

# MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE. Assistant Editor: FRANK OWEN STETSON.

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## INTRODUCTION.

The present summary for 1904 is based essentially upon data received from about 166 regular Weather Bureau stations, 33 regular Canadian stations, and from such climate and crop sections as have forwarded their annual summaries in time.

The statistical tables and charts have been prepared under the supervision of Mr. W. B. Stockman, Chief, Division of Meteorological Records, and the summary of flood movements by Dr. H. C. Frankenfield, Professor of Meteorology.

## FORECAST DIVISION.

Prof. E. B. GARRIOTT, in charge.

### RIVER AND FLOOD SERVICE.

The year 1904, in direct contrast to its immediate predecessor, was remarkably free from severe floods. Only those of January in the Ohio and Susquehanna valleys deserve the appellation of great, and both were due almost entirely to the formation of enormous ice gorges during the severe cold of the early winter, and their subsequent destruction by warm, heavy rains. These gorges were the greatest in the recorded history of their respective localities, and have been fully described in the WEATHER REVIEW for January, February, and March, 1904. They served to introduce a new and very complex element into the work of flood forecasting, for gorges of such magnitude were unprecedented. The field, however, had been most carefully observed and studied, with the result that very timely and effective warnings were issued as often as the situation required.

A considerable increase in the appropriation for its maintenance has permitted a great extension and improvement of the River and Flood Service during the year. The river districts of Columbus, Ohio, Des Moines, Iowa, and Meridian, Miss., were created, together with the necessary number of substations, and existing districts were provided with new stations and equipment and enlarged telegraph and telephone facilities. The State of Kansas and the interior rivers of Ohio are now provided with an adequate flood service, and the districts of Denver, Colo., and Moorhead, Minn., will shortly be established with territory comprising the rivers of Colorado and New Mexico and the Red River of the North, respectively. Several new stations in the upper Missouri watershed are also to be operated in the near future.

In all 101 new special river, and 29 new special rainfall stations have been established during the year. Their names, etc., are enumerated in the following table:

### RIVER STATIONS.

District.	Station.	River.
Albany, N. Y.	Tribeshill, N. Y.	Mohawk.
Atlanta, Ga.	Alaga, Ala.	Chattahoochee.
	Bainbridge, Ga.	Flint.
	Columbus, Ga.	Chattahoochee.
	Montezuma, Ga.	Flint.
Cairo, Ill.	Guntersville, Ala.	Tennessee.
	Mount Vernon, Ind.	Ohio.
	Terre Haute, Ind.	Wabash.
	Vincennes, Ind.	Wabash.
Charleston, S. C.	Mount Holly, N. C.	Catawba.
Chattanooga, Tenn.	McGhee, Tenn.	Little Tennessee.
	Tazewell, Tenn.	Powell.
Columbus, Ohio.	Circleville, Ohio.	Scioto.
	Coshocton, Ohio.	Muskingum.
	Defiance, Ohio.	Auglaize.
	Freemont, Ohio.	Sandusky.
	Hamilton, Ohio.	Miami.
	Napoleon, Ohio.	Maumee.
	Piqua, Ohio.	Miami.

