 1886, p. 272  
 monthly distribution ..... July-Sept. '86  
 Tobacco districts, map ..... 1883, 2, p. 19  
 Tornadoes, Detroit, June 27, '75, track ..... 1875, p. 488  
 Alabama, Georgia, South Carolina, and North Carolina, Mar. 20, '75,  
 tracks, isobars, and movement of storm-centre ..... 1875, 37-38, p. 398, 400  
 Richmond and Burke counties, Ga., Feb. 7-8, '78, tracks..... 1878, 39, p. 640-652  
 Wallingford, Conn., Aug. 9, '78, path..... 1878, p. 654  
 Colleton and Charleston counties, S. C., maps ..... 1879, 54-55, p. 758  
 Kansas, Missouri, Nebraska, and Iowa, May 29-30, '79, path..... 1880, 74, p. 984  
 isobars, isotherms, and winds..... 1880, 75, 78-86  
 isobars, temperatures, and tracks..... 1880, 76  
 isobars, temperatures, and low centre..... 1880, 77  
 wind chart..... 1880, 87-88  
 dew-point lines..... 1880, 89-97  
 temperature departures and variations ..... 1880, 98-106  
 maps..... 1880, p. 1015-1094  
 tracks for month ..... July-Sept. '86

## W.

Weather map, tri-daily, Dec. 2-6, '70..... 1871, p. 172  
 Sept. 28, '72..... 1872, 19-21, p. 282  
 Willamette river, oscillations, July '79-June '83..... 1880, 118; 1881, 69; 1882, 37;  
 1883, p. 262  
 Winds, prevailing, with monthly isobars and isotherms..... July '78-Dec. '87  
 monthly wet and dry..... 1875, 46-57  
 rose for April, with rain frequency, for United States..... Apr. '87, vii-viii  
 (See, also, International chart: Storms.)

## Y.

Youghiogheny river, oscillations, Oct. '74-June '83..... 1875, 75; 1876, 78; 1877, 16;  
 1878, 55; 1879, 68; 1880, 119  
 1881, 62; 1882, 30, 1883, p. 262

# ANNUAL REPORT.

1861-1887.

## MILITARY SIGNALING.

(The (\*) following the year indicates that the reference is to Report of the Chief Signal Officer Army of the Potomac, October 21, 1862. Washington, 1864.)

### A.

Alden, J., Capt., cited on value of service.....	1868, 10
Alexandria .....	1862,* 12
Allatoona .....	1866, 7-8; 1866, 6
Antietam .....	1863, 8
Appropriations, amount, expenditure, and estimates... 1861, 7-9; 1862, 10, 12, 13; 1864, 37; 1865, 6; 1866, 4-5; 1867, 1; 1869, 11; 1882, 11; 1883, 601; 1884, 58; 1885, 27, 599-600; 1886, 23-25, 188-190; 1887, 43-44, 161-162	
increase recommended .....	1883, 1; 1884, 7; 1886, 6-8; 1887, 3, 62
table for 1861-'85.....	1887, 62
Arizona, heliograph line .....	1882, 94; 1886, 6; 1887, 7
department of, instruction.....	1886, 33; 1887, 61
Arkansas Post .....	1863, 10
Atlanta.....	1864, 9, 10, 11
Atlantic, department of, instruction.....	1875, 4
Austria, telegraph corps .....	1886, 35

### B.

Balloons .....	1862,* 43, 44; 1887, 6, 60
Banks, N. P., Gen'l, commendation of signal officers.....	1862,* 18
cited on value of Signal Corps.....	1864, 22
Banks' headquarters, signal party .....	1861, 4; 1862,* 3
Batteries for field telegraph .....	1872, 124-125
Battery wagon .....	1872, 126
description of Philadelphia exhibit .....	1877, 515
Battles and expeditions, list, and services rendered by Signal Corps.....	1862, 5, 6-8
.....	1863, 4-5
.....	1862,* 10
Bayou la Fouché .....	1862, 11; 1862,* 31-32; 1863, 20
Beardslee, G. W., improvements in telegraph train.....	1882, 96; 1887, 58
Begbie heliostat .....	1886, 36
Belgium, telegraph corps.....	1862,* 15
Big Bethel .....	1865, 7
Big Shanty .....	1870, 3
Boston harbor, signal line .....	1887, 5, 69
Brickwood, use for torch .....	1862,* 9
Burnside expedition .....	

### C.

Cairo, report on signal connection with Memphis (Myer).....	1864, 35-36
California, department of, instruction .....	1869, 14; 1886, 34; 1887, 61
Casualties .....	1863, 5; 1864, 12, 17, 18, 21, 23, 26, 27, 33, 34
Champion Hills .....	1863, 11
Chancellorsville .....	1863, 8, 22
Chapin Mills, Ky .....	1862, 5
Charleston siege.....	1863, 9, 23
Chattanooga .....	1863, 11
.....	1886, 34
Chauvin, Gen'l von, cited on value of telegraph corps .....	1862,* 32-75
Chickahominy, service on .....	1869, 6, 15, 16
Chief Signal Officer of the Navy.....	

Cipher, necessity for .....	1862,* 52-58; 1864, 24, 25; 1866, 6-7; 1869, 6
improvements.....	1865, 8-9
instruction.....	1868, 5, 24-25
Coal Harbor .....	1862,* 84-85
Code (see Continental Morse: General service).	
Cold Harbor .....	1864, 28
Colored lights, experiments with.....	1868, 7
Columbia, department of, instruction.....	1869, 12; 1886, 84; 1887, 61
Confederate army, use of signals.....	1861, 6; 1864, 9, 13, 17, 18, 27
Continental Morse code .....	1886, 31
Corinth .....	1862,* 10
Correspondence (in Index to meteorological section).	
Countersign signals .....	1861, 8; 1862, 10-11; 1862,* 5, 6
Cumberland, department of, operations in .....	1862,* 8-9; 1864, 17-18
instruction.....	1869, 12
Cumberland Gap.....	1862, 5
Curtis, Gen'l, extract from letter on signal detachment .....	1864, 20

## D.

Dakota, department of, instruction.....	1869, 13; 1875, 4; 1876, 4; 1886, 33; 1887, 61
Denmark, instruction and apparatus furnished to.....	1868, 8
report on instruction (Norton).....	1868, 29
Departments, military, instruction... ..	1869, 12-15; 1870, 8; 1871, 5; 1872, 6; 1873, 2, 81;
.....	1874, 7; 1875, 4-5; 1886, 32-34; 1887, 60-61
(See, also, names of departments.)	
Detachments, reports, and discussion.....	1862, 4-5; 1862,* 8-11; 1866, 8-4
Districts, military (see names of districts).	
Division of military signaling, organization .....	1885, 3-4; 1886, 5-6; 1887, 3, 10
report of officer in charge .....	1886, 32-38; 1887, 57-64
Drill, form for section telegraph train.....	1868, 9-13, 15-18, 8 pl.
publication of manual.....	1870, 8
Fort Myer .....	1872, 3; 1873, 282; 1878, 3, 5; 1880, 8
schedule .....	1884, 81-82
Droop mountain.....	1864, 20

## E.

East, department of, instruction .....	1869, 12; 1880, 6; 1886, 32; 1887, 61
Eccard field telephone .....	1887, 57
England, telegraph corps.....	1886, 36
Enlisted men, examination .....	1863, 15
number and distribution .....	1864, 37; 1865, 8; 1866, 8
organization of batallion at Fort Myer .....	1881, 7; 1882, 8
(See Instruction; also, in Index to meteorological section, Observers.)	
Enlistment circular .....	1873, 316, 317
(See, also, in Index to meteorological section.)	
Equipments, cost.....	1861, 7
description .....	1862,* 5
experiments and improvements .....	1862, 9-10; 1863, 17-18; 1868, 7; 1878, 3-4;
.....	1879, 3-4; 1885, 3-4; 1886, 6; 1887, 4-5, 57-60
new .....	1885, 4; 1886, 81
issues to posts .....	1869, 15; 1870, 13; 1871, 54; 1886, 31-32; 1887, 68
needed at posts for 1887-8.....	1887, 64
Expenditures (see Appropriations).	

## F.

Fairfax Court House .....	1862,* 11-12
Fair Oaks.....	1862,* 42-44, 50
False messages.....	1862,* 52-58
Farragut, Adm'l, services to.....	1863, 10
Field glass .....	1887, 5-6, 59
Field telegraph (see Telegraph train).	
First military district, instruction in .....	1869, 13
Flag kit.....	1886, 6; 1887, 5, 58
Flash lanterns .....	1887, 5, 59
Fort Fisher .....	1865, 8



Fort Greble, telegraph train at .....	1868, 5, 6
camp of instruction .....	1868, 6-7, 24-25; 1869, 4-5
report of officer in charge (Plummer) .....	1868, 27-28
Fort Jackson .....	1864, 22
Fort McHenry, instruction at .....	1869, 18
Fort Morgan .....	1864, 25-26
Fort Myer, establishment of school at .....	1869, 7-8, 8-9
report on construction of telegraph line to (Howgate) .....	1869, 18-19
report of officer in charge .....	1869, 16-17; 1882, 174-177; 1883, 19-20; 1884, 48-49; 1885, 39-40
summary of work .....	1870, 4-5; 1871, 8-4; 1872, 3-4; 1873, 231-233; 1874, 3-7; 1875, 3-4; 1876, 3-4; 1877, 3-4; 1878, 3-6; 1879, 3-6; 1880, 3-7; 1881, 5-7; 1882, 3-7; 1883, 1, 19; 1884, 7, 48; 1885, 3-4, 39
buildings and equipments .....	1871, 6; 1872, 5; 1878, 231-232; 1874, 4; 1877, 4; 1878, 5; 1881, 7-8; 1883, 19; 1885, 39-40; 1886, 7
hospital .....	1873, 282
recommendation of permanent signal force .....	1877, 6; 1878, 6-7; 1879, 57; 1880, 6-7
economy and value .....	1880, 5-6; 1886, 7, 34
standing orders .....	1884, 31-47
discontinuance .....	1886, 6-8
Fort Wadsworth, instruction at .....	1875, 4
Fortress Monroe, signal party .....	1861, 8
instruction at artillery school of practice .....	1869, 8; 1870, 4
Fourth military district, instruction in .....	1869, 18
France, telegraph corps .....	1886, 35
Fredericksburg .....	1863, 8, 22

## G.

Gaines' Mill .....	1862,* 33-34, 54
"Galena," communication with .....	1862,* 63-64, 68
Garner heliograph .....	1887, 58
General service code .....	1864, 24, 26, 37-38; 1872, 134
lack of secrecy .....	1866, 6
used on telegraph lines .....	1863, 5
Georgetown, camp of instruction at .....	1861, 4; 1862,* 4, 13
Germany, telegraph corps .....	1886, 35-36
Gettysburg .....	1863, 8
Gloucester Point .....	1862,* 25; 1864, 12-13
Greece, telegraph corps .....	1886, 37
Grugan heliograph .....	1882, 95-96; 1887, 58
Gulf, department of, operations in .....	1862,* 9; 1864, 21-23; 1865, 4, 5; 1866, 3-4

## H.

Hagerstown, signal party at .....	1861, 4; 1862,* 3
Hampton Roads .....	1861, 4
Hancock, Gen'l, commendation of signal officers .....	1864, 29
Hanover Court House .....	1862,* 37-40
Harper's Ferry .....	1864, 18-19
loss from lack of signal force .....	1866, 6
Harrison's Landing .....	1862,* 63-75
Haxall's Station .....	1862,* 63-71
Hazen, W. B., Gen'l, notice of death .....	1887, 3
Heliograph, description of improved form (Grugan) .....	1882, 95-96
experiments .....	1878, 4; 1879, 4; 1880, 4; 1881, 5; 1887, 5, 58
use in Arizona .....	1882, 4; 1886, 6; 1887, 5
report on use in Arizona (Maus) .....	1882, 94
description of different forms .....	1887, 58
Holland, telegraph corps .....	1886, 36-37
Homing-pigeon, memoir on use (Birkhimer) .....	1882, 951-955
experiments .....	1887, 6, 60
foreign use .....	1887, 60

## I.

India, telegraph corps .....	1886, 37
Indian campaigns .....	1861, 8; 1865, 5; 1870, 3-4; 1882, 4; 1886, 6; 1887, 5, 94

Instruction, camps.....	1861, 4; 1862,* 3-4, 13; 1864, 36; 1868, 6-7, 24-25
report.....	1862, 8-9; 1862,* 4-5; 1863, 18-19; 1864, 5-6; 1868, 3-8; 1869, 4-11; 1870, 3-5; 1871, 3-5; 1872, 3-6; 1873, 281-283; 1886, 5-9; 1887, 8-10, 60-61
recommendations .....	1861, 5-6; 1862, 9; 1868, 6-7
introduction at West Point and Naval Academy, with papers .....	1867, 1-2, 5-7
orders for departments.....	1867, 4, 8
foreign officers .....	1868, 8, 23, 29
list of officers instructed .....	1868, 23, 24, 26; 1869, 17
(For continuation, see in Index to meteorological section.)	
statement of course of first class at West Point.....	1868, 22
report of officer in charge at West Point (Strong) .....	1868, 19-23
orders detailing officers to military posts .....	1869, 11
memorandum on, in military departments .....	1869, 12-15
statement of officers and men instructed at posts .....	1869, 15; 1870, 13; 1871, 54; 1886, 32-34; 1887, 61
table of field practice of officers.....	1870, 15; 1871, 52; 1872, 91; 1873, 312; 1875, 111; 1876, 122; 1877, 149; 1879, 229; 1880, 234; 1882, 176
course at Fort Myer.....	1881, 77-82; 1884, 33-41
International Exhibition at Philadelphia, report and descriptive catalogue	
of exhibit (Grugan) .....	1877, 507-517
International Exhibition of Electricity, Paris, telegraph train at .....	1882, 86
Italy, telegraph corps.....	1886, 37

## J.

James river expedition.....	1864, 13-16; 29-33
Japan, telegraph corps.....	1886, 38
Joint commission of Congress, action relative to Fort Myer.....	1886, 6-8
Jonesborough.....	1864, 11-12

## K.

Kansas, department of, operations in .....	1864, 20
Kenesaw Mountain.....	1864, 9

## L.

Lakes, department of, instruction .....	1869, 14
Lance-truck.....	1872, 127; 1887, 4, 57
description of Philadelphia exhibit.....	1877, 515-516
Lantern, flash.....	1887, 5, 59
Lee's Mills, battle.....	1862,* 22
Lime light.....	1887, 59
Lost mountain, station on .....	1864, 27
Louisiana, department of, instruction .....	1869, 14

## M.

McClellan, Gen'l, commendation of Signal Corps .....	1861, 4
approval of suggested telegraph train .....	1861, 8
McDowell, I., Gen'l, approval of suggested telegraph train .....	1861, 8
McPherson, Gen'l, commendation of Signal Corps .....	1863, 11
Malvern Hill .....	1862,* 63-69; 1863, 8
Manassas .....	1862,* 11-12
Mance heliograph .....	1882, 96; 1887, 58
Manual of signals .....	1868, 24; 1869, 16
Manual of signaling, preparation .....	1885, 4; 1886, 6; 1887, 62
Maryland heights, services of station.....	1864, 19-20
Mechanicsville, battle.....	1862, 35-37, 47, 52-53
Memphis, report on signal connection with Cairo (Myer).....	1864, 35-36
Miles, N. A., Gen'l, extract from report .....	1886, 6
request for signal detail .....	1887, 7
Military Academy (see West Point).	
Military telegraph lines (in Index to meteorological section).	
Mississippi, department of, operations in.....	1862*, 9-10; 1863, 9; 1864, 24-26 1865, 5; 1866, 3-4
Mississippi river reconnoissance.....	1864, 34-36

Missouri, department of, instruction.....	1869, 13-14; 1878, 231; 1874, 7; 1876, 4; 1876, 4; 1877, 6; 1878, 6; 1880, 6; 1886, 33; 1887, 61
Mobile.....	1864, 25-26
Murfreesboro.....	1863, 11
Muster out of Signal Corps force.....	1866, 3-4
Myer, A. J., Gen'l, notice of death.....	1881, 8

## N.

Nansemond river.....	1868, 9
Navajo campaign.....	1861, 8
Naval Academy, instruction at ...	1862, 8-9; 1863, 18; 1864, 5-6; 1868, 4; 1869, 5-6, 7
signal code furnished.....	1864, 6
adoption of course in signaling.....	1867, 2-3, 7
Naval flag signals, used at Port Royal.....	1861, 5
Naval officers, instruction by Signal Corps.....	1869, 6, 15-16; 1870, 5; 1871, 8
Naval operations.....	1861, 5; 1862, 8-9; 1862,* 14-76; 1863, 7, 10, 23; 1864, 13-15, 22-23, 24-26
co-operation of Army and Navy.....	1865, 4-5, 8; 1867, 2-3; 1869, 3-4, 5-6; 1870, 5; 1877, 3-4
Navy Department, formation of signal service.....	1869, 6, 15-16
Newbern.....	1864, 12
New Mexico.....	1861, 3
Newport News.....	1861, 3
New York Harbor, signal operations in.....	1869, 12; 1870, 8
North Carolina, department of, operations in.....	1864, 12-16
Norway, telegraph corps.....	1866, 37

## O.

Oatman flash lantern.....	1887, 6
Observatory stations, organization on Potomac.....	1861, 4; 1862, 6
Officers, number detailed.....	1861, 4, 5; 1862, 3; 1862,* 7; 1863, 3; 1866, 3; 1866, 3
duties.....	1862, 4-5, 5-6; 1865, 4-5
examination.....	1863, 14-15; 1864, 8-6
additional detail recommended.....	1873, 231-233
detail as instructors recommended.....	1887, 8-9
(See, also, Instruction.)	
Office Chief Signal Officer, recommendation of clerkships.....	1862, 13
organization.....	1863, 16-17
duties.....	1865, 6; 1866, 4; 1867, 1, 4; 1868, 5-6; 1869, 3
instruction at.....	1868, 5, 6
Ohio, department of, operations in.....	1862,* 8; 1864, 26-27
Ordnance department.....	1861, 8
Organization.....	1861, 6-7; 1862, 12-13; 1862,* 7-8; 1863, 6, 12-16; 1864, 3-5; 1865, 5, 9-10; 1866, 3-4; 1867, 3-4
report of board.....	1863, 13-14
orders for muster out.....	1866, 3-4
recommendation of permanent force at Fort Myer.....	1877, 6; 1878, 6-7; 1879, 6-7; 1880, 6-7
(See, also, in Index to meteorological section.)	
Out-post signals.....	1862, 6-7

## P.

Peninsula campaign.....	1862,* 11-75
Pennsylvania, department of, duties in.....	1865, 5
Pennsylvania reserve volunteer corps.....	1862,* 4
Petersburg, stations in vicinity.....	1864, 29-31
Platte, department of, instruction.....	1869, 14; 1866, 33; 1867, 61
Poolesville.....	1861, 4; 1862,* 3, 7
Port Hudson siege.....	1863, 10
Port Royal expedition.....	1861, 5; 1862, 8; 1863, 7
Porter, Fitz John, Gen'l, commendation of signal officers.....	1862,* 13-14
Porter, Adm'l, cited on value of Signal Corps.....	1865, 8
Portugal, telegraph corps.....	1866, 37
Posts (see Equipments: Instruction: Supplies).	
Potomac, army of, operations with.....	1861, 4-5; 1864, 27-33; 1865, 4
Potomac river stations.....	1861, 4

Property accounts.....	1868, 17
R.	
Rappahannock river.....	1868, 7
Ream's station.....	1864, 82
Recruiting stations.....	1864, 86-87
Richmond siege.....	1862,* 40-75
Roanoke Island.....	1862,* 9, 1868, 9
Rockets, code.....	1864, 14
used for day signals.....	1864, 20
Roper's meeting house.....	1862,* 81
Rosecrans, Gen'l, cited on Signal Corps at Stone river.....	1868, 11
Roumania, telegraph corps.....	1868, 87
Rousseau, Gen'l, commendation of Signal Corps.....	1862, 5
Russia, telegraph corps.....	1866, 86
S.	
Sabine Pass.....	1864, 21
San Francisco harbor.....	1870, 8
Savage station.....	1862,* 55-66
Scout-signals.....	1862,* 6-7
Secret service, added to duties of Corps.....	1865, 4
Secretary of the Navy, request for instruction at Naval Academy.....	1862, 9
request for Army system of signals.....	1864, 6
tender of thanks for services of Signal Corps.....	1866, 8
letter requesting instruction of officers.....	1869, 15
Secretary of State, letter transmitting thanks of Sweden for instruction to officers.....	1869, 18
Seneca, Md.....	1862,* 7
Servia, telegraph corps.....	1866, 87
Seven Pines.....	1862,* 41-42
Sewell's Point.....	1861, 4
Shells, experiments with.....	1878, 4; 1879, 4
Shenandoah Valley.....	1862,* 10, 12-18, 1863, 7
Sherman, W. T., Gen'l, application for signal officers.....	1862,* 8
cited on value of Signal Corps.....	1865, 7-8
Shiloh.....	1862, 5
Sieges, value of signaling in.....	1865, 9; 1866, 5-6
Sigel, Gen'l, commendation of Signal Corps.....	1864, 19
Signal Corps, value of services.....	1861, 4, 5; 1863, 5-6, 6-7; 1864, 22; 1865, 6-10; 1868, 7; 1869, 3-4; 1877, 5; 1878, 4, 5-6; 1879, 5-6; 1880, 4, 5-6; 1881, 6, 8; 1882, 87
best mode of service.....	1862, 4
list of officers commending.....	1862, 5, 7-8
origin.....	1862,* 7-8
summary of services rendered.....	1863, 5-12; 1865, 6-10
loss of efficiency from decreased appropriations.....	1867, 8-9
(See, also, Enlisted men: Officers: Organization.)	
South, department of, operations.....	1864, 16-17; 1865, 4
instruction.....	1869, 12
South Mountain.....	1868, 8
Spain, telegraph corps.....	1866, 34-35, 86
Spottsylvania Court House.....	1864, 28
Stoneman's hill.....	1864, 27
Sugar Loaf Mountain.....	1862,* 8, 7
Supplies, sale and proceeds from.....	1866, 4-5
order for Army posts.....	1867, 8
issues to posts.....	1869, 15; 1870, 18; 1871, 54; 1886, 81-82; 1887, 68
needed at posts for 1887-8.....	1887, 64
Surveying, instruction at Fort Myer.....	1881, 6; 1882, 4, 77
Surveys recommended for all permanent fortifications.....	1866, 5-6
Susquehanna, department, operations in.....	1864, 18-20
Sweden, instruction of officers from.....	1868, 8, 28; 1869, 8
acknowledgment of instruction to officers.....	1869, 18
telegraph corps.....	1866, 87
Switzerland, telegraph corps.....	1866, 87

## T.

Target ranges, deficiency appropriation recommended .....	1887, 8
Teche campaign.....	1864, 22
Telescope, use.....	1862, 5-6
improvements.....	1868, 7; 1887, 5-6, 59-60
report on improvement (Totten).....	1868, 28-29, 30, pl.
Telegraph code.....	1872, 134
Telegraph instruction room, report of officer in charge (Van Duzer).....	1868, 25-27
Telegraph line, Fort Whipple to Washington, report (Howgate).....	1869, 18-19
reconstruction of Fort Myer line.....	1881, 7; 1882, 6
practice, at Fort Myer.....	1878, 3-4; 1879, 3-4; 1880, 3-4; 1881, 7; 1882, 6
field, general direction for running.....	1868, 18
rapidity of erection.....	1868, 27; 1869, 10
durability.....	1869, 10
construction and equipment.....	1872, 122-128
permanent, construction and equipment.....	1872, 108-122
military (see Military telegraph lines, in Index to meteorological section).	
Telegraph testing, instructions.....	1872, 136-138
Telegraph train.....	1861, 8-9; 1862, 11-12; 1862,* 5-6; 1868, 3-4, 19-25; 1864, 6-9;
1867, 3; 1868, 26-27; 1869, 9-10; 1878, 232; 1878, 5; 1885, 3-4;	
1886, 6; 1887, 4, 57-58	
organization and cost.....	1862, 12; 1863, 24
use.....	1862, 11; 1862,* 81-82, 83, 35, 86, 41, 43, 47, 53, 56-57; 1863, 8, 9, 22-24
need and value.....	1862,* 18, 29, 75; 1868, 24; 1864, 8-9, 38
report on service.....	1863, 19-25
number and distribution.....	1863, 21
history in U. S. Army.....	1864, 6-9
transfer from military division to Signal Corps.....	1864, 24
instructions and drills.....	1868, 5
organization, forms of drill, and general directions..	1868, 8-18, 10 pl.; 1872, 126-138
report on instruction at West Point (Strong).....	1868, 19-21
drill at West Point.....	1869, 7
Fort Whipple.....	1871, 5-6; 1872, 8
description of Philadelphia exhibit at Paris.....	1877, 515-517
diploma of honor awarded by Electrical exhibition.....	1882, 86
introduction of Swedish form.....	1885, 4
organization in various countries.....	1886, 34-38
importance.....	1886, 34; 1887, 62
need of improvements.....	1887, 4, 57
storage at Fort Myer.....	1887, 7, 57
Telegraphy, instruction at West Point.....	1867, 2; 1868, 5-6
instruction of officers.....	1868, 6
rapidity acquired.....	1868, 26
manual of military.....	1872, 106-138
course of instruction at Fort Myer.....	1881, 81; 1884, 40
Telephones, field.....	1887, 4, 57
Tennessee, department of, operations.....	1864, 9, 12
Texas, department of, instruction.....	1886, 38; 1887, 61
Texas coast expedition.....	1864, 22
Thomas, Gen'l, commendation of Signal Corps.....	1864, 18
Thoroughfare mountain.....	1863, 9
Torch improvements.....	1887, 5, 58-59
Towers.....	1862,* 21-22; 1887, 6, 60
drill in erection.....	1877, 8
Turkey, telegraph corps.....	1886, 37

## U.

Upham, Maj., cited on use of homing-pigeon.....	1887, 60
---	----------

## V.

Vicksburg siege.....	1868, 10-11
Virginia, department of northeast, assignment to duty in.....	1861, 4; 1862,* 8
Virginia and North Carolina, department of.....	1864, 12, 16; 1865, 5

## W.

Washington, department of.....	1864, 28
instruction.....	1869, 18

West Point, Va, battle .....	1862,* 29-31; 1863, 7
West Point Military Academy, instruction at .....	1861, 5; 1862, 9; 1863, 18-19; 1864,
	5; 1868, 8-4, 5-6, 19-23; 1869, 6-7;
	1870, 4; 1871, 4-5; 1872, 5-6; 1873,
	231; 1875, 4; 1876, 4; 1877, 6; 1878, 6
introduction of course in signaling, with papers .....	1867, 1-2, 5-7
report on instruction at (Strong) .....	1868, 19-23
White House .....	1862,* 32, 33, 46-47, 51
White river .....	1862, 5
Wilcox's landing .....	1864, 29
West Virginia, department of, operations in .....	1864, 20-21
Wilderness .....	1864, 28
Willett's Point, instruction at Engineer school of practice .....	1869, 8; 1870, 4
Williamsburg .....	1862,* 26-29
Winchester .....	1862,* 12
Wire-wagon .....	1872, 127; 1887, 4, 57

## Y.

Yorktown .....	1862,* 14-15, 16-26; 1863, 7; 1864, 12-13
Yorktown celebration .....	1882, 6-7

# ANNUAL REPORT.

1870-1887.

## METEOROLOGICAL SECTION.

### A.

Accounts suspended.....	1885, 28; 1886, 25; 1887, 160
Actinometer, standard.....	1884, 22
(See, also, Solar radiation.)	
Agricultural convention, resolution on relation of service to agriculture ...	1882, 28-29
Agricultural meteorology; atmospheric conditions, June '71-May '72, and their effect on vegetation (Boehmer) .....	1872, 265-268
Agricultural societies (see Committees).	
Agriculture, services rendered to .....	1871, 16; 1872, 83-84; 1873, 304; 1874, 92-94; 1875, 97-98; 1876, 110-111; 1877, 128-130; 1878, 162-164; 1879, 204-206; 1880, 178, 201-208; 1881, 19-20 1881, 1825-1826
Air, instructions for collecting specimens (Morley).....	1881, 1825-1826
Alabama weather service, annual report.....	1886, 71-73; 1887, 92-94
Alaska, report on observations at St. Michael's (Nelson).....	1881, 768-790
summary of Nelson's work in meteorology, geography, ethnology, and zoology .....	1882, 79-86
Alaska, stations, table of monthly and annual max. and min. temperatures and precipitation.....	1882, 297
Alleghany river, high and low water, and danger-line.....	1876, 360
(See, also, in Index of charts, p. 19.)	
Altitudes (see Elevations).	
American forestry convention.....	1882, 78
Anemometer, instructions.....	1870, 25-26; 1871, 75-76; 1872, 183- 185; 1873, 328-333 (6 cuts.)
formula for three cups (Meyer) .....	1873, 1016
Anemometer support.....	1887, 128
Anemoscope, instructions .....	1873, 330-333 (3 cuts)
Annual meteorological summary (see Meteorological summary).	
Appendices, general subject index for 1870-'79.....	1880, 1115-1120
list.....	1882, 91; 1883, 1151-1163; 1884, 3-6; 1885, 85-88; 1886, 29-30; 1887, 53-55
Appropriations, extracts from acts.....	1873, 364-365; 1875, 16, 365-367
estimates for pay department .....	1875, 116
loss from decrease.....	1883, 3-4; 1884, 13; 1885, 22-23, 25-26; 1886, 9; 1887, 10-11
statements.....	1882, 11; 1883, 601-602; 1884, 9-10, 55-56; 1885, 27-28, 599-600, 1886, 28-29, 188-190; 1887, 43-44, 161-168
report of committee on expenditures .....	1886, 190-191
statement of items covered by estimates .....	1886, 191-193; 1887, 48
interchangeable .....	1887, 44-45
Arctic expeditions (see International polar work; Lady Franklin Bay; Point Barrow; Polaris expedition).	
Arkansas river, high and low water, and danger line .....	1875, 361
(See, also, in Index of charts, p. 19.)	
Arkansas weather service, report.....	1887, 96-97
Army posts, form for report.....	1875, 474-475; 1876, 299-300
list, forwarding reports.....	1875, 137-138; 1876, 147; 1877, 176-177; 1878, 215- 216; 1879, 530; 1880, 558; 1881, 292; 1882, 201; 1883, 28; 1884, 143; 1885, 559
table of monthly and annual mean temperatures.....	1881, 679-681; 1882, 241-243; 1883, 153-154; 1884, 280-281; 1885, 126; 1886, 484; 1887, 272-273
table of monthly max. and min. temperatures and annual range .....	1881, 682-683; 1882, 275-279; 1883, 155-158; 1884, 284-283; 1885, 128-129; 1886, 432-433; 1887, 274-277
table of monthly and annual precipitation.....	1881, 684-685; 1882, 307-308; 1883, 214-215; 1884, 330-331; 1885, 178; 1886, 457; 1887, 303-304

Astronomy, services rendered to .....	1882, 78-79
synopsis of lectures (Upton).....	1882, 104-120
Atlantic and Pacific telegraph company, assistance rendered by.....	1871, 10
Atmospheric currents, theory and study on weather map.....	1871, 93-94
Atmospheric currents, theory (Ferrel) .....	1871, 101-102
Attorney-General, opinion on relation of United States to telegraph com- panies.....	1874, 380-383
opinion on use of penalty envelopes by state weather services.....	1886, 121-122
Auroras, list of displays during Feb. '72.....	1872, 254-256
relation to storms (Fish).....	1873, 457
chronological list, 1870-'73 (Abbe) .....	1873, 1093-1107
April 7, '74, special report (Abbe).....	1874, 383-385; 1876, 301-385; pl. ch. 2
extracts from journals.....	1876, 867-874
chronological list, 1873-'75 (Greely) .....	1880, 217, 1096-1115
report on, St. Michael's (Nelson).....	1881, 779-786

## B.

Balloon, proposed ocean (King) .....	1882, 881-888
Balloon ascensions, Rochester, N. Y. (Schaeffer).....	1872, 86, 260-262, ch.
Nashville, Tenn. (Ford).....	1877, 541-544
Chicago, Ill. (Hass-Hagen) .....	1882, 76, 874-880, ch. 21-22
Minneapolis, Minn. (Upton).....	1882, 76, 862-873
summary.....	1882, 76-76; 1885, 14
Barometer, instructions.....	1870, 24-25; 1871, 74-75; 1873, 825-827
prediction of weather by (Scott).....	1871, 108-106
correction for temperature and altitude .....	1871, 112
instructions for self-recording.....	1872, 181-183
instructions to shipmasters for comparing .....	1878, 676-677; 1879, 500; 1880, 523
reports of boards on comparison and correction cards .....	1881, 1121-1125
report of board on alleged change in standard, with tables of temper- ature corrections.....	1881, 1126-1137
locations at stations, with changes for year.....	1884, 70-72; 1886, 218-215
correction tables for voluntary observers.....	1886, 812-813
adoption of standard .....	1887, 87-88
iron cistern for .....	1887, 146
new normal .....	1887, 147
Barometric reduction to sea-level.....	1871, 14, 112; 1882, 70
monthly constants.....	1881, 65; 1882, 70; 1886, 20
report of board .....	1881, 1185
letter recommending (Abbe) .....	1880, 1185-1189
report and list (Upton) .....	1882, 826-866
lists.....	1883, 50-52; 1884, 67-69; 1885, 571-574; 1886, 212
gravity correction .....	1885, 18; 1886, 221-232, ch. i-v
tables for voluntary observers .....	1886, 814-816
report, with tables (Ferrel) .....	1886, 221-232, ch. i-v
Benchmarks, statement of location .....	1873, 962-965
Bermuda telegraph cable.....	1873, 809
Bibliography of meteorology.....	1881, 80; 1882, 72; 1883, 11-12; 1884, 21, 63-64; 1885, 14, 560-570, 598-594; 1886, 210-211; 1887, 89-40, 169-171
Boards of trade, resolutions favoring permanent organization .....	1876, 473-484
(See, also, Committees.)	
Books of reference, list for stations .....	1871, 79
British-American stations, annual record.....	1873, 297-299; 1874, 82-83; 1875, 88-87; 1876, 97-98; 1877, 103-107; 1878, 182- 185; 1879, 160-178; 1880, 161-165; 1881, 282-284

## C.

California weather service, letter relative to establishment (Hall).....	1881, 1627; 1882, 770
Canadian service, co-operation .....	1872, 82; 1873, 800; 1874, 84-86; 1875, 87; 1876, 100; 1877, 111; 1878, 141; 1879, 178-179; 1880, 172; 1881, 37-38
Canadian stations, value .....	1870, 10
table of normal pressure and temperature.....	1882, 383-384
(See, also, British-American stations.)	



- Canadian storm warnings.....1875, 88; 1876, 100; 1877, 111; 1878, 162;  
1879, 204; 1880, 201; 1881, 50; 1882, 49
- Canal reports .....1874, 95; 1875, 100; 1876, 118; 1877,  
182; 1878, 166; 1879, 182; 1880, 210
- Cautionary signals, description of system .....1871, 8-10  
circular establishing .....1871, 109-112  
forms for record..... 1871, 165  
annual report..... 1872, 81-82; 1873, 309-310; 1874, 92; 1875, 96-97; 1876,  
109-110; 1877, 126-128; 1878, 158-162; 1879, 200-204;  
1880, 194-201; 1881, 46-50; 1882, 47-49; 1883, 6-7;  
1884, 18; 1885, 8; 1886, 10-14; 1887, 15-16, 68  
apparatus and instructions to observer sergeants..... 1878, 386-387  
rules for ordering..... 1873, 380-382; 1885, 49-50; 1886, 52-57  
experiments with gongs.....1878, 146; 1879, 184; 1880, 178-179  
display stations, list and annual record .....1879, 151-165; 1880, 144-  
166; 1881, 250-252  
circular..... 1878, 662-663  
list of stations, location, displaymen, &c.....1880, 196-198  
percentage of verifications .....1880, 197-198; 1887, 68  
report of officer in charge..... 1885, 539-542; 1886, 150-158  
1878, 308
- Census office, preparation of charts for ..... 1878, 308
- Central Pacific stations, tables of monthly max. and min., and annual  
range of temperature .....1882, 292-294; 1888, 178-180; 1884, 288-  
291; 1885, 132-135; 1886, 438-441; 1887, 342-345  
tables of monthly and annual mean temperatures.....1882, 262-264; 1883, 159-161;  
1884, 284-287; 1885, 130-131; 1886, 435-436; 1887, 339-341  
tables of monthly and annual precipitation .....1882, 327-329; 1883, 218-220; 1884,  
322-335; 1885, 174-175; 1886, 458-459; 1887, 346-347  
tables of monthly prevailing wind directions .....1882, 368-370; 1884, 370-371;  
1885, 218-219
- Charts (see Indications room charts; Weather map. For Index of  
charts, see p. 19).
- Chattanooga flood warnings, report..... 1884, 147-148
- Chicago fire, extract from journal ..... 1872, 17-19
- Chicago office report (Lapham) ..... 1871, 167-172
- Cipher, adoption ..... 1870, 7
- Cipher, adoption ..... 1870, 7  
weather reports..... 1872, 169-180  
sunset ..... 1877, 342-358  
cotton-belt stations ..... 1881, 762-767
- Climate, United States (Blodget)..... 1871, 102-103  
Saint Paul's Island (Fish) ..... 1873, 446-458  
Saint Michael's, Alaska (Turner)..... 1877, 557-568  
Palestine (Merrill)..... 1888, 652-659
- Cloudiness, tables and charts of seasonal distribution for 1882 (Dunwoody)  
1884, 128-137, ch. 1-4  
monthly and annual average from commencement of observations .....1884, 362-  
365; 1885, 208-210  
average monthly number of clear, fair, and cloudy days from com-  
mencement of observations..... 1886, 482-487  
average for each month ..... 1887, 321-323  
number of clear, fair, cloudy, and rainy days for each month..... 1887, 324-329  
1871, 93
- Clouds, theory, and study on weather map.....1878, 364-365, 16 pl.  
forms.....1878, 457-458  
St. Paul's Island forms (Fish) ..... 1883, 11  
study of movement..... 1884, 118-119
- Cold-wave warnings, circular ..... 1885, 8, 11-12; 1886, 12-13; 1887, 17-18, 67  
summary and verifications.....1885, 51-52; 1886, 59-60  
rules for.....1885, 509-515; 1886, 124-180  
report of officer in charge..... 1882, 858
- Colleges, list of stations..... 1884, 27, 128-129
- Colorado state medical society, resolution requesting humidity maps .....  
1884, 27, 128-129
- Colorado weather service, annual report ..... 1886, 91-92; 1887, 105-109  
Commissioner of Agriculture, request for co-operation of ..... 1887, 19-20
- Committees, circulars to agricultural societies, requesting appointment,  
and instructing..... 1871, 142-144; 1872, 269

Committees, letters to, requesting co-operation .....	1872, 268
list of agricultural societies.....	1872, 100-103; 1873, 968-974; 1875, 126-130; 1876, 136-140; 1874, 307-312
list of Boards of trade, etc .....	1862, 104-105; 1874, 398-399; 1878, 974-975; 1875, 130-131; 1876, 140-142; 1877, 168; 1878, 207-209; 1879, 742-743; 1880, 788-789; 1881, 754-755; 1882; pt. 1, 733-734; 1883, 49; 1884, 156-157; 1885, 557-558; 1886, 176-177; 1887, 138
organization and services.....	1873, 305; 1877, 185; 1878, 169; 1879, 213; 1880, 213-214; 1881, 23-24; 1882, 26; 1883, 7; 1884, 14; 1885, 11; 1888, 21-22; 1887, 29
resolution adopted by Boards of trade, etc., with form.....	1877, 169-171; 1878, 208-211
Consulting specialists.....	1881, 61-62; 1882, 68; 1883, 9-10; 1884, 21, 59; 1885, 18, 565
Constants (see Barometric reduction).	
Contracts, list for 1886-7 .....	1887, 164-166
Conversion tables.....	1881, 68, 1218-1246
Correspondence, summary.....	1871, 50; 1873, 236; 1874, 7; 1875, 5; 1876, 5; 1877, 7; 1878, 8; 1879, 8; 1880, 8; 1881, 12; 1882, 7-9; 1883, 18; 1887, 36
statement of communications sent and received...	1871, 60-61; 1872, 95-96; 1873, 385-386; 1874, 110-111; 1875, 114-116; 1876, 123-125; 1877, 151-152; 1878, 189-191; 1879, 238-234; 1880, 237-238; 1881, 91-92; 1882, 178-179; 1883, 21; 1884, 164-165; 1885, 550-551; 1886, 172-173; 1887, 135
Property division .....	1883, 600; 1884, 54; 1887, 161
Pacific Coast weather service .....	1887, 70
Correspondence division, regulations .....	1873, 367-370
report of officer in charge.....	1885, 550-558; 1886, 171-177; 1887, 134-139
Cost of service .....	1874, 94
decrease .....	1881, 12-13; 1883, 17
detailed statement.....	1882, 10-11
Cotton belt service, establishment and annual summary...	1881, 24-25; 1882, 29-30; 1883, 16; 1834, 27; 1885, 13; 1886, 15-16, 23; 1887, 26
circular, with list of stations, instructions, forms, and cipher .....	1881, 756-760
report of officer in charge.....	1882, 195-199; 1884, 150-155; 1885, 533-535; 1886, 147-149
resolutions of cotton exchanges on value .....	1882, 29-30
Cotton belt stations, table of monthly mean max. and min. temperatures...	1883, 162-163; 1884, 282-294; 1885, 136-138; 1886, 442-444; 1887, 278-281
tables of total monthly precipitation...	1883, 216-217; 1884, 336-338; 1885, 176-178; 1886, 460-462; 1887, 305-307
Cranberry districts, report on service.....	1886, 183-185
Cumberland river, high and low water, and danger-line.....	1875, 300
(See, also, in Index of charts, p. 19).	

## D.

Daily bulletin, plans, and copy.....	1870, 10-11, 40-41; 1871, 63, 149-150; 1873, 306; 1871, 264-272; 1875, 348-356
Dakota weather service, annual report.....	1886, 96-97
Danger and distress signals, establishment, and annual summary.....	1880, 224; 1881, 31-32; 1882, 34
Danger-line... 1874, 94; 1875, 99-100; 1876, 111-112; 1877, 130; 1878, 164; 1879, 207;	1881, 72; 1882, 74
report on Mississippi, Missouri, and Ohio rivers (Greely) .....	1874, 312-322
tables for principal rivers .....	1875, 357-361
report on revision (Hazen).....	1882, 736-750
Data furnished.....	1877, 153-155; 1878, 191-195; 1879, 234-242; 1880, 239-245; 1881, 93-101; 1882, 180-194; 1883, 53; 1884, 163; 1885, 557; 1886, 175; 1887, 139
limit .....	1887, 41-42

- Dew-point, tables of monthly and annual mean..... 1882, 835-889; 1883, 231-385; 1884, 347-850; 1885, 188-189  
 table of monthly and annual average from Jan. '82..... 1884, 351-354  
 Disbursing officer (see Property division).  
 Display stations, list and annual record.....1878, 99; 1879, 151-165; 1880, 144-156, 196-198; 1881, 253-272  
 report of officer in charge.....1885, 539-542; 1886, 150-153  
 Districts, lists..... 1878, 310-311  
 description ..... 1885, 508  
 (See, also, in Index of charts, p. 19).  
 Draughting room (see Publications division).

## E.

- Earth currents, suggestions on observations at Point Barrow..... 1881, 1281-1282  
 special instructions for observations at Point Barrow (Trowbridge and Eccard)..... 1881, 1283-1284  
 Earthquake, circular requesting observations, with instructions..... 1875, 874-877  
 Earth temperatures, importance of study and plans for observations... 1882, 78; 1885, 15  
 Eclipse of July, 29, '78.....1878, 168-169; 1880, 214-115  
 reports and observations (Abbe) ..... 1880, 809-882, 3 ch., 28 cuts  
 Electrical observations, results and importance (Lapham)..... 1871, 65-67  
 special instructions for Point Barrow (Trowbridge)..... 1881, 1283-1284  
 extracts from Pike's Peak journals..... 1882, 898-896  
 summary of work...1881, 65; 1882, 70-71; 1883, 11; 1884, 22; 1885, 151; 1887, 146  
 Electrometer, description of Dellmann's ..... 1871, 65  
 Elevations of stations, importance of determination ..... 1871, 14  
 summary of work... 1872, 85-86; 1873, 237; 1874, 8; 1881, 64-65; 1882, 70; 1883, 15  
 list, with bench-marks ..... 1873, 958-960  
 list and report (Hazen)..... 1881, 1178-1184  
 list, with changes during year ..... 1882, 855-857; 1884, 45-47  
 Enlistment, circular relative to..... 1871, 61-63; 1873, 316-319; 1877, 327-329; 1878, 426-428  
 examination for ..... 1873, 235-236; 1878, 7; 1879, 7; 1881, 9; 1882, 4-5  
 instructions for recruiting stations ..... 1873, 353-355  
 college graduates..... 1883, 3; 1884, 8; 1885, 5; 1886, 9  
 Entomological commission, correspondence with..... 1877, 500-503  
 circular requesting information on locusts ..... 1876, 503-504  
 Examiner's division, establishment and summary.....1882, 9-12; 1887, 38-39  
 report of officer in charge..... 1885, 602-604; 1886, 109-200; 1887, 149-150

## F.

- Fact and International bulletin division, report of officer in charge..... 1885, 559-564; 1886, 216  
 Farmers' bulletin, copy..... 1876, 471-472; 1881, 752  
 distribution..... 1873, 162-164; 1879, 204-206; 1880, 178, 201-203; 1881, 19-20; 1882, 22-33; 1884, 27  
 discontinuance ..... 1887, 22  
 Farmers' weather indicator.... 1877, 130; 1878, 163-164; 1879, 183, 205-206; 1880, 202  
 circular..... 1879, 535-539; 1880, 563-568  
 Fergusson building, recommendation of purchase..... 1886, 25-26; 1887, 45-46  
 Fires, forest ..... 1871, 16  
 northwest, in 1871 (Lapham) ..... 1872, 186-189  
 Fish commission, assistance rendered to..... 1873, 306; 1874, 95; 1876, 112-113; 1877, 132; 1878, 166; 1879, 209; 188, 210; 1881, 60-61; 1882, 64  
 Floods, circular and report, Mississippi river ..... 1882, 751-760  
 flood warnings..... 1874, 94; 1875, 98-100; 1876, 111-112; 1877, 180-181; 1878, 164-165; 1879, 207-209; 1880, 206-207; 1881, 52; 1882, 49-50; 1883, 16; 1884, 27; 1885, 12; 1886, 14-15; 1887, 25-26  
 report on Chattanooga ..... 1884, 147-148  
 rules for..... 1885, 52; 1886, 57-58  
 report of officer in charge ..... 1886, 154-168; 1887, 121-127  
 Flying stations ..... 1878, 97-98, 178; 1879, 113-114; 1880, 93-94  
 Forestry ..... 1882, 78  
 Forms, samples:  
 No. 1, telegraphic report ..... 1870, 20; 1871, 147

## Forms, samples :

No. 2, report of observations received .....	1871, 148; 1874, 255; 1875, 389
3a, daily bulletin.....	1870, 40; 1871, 64, 149; 1874, 264; 1875, 248
4, weekly record.....	1870, 19; 1871, 160; 1872, 284; 1876, 502
5, telegraphic report .....	1870, 20, 1871, 151; 1872, 285
7, press report .....	1871, 157
14, inspection report .....	1871, 145; 1879, 465
15, indications.....	1871, 141; 1872, 383; 1874, 324; 1875, 445; 1876, 472
16, (chart).....	1871, 82, 160; 1876, 48; 1879, 8
17, detailed synopsis and probabilities .....	1871, 161
18, marine record.....	1871, 189
18a, monthly record .....	1876, 294
18b, monthly register .....	1876, 299
22, monthly means.....	1871, 164
23, cautionary signals.....	1871, 165
24, record of bulletins.....	1871, 166; 1872, 286
25, telegram.....	1872, 287
26, daily river report.....	1872, 288
27, river observations .....	1873, 957
29, report railway bulletin .....	1879, 540; 1880, 568-569; 1881, 763
31, temperature water.....	1873, 986; 1874, 323; 1875, 444; 1876, 509
38, river observations..	1875, 444; 1876, 508
122g-1887, weather crop report.....	1887, 116
177, weather conditions of crop districts.....	1887, 117-118
A, messages refused .....	1872, 289
B, messages sent and received .....	1872, 290
C, notification to telegraph companies .....	1872, 291
E, monthly record for voluntary observers.....	1874, 291; 1875, 462
H, monthly register for voluntary observers.....	1874, 294; 1875, 470
working circuits.....	1872, 272
farmers' bulletin .....	1876, 471
international bulletin.....	1874, 273; 1879, 503
assistants on station, instruction.....	1876, 508
international observers .....	1878, 678; 1879, 498
railway daily weather report.....	1879, 540
special river report.....	1874, 323
verifications .....	1874, 297; 1875, 338; 1877, 381
army surgeon's report .....	1874, 294
Fort Myer, school of instruction... 1872, 4-5; 1873, 234-237; 1824, 4-6; 1875, 3-5; 1876, 3-4; 1877, 3-6; 1878, 3-6; 1879, 1-7; 1880, 1-7; 1881, 4-9; 1882, 3-7; 1883, 1-3; 1884, 6-8; 1885, 3-5; 1886, 5-9; 1887, 60-61	
construction of buildings.....	1872, 5
report of officer in charge.....	1882, 174-175; 1883, 19-20; 1884, 48-49; 1885, 39-40
improvements at .....	1884, 29
standing orders .....	1884, 31-47
discussion of closing .....	1886, 6-8
Franklin institute committee, report on plan for state weather service .....	1887, 74-77
Franklin telegraph company, assistance rendered .....	1871, 10
letter proposing rates for service .....	1871, 137
Frosts, tables of dates of first.....	1881, 677-678; 1882, 340-342
earliest and latest from commencement of observations.....	1883, 240-247; 1884, 374-376, 377-379
dates of first killing, 1883-'4.....	1884, 372-373
Frost, dates of first and last killing, 1873-'74 to 1884-'85.....	1885, 191-193, 195-198
dates of first and last light and killing, 1884-'85 .....	1885, 190-194
dates of first and last, 1885-'86, 1886-'87.....	1886, 473-474; 1887, 311-312
Frost warnings... 1880, 173; 1881, 52-3; 1882, 26-29; 1883, 16; 1884, 29; 1885, 13; 1886, 17-18	
circular of Louisiana weather service .....	1884, 119-120
report of officer in charge.....	1884, 149; 1885, 527-532; 1886, 133-135
rules for.....	1885, 50-51; 1886, 68-69
G.	
Garlington relief expedition (See Lady Franklin Bay).....	1886, 97-98
Georgia weather service, annual report .....	1886, 97-98

- Gibbon's self-recorder..... 1872, 87, 183-184; 1873, 330-333, 3 cuts.  
 "Giuseppe Massone," services rendered at wreck..... 1873, 177-178  
 Graphic map..... 1879, 211; 1880, 211-212; 1881, 26; 1882, 64-65  
 Gravity correction, adoption..... 1885, 18  
 report (Ferrel)..... 1886, 221-232, ch. i-v

## H.

- Humidity, theory, and study from weather map..... 1871, 92-98  
 absolute, tables and charts of seasonal distribution for 1883 (Dun-  
 woody)..... 1884, 128-137, 4 ch.  
 relative, table of monthly and annual mean... 1878, 415-417; 1879, 458-460; 1880,  
 272-275; 1881, 664-667; 1882,  
 330-334; 1883, 221-325; 1884,  
 339-342; 1885, 179-187; 1886,  
 470-472; 1887, 308-310  
 relative, table of mean monthly and annual, from commencement of  
 observations..... 1883, 226-230; 1884, 343-346  
 "Huron," services rendered at wreck..... 1878, 173-175  
 Hygrometer, instructions..... 1870, 25; 1871, 75; 1873, 327-328  
 Hygrometry, tables for practical use..... 1871, 107-109  
 summary of work..... 1881, 64; 1882, 70  
 report and tables (Abbe)..... 1881, 1138-1177  
 special observations..... 1885, 15  
 report on psychrometric formula, with tables (Ferrel)..... 1886, 233-259  
 tables for voluntary observers..... 1886, 302-311

## I.

- Illinois weather service, establishment..... 1882, 763  
 annual report..... 1886, 90-91  
 report for June..... 1887, 100-105  
 Index to appendices, 1870-'79 (Greely)..... 1880, 1115-1120  
 Indian troubles in Arizona..... 1877, 569-570  
 Indiana weather service, establishment..... 1882, 763-764  
 synopsis of monthly bulletin..... 1886, 93-95  
 annual report..... 1886, 95-96; 1887, 97-98  
 question of issuing..... 1870, 11  
 Indications..... 1871, 13; 1872, 81; 1873, 303; 1874, 91; 1875, 94-96; 1876, 107-109;  
 1877, 115, 120-125; 1878, 156-158; 1879, 192-200; 1880, 190-194;  
 1881, 44-46; 1882, 43-46; 1883, 5-7; 1884, 11-14; 1885, 5-9; 1886,  
 9-12; 1887, 11-15  
 circular of instructions..... 1876, 472-473  
 value to different classes..... 1882, 887-888  
 effect of decreased appropriations..... 1883, 5-6; 1884, 13  
 description of districts..... 1885, 508  
 Indications board, rules..... 1885, 55; 1886, 61  
 Indications division, rules..... 1873, 379-383; 1885, 41-57; 1886, 39-65  
 report of officer in charge..... 1887, 65-68  
 Indications room charts..... 1875, 94-95; 1876, 107-108; 1877, 120-123; 1878, 152-155;  
 1879, 192-195; 1880, 187-189; 1881, 38-44; 1882, 42-46  
 rules for preparation..... 1885, 42-46; 1886, 42-46  
 (See, also, in Index of charts, p. 20.)  
 Inspection of stations, report form..... 1871, 145-147  
 summary..... 1872, 79-80; 1873, 300; 1874, 99; 1876, 104; 1879, 174; 1880, 167;  
 1881, 16; 1882, 19-20; 1887, 28-30  
 list..... 1872, 94-95; 1873, 948-950; 1874, 374-375; 1875, 120-121; 1876,  
 130; 1877, 160-162; 1878, 200-201; 1879, 461-464; 1880, 485-487;  
 1881, 709-711; 1882, 731-732; 1883, 48; 1884, 158-159; 1885,  
 551-553; 1886, 174-175; 1887, 136-137  
 rules..... 1873, 384-385  
 instructions and forms..... 1879, 465-475; 1880, 488-498; 1881, 712-723  
 Instruction, list of officers, observers, and assistants instructed..... 1870, 14-16; 1871,  
 52-54; 1872, 90-93; 1873, 312-316; 1874, 106-109; 1875,  
 111-114; 1876, 122-123; 1877, 149-151; 1878, 187-189; 1879,  
 229-232; 1880, 234-237; 1881, 83-89; 1882, 176-177  
 course at Fort Whipple..... 1874, 106; 1877, 148-179; 1878, 185-186; 1879,  
 227-228; 1880, 233-234; 1881, 77-82; 1884, 81-44

- copy of observer-sergeants' report..... 1876, 508  
 annual report..... 1883, 665-666; 1884, 65-67; 1886, 570  
 (See, also, Fort Myer.)
- Instructions, observer-sergeants..... 1870, 22-26; 1871, 71-82; 1873, 820-865; 1877,  
 321-327; 1878, 420-426; 1879, 476-493; 1880,  
 499-516; 1881, 731-751
- cautionary signal circular..... 1871, 109-115
- special observations at Saint Paul's Island..... 1872, 75-76
- management of self-recording instruments..... 1872, 181-186
- observer-sergeants at recruiting stations..... 1873, 353-355
- river observations..... 1873, 950-962; 1875, 364; 1881, 888
- voluntary observers..... 1874, 288-295; 1886, 273-316
- sea-coast stations..... 1874, 375-378
- sunset observations..... 1877, 337-355; 1878, 430-433; 1879, 493-499; 1880, 516-522
- shipmasters comparing barometers ..... 1878, 676-677; 1879, 500; 1880, 523
- inspection officers..... 1879, 465-475; 1880, 488-498; 1881, 712-723
- cotton-belt observers..... 1881, 759-760
- construction and equipment of telegraph lines ..... 1881, 811-823
- Instrument division, summary..... 1881, 74-75; 1882, 63-64; 1885, 14-15; 1886, 20-21;  
 1887, 36-38
- report of officer in charge ..... 1887, 145-148
- Instrument room, regulations..... 1878, 383-384
- report..... 1873, 965-966
- Instruments, preliminary report on..... 1870, 11-12
- value of self-recording ..... 1870, 12; 1874, 98-99
- list and instructions for stations..... 1870, 24-26; 1871, 74-77
- instructions for placing and reading..... 1871, 112-115
- receipt, comparison, and issue..... 1872, 86-87; 1873, 302, 386; 1874, 98-99; 1875,  
 102-103; 1876, 115-116; 1877, 136; 1878, 169-170;  
 1879, 9, 214; 1880, 9, 217-218; 1881, 62-64;  
 1882, 269; 1883, 14; 1884, 25; 1885, 14-15;  
 1886, 20-21; 1887, 37, 146, 161
- instruction for self-recording..... 1872, 181-186
- synopsis of lectures (Abbe) ..... 1882, 97-108
- outfit of Lady Franklin Bay and Point Barrow expeditions..... 1882, 859-861
- standards, location, &c..... 1883, 10-11; 1884, 21-28; 1885, 13-14, 14-15
- report of work on standards ..... 1883, 660-662; 1884, 59-61, 90-91; 1885, 565-567;  
 1886, 208-209
- description and use (Pollok)..... 1884, 107-111
- treatise on meteorological apparatus and methods (Abbe)..... 1887, pt. 2.  
 contents: chapter I.—General history and development of thermometers.  
 II.—Modern thermometry; the air thermometer.  
 III.—The mercurial thermometer.  
 IV.—Exposure of thermometers.  
 V.—Miscellaneous forms of thermometers.  
 VI.—Thermographs.  
 VII.—The barometer in general.  
 VIII.—The mercurial barometer.  
 IX.—Miscellaneous barometers.  
 X.—Barographs.  
 XI.—Introductory on the measurement of the air.  
 XII.—Observation of wind direction; anemoscopes.  
 XIII.—Direct measurement of wind velocity.  
 XIV.—Estimates and arbitrary scales.  
 XV.—Pressure anemometers.  
 XVI.—Suction anemometers.  
 XVII.—Rotation anemometers.  
 XVIII.—Observation of upper currents; nepheloscopes.  
 XIX.—Hygrometry.  
 XX.—The measurement of rain and snow.
- preparation of treatise..... 1887, 42-43
- sale to private parties..... 1887, 47-48, 160-161
- International bulletin, summary of work..... 1870, 10; 1871, 14-15; 1873, 311-312;  
 1874, 88; 1875, 91-92; 1876, 104-105; 1877, 117-118; 1878, 147-152;  
 1879, 185-192; 1880, 179-186; 1881, 54-58; 1882, 53-58; 1883, 18;  
 1884, 28; 1885, 29-30; 1886, 26; 1887, 20-21
- memorandum on exchange of reports with Russia and Turkey..... 1873, 1108-1109

- International bulletin:  
 copy..... 1874, 273-286; 1875, 446-461; 1876, 485-501; 1877, 358-377; 1878, 434-459; 1879, 523-529; 1880, 528-557; 1881, 842-868; 1882, 771-803  
 circular letters requesting observations ..... 1875, 362-368  
 change of time of observations ..... 1880, 167-169  
 report form..... 1878, 678-679; 1881, 839-841  
 monthly summary, January, 1881..... 1882, 804-825  
 list of foreign bureaus, vessels, and stations contributing..... 1882, 35-38  
 contributions for year ..... 1884, 144-146; 1885, 568-564  
 annual summary ..... 1883, 667-688, ch. 6; 1884, 694-712, ch.  
 International bulletin division, report of officer in charge..... 1885, 559-564; 1886, 216  
 International chart, establishment and value..... 1878, 151; 1879, 189-192; 1880, 180-183; 1881, 56-58  
 International exhibition at Philadelphia, exhibit and awards.. .... 1876, 116; 1877, 186  
 report and catalogue of Signal Service exhibit (Grugan)..... 1877, 507-517  
 International exhibitions, awards to Signal Service..... 1882, 86  
 International geographical congress, resolutions on standard time..... 1881, 1249  
 International meteorological congress at Vienna .....1873, 311; 1874, 87-88  
 circular of invitation and appointment of General Myer as delegate.. 1873, 1107-1108  
 International meteorological congress at Rome ..... 1879, 192; 1880, 186-187  
 International ocean telegraph company, correspondence relative to charges 1870, 37, 39  
 assistance rendered..... 1871, 10, 11  
 International polar work .....1881, 72-73; 1882, 65-68, 74-75; 1883, 8-9; 1884, 14-20; 1885, 16-25; 1886, 22  
 memoranda of scientific co-operation.....1883, 646-649  
 (See, also, Lady Franklin bay; Point Barrow).  
 International storm warnings, (see Weather cablegrams.)  
 Iowa weather service, act establishing .....1881, 1263; 1882, 761
- J.
- Judge-Advocate-General, opinion on status of Signal Corps.....1882, 927-950  
 decision on transfer of property responsibility ..... 1887, 164
- K.
- Kansas weather service, establishment..... 1882, 768  
 annual report .....1886, 98-99; 1887, 81-82  
 Kew observatory, instruments furnished by ..... 1870, 12
- L.
- Lady Franklin bay expedition, orders, outfit and instructions.....1881, 78, 1286-1279,  
 1882, 65-68; 1883, 8-9; 1884, 14-21; 1885, 16-25; 1886, 22  
 scientific outfit.....1882, 859-860  
 report of relief expedition of 1882 (Beebe) .....1883, 607-611  
 preparation and instructions for relief expedition of 1883.....1883, 611-621  
 Lake disasters.....1871, 67-71; 1872, 195-206; 1873, 1094-1046; 1874, 388-397;  
 1875, 377-397; 1876, 360-378; 1877, 527-541; 1878, 685-645;  
 1879, 743-758; 1880, 789-802; 1881, 824-837; 1883, 264-272  
 Lake service, report (Lapham) .....1871, 167-172  
 Lakes (see Navigation).  
 Lectures, by professors, synopses .....1882, 97-172; 1883, 640-645; 1884, 73-75  
 by officers, list..... 1882, 173  
 to officers.....1882, 73; 1883, 20  
 Library..... 1878, 237; 1874, 8; 1875, 5; 1876, 8-9; 1877, 8-9; 1878, 10;  
 1879, 9-10; 1880, 9-10; 1881, 70; 1882, 71-72; 1887, 41, 161  
 list of exchanges received.....1873, 387-389; 1874, 111-113; 1875, 117-118;  
 1876, 125-129; 1877, 156-160; 1878, 195-199;  
 1879, 242-248; 1880, 245-251; 1881, 1260-1256  
 Life-saving service .....1872, 79; 1873, 306-307; 1874, 85-86, 99-100; 1876, 117  
 Local weather predictions.....1887, 11-12  
 Locusts, observations for Entomological commission and suggestion of  
 forecasts ..... 1877, 132-133  
 correspondence and abstracts of various journals .....1877, 500-507  
 establishment of stations of observation .....1881; 25; 1882, 30-31
- M.
- Magnetic forces above the earth's surface (Abbe)..... 1876, 335

- Maps (see Weather maps).
- Marine agencies..... 1882, 58-61; 1885, 9; 1886, 19  
 report of officer in charge .....1886, 217; 1887, 158
- Marine service, form of log .....1871, 139; 1876, 114-116; 1877, 118-119; 1878,  
 149-150; 1879, 187-188; 1880, 184-186; 1881, 56-58  
 lists of vessels and naval stations forwarding reports.....1874, 402-403; 1875, 138;  
 1876, 147; 1877, 178; 1878,  
 216-217; 1879, 501-602; 1880,  
 524-527; 1881, 869-872; 1882,  
 847-854; 1883, 89-90  
 instructions for shipmasters comparing barometers.....1878, 676-677; 1879,  
 500; 1880, 528
- Massachusetts militia encampment, meteorological record..... 1883, 651
- Mathematics, synopsis of lectures (Waldo).....1882, 148-172
- Meteorological observatory, report.....1883, 688-689; 1884, 89-90
- Meteorological problems, proposed to scientists.....1881, 1257-1258  
 proposed to officers and enlisted men.....1881, 1259-1261
- Meteorological record .....1882, 61-63; 1883, 18; 1884, 28; 1885, 80; 1886, 26
- Meteorological record division, report of officer in charge..... 1883, 637; 1886, 203-204
- Meteorological summary, monthly and annual..... 1881, 15-16, 305-641; 1882, 389-730;  
 1883, 278-584; 1884, 404-698; 1885,  
 224-507; 1886, 823-408; 1887, 172-247
- Meteorology, recommendation of study at military and naval schools..... 1871, 15  
 study .....1882, 78-74; 1883, 2; 1884, 8; 1885, 5  
 titles of works recommended for study..... 1883, 689-692  
 preparation of text books on.....1882, 78-74; 1883, 2-8; 1884, 8;  
 1885, 5; 1886, 8-9; 1887, 42-48  
 suggested course of study for scientific scholars..... 1884, 75  
 synopsis of lectures (Hazen) .....1882, 121-142  
 recent advances in (Ferrel)..... 1885, pt. 2  
 treatise on meteorological apparatus and methods (Abbe)..... 1887, pt. 2  
 (For table of contents see under Instruments.)
- Metric system, question of adoption by service ..... 1881, 68
- "Metropolis," services rendered at wreck .....1878, 175-177
- Mexican service, organization .....1878, 147; 1879, 184-186; 1880, 179
- Michigan weather service, establishment..... 1882, 763  
 act..... 1888, 891-892  
 annual report..... 1886, 87-89  
 appropriation act and crop bulletin..... 1887, 90-92
- Military telegraph lines, copy of act to aid in construction, and secure use  
 to government ..... 1878, 868  
 construction, order and report..... 1874, 878-880  
 copy of act to protect ..... 1874, 888  
 extracts from acts for construction, protection and maintenance..... 1875, 364-365  
 instructions for construction, equipment and management..... 1875, 440-444;  
 1881, 811-823  
 annual summary .....1874, 101-108; 1875, 104-107; 1876, 117-121; 1877, 144-147;  
 1878, 179-184; 1879, 220-227; 1880, 225-282; 1881, 82-87;  
 1882, 85-42; 1883, 12-18; 1884, 23-24; 1885, 10-11; 1886,  
 16-17; 1887, 31  
 annual report of officer in charge... 1883, 603-606; 1884, 80-88; 1885, 547-549; 1886,  
 180-183; 1887, 141-144  
 offices and receipts..... 1886, 190; 1887, 164
- Military telegraph stations, list and annual record... 1877, 89-103; 1878, 101-180; 1879,  
 115-150; 1880, 94-148; 1881, 194-250  
 value of reports ..... 1879, 184
- Minnesota weather service, annual report ..... 1886, 78-81; 1887, 100
- Mississippi river, report on danger-line (Greely) ..... 1874, 812-820  
 high and low water, and danger-line at various stations ..... 1875, 357-358  
 report on flood of 1882..... 1882, 751-760  
 study of rainfall and drainage for 1882 (Ellis)..... 1887, 121-125  
 (See, also, in Index of charts, p. 20.)
- Mississippi weather service, report ..... 1887, 84-86
- Missouri river, report on danger-line (Greely).....1874, 820-821  
 table of high and low water and of danger-line at various stations ..... 1875, 859  
 (See, also, in Index of charts, p. 20.)



Missouri weather service, establishment.....	1882, 761
act establishing .....	1888, 589
annual report.....	1886, 89-90; 1887, 79
Monongahela river, high and low water, and danger-line.....	1875, 860
(See, also, in Index of charts, p. 20.)	
Monthly summary, form .....	1871, 164
(See, also, Meteorological summary.)	
Monthly weather review, October 1872-December 1888 .....	1878-1888
(For paging and index, see p. 2.)	
preparation... 1873, 306; 1874, 95-96; 1875, 100-101; 1876, 118-114; 1877, 138-184;	
1878, 155-156, 167; 1879, 211-212; 1880, 212-214; 1881, 59-60; 1882,	
51-58; 1883, 17; 1884, 28; 1885, 29; 1886, 26; 1887, 20-21	
1871, 11	
Montreal telegraph company .....	1873, 300
Mount Mitchell, establishment of station.....	1878, 770-947
report of observations, and daily journal, May-Sept. '73.....	
Mount Washington, observations and abstract of journal for May '72, May-	
June '78.....	1872, 205-258; 1878, 580-769
Mount Whitney expedition .....	1881, 68-67
recommendation of military reservation .....	1882, 77
expedition, abstract of report (Langley).....	1882, 884-886
Mountain stations, importance.....	1871, 14; 1873, 300

## N.

National academy of sciences, advisory committee.....	1881, 1
Navigation, warning of closing .....	1874, 95
dates of closing and opening for 1871-'85 .....	1886, 488-489, 490-491
dates of closing and opening for winter at selected stations .....	1887, 338
Navy department, co-operation of.....	1878, 149
Nebraska weather service, establishment.....	1882, 768
annual report .....	1886, 92-93; 1887, 94-95
Nevada weather service, act proposed.....	1881, 1266; 1882, 769
New England meteorological society, circular requesting observations .....	1884, 116
list of stations displaying weather signals.....	1885, 521-528
annual report.....	1886, 73-78; 1887, 88-84
thunder-storm work .....	1887, 22, 88
New Jersey weather service, establishment.....	1882, 766
act .....	1888, 592-598
report .....	1887, 86-88
New York weather service, correspondence relative to establishment.....	1882, 768; 1887, 111
New York weather service, establishment.....	1886, 119-120
North Carolina weather service, establishment.....	1882, 767-768
report .....	1887, 109-111
Northers, warnings.....	1882, 26-29
rules for warnings.....	1886, 52; 1886, 67
Northwestern telegraph company, correspondence relative to charges ....	1870, 88, 89-40
assistance rendered by.....	1871, 11

## O.

Observatory, model .....	1871, 15-16
recommendation of construction.....	1885, 15
Observers, duties... 1870, 8-9; 1871, 50; 1872, 81; 1873, 285-286; 1874, 5-6, 99-100;	
1875, 106-107; 1876, 99-100; 1877, 108-110; 1878, 5-7, 188-140;	
1879, 5-6; 1880, 5-6, 167-172; 1881, 16-19; 1882, 4-5, 20-22; 1883,	
1-8; 1884, 7; 1885, 32; 1886, 7; 1887, 80, 128-129	
suggestion of mobilized corps.....	1872, 79
examination of.....	1887, 30
to be made responsible for property .....	1887, 45
classification recommended.....	1887, 49-50
Occultations visible at Lady Franklin bay (Newcomb) .....	1881, 1278-1279
Office Chief Signal Officer, rules and regulations.....	1878, 865-884
recommendation of promotion of clerks .....	1878, 802
recommendation of new building for... 1876, 106; 1881, 76; 1882, 89; 1884, 29; 1885,	
26, 29; 1886, 25, 26; 1887, 45-46, 166	
1878, 429	
table of divisions and rooms .....	1879, 7-10; 1880, 7-10; 1881, 9-11
annual summary .....	

- Office Chief Signal Officer, need of increase in force ..... 1882, 2  
civilian force recommended..... 1887, 49
- Officers, recommendation of increase in detail ..... 1882, 1-2  
(See, also, Instruction.)
- Ohio river, report on danger-line (Greely) ..... 1874, 321-322  
table of high and low water, and danger-line at various stations..... 1875, 359  
(See, also, in Index of charts, p. 20.)
- Ohio weather service, establishment..... 1882, 764-766  
annual report ..... 1886, 81-85; 1887, 88-90
- Organization, copy of original law and order.....1870, 6, 16-17  
preliminary plans .....1870, 6-13, 17-18  
permanent, recommendation .....1870, 9; 1871, 51; 1873, 235; 1874, 104-106;  
1875, 108-109; 1876, 121; 1877, 147-148;  
1878, 6-7; 1881, 75-76; 1882, 2-3; 1884, 29-  
80; 1885, 33; 1886, 27; 1887, 14, 48-50  
military, economy and value.....1871, 50; 1872, 45; 1877, 110; 1879,  
177-178; 1880, 171; 1881, 18-19; 1882, 3
- bill to limit and fix the Signal Service ..... 1876, 473  
resolutions of boards of trade, &c.....1876, 473-484  
effect of act of June 20, 1878..... 1878, 7  
recommendation for increase of force and two commissions each year. 1878, 429  
report of committee on military affairs ..... 1882, 87-88  
increase in force recommended..... 1882, 88-89  
opinion of Judge-Advocate-General on status of Signal Corps, with  
official papers.....1882, 927-950  
extracts from testimony before joint commission..... 1885, 81-83
- P.
- Pacific and Atlantic telegraph company, assistance rendered by..... 1871, 10  
letter proposing rates for service..... 1871, 136
- Pacific coast, table of monthly rainfall averages.....1886, 143-146  
table of average monthly and seasonal precipitation.....1887, 348-350
- Pacific coast service, verifications of indications ... 1880, 192; 1881, 45; 1882, 45; 1888,  
7; 1884, 12; 1885, 7; 1887, 16-17, 67  
annual summary.....1881, 53-54; 1882, 51; 1883, 15; 1884,  
26; 1885, 6; 1886, 10; 1887, 16-17  
report of officer in charge, official correspondence, forms, maps, &c... 1885, 59-64;  
1886, 133-146; 1887, 69-71
- Pacific railroad stations (see Central Pacific; Southern Pacific.)
- Palestine, report on climate (Merrill).....1888, 652-659
- Pay of enlisted men..... 1871, 62; 1873, 317, 319, 357-361; 1877, 109-110,  
329; 1878, 139, 428; 1884, 30; 1885, 32, 33  
forms .....1873, 357-361  
should be in lump sum.....1887, 46, 47, 50
- Penalty envelope, opinion of Attorney-General on use by voluntary ob-  
servers, with bill providing for same.....1886, 121-122
- Pendulum, construction of improved, for Lady Franklin bay..... 1881, 67  
observations ..... 1881, 67-68
- Pennsylvania weather service, organization, act and report ..... 1887, 74-78
- Physical laboratory division, report of officer in charge.....1885, 595-597; 1886, 218-220  
(See, also, Instrument division.)
- Pike's Peak, establishment of station ..... 1873, 300; 1879, 182; 1880, 177  
extract from daily journal ..... 1874, 118-126; 1882, 893-896
- Point Barrow expedition..... 1881, 73; 1882, 65-68; 1883, 8-9; 1884, 14  
orders, instructions and outfit ..... 1881, 1276, 1280-1286  
letter from Superintendent U. S. Coast Survey on magnetic station ..... 1881, 1287  
scientific outfit ..... 1882, 860-861  
report on the relief expedition (Powell)..... 1883, 622-630  
report on work 1881-'2 (Ray)..... 1883, 630-634  
preparations and instructions for relief expedition..... 1883, 634-636
- Polar bands, as storm indicators (Prestel)..... 1871, 106-107  
report on Saint Michael's (Nelson)..... 1881, 776-779
- Polaris expedition, observer sent with ..... 1871, 15  
order, instructions and report of Sergeant Meyer ..... 1873, 808, 995-1025
- Post Office department, co-operation... 1871, 49; 1873, 304-305; 1874, 93; 1876, 110-111;  
1877, 128-129  
correspondence relative to display of bulletins ..... 1873, 966-968

- Precipitation, discussion of Saint Paul's island (Fish)..... 1878, 450-451  
rain and dry winds for districts..... 1878, 616-684, ch. 38  
monthly rainfall and gauge readings, flood of 1882 .. 1882, 752-757  
influence of growths of population..... 1883, 11-12  
rainfall and drainage in river basins for 1882 (Ellis)..... 1887, 121-125  
Precipitation tables, monthly and annual... 1873, 483-484; 1874, 239-241; 1875, 148-144;  
1876, 152-154; 1877, 184-185; 1878, 224-227;  
1879, 255-258; 1880, 276-279; 1881, 668-672;  
1882, 302-306; 1883, 180-186; 1884, 295-299;  
1885, 168-172  
annual and mean annual, from commencement of observations.. 1880, 280-281; 1881,  
673-676; 1882,  
298-301; 1883, 187-  
191; 1884, 300-303;  
1885, 164-167; 1887,  
294-297  
monthly and annual at army posts... 1881, 684-685; 1882, 307-308; 1883, 214-  
216; 1884, 330-331; 1885, 173; 1886, 457;  
1887, 303-304  
monthly and annual at voluntary stations... 1881, 701-708; 1882, 309-315; 1883,  
205-213; 1884, 320-329; 1885, 168-172;  
1886, 452-456; 1887, 298-302  
monthly total, with max. and min. temperature, for Alaska stations... 1882, 297  
comparative, for principal stations.... 1882, 316-323; 1883, 192-199; 1884, 304-311  
average for states and territories of the United States..... 1882, 324-325  
monthly and annual amounts at Central and Southern Pacific stations. 1882, 327-329;  
1883, 218-220;  
1884, 332-335;  
1885, 174-175;  
1886, 458-459;  
1887, 346-347  
1882, 326  
average for districts ..... 1882, 326  
average monthly from commencement of observations.. 1883, 200-204; 1884, 312-315  
average monthly and annual at selected stations, from Jan. '74..... 1884, 316-317  
mean monthly and annual at selected stations, from Jan. '79..... 1884, 318-319  
mean monthly and annual at selected stations, from 1880..... 1884, 318-319  
monthly total for cotton region stations... 1883, 216-217; 1884, 336-338; 1885, 176-  
178; 1886, 460-462; 1887, 305-307  
average seasonal, with mean temperature, from commencement of ob-  
servations..... 1884, 224-226; 1885, 151-153  
monthly and annual average at selected stations, from 1875 ..... 1885, 160-161  
monthly and annual average at selected stations, from 1880 ..... 1885, 162-163  
monthly normal and departure..... 1885, 154-159; 1886, 446-451; 1887, 288-298  
monthly averages on Pacific coast, with seasonal means, and total for  
1885-'6 ..... 1886, 148-146  
monthly total and max. and min. temperature at 3d order stations... 1886, 463-466  
monthly total and mean max. and min. temperature at 3d order stations.. 1886, 468-469  
number of days of .01 inch, or more, with monthly max. and min. tem-  
perature, at 3d order stations..... 1887, 330-333  
number of days of .01 inch, or more, with mean max. and min. tem-  
perature, at 3d order stations..... 1887, 334-337  
average monthly and seasonal on Pacific coast..... 1887, 348-350  
Press reports..... 1871, 13, 85; 1872, 80  
form ..... 1871, 141  
rules for preparation..... 1885, 42; 1886, 41-42  
Pressure, theory, and study from weather map ..... 1871, 86-88  
prediction of weather (Scott)..... 1871, 108-106  
connection of variation with temperature..... 1872, 264-265  
table of lowest readings (Craig)..... 1873, 308-309  
barometric gradients and wind velocity..... 1874, 885-888  
preparation of charts of low areas..... 1874, 96-98; 1876, 115  
report on decrease with altitude and reduction to sea level, (Dunwoody).. 1876, 349-  
360, ch. 4-10  
retardation at high stations (Hazen).....1882, 897-926  
(See Barometric reduction, also, in Index of charts, p. 21.)

- Pressure tables, monthly and annual mean reduced to sea-level.....1878, 890-891; 1874, 127-128; 1875, 189-141; 1876, 148-150; 1877, 179-181; 1878, 218-220; 1879, 249-251; 1880, 259-262; 1881, 647-650; 1882, 222-226; 1888, 54-58; 1884, 174-177
- annual and mean annual, reduced to sea-level, from 1871..1880, 263-265; 1881, 655-657; 1882, 214-217; 1883, 68-71
- monthly and annual mean actual .....1878, 412-414; 1879, 454-457; 1880, 252-255; 1881, 642-646; 1882, 227-231; 1883, 59-63; 1884, 178-181
- mean normal..... 1878, 418-419; 1879, 451-453; 1880, 256-258; 1881, 651-654; 1882, 218-221; 1883, 64-67; 1884, 182-185; 1885, 67-70
- normal barometer and temperature at Canadian stations.....1882, 383-384
- mean monthly ranges from commencement of observations ..... 1883, 72-76
- monthly range for 1883 ..... 1884, 186-189
- mean of highest and lowest for each month from commencement of observations.....1885, 73-75, 76-78
- mean monthly range computed from Jan. '80..... 1886, 404-406
- Printing, instructions.....1878, 334-335
- Printing division, regulations.....1873, 378-379
- summary of work.....1881, 74; 1882, 61-63; 1887, 167-168  
(See, also, Publications division).
- Prize essays..... 1881, 71
- Probabilities (see Indications; Synopses and probabilities).
- Professional papers..... 1881, 70-71; 1882, 72; 1883, 18; 1884, 28-29; 1885, 30; 1886, 26
- Property, station receipt for..... 1871, 152
- instructions for returns..... 1878, 355-357
- recommendation of transfer to observers..... 1887, 45, 164
- Property division..... 1873, 236-237; 1874, 7-8; 1876, 5; 1877, 7-8; 1878, 8; 1879, 8; 1880, 8; 1881, 11; 1883, 17; 1884, 27-28; 1885, 28-29; 1886, 25-26; 1887, 38-39, 43-48
- regulations..... 1878, 370-372
- report of officer in charge..... 1883, 600-602; 1884, 50-52; 1885, 598-601; 1886, 186-198; 1887, 160-166
- Psychrometry (see Hygrometry).
- Publications, plans.....1870, 10-11, 17-18
- form for weekly report of issue..... 1871, 166
- law authorizing sale ..... 1873, 237
- summary.....1873, 303-306; 1874, 89, 95-98; 1875, 97-102; 1876, 113-115; 1877, 120-124, 133-135; 1878, 168; 1879, 8-9, 211-212; 1880, 8-9, 213; 1881, 286; 1882, 61-63; 1883, 17-18; 1884, 28-29; 1885, 129-130; 1886, 26-27; 1887, 42-43
- restriction ..... 1886, 20  
(See, also, titles of publications.)
- Publications division, report of officer in charge.....1883, 667-668; 1884, 92-93; 1885, 606-606; 1886, 201-202; 1887, 167-168
- R.**
- Railway bulletin service.....1879, 206-209, 540; 1880, 203-206, 568; 1881, 20-28, 753; 1882, 23-26; 1885, 12; 1886, 12; 1887, 22
- report of officer in charge.....1885, 524-526; 1886, 168-170
- list of roads receiving indications through state weather services.....1887, 112-118
- Railway weather signals .....1873, 289; 1882, 75; 1883, 16; 1884, 26; 1886, 16; 1887, 22, 89, 97-99
- Ohio system and code .....1883, 16, 588, 1057-1058; 1884, 117-118
- Alabama code .....1884, 115; 1886, 72
- rules for forecasts ..... 1885, 58-55
- Indiana code, with illustrations ..... 1887, 98-99
- Rainfall stations, river service.....1887, 25-26, 126-127

Rain-gauge, instructions.....	1870, 26; 1871, 76; 1872, 185-186; 1873, 838
Rain band, study of.....	1882, 75
Records, use as evidence.....	1882, 8-9; 1887, 42
Records division, establishment and summary .....	1887, 41-42
report of officer in charge .....	1887, 151-159
Red river, high and low water, and danger-line .....	1875, 360
(See, also, in Index of charts, p. 21).	
Review and bulletin division, summary.....	1881, 54-61; 1882, 51-58
River reports .....	1871, 11; 1872, 83; 1873, 301-302; 1874, 94-95; 1875, 98-100; 1876, 111-112; 1877, 130-132; 1878, 164-166; 1879, 207-209; 1880, 206-210; 1881, 50-52; 1882, 49-50; 1883, 16; 1884, 27; 1885, 12; 1886, 14-15; 1887, 25-26
instructions for.....	1873, 950-962; 1881, 838
copy .....	1874, 323; 1876, 503
circular requesting observations, with instructions.....	1875, 368-364
form.....	1875, 444
report of officer in charge, with location of gauges.....	1886, 154-168; 1887, 121-127
River stations, lists and annual record.....	1873, 296; 1874, 81; 1876, 94-95; 1877, 89; 1878, 100; 1879, 166-167; 1880, 157-158, 208-209; 1881, 273-281
Rivers, table of high and low water and danger-lines.....	1875, 357-361
tables of highest and lowest water at stations east of the Rocky mountains, from commencement of observations .....	1882, 373-379; 1883, 254-259
tables of highest and lowest water at special stations from July 1, '77..	1882, 380-382; 1883, 260-268
revision of danger-lines (Hazen).....	1882, 735-750
highest and lowest water, 1871-'81.....	1882, 744-750
dates of closing and opening for 1871-'85 .....	1886, 488-489, 490-491
dates of closing and opening for winter.....	1887, 388
(See Floods, also, in Index of charts, p. 21).	
Russia, memorandum on exchange of reports with.....	1873, 1108

## S.

St. Michael's, establishment of station.....	1874, 87
summary of observations, July '74-June '77 .....	1876, 76-78; 1877, 88
report on observations, July '74-June '77 (Turner).....	1877, 557-568
report on observations (Nelson) .....	1881, 768-790
Saint Paul, Minn., indications officer stationed at .....	1887, 17-18
Saint Paul's island, instructions for special observations.....	1872, 75-76
report of observations, 1872-'83 (Fish).....	1873, 446-529
report for year and abstract of observations.....	1874, 70-71; 1875, 72-73; 1876, 72
Sea-coast service, law.....	1873, 806-807
summary... 1874, 85-86, 99-100; 1875, 103-104; 1876, 117; 1877, 115-116, 187-143;	
1878, 145-146, 171-179; 1879, 183-184, 216-219; 1880, 178-179, 220-224; 1881,	
27-32; 1882, 33-34; 1884, 24; 1885, 10; 1886, 17; 1887, 32-36	
instructions.....	1874, 375-378
report on storm of March 21-30, '77 (Stein) .....	1877, 545-557
special service rendered to wrecks.....	1878, 173-188; 1880, 222-223
cost of stations.....	1884, 53
Sea-coast telegraph lines, annual report..	1884, 87-88; 1885, 547; 1886, 183; 1887, 140, 163
Shipping (see Lake disasters).	
Signal Corps (see Organization).	
Signal Service notes.....	1882, 72-73; 1883, 18; 1884, 29; 1885, 30; 1886, 26
Signals, circulars defining codes.....	1878, 662-675
(See, also, Cautionary, Danger and distress, Railway weather, Weather and temperature.)	
Smithsonian institution, transfer of meteorological work to Signal Service..	1874, 88-89, 286-287
Snowfall, table of earliest and latest for each winter from commencement of observations.....	1883, 243-253; 1884, 380-385
dates of first and last for winter .....	1885, 199-200; 1887, 813-814
Solar physics, study .....	1881, 67
solar radiation, study.....	1881, 66; 1884, 22
report of board on observations, with list of stations.....	1881, 1190
translations from papers by Levy and Aymonnet.....	1881, 1191-1216
statement of British committee on method of observing.....	1881, 1217

- South Carolina weather service, report..... 1887, 78-79
- Southern Pacific stations, tables of monthly and annual mean temperature.. 1882, 262-264;  
1883, 159-161;  
1884, 284-287;  
1885, 180-181;  
1886, 485-486;  
1887, 339-341
- tables of monthly max. and min. temperature, and annual range.. 1882, 292-294; 1883,  
178-180; 1884, 288-  
291; 1885, 182-185;  
1886, 438-441; 1887,  
342-346
- tables of monthly and annual amounts of precipitation... 1882, 327-329; 1883, 218-  
220; 1884, 332-335; 1885,  
174-176; 1886, 458-459;  
1887, 346-347
- tables of monthly prevailing direction of wind... 1882, 368-370; 1884, 370-371; 1885,  
218-219
- Special bulletin... 1881, 46; 1882, 46; 1883, 16; 1884, 11; 1885, 6; 1886, 10; 1887, 20, 65  
rules for preparation..... 1885, 48; 1886, 50-52
- Spectroscope, observations..... 1880, 177; 1881, 67; 1883, 11
- State weather services, circular requesting establishment and abstracts of  
replies ..... 1881, 1264-1267  
summary... 1881, 71-72; 1882, 50-51; 1883, 16; 1884, 26; 1885, 11; 1886, 18-19;  
1887, 23-25
- value (Mendenhall)..... 1882, 765-766
- report of officer in charge, with papers and reports.. 1882, 761-770; 1883, 585-599;  
1884, 94-127; 1886, 66-123;  
1887, 72-120
- opinion of Gov. Stephenson ..... 1883, 586-588
- report of conference..... 1886, 100-119
- lists of, forwarding reports ..... 1883, 32-34; 1885, 562-303
- Stations, plans for location..... 1870, 7-8, 17, 18
- general review..... 1871, 7; 1872, 78-79; 1876, 99-104; 1877, 108-114; 1878, 137-  
144; 1879, 174-181; 1880, 166-179; 1881, 18-14; 1882, 12-17;  
1883, 14-16; 1884, 25-26; 1885, 9; 1886, 13; 1887, 26-28
- annual record, with latitude, longitude, and elevation..... 1871, 16-61; 1872, 6-77;  
1873, 237-299; 1874, 8-  
84; 1875, 6-87; 1876, 6-  
98; 1877, 9-107; 1878,  
10-136; 1879, 10-174;  
1880, 10-166; 181, 102-  
291
- list, from which reports have been sent ..... 1871, 54-57
- lists, showing location of office, elevation, and number of reports re-  
ceived ..... 1871, 58
- requested..... 1872, 97-100; 1873, 978-981; 1874, 399-402; 1875, 122-125; 1876, 130-  
135; 1877, 162-167; 1878, 201-207; 1879, 774-780; 1880, 803-808; 1881,  
298-304; 1882, 206-213; 1883, 41-44; 1884, 160-162; 1885, 553-556;  
1887, 36, 189
- average cost ..... 1874, 8; 1876, 99; 1877, 108; 1878, 137; 1879, 174;  
1880, 167; 1881, 14; 1884, 52-53; 1887, 27, 161
- classified list..... 1877, 110-113; 1878, 142-143; 1879, 180-181; 1880,  
174-176; 1881, 286-291; 1882, 13-17; 1883, 22-27; 1884,  
166-173; 1885, 536-538; 1886, 317-323
- list of reports made..... 1881, 800-810
- list with latitude, longitude, and elevations..... 1882, 855-857; 1883, 45-47
- at colleges and scientific schools..... 1882, 858
- abandoned in consequence of decreased appropriations ..... 1883, 3-5; 1884, 13
- established since Nov. 1, 1870, list, with dates of opening and closing... 1885, 543-546
- recommendation of use of government quarters ..... 1887, 28
- Stations division, regulations..... 1878, 373-376
- summary..... 1881, 13-26; 1882, 12-31; 1887, 27-28
- report of officer in charge..... 1885, 65-66; 1886, 178-179; 1887, 128-133
- Storm signals (see Cautionary signals).
- Storm waves, instructions for observations at St. Paul's island ..... 1872, 76
- Storms, direction and progress..... 1871, 94-95

- Storms, types in United States..... 1871, 95-97  
 prediction ..... 1871, 97-98  
 theory (Redfield)..... 1871, 98  
 theory and description of United States (Espy)..... 1871, 99-100  
 direction of advance (Scott)..... 1871, 106  
 prediction by polar bands (Prestel)..... 1871, 106-107  
 movement in United States..... 1871, 110-111  
 list of United States (Lapham) ..... 1872, 190-195  
 Nov. 11-16, '72, from Omaha eastward, description..... 1872, 257-258, ch.  
 Atlantic coast, March 1-2, '72..... 1872, 258-259, 7 ch.  
 Lake region, Sept. 28-29, '72..... 1872, 259-260, 7 ch.  
 study of Pacific coast..... 1872, 262-264  
 discussion of St. Paul's island (Fish)..... 1873, 451-455, 457-458  
 Arctic types (Meyer) ..... 1873, 1017  
 Nova Scotia cyclone, Aug. 24-25, '73, (Abbe)..... 1873, 1025-1034, ch. 30-37  
 Lake region, April 14-18, '73, report (Smith)..... 1873, 1097-1098, ch. 38-46  
 cyclone of Oct. 6-7, '73, Punta Kassa, Fla. .... 1874, 61-62  
 course of West Indian ..... 1874, 85  
 preparation of track charts..... 1874, 96-98  
 types and movement in United States..... 1874, 97  
 Indianola, Texas, Sept. 15-16, '76 report (Smith)..... 1876, 378-382  
 preparation of charts of low areas..... 1876, 115  
 West India cyclone, Sept. 8-24, '75, report (Craig)..... 1876, 336-349, ch. 8  
 Lake region, Sept. 15-16, '83, discussion (Upton)..... 1882, 872-873  
 (See, also, in Index of charts, p. 21.)
- Study room, organization, and summary of work..... 1881, 61-70; 1882, 68-69; 1883,  
 12; 1884, 21; 1885, 13-14  
 list of matters referred to..... 1881, 1120  
 report of assistant in charge..... 1882, 660-666; 1884, 59-79; 1885, 565-  
 594; 1886, 203-215; 1887, 169-171
- Sugar districts, frost warnings..... 1880, 173; 1881, 52-53  
 (See, also, in Index of charts, p. 22.)
- Sunset stations, instructions, cipher, and forms.... 1877, 822-823; 1878, 430-433; 1879,  
 493-499; 1880, 516-522  
 verifications of predictions ..... 1878, 145  
 list ..... 1877, 337; 1878, 135; 1879, 150; 1880 144; 1881, 250  
 establishment and nature of work..... 1879, 182-183; 1880, 177-178
- Sunspots, statement of British committee on method of observing..... 1881, 1217
- Surgeon-General, observations at military posts furnished by..... 1874, 89; 1876, 105  
 correspondence with relation to transfer of monthly reports to Signal  
 service..... 1875, 362
- Synopses and probabilities..... 1871, 8-9, 12-13; 1872, 80; 1873, 303-304; 1874, 90-92;  
 1875, 94-96; 1876, 107-108; 1877, 124, 134; 1878, 152-  
 156, 167-168; 1879, 192-197, 212; 1880, 187-194,  
 213; 1881, 74  
 copy ..... 1871, 140; 1872, 288; 1874, 324; 1875, 445; 1876, 472  
 rules for preparation ..... 1873, 379-383; 1885, 46-48; 1886, 47-50

## T.

- Tables, reduction (see Barometric reduction; Conversion tables; Hygrometry).
- Telegraph division, regulations..... 1873, 376-377  
 annual summary ..... 1881, 26-38; 1882, 31-43  
 report of officer in charge..... 1885, 547-549; 1886, 180-185; 1887, 140-144
- Telegraph lines (see Military telegraph lines; Sea-coast lines.)
- Telegraph service..... 1870, 9-10; 1871, 10-11; 1872, 6; 1873, 302-303; 1874, 103-104;  
 1875, 89; 1876, 116-117; 1877, 136-137; 1878, 146-147, 170-  
 185; 1879, 214-227; 1880, 173-174, 209-232; 1881, 26-27; 1882,  
 32; 1882, 32; 1883, 5; 1885, 9-10; 1886, 16; 1887, 30-31  
 1870, 17  
 plans for transmission of reports..... 1870, 17  
 working forms of circuit..... 1870, 27-36; 1871, 116-133; 1872, 272-282  
 correspondence between Chief Signal Officer and telegraph companies  
 on establishment ..... 1870, 36-39  
 conferences with companies..... 1871, 10-11  
 list of weather report circuits..... 1871, 57  
 report of Chief Signal Officer, correspondence and decision of Post-  
 master-General on rates..... 1871, 133-138

Telegraph service, message form .....	1871, 147-148, 151
list of stations with telegraph numbers.....	1871, 164
order of Secretary of War, appointing Signal Service employés agents for transmission of messages.....	1873, 364
instructions for messages.....	1873, 362-363
extract from act providing for fine of company refusing message.....	1873, 365
regulations for coast service .....	1874, 376-377
opinion of Attorney-General on relation of United States to com- panies .....	1874, 380-383
number of messages sent and received... 1872, 95-96; 1874, 110-111; 1875, 114- 116; 1876, 125; 1877, 152; 1878, 191; 1879, 234; 1880, 238; 1881, 27; 1882, 178-179; 1883, 21; 1884, 164-165; 1885, 9-10; 1886, 16; 1887, 135	
rules for the government of lines.....	1875, 444-448, 448-444
description of manner of collecting reports, with working forms of circuits.....	1881, 790-810
correspondence with companies, relative to decrease in expenses.....	1883, 698-695
agreement to rates for state weather service.....	1887, 111-112
Telephone, sea-coast line .....	1882, 35
instructions for Point Barrow.....	1881, 1285
use of Eccard.....	1883, 14
Temperature, theory, and study from weather map.....	1871, 91-92
connection with pressure.....	1872, 264-265
discussion of St. Paul's island (Fish) .....	1873, 447-449
report on decrease with altitude, at Mount Washington, Mount Mitchell, and Pike's Peak (Dunwoody).....	1876, 349-360, ch. 4-8
preparation of charts .....	1880, 216-217
Temperature signals (see Railway weather signals; Weather and temperature signals).	
Temperature tables, comparative monthly means... 1882, 250-257; 1883, 91-98; 1884, 211-218	
normal at Canadian stations, with normal pressure .....	1882, 383-384
mean monthly, for districts.....	1882, 260-261
mean for states and territories .....	1882, 258-259
monthly max. and min. and annual range at voluntary stations.. 1881, 698-700; 1882, (Annual range added in 1882.) 280-291; 1883, 166- 177; 1884, 268-279; 1885, 118-125; 1886, 424-431; 1887, 264, 271	
monthly and annual mean at voluntary stations.. 1881, 686-692; 1882, 244-249; 1883, 146-162; 1884, 260-267; 1885, 114- 117; 1887, 260-263	
monthly max. and min. and annual range at army posts.. 1881, 682-683; 1882, 275- (Annual range added in 1882.) 279; 1883, 155-168; 1884, 282-283; 1885, 128-129, 1886, 432-433; 1888, 274- 277	
monthly and annual mean at army posts... 1881, 679-681; 1882, 241-243; 1883, 153- 154; 1884, 280-281; 1885, 126; 1886, 434; 1887, 272-273	
annual and mean annual, from 1871... 1880, 270-271; 1881, 662-663; 1882, 232-235; 1883, 77-80; 1884, 190-193; 1885, 88-90	
monthly and annual mean... 1873, 392; 1874, 180-181; 1875, 142-143; 1876, 151-152; 1877, 182-183; 1878, 221-223; 1879, 252-254; 1880, 266- 269; 1881, 658-661; 1882, 236-240; 1883, 81-85; 1884, 104-107; 1885, 114-117; 1886, 419-422	
daily max. and min. and monthly range and mean... 1873, 393-432; 1874, 132-233; 1875, 145-253; 1876, 155-278; 1877, 186-306; 1878, 228-394; 1879, 259-433; 1880, 282-466	
highest and lowest from commencement of observations..... 1882, 385-388; 1884, 234-237	
monthly and annual mean at Central and Southern Pacific stations.. 1882, 262-264; 1883, 178-180; 1884, 288-291; 1885, 132-135; 1886, 438-441; 1887, 339-341	



Temperature tables, monthly max., min., and annual range at Central and Southern Pacific stations...	1882, 292-294; 1888, 178-180; 1884, 288-291; 1885, 132-135; 1886, 438-441; 1887, 342-345
monthly and annual max. and min., with precipitation, at 3d class stations .....	1882, 295-296
monthly and annual max. and min., with precipitation, at stations in Alaska.....	1882, 297
mean monthly and annual computed from commencement of observations .....	1883, 86-90; 1884, 198-201; 1885, 79-81
highest summer and lowest winter in each state and territory for 1871-'81 .....	1882, 371-372
mean normal from Nov. '79-Oct. '82 .....	1883, 99-102
mean monthly ranges from commencement of observations.....	1883, 103-107
mean daily range for each month.....	1883, 108-115; 1884, 207-210; 1885, 91-93; 1886, 416-418; 1887, 252-254
highest for each month and the year ...	1883, 126-135; 1884, 238-245; 1885, 94-103
lowest for each month and the year...	1883, 136-145; 1884, 246-253; 1885, 104-113
average daily max. and min. at cotton-region stations.....	1883, 162-163, 164-165
mean annual at selected stations from 1874.....	1884, 202-203
mean monthly and annual at selected stations from 1879.....	1884, 204-206
mean a. m., p. m., and midnight for each month from the commencement of observations.....	1884, 220-223; 1885, 144-149; 1887, 282-287
mean seasonal, with average precipitation, from commencement of observations .....	1884, 224-226; 1885, 151-153
max. and min. monthly .....	1882, 265-274; 1883, 116-125; 1884, 228-233
means of daily max. and min. for each month .....	1884, 254-259
mean max. and min. for months at cotton-region stations.....	1884, 292-294; 1885, 186-188; 1886, 442-444; 1887, 278-281
mean for each month computed from Nov. '79.....	1885, 82-84
mean monthly and departure from normal .....	1885, 85-87; 1886, 412-415; 1887, 248-261
mean at 7 a. m., and 11 p. m., for each month, computed from Jan. '80 .....	1885, 140-143
mean max. and min. for each month, computed from Jan. '80.....	1886, 407-411
monthly max. and min., with precipitation at 3d order stations.....	1886, 463-466
monthly mean max. and min., with precipitation, at 3d order stations...	1886, 468-469
monthly max. and min. with number of days of .01 inch or more of precipitation at 3d order stations.....	1887, 330-333
monthly mean max. and min., with number of days of .01 inch or more of precipitation, at 8d order stations .....	1887, 334-337
mean max. and min. for each month.....	1887, 256-259
Temperature of water, forms.....	1873, 976-977
summary of work.....	1874, 95; 1876, 111-112; 1877, 132; 1878, 163; 1879, 209; 1880, 210; 1881, 60-61; 1882, 64
sample report.....	1875, 444; 1876, 509
average of ocean surface.....	1886, 150; 1886, 445
Tennessee river, high and low water and danger-line .....	1875, 360
(See, also, in Index of charts, p.22.)	
Tennessee weather service, report .....	1886, 86-87; 1887, 80-81
Thermometer, instructions.....	1870, 25; 1871, 75; 1873, 327-328
photographic, instructions.....	1872, 133
reports of boards on comparison and correction cards.....	1881, 1121-1125
standard .....	1884, 25; 1885, 15
Thermometer exposure .....	1885, 13-14; 1886, 20
Thunder-storms, report on progress of study... 1884, 73; 1885, 14, 508; 1886, 211-212; 1887, 22	
circulars of New England meteorological society.....	1886, 75-77
report with discussion of relation to meteorological elements, moon, and sun spots (Hazen).....	1886, 260-272, 6 ch.
Tides, instruction for observations at Saint Paul's island .....	1872, 75-76
instructions for observations in Polar regions .....	1881, 1286
Time, instructions.....	1870, 26; 1871, 76; 1873, 833-334
table of difference between local and Washington mean.....	1873, 960-902
standard, importance.....	1881, 68-69; 1882, 71
correspondence and circulars on .....	1881, 1247-1248
resolutions submitted to International geographical congress .....	1881, 1249
Time balls .....	1882; 77-78; 1884, 22

- Tornadoes, spiral motion (Redfield)..... 1871, 99  
 list of United States (Lapham)..... 1872, 190-195  
 Iowa and Illinois, report (Mackintosh), May 22, '73 ..... 1873, 1046-1097, cuts  
 Georgia, South Carolina, and North Carolina, March 20, '75, instruc-  
 tions and report (Calver)..... 1875, 398-438, ch. 37-38, pls  
 Detroit, June 27, '75, report (Finn)..... 1875, 488-440  
 Tornadoes, Mount Carmel, Ill., instructions and report (Calver)..... 1877, 517-527  
 Richmond and Burke counties, Ga., report (Stockman)..... 1878, 646-654, 5 diag.  
 Wallingford, Conn., notes (Glassford)..... 1878, 654-657, 2 ch.  
 Wallingford, report (Reed)..... 1878, 658-661, 2 pl., 6 cuts  
 Waltherborough, S. C., report (Penrod) ..... 1879, 758-774, ch. 54-55  
 study by Signal Service ..... 1880, 214-215  
 Kansas, Missouri, Nebraska, and Iowa, May 29-30, '80, report (Fin-  
 ley) ..... 1880, 984-1096, ch. 74-89, cuts  
 destructive forces and distribution with list of papers ..... 1882, 889-892  
 organization of service and summary ..... 1883, 16; 1884, 22  
 sketch of progress in study..... 1884, 72-73; 1885, 568-569; 1886, 212  
 rules for predictions ..... 1885, 23  
 list of reporters ..... 1885, 577-593  
 report of officer in charge..... 1886, 205-207; 1887; 153-157  
 list by months for 1886-'7..... 1887, 154-157  
 prediction ..... 1887, 21-22  
 Transit of Mercury ..... 1878, 168-169  
 table of observations (Abbe)..... 1879, 780-782  
 Turkey, memorandum on exchange of reports with ..... 1873, 1109
- U.
- Unalaska, meteorological record June-Aug. '72 ..... 1873, 459-471  
 Uniform, recommendation of change..... 1887, 51
- V.
- Verifications of cautionary signals, percentages... 1879, 201; 1880, 195; 1881, 50; 1882,  
 48; 1883, 6-7; 1884, 13; 1885, 8; 1886,  
 11; 1887, 68  
 Verifications of cold wave warnings, percentages..... 1885, 8; 1886, 13; 1887, 18  
 Verifications of indications, percentages... 1871, 13; 1872, 81; 1873, 311; 1874, 297-306;  
 1875, 333-338; 1876, 108; 1877, 124; 1878,  
 155-157; 1879, 197-198; 1880, 191-192; 1881,  
 44-45; 1882, 44-45; 1883, 6-7; 1884, 12-13;  
 1885, 7-8, 58-59; 1886, 11, 141; 1887, 13-14,  
 66-67  
 rules for..... 1874, 296; 1876, 473; 1877, 330; 1886, 55-56; 1886, 61-64  
 average percentages for 1874-'83..... 1883, 6  
 annual percentages 1881-'7 ..... 1887, 14  
 Voluntary observers, transfer from Smithsonian institution and circular of  
 instructions..... 1874, 286-295  
 forms for report..... 1875, 462-473; 1876, 294-298  
 list... 1875, 131-137; 1876, 142-146; 1877, 172-176; 1878, 211-215; 1879, 530-535;  
 1880, 558-563; 1881, 293-297; 1882, 202-205; 1883, 29-31; 1884, 138-142; 1885,  
 560-562  
 use of official envelopes by ..... 1886, 121-122  
 instructions..... 1886, 273-316  
 Voluntary stations, tables of monthly and annual mean temperature... 1881, 686-692; 1882,  
 244-249; 1883, 146-  
 152; 1884, 260-267;  
 1885, 114-117; 1886,  
 419-422; 1887, 260-  
 268  
 tables of monthly max. and min. temperatures and annual range. 1881, 693-700; 1882,  
 280-291; 1883, 166-  
 177; 1884, 268-279;  
 1885, 118-125; 1886,  
 424-431; 1887, 264-  
 271  
 monthly and annual precipitation... 1881, 701-708; 1882, 309-315; 1883, 205-213;  
 1884, 320-329; 1885, 168-172; 1886, 452-456;  
 1887, 298-302

## W.

- Water gauge, instructions ..... 1873, 335-336
- Weather and temperature signals..... 1885, 12; 1886, 13-14; 1887, 18-19  
 value ..... 1886, 14; 1887, 72, 80, 86, 87, 89, 90  
 report of officer in charge..... 1885, 516-523; 1886, 131-137  
 rules for ..... 1886, 52  
 code and circular..... 1886, 67-70  
 report and discussion at conference of state weather services ..... 1886, 102, 107-110  
 report of indications board on systems ..... 1886, 122-123
- Weather cablegrams..... 1887, 157-158
- Weather crop bulletin, establishment..... 1887, 19-20  
 circulars, forms for report, and sample copies of bulletins and dis-  
 patches received ..... 1887, 114-119
- Weather maps ..... 1871, 7-8, 12-18  
 method of printing ..... 1871, 49  
 memoir on practical use..... 1871, 83-109; 1872, 269-271  
 law authorizing sale ..... 1873, 237  
 account of sales..... 1872, 389; 1874, 44; 1887, 160  
 instructions for printing and distributing ..... 1873, 334-335  
 distribution ..... 1878, 166-167; 1879, 209-211; 1880, 210-212  
 newspaper ..... 1881, 25-26; 1882, 64-65  
 adoption of uniform system..... 1883, 17  
 value and use (Noyes) ..... 1886, 106-107  
 substitution for manifold bulletins ..... 1887, 129-130
- Weather reports, preliminary plans..... 1870, 7, 10, 17-18; 1871, 6, 12, 14  
 forms ..... 1871, 153-163  
 copies of telegraphic..... 1874, 255-263; 1875, 339-347  
 annual summary ..... 1876, 116; 1877, 111, 115-116; 1878, 143-144, 145; 1879, 192,  
 214-215; 1880, 210, 218-219; 1881, 27, 23; 1882, 32; 1885, 9;  
 1886, 16; 1887, 30  
 form for monthly meteorological ..... 1881, 724-730  
 statements showing number of words transmitted ..... 1871, 59  
 description of manner of collecting with list for each station..... 1881, 790-810
- Weather telegraphy (Scott)..... 1871, 105-106
- Weekly weather chronicle, sample copy... 1872, 282-283; 1874, 324-325; 1875, 331-332;  
 1876, 333-334
- West India and Panama telegraph company ..... 1873, 301
- West Indian service... 1872, 83; 1873, 300-301; 1874, 85; 1875, 89; 1876, 101; 1877, 111,  
 114; 1878, 141; 1879, 179, 181-182; 1880, 172-173, 176
- West Indian stations, annual record... 1873, 297; 1874, 79-80; 1875, 81-83; 1876, 95-96;  
 1877, 103; 1878, 180-181; 1879, 168-169; 1880,  
 159-161; 1881, 285-286
- West Indian storm warnings... 1874, 85; 1875, 89; 1876, 101, 102; 1877, 111; 1878, 141,  
 1879, 179; 1880, 173; 1882, 49; 1883, 4-5, 15; 1887, 15
- Western Union telegraph company, correspondence relative to rates for  
 telegraphic service..... 1870, 36-37, 38-39; 1871, 136-137  
 discontinuance of service..... 1871, 10  
 correspondence relative to decrease in service ..... 1883, 693-695  
 agreement relative to rates to state weather services..... 1887, 111-112
- Whirlwinds, spiral motion (Redfield) ..... 1871, 99
- White river, high and low water, and danger-line..... 1875, 361
- Wind, table of force for Lind's wind gauge..... 1870, 26  
 law, and study from weather map ..... 1871, 88-91  
 Northern hemisphere (Coffin) ..... 1871, 102  
 dependence of direction on barometric gradient (Chase) ..... 1871, 103  
 relation to pressure (Buchan)..... 1871, 102-103  
 discussion of St. Paul's island (Fish)..... 1873, 449-450  
 velocity in tornado (Mackintosh) ..... 1873, 1088-1093  
 relation to barometric gradients ..... 1874, 385-388  
 wet and dry for districts..... 1878, 616-634, ch. 38  
 study of force ..... 1881, 65-66  
 velocity and currents in tornadoes..... 1882, 889-890
- Wind tables, number of times observed from 8 points..... 1873, 435-446; 1874, 242-255  
 1875, 254-267; 1876, 279-293;  
 1877, 307-320; 1878, 395-411;  
 1879, 434-450; 1880, 467-484

Wind tables, monthly quadrants most and least likely to be followed by	
rain or snow.....	1882, 348-355, 356-363; 1884, 386-393, 394-401
monthly district quadrants most and least likely to be followed by rain	
or snow .....	1882, 364-365, 366-367; 1884, 402-408
monthly prevailing direction at Central and Southern Pacific stations..	
.....	1882, 368-370; 1884, 370-371; 1885, 218-219
monthly prevailing direction .....	1882, 348-347; 1885, 220-222
mean movement in miles for each month .....	1883, 236-240; 1884, 355-357;
.....	1885, 201-204; 1886, 475-478
average hourly velocity for each month and the year.....	1884, 358-361; 1885, 205-
.....	207; 1887, 315-317
maximum velocity for each month .....	1887, 318-320
Wind vane, instructions.....	1871, 76; 1873, 330-333
Wisconsin weather service, efforts to establish.....	1882, 768-769
Wrecks, report on storm of March 21-30, '77 (Stein).....	1877, 545-547
special assistance of sea coast service.....	1878, 173-178
order commending action of observers during "Metropolis" storm...	1878, 676
(See, also, Lake disasters.)	
Y.	
Yellowstone Park, preparation of report on water supply .....	1885, 14
Youghiogeny river, high and low water, and danger-line .....	1875, 360
(See, also, in Index of charts, p. 22.)	