### RIVER STATIONS—Continued.

District.	Station.	River.
Columbus, Ohio.	Prospect, Ohio.	Scioto.
	Sherwood, Ohio.	Maumee.
	Springfield, Ohio.	Mad.
	Tiffin, Ohio.	Sandusky.
Davenport, Iowa.	Clinton, Iowa.	Mississippi.
	Muscataine, Iowa.	Mississippi.
Des Moines, Iowa.	Boone, Iowa.	Des Moines.
	Fort Dodge, Iowa.	Des Moines.
Fort Smith, Ark.	Calvin, Ind. T.	Canadian.
	Fort Gibson, Ind. T.	Neosho.
	Iola, Kans.	Neosho.
	Neosho Rapids, Kans.	Neosho.
	Oswego, Kans.	Neosho.
	Tulsa, Ind. T.	Arkansas.
Galveston, Tex.	Gonzales, Tex.	Guadalupe.
	Long Lake, Tex.	Trinity.
	Valley Junction, Tex.	Brazos.
	Victoria, Tex.	Guadalupe.
Grand Rapids, Mich.	Eaton Rapids, Mich.	Grand.
	Grand Ledge, Mich.	Grand.
	Ionia, Mich.	Grand.
	Lansing, Mich.	Grand.
	Portland, Mich.	Grand.
Harrisburg, Pa.	Cedar Run, Pa.	Pine.
	Sinnemahoning, Pa.	Sinnemahoning.
Kansas City, Mo.	Abilene, Kans.	Smoky Hill.
	Beloit, Kans.	Solomon.
	Blue Rapids, Kans.	Big Blue.
	Clay Center, Kans.	Republican.
	Lindsborg, Kans.	Smoky Hill.
	Manhattan, Kans.	Kansas.
	Topeka, Kans.	Kansas.
Keokuk, Iowa.	Cedar Rapids, Iowa.	Kansas.
	Iowa City, Iowa.	Iowa.
	Warsaw, Ill.	Mississippi.
Knoxville, Tenn.	Dandridge, Tenn.	French Broad.
	Rotherwood, Tenn.	Holston.
La Crosse, Wis.	Stillwater, Minn.	St. Croix.
Little Rock, Ark.	Batesville, Ark.	White.
	Blackrock, Ark.	Black.
	Calico rock, Ark.	White.
	Clarendon, Ark.	White.
	Jackson, Ky.	Kentucky.
Louisville, Ky.	Milledgeville, Ga.	Oconee.
Macon, Ga.	Luxora, Ark.	Mississippi.
Memphis, Tenn.	Marked Tree, Ark.	St. Francis.
	Columbia, Miss.	Pearl.
Meridian, Miss.	Enterprise, Miss.	Chickasawhay.
	Hattiesburg, Miss.	Leaf.
	Jackson, Miss.	Pearl.
	Merrill, Miss.	Pascagoula.
	Shubuta, Miss.	Chickasawhay.
Minneapolis, Minn.	Mankato, Minn.	Minnesota.
	St. Cloud, Minn.	Mississippi.
	Vienna, Ala.	Tombigbee.
Mobile, Ala.	Morgan City, La.	Atchafalaya.
New Orleans, La.	Simmesport, La.	Atchafalaya.
	Blair, Nebr.	Missouri.
Omaha, Nebr.	St. Marys, Ohio.	Ohio.
Parkersburg, W. Va.	Hancock, N. Y.	Delaware (E. Br.).
Philadelphia, Pa.	Hancock, N. Y.	Delaware (W. Br.).

## RIVER STATIONS—Continued.

District.	Station.	River.
Philadelphia, Pa.	Mauchchunk, Pa.	Lehigh.
	Phillipsburg, N. J.	Delaware.
	Port Jervis, N. Y.	Delaware.
	Reading, Pa.	Schuylkill.
	Trenton, N. J.	Delaware.
St. Louis, Mo.	Arlington, Mo.	Gasconade.
San Francisco, Cal.	Colgate, Cal.	Yuba.
	Knights Landing, Cal.	Sacramento.
	Riovista, Cal.	Sacramento.
Shreveport, La.	Kiomache, Tex.	Red.
	Springbank, Ark.	Red.
	Whitecliffs, Ark.	Little.
Vicksburg, Miss.	Greenwood, Miss.	Yazoo.
	Swanlake, Miss.	Yazoo.
Portland, Oreg.	Bonners Ferry, Idaho.	Kootenai.
	Harrisburg, Oreg.	Willamette.
	Jefferson, Oreg.	Santiam.
	McMinnville, Oreg.	Yamhill.
	Newport, Wash.	Pend d' Oreille.
	Pasco, Wash.	Columbia and Snake.
	Tualitin, Oreg.	Tualitin.

## RAINFALL STATIONS.

District.	Station.	Watershed.
Augusta, Ga.	Anderson, S. C.	Savannah.
Cairo, Ill.	New Athens, Ill.	Kaskaskia-Mississippi.
Charleston, S. C.	Catawba, S. C.	Catawba-Santee.
	Enoree, S. C.	Broad-Santee.
	Pelzer, S. C.	Saluda-Santee.

## RAINFALL STATIONS—Continued.

District.	Station.	River.
Cincinnati, Ohio.	Ivanhoe, Va.	New-Ohio.
	Pikeville, Ky.	Big Sandy-Ohio.
Columbus, Ohio.	Lima, Ohio.	Maumee.
	Upper Sandusky, Ohio.	Sandusky.
Fort Smith, Ark.	Marion, Kans.	Neosho-Arkansas.
Grand Rapids, Mich.	Jackson, Mich.	Grand.
Keokuk, Iowa.	Mount Pleasant, Iowa.	Skunk-Mississippi.
La Crosse, Wis.	Black River Falls, Wis.	Black-Mississippi.
	Peterson, Minn.	Mississippi.
Memphis, Tenn.	Dyersburg, Tenn.	Mississippi.
Montgomery, Ala.	Dadeville, Ala.	Alabama.
Nashville, Tenn.	Walling, Tenn.	Cumberland.
Parkersburg, W. Va.	Smithfield, W. Va.	Ohio.
Philadelphia, Pa.	Griffin Corners, N. Y.	Delaware.
Raleigh, N. C.	Louisburg, N. C.	Tar.
	Randolph, Va.	Staunton-Roanoke.
	Randleman, N. C.	Cape Fear.
	Rocky Mount, N. C.	Tar.
Richmond, Va.	Covington, Va.	James.
	Glasgow, Va.	James.
	Howardsville, Va.	James.
St. Louis, Mo.	Albany, Mo.	Grand-Missouri.
	Osceola, Mo.	Osage-Missouri.
	Trenton, Mo.	Grand-Missouri.

The highest and lowest stages, together with the annual ranges at selected stations, are given in Table VII.—*H. C. Frankenfield, Professor.*

## REPORT OF THE CHIEF OF THE WEATHER BUREAU FOR THE FISCAL YEAR ENDING JUNE 30, 1904.

[Reprinted from the report of the Secretary of Agriculture, October, 1904.]

I have the honor to submit a report of the operations of the Weather Bureau during the fiscal year that ended June 30, 1904.

### FORECAST DIVISION.

#### PRACTICAL VALUE OF FORECASTS AND WARNINGS.

Weather forecasts for thirty-six and forty-eight hours in advance have been made daily throughout the year for each State and Territory, and special warnings of gales on the seacoasts, Gulf, and Great Lakes, and of cold waves, frost, heavy snows, floods, etc., have been issued when the advices were calculated to benefit commercial, agricultural, and business interests. The North Atlantic and West Indian storm-warning service was continued, and forecasts for steamers bound for European ports for the first three days out were issued daily at 8 a. m. and 8 p. m. In a number of instances European shipping interests were notified of the character and probable course of severe storms that were passing eastward from the American coast.

#### A WEST INDIAN HURRICANE.

The first important tropical storm of the year moved from the Windward Islands of the West Indies over the Caribbean Sea and the Gulf of Mexico from August 8 to 15, 1903. The vortex of this storm passed over or near the island of Martinique during the night of the 8th-9th, reached Jamaica on the morning of the 11th, crossed the Cayman Islands during the evening of the 11th, advanced over northern Yucatan on the 13th, and apparently dissipated on the Mexican coast of Tamaulipas during the 15th. Except during its passage over Jamaica the center of this hurricane did not come within the region of observation. Beginning with the first indications of its appearance near the Windward Islands, however, shipping interests and West Indian stations were advised daily regarding its character and probable course. At Kingston, Jamaica, the barometer fell to a minimum of 28.80 inches, and on the island the losses to owners of banana plantations were estimated at more than 500,000 pounds sterling, and the destruction to houses, property, and plantations was appalling. At Grand Cayman Island a minimum barometer reading of

28.30 inches was recorded in the harbor of Georgetown, and of 23 vessels in the harbor but one was saved. Every tree or plant on the island was either blown away or had its leaves and small branches stripped off, crops were entirely destroyed, and about 200 houses were blown down or unroofed. Reports from vessels that encountered the storm in the Gulf of Mexico show that it diminished rapidly in intensity after passing westward from the Caribbean Sea.

#### VESSELS SAVED FROM A BAHAMA STORM.

In September, 1903, two storms of marked intensity advanced from the subtropical region north of the West Indies to the Atlantic coast of the United States. The first of these storms appeared over the Bahamas on the morning of the 10th, advanced north of west over the southern point of Florida by the morning of the 12th, moved northwestward over the eastern part of the Gulf of Mexico during the 12th and 13th, after which it diminished in intensity and finally dissipated over the South Atlantic States. At Nassau, New Providence Island, Bahamas, the wind reached an estimated velocity of 90 miles an hour, and at Cat Bay, Bahamas, a minimum barometer reading of 28.30 inches was reported. During its progress over Florida and the Gulf, the storm destroyed property to the value of \$100,000 from West Palm Beach to Miami, Fla., and nine lives were lost by the stranding and breaking up of the British steamer *Inchulva* at Delray. The steamer and cargo were valued at \$350,000. Other marine losses amounting to about \$20,000 were reported on the eastern Florida coast. At Tampa, Fla., the barometer fell to 29.42 inches, the wind blew in squalls at a rate of 50 to 60 miles an hour, buildings were destroyed or damaged to the extent of about \$200,000, and great havoc was wrought in the orange groves of the surrounding country.

The warnings and advices issued in connection with this storm permitted all possible precautions to save exposed property, and comparatively little damage was caused to vessels.

Mr. C. E. Garner, president of the Jacksonville Board of Trade, has written as follows regarding the warnings: